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Bridging troubled waters:
Water sharing and the challenge of hydro-solidarity in Pakistan

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Acknowledgements

Distillate of an intensive scientific dialogue, a doctoral dissertation is part of a continuous process to promote collective knowledge. This study aims to add information on, and insight into, the intricate problem of sharing water where shortage reigns. I am grateful to the following persons for their help and advice on what had at the beginning seemed a voyage through uncharted waters.

As a student of political science at the University of Heidelberg's South Asia Institute (SAI), I have enjoyed a fine example of a cross-disciplinary and cross-cultural academic discourse. Professor Subrata Kumar Mitra, the head of the SAI's Department of Political Science and an enthusiastic sponsor of this dialogue, has been a wonderful teacher and supervisor who, by asking the right questions at the right time, would help me steer this study in the proper methodological direction.

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Water being a politically sensitive issue in Pakistan, I am especially grateful to all the scholars, journalists, activists, politicians, officials and engineers in the *Land of the Pure* who readily disclosed their views and interpretations to me, highlighting many aspects not found in common literature and reports. Among them, Basharat Hussain and Aarish Ullah Khan stand out as both skilled social scientists and wonderful hosts. A political analyst with the Institute of Regional Studies (IRS), Basharat helped me navigate the political waters of this study. Aarish, also with the IRS, has been a perfect guide on many journeys through the country.

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Scientia humanitati servit

This study aims to advance the understanding of the challenge to share of water. The chosen case, Pakistan, exhibits the complex nature of this essential problem in a most dramatic fashion. Having received plenty of political and academic attention in recent years for a multitude of security-related concerns, Pakistan urgently deserves at least equal attention for its more profane problems of water management – an issue no less acute and threatening.

Science is part curiosity and part responsibility. Searching for the sake of research and searching for the sake of mankind go hand in hand. The global community of water experts, through an ever-increasing number of conferences and publications, has turned H^2O into an acronym of a cross-border dialogue on sustainable economic growth and livelihoods, public health and social stability, governance and participation. While the original experts on the Indus are the people of Pakistan who have been managing this river for over four millennia, the findings from this study may promote this dialogue and contribute to the solution of existing and future problems in the Indus region and beyond.

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Preface
Pakistan's water: why is it a problem?

Pakistan's water resources have played a central role in this country since ancient times. Pakistan's main river basin, the Indus, with its abundant supplies of water, has long been the agricultural heartland of the Indian subcontinent. Today's management of this river basin, applying traditional techniques operated side by side with sophisticated mechanisms, reflects the public awareness of this heritage as much as it signals the manifold challenges arising from a constantly growing demand for this vital resource.

One of these challenges – like in the case of most large Asian rivers – is to synchronize highly variable supplies with equally dynamic, yet steadily rising needs. Dictated by unpredictable climatic cycles, irrigated agriculture has over centuries developed into an elaborate mechanism customized to regional and even local geological and hydrological conditions. Social and political factors, especially the drastic demographic changes since the end of the nineteenth century, have prompted the development of systematic large-scale irrigation networks that make ever more water available and use supplies more efficiently than ever before.

Water shortage nevertheless has become a persistent phenomenon in Pakistan. Though the modernization of the Indus Basin irrigation system in the 20th century has increased water availability thanks to an elaborate network of canals, link canals, barrages and reservoirs, water demand could not be dependably satisfied because an unprecedented growth of the country's population – particularly after independence (1947) – outpaced water resources development.

Water distribution, in addition to insufficient quantities, is a major problem in several respects. The overall dependence on the Indus River for various types of consumption makes industrial consumers compete with agricultural and household consumers. Aside from mere quantities, access and timing are critical factors as crop patterns demand timed water deliveries, whereas household consumption typically shows little variation over time; industrial consumption, in turn, varies according to particular production processes. At the same time, riparian provinces raise claims for water shares from the common source based on perceived entitlements. As a result, water has become a political issue rising to prominence with the beginning of systematic irrigation at the end of the 19th century. Since the consolidation of Pakistan as an independent nation, water disputes on several levels have accompanied water management.

Water institutions have obtained an important role in both the management of water and of the disputes over water. This study will examine whether the series of institutional mechanisms put in place over time to tackle water-related disputes are adequate tools for managing water under conditions of shortage and conflicting demands.

Information, politics and the study of water

Water sharing is a delicate issue in Pakistan, sometimes attached to the arcane sphere of national security, sometimes seen as part of a cultural or social struggle. At once an object of politics and an instrument to promote political interests, the challenge to the outside observer is to separate fact from propaganda, particularly where water is addressed as a matter of collective identity, loyalty and patriotism. Evaluating and interpreting information therefore is as much a challenge to researchers as is the assessment of factors behind water management decisions and politics.

Primary sources

Official information on water sharing is scant and sporadic. Provincial and federal government branches only infrequently issue press releases on water management, most of which are vague and superficial. This phenomenon has not changed much over the past ten years, despite significant technical efforts in official online presentation. Though the problem of water sharing is regularly addressed by the media, the quality and quantity of official information on the subject does not correspond with the relevance of the issue. Whether behind this apparent neglect to keep the public adequately informed is a general lack of concern about transparency or an actual policy-related interest will be analyzed in this study.[1]

Among the major official institutions in the water sector, the Water and Power Development Authority (WAPDA) holds a monopoly on much of the available official water information. It gives day-to-day figures of water releases and issues water project outlines. WAPDA's annual report offers a fairly comprehensive account of its water and power operations. The Indus River System Authority (IRSA), by contrast, has until recently been almost invisible to the public. The main institution in charge of water sharing does not publicize reports. Its website was inaugurated as late as 2006 but to date offers very little information.[2] Even the Ministry of Water and Power did not have a web page within the domain of the Government of Pakistan until a few years ago, suggesting that this policy area is of secondary importance.[3]

During the Musharraf era, official water management information was issued on the President's official website, indicating both an unclear state of authority regarding

[1] The security dimension will be discussed in sections IV and V of this study.

[2] The content has improved somewhat since its inception (initially at www.irsa.gov.pk; from 2008 to 2010 it was located at a sub-domain at www.stormpages/i/irsaa/). In 2011 at last, its website was integrated into the government framework (www.pakirsa.gov.pk), offering only two major documents (the Water Accord of 1991 and the IRSA Act of 1992), current release data and so-called press releases which, however, do not address the central issue – water sharing – but rather trivial issues like "retrofitting of IRSA office building" (as of 10 March 2013, none of the links to press releases were active).

[3] While all federal government branches are incorporated in the main site, www.pakistan.gov.pk, the Water Ministry was listed, but not activated until around 2005. It is now online at www.mowp.gov.pk, yet with no information on water sharing (as of March 2013). WAPDA, visibly reflecting its unique position, has its own site (www.pakwapda.com), independent of the GoP domain; it happens to be one of the most comprehensive websites of all official water institutions in Pakistan.

water as well as a degree of importance.[4] The Inter-Provincial Coordination Committee (IPCC), a newly established forum for dialogue between the provinces, publishes regular reports on its work.[5] The work of two high-profile government-initiated water committees has been documented with sufficient transparency from semi-official sources.[6] Statistical data on water use and availability is published in the annual *Agricultural Statistics* of the Ministry of Food, Agriculture and Livestock, and the *Economic Survey* published by the Ministry of Economic Affairs and Statistics.[7] On the level of the provincial governments, the Punjab government's information is the most comprehensive regarding water. The other provinces (Sindh, Balochistan, NWFP/Khyber Pakhtoonkhwa) offer very little information.

The legislative tiers of the political system have gained relevance in the democratic process of the country. The National Assembly and the Senate each have established internet sites providing information on their activities. Like in the case of most government branches, however, the limited amount and quality of information is in sharp contrast to the widespread use of the internet by the citizens of Pakistan. Specific water-related information is almost negligible, mirroring the parliament's rare involvement in water issues.[8] Public information is disclosed through press conferences and occasional press releases.[9] Acts and Ordinances appear in the official *Gazette of Pakistan*.[10] A recent, very noteworthy addition to official documentation is the Punjab Law Database, so far the only internet-based collection of legal texts in Pakistan.[11]

Personal communication with officials is often the only way to obtain primary information, either in the form of verbal communication or in the form of written material that is not readily accessible. In the course of my field research, access to officials has proven most successful when mediated by people with inside knowledge, like retired officials, journalists and academics. Direct approaches, however, have been met with little response, if any. Written or e-mailed queries

[4] http://www.presidentofpakistan.gov.pk (as of 31 July 2008). "Water strategy" is one of four columns. After the demise of the Musharraf presidency, many contents have been removed or replaced.

[5] At http://www.ipc.gov.pk/, the IPCC provides a protocol-type report on all meetings since its inception which is remarkable when compared to the websites of other, older government branches, though the actual information lacks detail.

[6] http://www.pakwaters.gov.pk/treaty.htm - the PCWR website may be the only one informing on the political dimension of water management. The TCWR does not have its own site; important documents are found at www.ppib.gov.pk (the Private Power and Infrastructure Board) and the President's water page (as quoted earlier). Information on the PCWR is found on the private site of its chairman: http://www.nisarmemon.org/ . The Pakistan Water Gateway, at www.waterinfo.net.pk, was temporarily closed in mid-2008. The Gateway, issued at around 2001, was a collaboration of IUCN and SDNPK (Sustainable Development Networking Programme, a joint IUCN and UNDP initiative) endorsed by the Ministry of Water and Power. The Gateway has recently been reopened with reduced content (as of March 2011).

[7] http://www.statpak.gov.pk/depts/index.html . The current *Survey* is available for download.

[8] The Standing Committees on Water and Power of both Houses are listed with their members, yet no information on their activities is given (as of 6 August 2008).

[9] Press releases remain rare on most official sites; cf. www.na.gov.pk , www.senate.gov.pk. The judicature is listed under two internet addresses http://www.supremecourt.gov.pk/ and www.supremecourtpakistan.org/index.htm; the latter has been issued in *an act of defiance* to the actions of the President against the SC in 2007 over the re-election of President Musharraf.

[10] Some acts are now available online at: http://www.pakistan.gov.pk/gazpakArchive.jsp (by year; not all years available yet – as of 1 August 2008).

[11] http://www.punjablaws.gov.pk/index4.html . Though this official database only covers one province, it is a fine example of user-friendly information and transparent government.

generally remained unanswered, even when it was only for statistical data that had been published before.

WAPDA, the biggest water authority in the country, was a notable exception: officials have readily replied to questions regarding the debate over water reservoirs and provided technical information (including the *Annual Report*) useful to understand the physical dimension of the problem. IRSA, the most important body in the field of water sharing, proved difficult to access. Initial contact was made through mediation and resulted in a brief conversation with the chairman, albeit not without a degree of reservation. This may be due to the critical institutional position of IRSA at the centre of the water dispute between the provinces.[12] Nevertheless, some information on the procedure of water distribution – including water release charts – was obtained.[13] The Irrigation and Power Department of the Punjab has been very helpful, providing material important for the conduct of this study which is not otherwise available.

Documentation of the water committees and commissions that took place between 1968 and 1983 has proved very difficult to obtain. A number of direct and indirect approaches and queries have not resulted in any substantial information, not to mentions documents, on the work of these institutions. At this point it is not even clear what kind of documentation, if any, exists since none of the articles and books used for this study contains any concrete reference to these institutions beyond barely mentioning them.[14]

Secondary sources

Non-governmental sources bridge the information gap by conducting and publicizing research which helps to establish a set of data not otherwise available.[15] The capacity of institutions like the International Water Management Institute documents the country's growing expertise in many areas of water management. Its researchers, some of whom enjoy rare access to official sources, are the most important secondary source.[16]

Most academic research in Pakistan focuses on technical and agricultural aspects of water management. Headquartered in Colombo, Sri Lanka, the International Water Management Institute (IWMI) is the leading research institution in this field, covering most aspects of water management, from irrigation techniques to drainage,

[12] IRSA is located outside the government complex in Islamabad. This geographical position seems to mirror the troubled political position of IRSA. Requests regarding the seasonal Water Account Report – a document on water releases to be provided to the federal and provincial water authorities – have not met with success.

[13] In sum, access to information is very much the result of perseverance and luck in terms of meeting people willing to disclose information and discuss the problem at hand. In a sense, the study of water mirrors the politics of water: Actors may, under certain circumstances, be ready to give information if it seems beneficial – just as they may be willing to share the resource if advantages are to be realized. This observation, by no means a rule, certainly is not limited to Pakistan.

[14] The existing details on these four institutions will be presented in the analysis of the water sharing process.

[15] Research findings, according to personal discussions with academics in Pakistan, are typically published not in Urdu, but in English, as English is the main language of higher education in Pakistan.

[16] In light of IWMI's widely acknowledged scientific achievements, the reduction of staff at IWMI's Pakistan branch in recent years is all the more deplorable.

desalination and socio-economic aspects of water utilization.[17] Though the inter-provincial water dispute in Pakistan has not been a central focus of IWMI research yet, its findings – regularly published in its *Working Paper* and *Research Report* series – are indispensable for the understanding of the economic, social and environmental aspects of the dispute at hand.[18] Smaller institutions like the Centre of Excellence in Water Resources Engineering in Lahore specialize in hydrology and irrigation management. The Pakistan Council of Research in Water Resources (PCRWR) is an official research institute founded as a consulting body for federal and provincial governments and the bureaucracy.[19] Its importance, however, is difficult to assess because its research findings are not publicly available.

The political dimension of water and water sharing in particular is rarely addressed in both Pakistani and international publications. Only very few academic publications offer comprehensive assessments of water management and water politics in Pakistan.[20] Aloys Arthur Michel's quintessential history of Indus Basin development and management, *The Indus Rivers* (1967), remains the most comprehensive work to date. Niranjan D. Gulhati's *Indus Waters Treaty: an exercise in international mediation* (1973) offers a balanced insider's view of the negotiating process from a former diplomat who was part of the World Bank team. Undala Alam's *Water rationality: mediating the Indus Waters Treaty* (1995) is likely to be the only study to take an in-depth approach to the political dimension of the dispute between India and Pakistan. Two books on the inter-provincial dispute edited by Pakistani scholars are the 2007 volume *Problems and Politics of Water Sharing in Pakistan*, edited by Pervaiz Cheema, Rashid Khan and Ahmad Malik, and *The Politics of Managing Water*, edited by Kaiser Bengali (2003). Both highlight some of the more important aspects of the dispute and incorporate differing viewpoints on this divisive issue, unfortunately, though, without reference to documents referred to in the text.[21]

Among academic journals in the field of water management, *Water Policy*, *Water International* and the *International Journal of Water Resource Development* (recently renamed *Water Resources Development*) stand out. Their thematic scope ranges from water management issues like sanitation and drainage to political issues like corruption in the water sector, conflict management and water policies. The Indus River has received occasional attention for the successful resolution of a conflict between two otherwise hostile neighbours, India and Pakistan. But in spite of these

[17] With country offices in most countries of the subcontinent and affiliations with many other scientific institutions, IWMI represents a unique research network. Both by the scope and the quality of its research, IWMI stands out as the leading institution of water research in Pakistan. Its openly available research reports represent a fine example of cross-discipline, international scientific dialogue.

[18] The IWMI series, available free of charge in print and online versions, are among the very few regular academic journals on aspects of water management in Pakistan.

[19] The Pakistan Council of Research on Water Resources Act, No. I of 2007.

[20] This accounts for monographs on the Indus River dispute as well as focussed articles in multi-authored books. Discussions with Pakistani academics during several visits to the country have not resulted in any academic study of the inter-provincial water dispute.

[21] The former is an Islamabad Policy Research Institute (IPRI) publication that includes short articles from academics and former water officials, rendering an inside view of the institutional process of water management. The latter, published by the Sustainable Development Policy Institute (SDPI), may be credited with being the first serious attempt at overcoming the Sindh-Punjab divide in water analyses as it contains contributions from all provinces. Both publications, however, lack attached documents or detailed references concerning the many official steps taken to solve the dispute.
The problem of poor or non-existent referencing applies to many publications from Pakistan which limits their use in the context of a scientific study.

contributions the conclusion that water is not nearly as attractive an issue as the Kashmir conflict is inescapable. In the face of an abundance of classic conflict research, water-related problems play a peripheral role. In this sense, the academic sphere mirrors the political arena.

International organizations like the World Bank, due to their technical and financial involvement in Pakistan's water sector, have accumulated important information on water management. The Bank's reports, assessments and recommendations, compiled by experts from Pakistan and other countries, benefit from privileged access to government officials. Most relevant to the political dimensions of water are the *Country Water Resources Assistance Study*, the *Public Expenditure Management* and the *Pakistan Water Sector Strategy*. Designed as a scientific analysis *cum* policy recommendation, they combine theoretical analysis with aspects of policy implementation. Other United Nations affiliates, like the Food and Agriculture Organization (FAO) with its Aquastat database and UNESCO (with its *World Water Development Report* and its *From Potential Conflict to Co-operation Potential* series) have each established special water research units that contribute to the mounting knowledge base on river basins.

Non-government organizations (NGOs) like the Sustainable Development Policy Institute (SDPI) or the Pakistan Institute of Legislative Development and Transparency (PILDAT) sporadically contribute to the water debate. Most notably, PILDAT has initiated a rare conference addressing the water dispute in 2010.[22] The Pakistan Water Partnership, a subsidiary of the UN-sponsored Global Water Partnership, has hosted the South Asia Water Forum, bringing together international and regional water experts and officials.[23] The Pakistan office of the International Union for the Conservation of Nature (IUCN) has conducted research into ecological aspects of water management in Pakistan. International research institutions like the International Rivers Network (IRN), the World Resources Institute (WRI), and the Pacific Institute for Studies in Development, Environment and Security have compiled important databases on river management, like the bi-annual report *The World's Water* and the *International Water Law Project*.[24]

Newspapers like *Dawn*, *Business Recorder*, *The Nation,* and *Daily Times* provide information on day-to-day developments in the water sector and in some cases have been the only reference to official documents, reports and events. Among the daily papers, *Dawn* proved to be the most comprehensive and most widely respected source of daily information both in and outside of Pakistan. Its archive has been browsed on a daily basis for water information.

Library search was conducted at the South Asia Institute (SAI), of the University of Heidelberg, for works on the political system and history of Pakistan; at the library of IWMI, Lahore, for water management; and at the libraries of the Free University, Berlin, for selected works on irrigation. Again, field research in Pakistan has been

[22] Various conferences with a more political motivation are frequently organized by interest groups in Sindh and Punjab.

[23] The PWP conference was held 14-16 Dec. 2002 in Islamabad, Pakistan. Cf. Proceedings, vol. 1 and 2 (Pakistan Water Partnership, 2002).

[24] The IUCN is among the most influential NGOs in Pakistan, closely collaborating with provincial and federal government units. Cf. Matthias Paukert: Umweltengagement an der Wasserscheide; *Südasien* no. 2, 2008, p. 77 (Environmental commitment at the crossroads, in German).

vital in order to obtain publications not commonly available outside that country. Among them were books and journals by the Institute of Regional Studies (IRS) and the Islamabad Policy Research Institute (IPRI) and publications from the private sphere – especially from NGOs, political parties and individual political activists.

Discussions with experts – academics, journalists and activists – have rendered a deeper understanding of the complex nature of water sharing with its political, social and historical underpinnings. In general, most people approached for a discussion on water have reacted positively, reflecting the relevance of the issue and the public interest in an open discourse.[25]

A note on references

All primary and secondary sources used in this study are named in the footnotes. An English translation of titles, where necessary, has been added in brackets for better understanding. Where an English language version exists, the respective title is referred to as the *English version* in brackets. Unless noted otherwise, the translation to English is mine. All original quotes are in italics, with the author's name given after the quote or in the footnote. Internet sources are cited by their respective website addresses and the date of download or last access. As with all online sources, there is no guarantee that the content referred to in this study is still available today.

[25] I am grateful to Mohsin Babbar for facilitating discussions in Sindh, the downstream area particularly vulnerable to water shortage in the Indus River.

Introduction
I. The dilemma of water sharing: pieces of a puzzle

Water is short. Insufficient water supplies are a fact of life in many countries in the southern hemisphere at present and in the future.[26] This applies – by most accounts – also to the chosen case of Pakistan. [27] The use of water as a universally essential and irreplaceable resource is limited by its spatial and temporal availability. Some countries can easily satisfy their needs, others face major obstacles meeting minimal demands. Even within a country water availability can differ sharply. Some areas may enjoy regular supply, others may suffer seasonal or even permanent shortage. This is true for Pakistan, too.

In order to assess the status, quality and conditions of water availability, this study needs to be based on a qualified definition of water shortage that renders a comprehensive picture of water in the chosen country. Forms of water supply and use are to be taken into account, requiring a closer look at the economy that consumes most of the water and the way it is managed. In addition, social, political, hydrological, climatic and ecological aspects of water have to be factored in as they affect the supply, distribution and utilization of water.

Sharing water under conditions of water shortage means one or more parties are likely to receive less than their expected share. Does water shortage increase the chances of an amiable solution towards satisfying all parties? When water is short, securing water for one's own needs seems to be a natural priority, even a matter of survival.[28] Does this in turn mean that water sharing only takes place if and when surplus water is available, or if there is a strong compulsion to do so accompanied by the threat of severe punishment in case of non-compliance, or if there is a benefit to be realized from water sharing that is greater than the value of the resource?

To assess the conditions of water sharing, the existing mechanisms for water distribution are to be analyzed. Whether the institutional arrangements in place – treaties, laws, administrative bodies – regulate joint water use towards unilateral satisfaction is only one question. The other is: what do the parties do in order to avert one-sided losses? Will they cooperate and coordinate when it comes to withdrawing water from the common source? Or will there be confrontation? Why do these actors act the way they do?

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[26] Various estimates put the amount of freshwater fit for human consumption (sweet water) at between 2.5 and 3 % of all existing water resources; *confer* Peter Gleick, ed.: Water in crisis. A guide to the world's freshwater resources; Oxford: OUP. 1983; World Resource Institute: World resources 2002-2004; Washington, D.C.: WRI, 2003 (online: http://pdf.wri.org/wr2002fulltext_230-283_datatables.pdf). Precise figures are only available for renewable resources (*i.e.* those resources that are replenished by rain fall), not for non-renewable water (fossil groundwater in deep aquifers).

[27] Pakistan has been added to a World Bank list of countries likely to face internal conflict due to a lack of stable food supply; see Christian Lorenz: Talfahrt der Wirtschaft? (An economic downturn? in German); *Südasien,* 2/2008, p. 79.

[28] One early example exhibiting the vulnerability of arid regions is the ancient Maya civilization, according to recent findings: Mild drought caused Maya collapse in Mexico, Guatemala; *BBC News* (online), 23 Feb. 2012.

Conflict over limited water resources seems a likely consequence of water shortage.[29] Violent clashes have indeed been reported from dry, water-scarce regions the world over. Do a lack of water and an inability to share it promote confrontation? In some cases – as will be seen – elaborate regulations direct water users to take into account other water users' needs. In other cases water users have arrived at specific agreements to share water. Forms of water sharing are found on all levels and in all types of society but responses to this problem typically reflect the conditions of a given case: its geographical setting and hydrological conditions, and its political, social and economic circumstances. Are there solutions that might be transferable? Does a solution that has proved successful in Australia fit in a place like Pakistan?

To find answers, the roots of disputes that have taken place in the chosen case will be analyzed. The question whether water shortage alone or unclear regulations for water sharing or even causes not directly related to water are behind the given dispute is important as it points to the nature and dimension of water disputes as well as their potential solution. This means that an evaluation of the conditions under which water disputes take place in the chosen is necessary. A particular focus must therefore be on the institutional mechanisms in place to regulate water sharing: Do they work effectively, and do they provide conflict management tools? Or are they more of a problem than part of a solution?

Rivers exhibit the obstacles to water sharing in all dimensions.[30] Unlike lakes, rivers allow permanent water withdrawals by several users for a variety of purposes, from irrigation and household water supplies to power generation and navigation. This capacity makes interaction between users inevitable – whether cooperative or confrontational, continuous or temporary – because any withdrawal of water by one side, be it for consumptive or non-consumptive uses, directly affects other riparian users. In addition, the river's flow regime is marked by an asymmetry in terms of water quantity and quality that typically favoures upstream locations. Plus, the dynamics of rivers and climate make water availability more or less unpredictable with regard to quantity, quality, time and space. This is particularly true for rivers in the Himalayan region, as will be seen.

To assess the challenge immanent in the chosen river basin, a hydrological profile is needed, augmented by geographical and climatic features.

The case of Pakistan is special for at least three reasons. First, it is the dependence on a single river system, the Indus Basin, for most of its water consumption. Located in an arid zone, the Indus Basin regularly confronts the people of Pakistan with the inescapable social and economic consequences of water shortage. The Indus Basin embodies all the major challenges that much of Asia has to face: a marked discrepancy between upstream and downstream water supplies, high seasonal variations, great sector-wise differences in water consumption, and a strongly rising over-all demand due to dramatic demographic and economic changes.

[29] Water distribution has been identified as one of the major economic, social and political challenges of the coming years at the World Water Week 2007 (Stockholm, 12 – 18 August 2007); www.worldwaterweek.org.

[30] The UN Register of International Rivers lists over 200 international river basins (Oxford: Pergamon, 1978).

Second, Pakistan's history since independence has been defined by the colonial heritage and the perceived threat from India. The experience of foreign rule and violent conflict has shaped the formation and development of this nation and has since overshadowed its political discourse in many fields, including water management.

Third, these physical and historical factors are compounded by distinctive social and political drivers of water use in each of Pakistan's four provinces. Taken together, these circumstances make water sharing one of the most difficult challenges of Pakistan in economic, social and political terms.

To understand the role that history and politics play in Pakistan and how politics affect water management the historical development of this nation and its water management as well as federal relations deserve a critical review.

The problem is management.[31] Water management is more than making water available and allocating shares. Commonly understood as a comprehensive planned process of administrating and controlling resources and their utilization, it affects the way this resource is utilized. Whether stakeholder demands are met or not, and whether they might resort to confrontation in order to reach their objectives, is linked to water management. As the possession and control of water is directly related to economic development and the wealth of social groups or political entities, of states and provinces and whole nations, water management obtains a fundamental role, particularly in countries which heavily rely on one source of water to fuel their economy. Due to its economic potential, water transforms into an instrument of power where upstream stakeholders use scarce resources and privileged access as an economic and political leverage to achieve targets that would otherwise be blocked by downstream stakeholders. Thus the intrinsic challenge of water management is political.

To evaluate the nature and political dimension of water management, both the development of the political system and the institutional development will be analysed.

The dilemma of water sharing, as this brief sketch has shown, is multi-layered. It includes the hydrological, geographic and climatic conditions, the economic dimension, the irrigation management, as well as political and legal aspects. The task of this study therefore will be to analyze all layers in order to put the pieces of this puzzle together again.

In methodological terms this means that a single, one-dimensional theoretical concept might not be sufficient to explain this complex problem. In the theoretical section of this study a number of concepts will be discussed. The empirical section will assess the significance of the problem in Pakistan in its hydrological, social, economic and political dimensions. The task will be to find out whether Pakistan is just one example of a typical problem or instead a case of its own.

[31] Asit K. Biswas, director of the Third World Centre for Water Management, in an interview on the occasion of his receiving the Stockholm Water Prize; *Impeller* no. 73, June 2006, p.19.

I.1 Hydro-solidarity: a hypothesis

The basic assumption of this study is the fundamental importance of water to many social and economic activities in every human society. Its status as an irreplaceable and indispensable resource makes it too important to simply be given away. Even in the few places where water is not in short supply, it cannot be wasted.

While the local availability of water depends on factors that are only partly within the capacity of human intervention, its future quantity (and quality) is unpredictable. This is the general condition that a host of countries around the world, particularly in Asia, Africa, Australia and Latin America face. With the rising human population in these regions, the importance of managing water is growing.

If water use is restricted by uncertain availability, the task of meeting current and future needs becomes a more or less permanent challenge. The prospect for water sharing, as a consequence, is limited where there is no water to sustain even minimal demands. In those cases where water supplies are sufficient to at least temporarily satisfy demands, available water can be shared. The question is: when and how?

Water sharing is possible, yet it requires favourable conditions. In the absence of favourable conditions, water sharing is unlikely to happen, and some form of conflict may occur. In order to achieve their individual goals and satisfy their individual water needs, actors may turn to confrontation. Confrontation carries the risk of aggression and escalation to a level of conflict that implies huge costs and little hope for adequate gains.

The empirical observation that to date only few **conflicts over water** have turned violent does not come as a consolation to those who face water shortage on a frequent or even permanent basis.[32] It does not explain why conflict, even in grave situations, did not lead to war: was it because one side simply avoided conflict by moving out of the area to a place with more favourable conditions, or because there was some form of rapprochement or trade-off? Likewise, it does not explain when and how some form of cooperation did take place and whether these forms of cooperation might be replicated in comparable situations: was there any factor that effectively compelled or even forced both sides to share water?

The reality of dwindling water resources all over the world dictates riparian neighbours to find answers to these questions. The nature of cooperation and

[32] A record of over 400 water management agreements concerning the cooperative use of rivers is the Transboundary River Database, compiled at the Oregon State University through the TFDD project supervised by Aaron T. Wolf: http://www.transboundarywaters.orst.edu/projects/internationalDB.html (May 2010). It suggests that, at least statistically, cooperation is more likely than crisis even where cooperation was preceded by confrontation. A chronology of water-related conflict is the World's Water database, compiled by Peter Gleick (Pacific Institute), at: www.worldwater.org/conflict.htm (April 2008). The chronology begins in 1503 and lists water disputes, either as a single-issue dispute or as part of a larger set of disputed issues. A precise definition of conflict is not given there. The database nevertheless serves to illustrate the volatility of shared trans-national bodies of water. It also augments the historic knowledge of water management to the point that rivers have always been strongly influencing human settlement patterns, by either attracting or diverting human economic activities, depending on available water supplies.

confrontation in the water sector needs to be understood more fundamentally: Are there mechanisms, institutions, laws or other structures and practices that promote cooperation, i.e. water sharing? If so, how can they serve as a model to manage water disputes at present and in the future?

The puzzle of water sharing

The central question is: **why share?** Water sharing poses a complex challenge that is borne out of resource-related factors, like the flow regime of a river and the discrepancy between upstream and downstream water availability, as well as factors related to the environment, to the societies that utilize water, and to wider economic, political and cultural parameters. Any scientific effort to evaluate these factors has to rely on a variety of instruments from different academic disciplines, ranging from economic theory to hydrological knowledge. The capacity of political science to integrate elements of neighbouring disciplines is crucial in understanding why water sharing takes place in some cases and not in others.

Water sharing is a process of **cooperation**. Cooperation, by its Latin origin, is a form of purposeful interaction between at least two sides over a given object. In this case, cooperation is directed at sharing water from a river. The phenomenon of water sharing can be disassembled into two major components:

1 The **actors** that may engage in water sharing (or not), i.e. the states that are located within a river basin, and the factors that may influence political action regarding water.

2 The **object** of this interaction, i.e. water available from a river system, and the hydrological, geographical, environmental and climatic factors that influence water quality, quantity and availability.

The critical difference between the two components is that the second describes a more or less static dimension of water, its **natural conditions**. River flow regimes, climatic cycles and other environmental aspects determine in principle how much water is available in a given place at a given time. The reach of human intervention is limited: rivers can be diverted to allow distant fields to be irrigated, yet the available amount of water is determined by hydrological conditions at the river's source, rainfall patterns, and other ecological factors. Likewise, water storage in dams won't alter the principal water availability. It only changes the temporal supply of the resource in a selected location.

Aspects that relate to the actors involved and the **interaction** between them focus on the circumstances that make actors consider cooperation, i.e. water sharing, or confrontation, or denial of water sharing. Confrontation first leads to a standstill. The losing side may either accept the stalemate and withdraw or proceed to reinvigorate its demands. Interaction takes place in an informal manner or through institutional channels. It may be sporadic or part of an elaborate, organized process, itself exhibiting an institutional character. This process may follow certain established rules and regulations or function on a spontaneous, *ad hoc* basis. Unlike the object-related category, it depends on the actors' interests, objectives and capacities.

The study of water sharing thus requires a methodology that explains actor-related as well as object-related aspects: Why is water sharing in a selected case difficult? What are resource-related challenges, and what are actor-related challenges? If water sharing has taken place in a given case, can it be repeated under similar conditions in another case or not?

Objective of research

The aim of this study is to find out how water sharing can be promoted in order to avoid confrontation. Water sharing – in some form or another – is necessary to avoid or to alleviate water shortage. In the absence of water sharing some actors – governments, communities, groups of water users – will be left without this vital commodity and face drastic consequences. Confrontation is expected to result in negative consequences because it will make water sharing more difficult. To avoid confrontation and promote water sharing, a mechanism is required, components of which have been tested in some cases. It remains to be seen whether they are universally applicable.

The problem of asymmetry

Adding to the basic challenge of water sharing is a peculiar condition that characterizes many river basins: the uneven relationship between **upstream and downstream** positions. This condition typically results in a one-sided control of water resources and better supply of water, both in terms of water quality and quantity, in the upstream position. This advantage directly translates into economic benefits and, potentially, political power, too, as the upstream actor may exert pressure on the lower riparian neighbour in order to reach objectives not otherwise feasible.

Holding a downstream riparian position in turn means to a disadvantageous position with regard to quality and quantity of water. In the case of insufficient overall water supplies, the downstream position is at greater risk to face shortage. Hypothetically, upstream riparian actors may alter the water flow pattern either by intention aimed at confrontation or simply by “reckless” one-sided water withdrawals that leave the downstream neighbour without sufficient water.

From a downstream perspective, the intention behind this action upstream may not be a primary factor. The simple lack of water can create an urgent situation that necessitates a reaction in order to avoid or alleviate grave consequences. Whether this reaction will lead to cooperation or confrontation depends on the readiness of both sides to seek an agreement on water sharing or any arrangement that would satisfy demands of both sides. The disproportionate advantage may tempt the upstream riparian to apply pressure in order to exert concessions rather than reaching a mutually satisfactory agreement, particularly because the object of concern is indispensable.

Under conditions of asymmetry, the theoretical obstacles to cooperation, i.e. water sharing, are greater. Existing water shortage may be aggravated as a result of this principal upstream – downstream asymmetry, or created where it didn’t exist before. In turn, the demand for reliable cooperative arrangements that reduce or minimize

the risk of exploitation of one side by the other becomes evident. The undisputed need for water appears to provide an incentive to cooperate, yet at the same time the potential one-sided benefits of unilateral, non-cooperative action may lure one side into using its natural advantage to exert power to gain additional benefits in the form of concessions extracted under the threat of blocking the river flow.

As a consequence, the problem of water sharing may turn into a political struggle over power and dominance that reaches beyond mere water-related issues. Thus any effort to tackle this problem will require methods that are not limited to water management.

Compounded by factors that directly or indirectly relate to the quantity and quality of water available in an upstream location, the principal upstream-downstream asymmetry leads to **political-economic asymmetry** that further enhances the position of the upstream riparian entity. This effect is expected to influence upstream-downstream relations over water. Tropical regions are more exposed to this problem where significant variations between wet and dry seasons tend to aggravate the principal asymmetry.

Research questions

The problem of water, from a political science perspective, is its potential for conflict. If competing demands for water cannot be met, a dispute over water may result in division and conflict. As a result, the water situation may worsen and other issues may also be affected negatively, potentially creating a downward spiral that could undermine the stability of a nation.

The central question – why share – requires a multi-disciplinary approach. Water, unlike many other natural resources, is highly dynamic because of climatic, hydrological and ecological factors. Its availability poses additional challenges to collective water use. Its universal indispensability does not make water sharing an automatic, natural process. To the contrary: the greater the demand, the more acute the competition over this limited commodity. Therefore the need for some form of cooperation to satisfy competing demands appears most pressing where a condition of shortage already exists.

The challenge: What enables, what hinders water sharing? Mechanisms that guide collective water management with a view to either alleviating or blocking water sharing have been established in most countries and in most river basins. The mechanisms (processes and structures) in place are norms on water use and political instruments such as agreements and institutions. Many of these mechanisms have lead to cooperation.

The purpose of this study is to identify mechanisms that promote water sharing and test them in a selected case. Starting with institutions (treaties, laws, authorities etc.) that have proven successful, it is suggested that there are general rules that can be applied to other cases, either in part or in an adapted form. But are these mechanisms sufficient to guarantee cooperation? Which role do actors' interests play?

Target questions: To establish and understand the factors that determine cooperation or confrontation, the following questions will be addressed.

Category	Research questions
1 – Actor	- What drives individual water demands? - How do actors behave under conditions of water shortage?
1a – Conditions of interaction	- Which institutional mechanisms are in place to regulate water utilization and management? - How do these institutions impede or alleviate water sharing?
2 – Object	- Which quality and quantity of water is available in the given case over time and space?
2a – Object-related factors	- Which factors determine water utilization in the given case?

Instruments of analysis

Category 1 requires an analysis of the individual water profile that includes political, societal and economic characteristics of each political actor in the process of water sharing. These characteristics explain the demand for water and help understand why actors may be ready and willing to share water or not. Theories of political economy have defined self-interest as a major driver of political interaction. The objective of all interaction is to defend and strengthen this stated interest. Self-interest also attains a defining role: through clearly demarcated interests, the identity of a state is underlined. Water shortage and conflicts over water will be discussed as potential factors determining the likelihood of water sharing.

Category 1a addresses factors that bear on political decision-making regarding water. These are, according to Jehangir and Horinkova, formal rules (laws and other regulations), informal rules (values and practices) and organizational structures (institutional arrangements).[33] These factors describe the coordinates of political action. They will be analyzed using theories of water law and institutionalism. The concept of Integrated Water Resources Management deserves special attention as it attempts to integrate different approaches to regulate water use.

Category 2 focuses on the issue at stake, water. To understand the relevance of water in the chosen case, a hydrological profile of the Indus River will enable an assessment of water flows, seasonal water availability, and aspects of water quality. The specific features of water in Pakistan determine how much water is available, and how this commodity may be used.

Category 2a describes the factors that relate to the use of water in the given case: agricultural, industrial and other forms of water use. Water utilization in any given case depends on a set of social and economic factors that affect water management. In Pakistan, irrigation is to be assessed towards water productivity which in turn

[33] Waqar Jehangir & Wilma Horinkova: Institutional constraints to conjunctive water management in the Rechna Doab; Lahore: IWMI, 2002.

depends on climatic and hydrological conditions. This assessment is important for testing theoretical models of water sharing under diverse conditions: the chosen case of Pakistan will be confronted with the water utilization in other countries in order to distinguish specific circumstances of water use.

Methodological sketch

Hypothesis: Adequate water supplies are a universal interest. Cooperation over water, i.e. water sharing, allows the peaceful water utilization through adequate water supplies. However, unless benefits to be realized from cooperation or incentives that reward cooperation are in place, upstream riparian actors will tend to withdraw water regardless of their neighbours' needs.

Dependent variable: Cooperation is possible if both sides, i.e. all riparian actors, can satisfy their demands and / or realize important benefits, water-related or not. To engage in cooperation rather than confrontation requires incentives, i.e. the promise of a beneficial outcome of such interaction to both sides, and / or a dependable arrangement for water sharing.

Independent variable: Institutionalized mechanisms can promote cooperation. Mechanisms that are transparent and based on a precise concept with clear provisions can provide the basis for water sharing as several cases have shown. Institutions can provide incentives for cooperation.

The task of this study is to confront this hypothesis with the reality of Pakistan's Indus River by analyzing the four categories of the actor – object – framework of this case.

Hydro-solidarity: Systematic cooperation

Australia's Murray – Darling River Basin is presented as a case of comprehensive water sharing and management. It has frequently been cited as an example of hydro-solidarity, a concept of water management that aims to offset divisive aspects, especially asymmetry.[34] Like in the IWRM concept, the river is seen here as a functional unit in its ecological, social-economic and cultural dimensions.

Falkenmark has been among the first to define this term.[35] Representing a hydrological and environmental position on water management, her work takes a

[34] A concise review of the discourse over of this concept and its evolution is provided by Andrea Gerlak, R. Varady and A. Haverland: Hydrosolidarity and international water governance; *International Negotiation*, vol. 14, 2009, p. 311 – 328.

[35] Malin Falkenmark: Ecohydrosolidarity: Towards better balancing of humans and nature; Waterfront, July 2009, p. 4 – 5. Malin Falkenmark and Jan Lundqvist: Towards hydrosolidarity: focus on the upstream-downstream conflict of interests; editorial to a special edition of *Water International*, vol. 25, no. 2, p. 168 – 171, referring to a seminar by the Stockholm International Water Institute (SIWI), Towards upstream-downstream hydrosolidarity, Stockholm 1999; Falkenmark further elaborates hydrosolidarity in the same journal: competing freshwater and ecological services in the river basin perspective. An expanded conceptual framework; *ibidem*, p. 172 – 177. SIWI has addressed this concept of hydrosolidarity again in its August 2001 seminar Water Security for Cities, Food and Environment – towards Catchment Hydrosolidarity; see: *Waterfront*, July 2001, p. 4.

cautious approach to river management, warning of the dangers of overuse and resource degradation.

Falkenmark sees a state of hydro-solidarity as an almost inevitable objective of progressive river management if the river as such is to be preserved as a lifeline of society and nature. Acknowledging a condition of interdependence of basin stakeholders, hydro-solidarity is the outcome of a partnership between upstream and downstream water users. Conflicting interests and asymmetric water availability hinder this partnership.

Falkenmark identifies as a major challenge the lack of incentives on the part of the upstream user, generally in an advantageous position, to work towards the benefit of the downstream side, if the status of the river basin as a whole requires it.[36] Therefore the concept of hydro-solidarity is directed towards improving the conditions downstream. Falkenmark and Lundqvist have focused on the over-all conditions downstream, stressing that, in many river basins, as a result of uncoordinated water and land use at upstream locations, the available water is minimal and of poor quality over long periods per year.[37] Their solution to this impending water crisis is a re-orientation from simple allocation towards regulated and coordinated water use based on principles of reasonable utilization.

Turton's understanding of hydro-solidarity, originating from a social science position, basically is in line with Falkenmark's. Starting with the basic demand of basin states for security of water supplies, Turton advocates a regime theory approach to achieve hydro-solidarity. Essential, according to Turton, is the institutionalization of water management relying on uncontested river flow data and instruments for conflict resolution.[38] What makes this approach seem incomplete is the failure to address an important problem: the lacking willingness of the upstream side to make concessions in order to achieve common goals. Falkenmark suggests a strategy of compromise-building and trade-offs.[39]

Wouters, a legal scholar, shifts the focus on entitlements and a commonly accepted norm of water use, notably the principle of equitable and reasonable use.[40] Hydro-

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See also Falkenmark's Analytical Summary in the Proceedings of this seminar: www.siwi.org. For a review of the discussion of this concept see Andrea Gerlak, R. Vardy, A. Haverland: Hydrosolidarity and international water governance; *International Negotiation*, vol. 14, 2009, p. 311 – 328.

[36] Malin Falkenmark: Towards hydrosolidarity. Ample opportunities for human ingenuity. Fifteen-year message from the Stockholm Water Symposia; Stockholm: SIWI, 2005, p. 25; www.siwi.org (Nov. 2006).

[37] Malin Falkenmark and Jan Lundqvist: Focusing on the upstream/downstream interdependencies and conflicts of interests; Proceedings of the seminar Towards Upstream/Downstream Hydrosolidarity, SIWI, Stockholm, 1999, p. 108 - 121; www.siwi.org (March 2010).

[38] Anthony Turton: Towards hydrosolidarity: moving from resource capture to cooperation and alliances; conference paper; in: Proceedings of the seminar Water Security for Cities, Food and Environment – towards Catchment Hydrosolidarity; Stockholm: SIWI, 2001; www.siwi.org (August 2007).

[39] Falkenmark: Competing …, *supra*, note 1, p. 176.

[40] Patricia Wouters: The relevance and role of water law in the sustainable development of freshwater. From "hydrosovereignty" to "hydrosolidarity"; *Water International*, vol. 25, no. 2, p. 205. Wouters admits that no one discipline can offer an effective answer (to the question: How are the conflicts of uses between the multitude of stakeholders involved in upstream/downstream situations to be resolved?), p. 206. Falkenmark, in her Analytical Summary, *supra*, note 1, aptly criticizes the *sectarianism within science* (which is) *incompatible with water's large complexity in both roles and functions*.

solidarity is to be targeted against hydro-sovereignty, reiterating in part Falkenmark's position.[41] Falkenmark and Lundqvist, however, go one step further demanding the inclusion of responsibility in every discussion of water rights.[42] It could be argued, from an international legal perspective, that this demand is, at least in principle, being recognized by the appreciable harm clause of the 1997 UN Watercourses Convention. What is missing is the transformation of this legal norm designed for international waterways into a national legal principle.

Pigram, describing a system of integrated river basin management in Australia, has used hydro-solidarity to describe a state of advanced coordination, participation and cooperation in water management among the federal units utilizing the Murray-Darling Basin.[43] The essence of solidarity, in this case, is the balancing of upstream and downstream riparian conditions: *The institutional arrangements in place certainly have many of the elements conducive to reconciling and rationalizing competing interests for basin resources*, as Pigram summarizes the qualities of the existing system, adding that initiatives to curb withdrawals for ecological reasons have encountered resistance from the stakeholders.[44]

Prospect: hydro-solidarity as a workable concept

The search for a concept on which comprehensive, long-term cooperation can be modelled has brought to the surface the limitations of the existing concepts – or rather, the challenge for present and future water research and management. Hydro-solidarity has not so much developed into an analytical tool of its own as it rather represents a synopsis of existing concepts. Hydro-solidarity integrates these concepts into a new concept that highlights the importance of functional cohesion: rather than just summarizing the benefits of the previously discussed concepts, it makes clear why and how these concepts have to be connected in order to meet the demands of long-term water sharing. Without this integration, water sharing would be too unstable and too unpredictable to support long-term socio-economic development that is based on reliable water supply-and-demand management.

As Wouters pointedly remarks, asymmetry remains the biggest potential stumbling bloc for any effort at sustainable river management. In other words, the difficulty lies in hydro-solidarity's main concern: how to turn sustainable river management into a **common cause**? This form of management and the notion of interdependence implied herewith make a lot of sense, but how to convince every riparian stakeholder to contribute towards this objective if it means to compromise on individual benefits – especially when these benefits carry political power? Economically speaking, this would mean that other stakeholders would have to compensate that stakeholder in more than just one way. Lundqvist answer, to link water rights and responsibilities, convincingly points in the right direction, but the scope of water rights should realistically not go so far as to restrict individual freedom to negotiate in order to seek

[41] Hydro-hegemony is used here to describe a behaviour diametrically opposed to cooperative approaches like hydro-solidarity; Gerlak *et al.* refer to "hydroegoism", describing the same, power-centred approach by upstream stakeholders: Gerlak *et alii*: Hydrosolidarity …, *supra*, p. 312.
[42] Falkenmark and Lundqvist: Towards hydrosolidarity …, *supra*, p. 168.
[43] John J. Pigram: Towards upstream-downstream hydrosolidarity. Australia's Murray-Darling River Basin; *Water International*, vol. 25, no. 2, 2000, p. 222 – 226.
[44] Pigram*, ibidem*, p. 225.

individual gains.[45] Such gains do not necessarily have to come at the expense of the downstream neighbour.

As Pigram has shown, a system that effectively institutionalizes cooperation a.k.a. water sharing is possible. If cooperation is embedded in an **institutional framework** that safeguards established rights as much as it allows stakeholders to cooperate according to their current interests. Competition as such cannot be eliminated this way. And maybe it does not have to. So long as a degree of rivalry does not develop into confrontation and conflict or compromise the status of the river as a functional system, it is acceptable because the main objective of hydro-solidarity would not be forsaken. Thus one task of an institutional arrangement would be to carefully balance the positions of stakeholders in order to prevent overarching dominance. As water supplies and the benefits drawn from them tend to vary, especially in tropical regions, this balance could be restored through a system of rewards and penalties, or incentives. Falkenmark's suggested motto, *prevention pays off*, applied here to the issue of water pollution, points in this direction.[46]

The concept of hydro-solidarity, as formulated by Falkenmark and Wouters, is compatible with the hypothesis stated above. It reiterates some of the demands already stated relating to mechanisms for long-term water sharing. Though it has originally been initiated with a view to managing international river basins, its central concern is not limited to the interaction between sovereign nations. The call for a comprehensive, participatory and sustainable approach to rivers does apply to the relationship between states or provinces as federal parts of one nation, too. As will be seen in the empirical section, inter-state or inter-provincial disputes – though apparently less volatile than international disputes – pose a serious challenge to the cohesion of a nation and can undermine its sovereignty.

Hydro-solidarity does not eliminate incentives as a mover of cooperation, but it sets **standards** to be observed by all stakeholders. It requires an appropriate institutional arrangement, especially a legal underpinning of water rights based on reasonable utilization and an enforcement mechanism. This means that the institutional features established above have to be augmented by adding this legal principle which is derived from the said 1997 Convention. Gerlak *et alii* have questioned the use of hydro-solidarity as a concept due, in part, to its vagueness while highlighting its potential as a *broad framework* or *paradigm that can help shape how we negotiate and manage shared waters*.[47]

Hydro-solidarity, in the form defined by Falkenmark which is used as a reference, does indeed rely on negotiation to overcome the divide between upstream and downstream stakeholders. Asymmetry, in this case as in other, non-water cases, will always be a condition that demands strong skills in conflict settlement. That is not exclusive to water. It applies to the field of military security or economic relations as well. Even where explicit legal regulations are in place and effectively enforced,

[45] Jan Lundqvist: Rules and roles in water policy and management. Need for clarification of rights and obligations; Proceedings, SIWI seminar, *supra*, fn. 4.
[46] Falkenmark: Towards hydrosolidarity. Ample opportunities …, *supra*, p. 25.
[47] Gerlak *et al*.: hydrosolidarity …, *supra*, p. 316.

political actors tend to make use of their physical advantage.[48] This does not as such diminish the potential of hydro-solidarity. Instead it stresses the need for a concept that focuses on this obstacle to cooperation. Dukhovny, citing examples from Central Asia, doubts that hydro-solidarity is feasible where upstream stakeholders draw benefits from selfish water utilization.[49] He, too, highlights the need for incentives and government regulation, especially in the form of protected water rights.

To make sure that all stakeholders will be committed to cooperation, reliable and authentic information is essential, as Dukhovny points out. Information on current and expected water situations, particularly supply projections, is part of a transparent monitoring and communication process. This process, as Dukhovny recommends, should not be limited to the political sphere, i.e. the stakeholders, but include the wider public, too. This demand is important because the public is the end-user of water and – especially in participatory political systems – is capable to indirectly influence decision-making.[50]

The focus of designing the institutional arrangement should therefore be on a **balance** between necessary regulations and the *freedom of movement* required for incentives to bear fruit with individual stakeholders. The danger in tight regulations is that they might inadvertently eliminate all motivation on the part of the stakeholders to pursue their legitimate interests by cooperative means which might instead resort to blockade or withdrawal. Whether the preservation of the water source will be treated as a common interest, and whether water sharing on a long-term basis is possible, depends largely on this balance.

None of the characteristics identified here as crucial for the success of this concept can be implemented simply by an ordinance or an agreement. It will take time for all parties to such an endeavour to realize their benefits. In other words, hydro-solidarity involves a readiness on the part of stakeholders to perceive potential benefits on a long-term scale, rather than in terms of short-term gains. This means that negotiations between stakeholders should focus on long-term gains from cooperation. These depend on a collective commitment of all stakeholders to the preservation of the river basin as a resource system.

The realization that this prospect in effect implies that all stakeholders are bound to each other by a form of interdependence can promote cooperation. To perceive another stakeholder's advance as a gain for oneself would mean that the common goal is being accepted. Thus hydro-solidarity is a process, rather than a status quo or a structure.

Solidarity, by its French origin, is defined as a sense of togetherness and commitment to a common cause. This term appeals to ethical motives of interaction

[48] The history of the Cold War is a series of examples of how power – military and economic – is used to gain benefits, often through the implicit or explicit threat of force and in direct violation of relevant international law.

[49] Victor A. Dukhovny: Big challenges and limited opportunities: What are the constraints on cooperation? in: Saskia Castelein, ed.: *From conflict to cooperation in international water resources management: challenges and opportunities*; Delft: UNESCO, 2002, p. 119 – 125.

[50] The fact that the number of water conferences, workshops and other fora has increased dramatically over the past 20 years underlines the realism of this expectation as much as does the growing number of NGOs and research institutions focusing on problems of water sharing .

and tends to be used as an antipode to interest-driven, power-oriented political behaviour – the realism of which will be assessed in the course of this study.

The quality of Australia as a potential model for other cases like Pakistan will be part of the following analysis. From the above concept, a number of requirements can be deducted

- temporal scope: seasonal and long-term,
- spatial scope: basin-wide,
- topical scope: all water uses (consumptive, non-consumptive),
- institutional features: transparency, coordination, division of authorities, clear implementation procedures, legally protected entitlements, adaptation to changing water availability, dispute handling facility,

which will be part of the final assessment of the case at hand: Pakistan and the Indus Basin.

I.2 Hydro-solidarity: Australia as a model

Australia's Murray-Darling River Basin is a remarkable river system in several respects: Similar to Pakistan's Indus Basin, it is the country's lifeline in economic terms as it supplies the bulk of Australia's water, for an area of over one million square km, the agricultural heartland of the continent, including six million people, or roughly one third of the country's population. Unlike other large river basins, including the Indus, it is not divided by international boundaries. The analysis of its management and water sharing system thus focuses on the inter-state or federal level.

This basin which is formed by two large rivers has frequently been cited as a potential role model of progressive river management and a case of practical hydro-solidarity.[51] The main interest within the context of this study is to assess the institutional components of this mechanism and to evaluate their effectiveness vis-à-vis water sharing: What makes the Australian case special, and does it qualify as a potential role model for Pakistan?

To meet the demands of hydro-solidarity, as outlined before, this mechanism would have to feature

- a legal framework with clear entitlements for reasonable water use,
- an institutionalized mechanism of seasonal and long-term water sharing,
- an transparent implementation procedure, and
- a separate conflict settlement facility.

Institutional development

Riparian states of the Murray-Darling Basin are New South Wales, Victoria, South Australia and Queensland. Water availability at upstream and downstream locations differs significantly due to hydrological and climatic factors. In general, water in the basin is short, the region is drought-prone.[52] It is against this background of increasing water scarcity that institutional measures have been taken to regulate water use towards preventing a further aggravation of the water situation.

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[51] John J. Pigram: Towards upstream-downstream hydrosolidarity. Australia's Murray-Darling River Basin; *Water International*, vol. 25, no. 2, 2000, p. 222-226. Hydro-solidarity originally describes a state of comprehensive water management based on rules of collective water use as opposed to a one-sided concept of water sovereignty. Among the first to use this term as a scientific model was Patricia Wouters, a University of Dundee expert in international water law, applying it to upstream-downstream conflicts over water from an international river. Commonly used for trans-national cases, its application to a federal, intra-state dispute appears even more fitting because of the legal and social affiliation of the competitors. Cf.: Towards upstream/ downstream hydro-solidarity. International Seminar of the Stockholm International Water Institute (SIWI), 14 Aug. 1999 - www.siwi.org.

[52] William Blomquist, B. Haisman, A. Dinar, A. Bhat: Institutional and policy analysis of river basin management. The Murray Darling River Basin, Australia; *World Bank Policy Research Working Paper* series no. 3527, 2005, p. 7; H. Malano, M. J. Bryant, H. N. Turral: Management of water resources – can Australian experiences be transferred to Viet Nam? *Water International*, vol. 24, no. 4, 1999, p. 308; R. Maria Saleth & Ariel Dinar: Institutional change in global water sector: trends, patterns, and implications; *Water Policy*, no. 2, 2000, p. 188.

The legal foundation of water use is the authority of the states over their respective lands and natural resources granted by the Constitution of 1901.[53] The institutional process to regulate water use in the Murray-Darling Basin dates back to the 19th century. A long-standing dispute between the states was partly resolved in 1917 with the conclusion of the River Murray Water Agreement and the establishment of the River Murray Commission.[54] The initial administrative structure had limitations as it did not cover the Darling River, the Murray's major tributary. Queensland, the uppermost riparian state, did not participate in the regulation. The Commission's task was the distribution of water from the Murray River among the three parties to the Agreement and the coordination of water works to that end.[55] These two major issues, water sharing and the financing of water works, were the source of several inter-state disputes raging in the 19th century.

The utilization of the smaller tributaries remained within the authority of the respective states, *i.e.* it was primarily based on territory, less on hydrological concerns. The Darling River, though accounting for a larger catchment area than the Murray River, was not part of a coordinated river management scheme until 1993. Following the findings of a comprehensive study of the combined river basin of the Murray and Darling rivers (Murray-Darling Basin Environmental Resources Study, 1987), a new water management approach came to be realized as a necessity. Economically speaking, the rising cost of containing salinity in the Murray River proved to be a major incentive for the riparian states to seek a collaborative solution.

With the new Murray-Darling Basin Agreement (1993), a more advanced concept of water management was inaugurated that recognized the integrity of the basin and the need for cooperation of all riparian states. The inclusion of Queensland in the newly created collaborative water management institution, the Murray-Darling Basin Ministerial Council (MDBMC), for the first time enabled all riparian states to make joint decisions on all river management issues. All four states plus the federal government and the Capital Territory (also within the basin) have a seat in the Council; the capital holds an observer status.[56] Most importantly, each state may veto propositions that it considers adverse to its own interests. The Agreement continues to be the basic formula for water management in Australia's largest river basin. All participating states have enacted legislation to implement the Agreement.[57] For the funding of necessary water works federal government money would become available and thus serve as a stimulus for reforming the management system towards greater state-to-state coordination and collaboration.

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[53] Anjali Bhat: The politics of model maintenance: The Murray Darling and Brantas River Basins compared; *Water Alternatives*, vol. 1, no. 2, 2008, p. 205.

[54] Jyothsna Mody: Management of river basin systems through decentralization; World Bank Report; Washington, D.C.: World Bank, 2001, p. 12; www.worldbank.org (Aug. 2003; as of May 2005 listed as unpublished and not available online any more). The process of decentralization took almost 80 years due to disputes between riparian states.

[55] Pigram: hydrosolidarity, *op. cit.*, p. 223

[56] The new agreement received full legal recognition in 1993; Pigram, *ibidem*, and Jonathan Chenoweth: Effective multi-jurisdictional river basin management. Data collection and exchange in the Murray-Darling and Mekong river basins; *Water International*, vol. 24, no. 4, 1999, p. 369 – 370; see also Govt. of Australia, Dept. of Environment and Heritage: The Murray-Darling Basin Initiative - integrated cross-border river basin management and community engagement; www.environment.gov.au/water/ (Nov. 2010). Document text: www.mdbc.gov.au (Nov. 2010).

[57] The state Murray-Darling Basin Acts were enacted in 1993.

The Council serves as the highest-ranking body for water management on basin levels. Decisions are reached by consensus. This means that vital interests of all stakeholders will be taken into account. The Council's executive body is the Murray-Darling Basin Commission. Like the Council, the Commission is made up of representatives of all riparian states (responsible for all water, land and environment issues relating to river management).

The task of the Council, according to the 1993 Agreement, is *to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin*.[58] To this end, the Commission advises the Council members on all aspects of river hydrology, water flows, water quality, water distribution, water utilization, and river basin ecology. The scope of these issues leaves all river-related matters in the hands of one institution. From an institutional economic perspective, the effect on decision-making is expected to be positive because institutional coordination is limited to the Council and the federal and state governments.

Decision support is provided by the Community Advisory Committee (CAC).[59] Representing interest groups from all basin communities that are directly affected by Council decisions, CAC forms *one of the most important factors in strengthening community participation and empowerment* (Pigrim).[60] The 23 representatives of the basin communities on the CAC report to the Council directly. The CAC is credited with promoting the concept of IWRM – it is the essential stakeholder representation.[61]

The institutional development up to this point has been mostly positive as it establishes equal stakeholder participation, thus offsetting the hydrological discrepancy between upstream and downstream users. The Commission's responsibility to distribute water among the riparian states has a strong long-term perspective which supports the economic planning of all member states. The inclusion of water quality aspects and environmental concerns is an important element of integrated river management. Though much of the day-to-day operation of the river basin rests on coordination between lower-tier units of the water management apparatus, the elaborate nature of the river management system as envisaged in the Agreement is in itself a factor in strengthening cooperation because it leaves little room for free-wheeling. Most aspects of river management are bound to coordination between state water authorities prescribed by the Agreement.

Lastly, by issuing regular reports on water withdrawals (as required by the Agreement) the Commission provides **transparency** regarding the work of the Commission vis-à-vis the targets set forth in the Agreement. The Water Audit Monitoring Reports issued by the Commission are a requirement outlined in detail in the Agreement. The same is true for the financial statements to be submitted through an auditor to the Ministerial Council.[62]

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[58] Murray-Darling Basin Agreement, 24 June 1992, Part 1; document text: www.mdbc.gov.au (Oct. 2010).

[59] D. J. Blackmore: Murray-Darling Basin Commission: A case study in integrated catchment management; *Water Science and Technology*, vol. 32, no. 5 – 6, 1995, p. 18.

[60] Pigrim: hydrosolidarity, *op. cit.*, p. 224.

[61] Govt. of Australia, *op. cit.*

[62] The requirement of monitoring and reporting is detailed in Schedule F of the Agreement, see p. 130 of the above cited document. It explicitly states the duties of each state and the Commission. States have to monitor all annual withdrawals from the river basin and report them to the Commission which

Implementation

The sharing of waters from the river basin is regulated through several measures:

- **fixed allotments** (in megalitres per month, according to Part X of the Agreement)
- **caps** on withdrawals from rivers in order to maintain a minimum flow for river ecology (Schedule F of the Agreement
- inter-state **water trading**
- a moratorium on new **irrigation licenses**
- a restriction on **off-allocation withdrawals** (surplus water supplies in wet years that exceed the projected requirement) in favour of water storage.

The Commission oversees the distribution of water, that is, the appropriate withdrawals by each basin state. A detailed plan is set for each state: for downstream-most South Australia, it is fixed varying monthly rates to be withdrawn from the Murray, the only river running through this state. For the other states, withdrawals are to be made from given tributaries, under conditions to adhere to ecological rules in order to preserve the river system. The Commission is in control of the water storages and responsible for water releases from these reservoirs to meet the states' requirements as laid out in the Agreement. Provisions are made to refill the reservoirs; the water level at which to refill is to be determined by the Commission. The states upstream of South Australia are required to maintain a minimum flow in order to meet South Australia's entitlement (Part X, clauses 93, 94). The minimum flow is not quantified here: the legitimate withdrawals by the other states (upstream of South Australia) are to be calculated on an annual as well as long-term schedule.

To prevent overuse and eventual water shortage caps (according to Schedule F) were introduced in 1997. They mark limitations on water consumption based on so-called *baseline conditions* that existed on 30 June 1994 reflecting the basin's state of water management at that time. The caps, representing a complex set of data that take into account each state's water resources, demand, and climatic conditions, define the maximum water withdrawals per state *per annum*.[63] In light of steadily growing withdrawals, the need was realized to freeze the growth rate, rather than reduce the consumption. The baseline conditions refer to the water management situation as of 30 June 1994 regarding

- the state of infrastructure (canals etc.),
- water allocation rules,
- efficiency of water management,
- entitlements to use water, and
- levels of water demand.

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sums up all water flows state-wise in its annual Water Audit Monitoring Report. Reports are available at www.mdbc.gov.au. The accuracy of water statistics depends on the metering system in place in any particular spot. The report notes that not all diversions are subject to precise metering; some diversions are calculated upon estimates from user information which are known to be unreliable. The average accuracy in the 2002/2003 report is given as +/- 7% for the whole basin (p. 9). This relative inaccuracy, observed in all basin states, does not diminish the value of transparent reporting as such. Financial reports will be reviewed by the Commonwealth auditor who in turn is answerable to the Ministerial Council (Part VIII of the Agreement, p. 42.).

[63] Water Audit Monitoring Report 2002/2003, p. 4, 13. The caps are calculated yearly. The caps are based on recommendations and data provided by the Independent Audit Group, a consulting body hired by the Council.

Relevant data cover an 11-year-period prior to that date. These conditions go far beyond simple historical data. They reflect a multi-dimensional understanding of water management that exhibits hydrological, economic and ecological concerns coupled with a long-term perspective. The responsibility to implement the caps, *i.e.* respect the set limits on withdrawals for every state, lies with each state government. The Ministerial Council, *i.e.* the representatives from all basin states, retains the right to alter the caps if found necessary. In some cases, additional amounts may be allotted by the Commission (under Part X of the Agreement).

In addition, water trading has become an important instrument to utilize water resources with greater flexibility and towards higher productivity. Water trading is regulated and subject to financial compensation, environmental requirements and approval by the Commission which oversees the transfer of water entitlements between basin states.[64] Trading entitlements not only provides communities and states with additional quantities to meet short-term needs without putting an extra stress on the whole basin. At the same time, it means an incentive for the other state or community to save water in order to sell it. The transfer of entitlements is mostly temporary, for a period of one year, rather than permanent. As such, they resemble water markets in the United States. The results are entirely positive, as the Commission finds: resource productivity, especially in irrigation, has increased; the availability of water has improved as transfers have been extended from inter-sector/intra-state to inter-basin/inter-state.[65] Economic development has risen, according to the Commission, as a result of greater investment in irrigation.[66]

Two aspects were given priority by water managers upon reaching the Murray-Darling Agreement: Water sharing, from 1989 on, should be more transparent and provide a degree of security about water supplies to the riparian states and communities.[67] Greater security means that the states and communities would have a basis on which to plan water utilization in the near and distant future. The above cited annual reports by the Commission quote historical water withdrawals and rainfall patterns that allow a scenario for future water availability projections. The state of water quality and availability is measured in regular salinity reports.[68] In sum, this procedure means that the downstream riparian state is effectively protected by its upstream neighbours from drying out!

Charged by the Commission, the Independent Audit Group observes and critically assesses the implementation of the Agreement, particularly the caps on water withdrawals, by each state. Its neutral status is an important factor in avoiding

[64] Transfers are administered by the Commission since 1998. The MDBC maintains separate accounts for each tributary, according to the Operational Principles of the Agreement (Schedule E, Part IV, p. 106). The actual transfer is regulated through licences issued by state authorities. The motivation to introduce water trading, according to the Commission's President, was the belief that competition can result in greater resource productivity; see Roy Green: Water – the new liquid asset; presentation to the Queensland Farmers' Federation, Brisbane, 15 March 2001; www.mdbc.gov.au > newsroom (as of Aug. 2001). Green points out that the cap has effectively promoted water trading.

[65] For the development of water transfers see the Water Audit Monitoring Report (various issues). Transfers play a great role in several fields of the agricultural sector and between agriculture and the environment; see Malano, Bryant and Turral: Management of water resources, *op. cit.*, p. 78.

[66] MDBC: Interstate Water Trade; Fact Sheet 1, May 2006; www.mdbc.gov.au.

[67] Blackmore, *op. cit.*, p. 19.

[68] The Basin Salinity Management Strategy is an important element of the Agreement (Schedule C, p. 65 in the above cited document); it is based on the close monitoring of salinity in all rivers and tributaries of the basin.

political interference. The risk of water management being hijacked in order to further one-sided political interests can thus be averted or at least minimized. Guaranteeing a necessary degree of transparency, its annual Review of Cap Implementation is an important indicator not only of the state of implementation and the utilization of waters from the basin, but also of the adherence of member states to the common formula, i.e. their *partnership*.[69] By regularly reviewing the performance of state water management systems, the auditors point the finger at potential faults in the existing system.[70]

The settlement of disputes is outlined in detail in the Agreement.[71] The mechanism to solve disputes is similar to that of other river commissions, like in some Indian cases. The Australian case is particularly noteworthy as it leaves little room for interpretation: If the Commission fails to reach agreement on an issue within two months, the issue may be referred to the Council, which has another six months to solve it. If the Council also fails, an arbitrator is to be appointed within two months, if necessary, by the Supreme Court of Tasmania, a non-basin state. The decision reached by that arbitrator is to be treated as a decision by the Commission and as such is binding upon all states, the Commission and the Council. Thus a precise procedure is prescribed in the case of dispute, with a clear advantage: Because every step of the process is clearly separated from the next, with a fixed time frame attached to it, the outcome is predetermined and not prone to political manoeuvring.

Institutional change and new institutions

The recent years have seen changes in the existing institutional arrangement. On the state level, several governments have concentrated water-related tasks in one government branch in an obvious effort to promote the integrated management of water resources, as Blomquist *et al.* observe.[72] While the results of this development are naturally hard to assess, for a lack of causal links, the fact that inter-departmental rivalry as a common bureaucratic phenomenon could by and large be eliminated would certainly be a positive result: The need to coordinate and the innate drive to fight over budget allocations would cease to be an impediment to focused water decision-making.

On the national and basin level, a review of inter-institutional coordination found a degree of rivalry between the Commission and the Commonwealth government. The position of the central government was that the Commission overstepped its authority, effectively becoming a governing body in itself. In response the government aimed to strengthen its relationship with the state governments by outflanking the Commission.[73] Another impetus for changing the existing institutional arrangement was the status of the resource. In the face of growing water shortages, the need to revise the system of water management towards greater sustainability was felt.

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[69] The integrated catchment management in the Murray-Darling Basin is based on *a spirit of partnership*, as outlined in the prelude to the 2004/2005 Review; document text: www.mdbc.gov.au (Aug. 2010).

[70] The Group's recommendations (by state), however, are fairly short, and it would seem desirable for state water authorities to receive a more profound analysis; *supra*, p. 14.

[71] Part XIII, p. 58 of the above cited document.

[72] Blomquist *et al.*: institutional and policy analysis, *op. cit.*, p. 15.

[73] Bhat: Politics of model maintenance, *op. cit.*, p. 211.

The central government, though legally not in a position to direct water policies, pushed for a change by way of its budgetary power. It initiated the National Competition Policy which, though not specifically aimed at the water sector, served to stimulate bureaucratic efficiency through monetary incentives. On a wider level, it helped to introduce market-based mechanisms. This had a positive effect in the water sector, too: water management came to be replaced by a demand-based management approach furthering more economic water consumption. Inter-state water trading and realistic water pricing have since become important elements of federal water management.

The influence of the central government, based mostly on its budgetary power, has been rising steadily over the past two decades.[74] It has influenced water policy-making through the Council of Australian Governments (COAG) which initiated a National Water Policy Reform dialogue in 1994.[75] The outcome of this dialogue was the National Water Initiative (NWI), formally agreed in 2004. The NWI has since become the major policy directive of water management in Australia. It stipulates

- economic efficiency that should be linked to ecological sustainability,
- flexible water use by trading entitlements more widely than before,
- greater participation and responsibility of local water management bodies.

Though not a law, the NWI requires all signatories to implement it following a detailed plan.[76] For this purpose, the National Water Commission (NWC) has been established in 2004. Based on a solid legal foundation, the NWC oversees the implementation of the Initiative and consults the COAG. Unlike the Murray-Darling Basin Commission, the NWC's role is *to drive reform* by issuing regular reports on the status of water resources and the implementation of the reforms.[77]

The Agreement of 1992 remains the central statute of Australia's water distribution mechanism. It has been elevated to the status of a federal law by being incorporated into the comprehensive Water Act of 2007 (under Schedule 1).[78] The Water Act marks the latest and most important stage in the reform process. It reflects an analysis of water management in the Basin: Shortcomings of the Murray-Darling Basin Commission, especially its unanimous decision-making rule and its inability to push reluctant basin states to implement the Water Initiative, led the Central Government to push forward a new institution, the Murray-Darling Basin Authority (MDBA). The new Authority, successor to the Commission, would have extended responsibilities.[79] Its main objective would be to turn the recommendations of the Water Initiative into a comprehensive water management plan.[80]

[74] The Commonwealth Government has established a Water Fund (budget: $ 2.5 bn) for infrastructure projects; see National Water Commission: Annual Report 2009-10; www.nwc.gov.au (Oct. 2010).
[75] The COAG, founded in 1992, is the highest inter-governmental forum; it consists of the Prime Minister of Australia, the heads of the six state governments and two territories (premier/chief minister) and the President of the Australian Local Government Association. Its purpose is to coordinate policies on all federal levels.
[76] See the National Water Commission: www.nwc.gov.au/www/html/117-national-water-initiative.asp .
[77] See National Water Commission Act (2004); www.comlaw.gov.au.
[78] Document text: www.comlaw.gov.au (Oct. 2010).
[79] The National Water Amendment Act (2008) formally makes the Authority the successor of the Commission.
[80] Water Act, Part 2, Division 1, p. 37 – 38.

The Murray-Darling Basin Plan, to be drafted by the Authority as a requirement of the Water Act (Part 2), is to be understood as *a strategic plan for the integrated and sustainable management of water resources in the Murray-Darling Basin.*[81] Based on extensive scientific research into the current status and likely development of the river basin in light of continuously rising water withdrawals, the Authority has recently published the first part of the Plan, pointing at a severe gap between water availability and water demand.[82] The prospect of dying rivers has led the Authority to announce a 27 to 37 per cent reduction in existing entitlements.[83] The new plan sets Sustainable Diversion Limits (SDL) for each sub-basin region. This means a definitive end to classic water management based on the demands of water users.

The new plan instead seeks to curtail demand. The remedy, according to the plan, is to rely on water trading and raising efficiency.[84] In the case of one of the basin regions (the Lower Darling Region), *the Murray–Darling Basin Authority acknowledges that implementing SDLs may have significant social and economic implications for individual entitlement holders and communities across the Basin. However, the Australian Government has committed to recovering sufficient water access entitlements to fully offset the impact of SDLs across the Basin, including the Lower Darling region. This will be achieved through a combination of purchasing entitlements in the market and investments in more efficient irrigation infrastructure.*

Thus the preservation of the river basin as a hydrological system of the highest nation-wide economic and social importance has become the prime motivation to change the water management mechanism. The cooperation of states had so far been effective in the era of the Murray-Darling Basin Commission. Pressure from the Commonwealth Government has led to a new institution, the Murray-Darling Basin Authority, with greater responsibilities, especially for the environmental dimension of river use. The sharpening water shortage will put the existing cooperation under stress. It remains to be seen whether state governments, driven by their communities, will continue to work towards the common goal or opt for a more confrontational, egocentric policy that aims to maximize individual, rather than collective, benefits.

Conclusion: a potential role model?

The theoretical concept of hydro-solidarity, formulated as an extended hypothesis before, has been the standard against which to test the Australian case. Here an elaborate system of water management has evolved from fairly modest beginnings. *Hydro-solidarity*, as has now become a sophisticated formula of managing water, has not been the explicit objective of water managers in the Murray-Darling Basin. The

[81] Government of Australia, Ministry of Environment: Water for the future; www.environment.gov.au/water /australia/water-act/key-features.html (Oct. 2010).
[82] Cf.: The Murray-Darling plan explained; *ABC News* (Sydney), 8 Oct. 2010; www.abc.net.au/news/stories/2010/10/06/3030629 (Nov. 2010).
[83] The announcement has prompted widespread criticism especially from the farming community and gained some support from environmental organizations: MDBA Chair explains water allocation cuts; *ABC News* (Sydney), 12 Oct. 2010; www.abc.net.au/local/stories/2010/10/12/3036291.htm (Nov. 2010).
[84] The MDBA has presented status reports for all 21 sub-basin regions of the Murray-Darling Rivers; www.mdba.gov.au/guide/ (Dec. 2010).

current system, which has developed over more than a century, has indeed reached a status that embodies many important elements of progressive water management.

First, the Murray-Darling Basin Agreement, with its comprehensiveness and long-term perspective, corresponds to the basic demands of **Integrated Water Resources Management**. The river basin is treated as a hydrological unit; important requirements of the river are met through detailed provisions in the Agreement that make it binding for every riparian state to implement them. Second, the Agreement and the Water Act link water use to river development, both in procedural and in structural or institutional terms.

An important driver in developing the existing water management and distribution system has been the growing **water shortage** in most parts of the wider basin and in fact the country. Economically speaking, the widening gap between supply and demand, and the inter-state disputes attached to it, has provided an incentive for institutional development. The Cap and the transfer of entitlements are direct consequences of the institutional discourse on water management. The decision-making body, the Council, has made water security a priority, especially for the downstream states. The stability of the institutional process in the water sector of Australia can also be read from the consistent **long-term orientation** of water policies.

Critical elements of the Australian model are the **institutional set-up** and the **ownership**. The river basin and its resources are effectively owned by the states and their communities. **Responsibility** is not transferred to any detached institution but in essence rests with the state governments themselves which, through the Community Advisory Committee (CAC), are tied to the communities, in other words, the actual **water users**, whose interests are voiced in the CAC. Responsibility not only relates to the neighbouring basin states but to the hydrological system and to the wider economy of all basin communities. The Agreement, in all its detail, effectively links all states to each other and the river they all depend on.

Pigram and Musgrave refer Australia's success in terms of water management to **cooperative federalism**.[85] It is difficult to assess whether the state of federalism enabled the governments to reach this Agreement or whether the Agreement has in fact elevated the state of federalism. Both may be true. In the water sector, the agreed formula for cooperation has proven over time that collaboration bears fruit for every state to harvest. If cooperation had not been beneficial to all, the Agreement might not have survived. Outside pressure (from the federal government) probably helped to further cooperation, yet in principle each state, based on its constitutional rights, could exert a degree of independence in water management. The establishment of the Water Act, in 2007, has further solidified the principles of inter-state collaboration, making deserting more difficult. Painter cautions that cooperation is not an automatic function of Australian federalism (or any federalism, for that matter).[86] It might be rather limited to one area (*e.g.* water management) and to a

[85] John J. Pigram & Warren F. Musgrave: Sharing the waters of the Murray-Darling Basin: Cooperative federalism under test in Australia; in: Richard E. Just & Sinaia Netanyahu, eds.: *Conflict and cooperation on trans-boundary water resources*; London: Kluwer, 1998, p. 133.

[86] Martin Painter: When adversaries collaborate. Conditional co-operation in Australia's arm-length federal polity; in: Ute Wachendorfer-Schmidt, ed.: *Federalism and political performance*; London: Routledge, 2000, p. 130 – 145.

period when collaboration is perceived by both or all states to be beneficial. In the case of the water sector, specifically the Murray-Darling resources, the need to cooperate was realized not least because of the significant financial commitments necessary in the future. Given the tax system in place in Australia, the weight of the Central Government's position could not be ignored. And: *Where it is to the mutual benefit of the actors concerned, operating rules may evolve that facilitate bureaucratic accommodation and consensus*.[87] That means if benefits can be realized, state governments might even work to streamline (or bypass, if necessary) the existing institutional processes in order to accelerate cooperation. Painter describes Australia's federalism as a *mixed system*, with elements of competitive (cooperation as a choice) and collaborative (cooperation as a predetermined process) federalisms.

Technically and legally, the principle of **solidarity** – by taking into account upstream-downstream discrepancies – is acknowledged in the form of the **Council's composition**. By giving each state an equal representation and vote (any state holds the right of veto) and by effectively making the river system a common goal, the foundation is laid for decisions that benefit all riparian states and communities. One-sided decisions that may have disadvantageous consequences for some riparian states can easily be prevented. The cost of blocking decisions that would favour one side over the other, of course, may come in the form of concessions. This is an element of conventional economic and political transactions and not a design fault of the Council as a collective decision-making body. The states are tied to each other, in a sense forced to find solutions and reach decisions that suit all.

Maybe even more important in terms of solidarity and **institutionalized cooperation** is the provision in the Agreement that specifically directs upstream riparian states to enable the lower riparian state (South Australia) to satisfy its legitimate needs. This provision is a strong expression of **solidarity** as it acknowledges the weak position of the downstream state. It effectively ties water utilization of upstream neighbours to that of downstream neighbours, in this case the three neighbouring states of South Australia, New South Wales and Victoria.

Another important technical aspect is the **detailed water distribution formula**. Rather than setting figures for each state's annual or seasonal water allowance, criteria for sustainable and equitable water sharing are set. They reflect each state's individual water situation, not only supply and demand, and its hydro-economic position within the basin. By extending the baseline conditions on which the water entitlements are calculated to technical and legal parameters of water management, a narrow dispute over monthly or seasonal allotments is avoided. At the same time enough **flexibility** to react to unexpected shortages or changes in demand is at hand by tapping water sources out of the basin. For these sources, another detailed formula is set out.

The **water sharing mechanism** in the Murray-Darling Basin combines safety, flexibility and balance while avoiding over-regulation. Instead it allows economic incentives to work in favour of efficiency and sustainability:

- The instrument of **caps** can have a positive effect as they manage demand, rather than stimulate consumption. By marking a ceiling, they translate into an

[87] Painter, *supra*, p. 134.

incentive to increase efficiency, i.e. raise water productivity. They also prevent river basin deterioration from over-exploitation.
- The fixed monthly **allotments** for South Australia provide a safeguard as they recognize the minimal needs of the downstream-most state.
- The **transfer** of entitlements, regulated by the Commission, provides flexibility without compromising the minimum requirements of states and their communities. Trading shares effectively turns states into business partners thus fostering a collaborative relationship which makes cooperation over other issues easier.

The comprehensive **reports** enable all states to review the process of water sharing and to monitor river development. The exchange of **information** as such fosters cooperation because effective water utilization hinges on reliable and verifiable data which all states are required to supply. Finally, the independent annual audit of the caps (as implemented by each state) adds a quasi-judicial element. By measuring the progress of each state on a strictly professional, non-political scale, this neutral body reduces the danger of water becoming politicized.

This does, of course, not mean that in Australia water is a non-political issue. Political interests are linked to water management, just as in most countries water is too important as to be insulated against political instrumentalization, yet they do not seem to dictate it. The main reasons appear to be the degree of water **professionalism** as reflected in the integrated water management system, the legal status of the water administration and bureaucracy, the development of effective water institutions, and the preponderance of economic approaches to water.

In sum, Hydro-solidarity has proved to be a workable concept in principle. The Australian case fulfils the basic demands of this concept. Looking at the evolution of the Murray-Darling institutional arrangement, it seems that hydro-solidarity should be understood as a **process**, rather than a status quo. The dynamics of water demand versus water supplies promise on-going challenges to existing mechanisms of water management. Cooperation is by no means a permanent procedure or inevitable mode of interaction. The **conflict** between Australian farmers and environmentalists, like similar ones in other countries, serves as a reminder of the volatile nature of modern water management: Success will not only depend on effective institutions but on constant bargaining, too. The idea that a fundamental conflict over vital interests may be ended by a perfectly designed institutional mechanism runs counter to the very notion of interest aggregation. Water trading, as suggested in the new Basin Plan, will play a bigger role in the future.

But the increased flexibility, or resilience (as noted in the Plan), does not *per se* increase water supplies; it only improves local **availability** by shifting capacities, i.e. managing demand. In a sense, much of the new water management system of Australia resembles a logistical effort. Natural water shortage clearly exceeds the potentials of institutional refinement. Ultimately only a reduction in water consumption will avert the water crisis.

Whether and how the Australian example may be **replicated** in another case and country is a matter of careful analysis, as the summary of particular facets of the Australian case suggest. While some **technical aspects** – like the institutional arrangement (the detailed Basin Agreement, the set-up of the Council and

Commission, the Independent Audit Group, the comprehensive Water Act, the reporting system) – may, at least in part, be relatively easy to be installed in another country, their eventual effectiveness hinges on **social-economic, political and cultural conditions** in place in that particular country. Those in place in Australia seemed favourable to the development of the water management mechanism that is now in existence there. As such, it reflects that particular country's circumstances – circumstances which over the course of more than a century guided the development of water management from a somewhat sketchy concept to a highly integrated system.

Particular aspects of the Australian case:

- (PA 1) Unlike other major rivers, the Murray-Darling Basin is confined to **one national territory**, thus limiting water sharing arrangements to the federal context. The absence of trans-national claims to shared water resources makes water management easier.
- (PA 2) The existence of strong **federal institutions** has helped the development of effective long-term water management mechanisms. The fact that the original water agreement has been augmented over time, rather than being replaced altogether by a different formula, indicates that the **states' interests** have been taken into account consistently.
- (PA 3) The **combination** of a modern industrial economy, a participatory political system, the near absence of overarching ideological divisions, and a small population provides a basis convenient for reaching a pragmatic agreement like the Murray-Darling Basin Agreement.

General aspects of the Australian case:

- (GA 1) The **federalist structure** of the political system turns states into competitors over economic and political power. Control over water resources is an important factor in determining which state will advance and which will not.
- (GA 2) The discrepancy between **upstream and downstream** locations is the major natural cause of disputes between riparian communities and states. Existing disputes are referred to a specialized conflict settlement forum outlined in detail in the Agreement. Similar procedures are detailed in other cases.
- (GA 3) **Water shortage** and river deterioration (from over-use) are the most significant limiting factors in water management. Resource shortage, however, seems to have stimulated cooperation, rather than confrontation, as most if not all stakeholders are similarly affected by the shortage and the declining state of the river.
- (GA 4) Most **institutional instruments** applied in sharing water in Australia – caps, quota, transfer of entitlements – were adapted from river basins in other parts of the world.

Hypothetically, the Australian case can serve as a model for other basins where similar features exist. The **successful implementation** of a comprehensive water sharing mechanism in principle will hinge not only on the inclusion of the important rules such as those in the Murray-Darling Agreement. It will primarily depend on the capacity, ability and willingness of the stakeholders to move in such a direction. Secondly, a stable long-term water management mechanism depends on legal

foundations and institutional arrangements already in place to serve as guidelines for decision-makers.

Most, if not all aspects of the Australian water sharing mechanism are **linked** to each other; thus they cannot be transferred separately. The Australian case confirms that water management has to be understood as a **complex system** incorporating political-legal, economic, social and hydrological-environmental elements:

- (PA 2 + GA 4) Without its constitutional footing, the Agreement would not have been as stable in legal terms. In a dispute, the Agreement could have been stalled by one or more state governments denying its binding force, effectively ending cooperation.
- (PA 2 + GA 2) The comprehensive nature of the Agreement does not *per se* guarantee that all states will receive their agreed entitlements. The built-in monitoring and reporting system enables all stakeholders to verify the correct implementation of the Agreement.
- (GA 2 + GA 3) The hydrological discrepancy between upstream and downstream states is by and large offset not only by special provisions for the protection of the downstream state, but also by precisely formulated norms of equality, accountability and information. If one (downstream) state was singled out to claim an advantageous position in terms of water entitlements, collaboration towards the joint long-term utilization of the river would be jeopardized. The risk of water becoming a political tool in a power struggle between the states would become greater.
- (GA 1 + GA 4) The objective to maintain the river's long-term water supply depends not only on restrictions on withdrawals. If legitimate state and community interests are not acknowledged, their willingness to contribute to joint long-term efforts might fade. The transfer of entitlements enables states and communities to realize individual benefits through market mechanisms. Without this incentive, the long-term sustainability of river utilization would be undermined.

The Australian case demonstrates the importance of a **combination** of precise institutional arrangements, clearly defined responsibilities, transparent processes, economic incentives and equal stakeholder involvement. If these elements are in place, **cooperation** can be successful. States share water because they benefit from cooperation. Cooperation is based here on agreed principles of equality, transparent and verifiable processes, reliable water information, and effective participation by all stakeholders on all levels of decision-making.

To make these elements work in a different setting (river basin) means to assess the respective institutional, political-legal and hydrological conditions. A customized strategy to reach a state of water management like in the Australian case, however, cannot be prescribed by drawing on any generalized formula.[88] The individual case,

[88] In the words of Malano, Bryant and Turral, *op. cit.*: *The general principles of good allocation and rational water resources management are transferable from one context to another, although there is clearly no package or formula for doing so. Context, hydrological and socio-economic, defines the detail and balance that is required within such principles, and can result in very different outcomes*; p. 84. The authors have posed the more general question of transferability of experiences from one river case to another; the specific issue of cooperation (and its political dimension) was not given special attention and has therefore not been analyzed. Like Pigram and Musgrave, *op. cit.*, the authors focus on the economic dimension (the water industry, comparison of investment and returns); a similar

as presented here, includes both general and particular aspects. An assessment of the conditions in any given case, e.g. Pakistan's Indus River, should therefore check the existence of the vital elements:

- A) **water norms** with strong legal foundation, clearly stated objectives and precise shared responsibilities;
- B) **inclusion of all stakeholders** (state/province governments and lower administrative levels);
- C) **integrated river management** targeted at the long-term use of rivers and, consequently, their sustainability, rather than short-term, single-purpose water management oriented towards satisfying the seasonal needs of water users;
- D) strong institutional **authority to enforce** laws and treaties, and to handle disputes;
- E) sound **reporting and monitoring** to ensure informed decision-making and transparency;
- F) institutionalized system of **incentives** to promote cooperation, and penalties for confrontation.

The performance of any water sharing mechanism will depend on the **quality** of these elements, i.e. the degree to which they are institutionally implemented (controlled implementation) and how they are tied to each other by relevant norms (laws, treaties etc.). If these elements are in place and systemically linked to each other, hydro-solidarity seems possible. If any of these elements are missing, a process towards hydro-solidarity faces critical obstacles.

perspective is presented by David Grey: Australia institutional model: guiding principles; presentation to the Pakistan Development Forum 2007, hosted by the World Bank; www.worldbank.org.pk.

Introduction
II. The politics and science of sharing water

What are the conditions under which water sharing takes place? Do structural or behavioural factors determine water sharing, or is water sharing simply a matter of sophisticated hydro-engineering? This chapter enters the theoretical discussion of norms and rules that guide collective water utilization. Water laws, institutional frameworks, ethical concepts of property and economic theories of benefit-oriented rationality are instruments that are brought in to understand when and why actors decide to share water or risk confrontation instead.

As there is no single, universally applicable formula for water sharing, the objective of the theoretical debate is to identify certain rules that are likely to alleviate water sharing and, conversely, factors that hinder it. The example of the water law debate indicates the political dimension that overshadows each case: Certain rules of water management are found acceptable in some countries, yet not in others, resulting in a controversy over globally applicable legal principles. Similar observations have been made in the case of property rights and water management techniques. Even the very definition of a river basin is not undisputed.

This section presents and assesses the methodical tools to understand cooperation and confrontation over water.

II.1 Laws and norms of water management

The regulated use of water is based on a system of norms aimed at establishing general principles for water utilization. These norms influence the way actors may or may not engage in water sharing. Some water norms explicitly direct water users to share, others provide only scant or indirect guidance to the question of when and how to share water, indicating a twofold approach to the problem of water sharing: On a historical scale, the need to share became obvious very early, yet the question whether water users would act out of a readiness to share or only under compulsion prompted different answers over time.

This chapter explores the efforts to regulate water utilization over time in order to assess the relevance of regulatory measures regarding water sharing: Can – and should – water sharing be enforced by law? Will a lack of regulation make water confrontation more likely? Or will a degree of regulation be likely to promote cooperation thus making more water available to more people? A historic overview of the development of water regulation shows that the core problem has been addressed from various perspectives, without leading to a uniform code or rule that was found universally acceptable. It also shows that water regulation is by no means a permanent status but rather a continuous process that continues to date reflecting changing conditions, increased awareness and knowledge, and new demands.

The requirement of some form of water regulation was first realized in dry regions where climatic conditions turned water into a very limited commodity. Thus from ancient times water was perceived as a resource that required special protection by way of laws or other binding norms and rules. Water laws of some kind have emerged all over the world, establishing rules for many large rivers. Most of these rules have gradually fed into a body of water law that to date forms the basis of modern water regulation, addressing questions of ownership and access. While some of the early legal principles have survived until this day, representing universal demands on water sharing regulation, different strands of law have emerged, signalling the need for specified rules.

Early norms of water use: Roman, Islamic, Ottoman water laws

The development of water laws and norms runs parallel to river basin development. Rivers, due to their unique dynamic, have provided the basis for steady progress in water management and regulation. The earliest water laws originated from the basins of the Nile, Euphrates and Tigris, Indus, and Yellow River – the centres of early hydraulic societies that thrived on complex systems of river management.[89] Almost 2,000 years B.C. the foundation of water regulation in the region that would become

[89] Berber goes further, stressing that *water rights have been the subject of state concern ever since the earliest appearance of any form of state organization (…) the organization of the state as known to us over the last 6,000 years had its origins in water rights,* see Friedrich J. Berber: Rivers in international law. London: Stevens and Sons, 1959, p. 1. Berber has earned practical experience in the application of international water law as a legal consultant to the Government of India in the course of the Indus River negotiations in the 1950s; cf. N. D. Gulhati: Indus Waters Treaty. An exercise in international mediation; Delhi: Allied Publishers, 1973, p. 104.

known as the Middle East was laid, in the form of the Hammurabi Code on river development, resource protection, and canal operation and maintenance.[90]

The early institutional arrangements dedicated to water management, in the form of authorities and laws, don proof of the attention to water given by the rulers. Interestingly, besides the complexity of water regulation at that time, many rules were designed to react to changing conditions of water management, i.e. there was an understanding that managing water required a degree of planning and flexibility, rather than an everlasting arrangement.[91] These rules also reflect in principle a hydrological perception of rivers as a unit in the sense that water use by one person at one location might affect potential water uses by other people at another riparian location. Though the problem of international boundaries cutting through river basins was not known yet, the general awareness of a hydrological relationship between users of a river had already developed into a conceptual underpinning of water regulation.

The Roman law classified water rights on the basis of ownership of the land as either private (within the control of a private landholder, to be used without limitations or restrictions), common (*res communis omnium*, not subject to ownership, to be used by every member of the community regardless of purpose or quantity of withdrawal), or public, i.e. open to public access, but under the ownership and control of the government.[92] Here, the question of ownership was addressed from a different perspective than in the Hammurabi Code. Access to water and use of this resource was primarily bound to respective land ownership. The Roman law was extensive: besides regulating a wide array of water issues, including resource protection, rules of access and utilization were very detailed. Water was also seen as a tradable good. Ownership did include the right to transfer water, whereas the right to use did not include any further entitlements.[93] Most significantly with regard to river management, Roman law identified a *community of interests* based on the mutual dependence of riparian entities on the flow of the river.[94] In other words, cooperation in some form was identified as a relevant component of water management.

Religious norms have played an important role in the formulation of water laws. In Islam, Judaism and Christianity, water is seen within the context of a concept of society built on solidarity. Principles of caring and sharing are central to this concept, as are rules for the protection of commonly used resources. Water is identified as a commodity on which the physical survival of the community depends and which therefore has to be protected against overexploitation and waste.[95] This demand

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[90] Cf. Meredith Giordano: International River Basin management: global principles and basin practice. Oregon State Univ. dissertation, 2002, p.10; these rules, among else, covered canal and dam operation and included a liability clause requiring a farmer to pay damages in case of neglecting these rules.

[91] Giordano, p. 9.

[92] Steve Hodgson: Modern water rights – theory and practice. Rome: Food and Agriculture Organization, *FAO Legislative Studies* No. 92, 2006, p. 9-10.

[93] Dante A. Caponera: Principles of water law and administration: national and international. Rotterdam/Delft: Balkena/International Institute for Hydraulic and Environmental Engineering, 1992, p. 30-42; Antoinette Hildering: International law, sustainable development and water management, Delft: Eburon, 2006, p. 45.

[94] Andromecca-Civic, *op. cit*., p. 67.

[95] Iyad Hussein, Odeh Al-Jayyousi: Management of shared waters: a comparison of international and Islamic law, in: Naser Faruqui, Asit Biswas, Murad Bino, eds.: *Water management in Islam*. New York: United Nations University Press, 2001, p. 131-134. The main sources of Islamic law are the Quran and

requires all believers to use water in a way that will not deprive others – believers and non-believers – of their legitimate share in water. This concern reflects an awareness of the social and environmental consequences of water use, some of which have been identified in earlier water regulation, like the Hammurabi and Roman laws. Thus the religiously motivated water norms have augmented the existing body of water law by the important element of social responsibility based not merely on practical reasons but also on ethical motives.

The right to quench thirst is given priority over other uses. Water is a public good that is not to be owned privately.[96] Landowners may have control over the flow of a stream, yet they do not possess the water because – as in the Roman law – land ownership might prevent, curtail or condition water access. This provision has relevance to surface and underground water sources and also extends to upstream – downstream relationships of water users. While priority access is given to upstream users, the obligation to mind downstream users' legitimate rights – through preventing avoidable harm – remains intact.[97] As will be seen, this rule will have a role to play in modern water laws, too.

With water defined as a public good, water sharing has always been an important obligation in Judaism as well in Islam and in early Hindu water law.[98] The commodity is seen as a gift of God that deserves appreciation and may not be traded. This also implies that water must not be used as a means to exert pressure on other water users, a very important notion with regard to potential disputes over water sharing. Thus resource protection and equitable distribution are indispensable duties for every member of the community: *the concept of a community right to water – a thing that is shared and not owned – a gift from God to all people … is one of the distinctive principles of water regulation that have flowed from one legal system to the next*, as Andromecca-Civic describes the most prominent characteristics of Judaic and Islamic legal sources that in principle prevail to date.[99]

The importance given to norms for water use in most world religions also relates to the frequent occurrence of water shortages in the respective regions, most notably today's Middle East. The long absence of a centralized government and of concepts of nation is another factor, as Andromecca-Civic points out.[100] Questions of territory at that time did not have the relevance they were to receive in the colonial era. The background of ancient water norms was the community and local, rather than national or transboundary conditions. Therefore the problems attached to demarcations that cross river basins by and large were avoided.

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the Hadith of the Prophet Mohammad. See also the international conference *Water Management in the Islamic Countries,* Tehran, Iran, 19 - 21 February 2007 (http://www.irc.nl/page/31859).

[96] Caponera: Principles, *supra*, p. 69-70, stresses the detailed hierarchy of water uses.

[97] Mélanne Andromecca-Civic: A comparative analysis of the Israeli and Arab water law traditions and insights for modern water sharing agreements; *Denver Journal of International Law and Policy*, vol. 26, no. 3 (1998), p. 441 - 442, referring to Talmudic and Quranic sources; Walid Abderrahman: Water demand management and Islamic water management principles: A case study; *Water Resources Development*, vol. 16, no. 4, 2000, p. 466.

[98] Dante Caponera: The importance of water law and institutions for sustainable development. www.oieau.fr/contributions/atriob/contribution/caponera.htm (May 2007).

[99] Andromecca-Civic, *supra*, p. 450; Abderrahman, *supra*, p. 469 - 470.

[100] *Ibidem*, p. 449 ; Caponera: Principles, *supra*, p. 73.

Ottoman rule, in the 19th century, introduced centralized administration to the very same regions where these early laws originated. A major step was the codification of laws, through the *Code Méjelle*, that incorporated ancient water rules. Milestones in **civil law**, the first water laws under Ottoman rule surfaced in northern Africa. Many ancient principles remained: most importantly, water was put under state control, thus in fact remaining a public good not to be traded. This process of institutionalization also led to water commissions in place to ensure the implementation of water rights.[101] As the Ottoman Empire withered, British and French-controlled administrations in those soon-to-be independent countries upheld the *Code Méjelle* in principle, supplementing it in some form or another: public ownership, i.e. state control, remained intact, yet the institutional mechanism was altered along the lines of riparian rights established in Great Britain.[102] In this context, the institution of River Committees by the British is particularly noteworthy, as will be seen in the case of Pakistan, then part of the British Crown Colony of India.

Water law in the colonial era

In much of Europe, at about the same time, the *Code Napoléon* (1804) introduced a distinction between public and private waters that in part meant a departure from Roman and other ancient rules of water management.[103] Territory began to play a more important role in the control of and access to water sources in the light of political transitions from feudal to republican systems (beginning in France) and the introduction of private landownership. The circulation of the Napoleonic laws, in the course of the French imperial extension in the early 19th century, reached the French speaking colonies, effectively determining future water laws. The wider **civil law** trend, based on explicit water laws in all European colonial powers, would be exported to Latin America, parts of Africa and eastern Asia.[104] Most importantly, like in the Roman tradition, public waters were subject to legal authority and limitations, whereas private waters, legally belonging to privately owned land, could be used without such limitations. Most rivers would be defined as public, putting them under the authority of judges and courts.[105]

In a parallel string of development the **British common law tradition**, by contrast, rose to become the basis of water regulation in Australia, New Zealand, Canada and the U.S., India and Pakistan and in other Commonwealth countries.[106] With a lesser degree of codification, common law did not distinguish between public and private waters, as the Roman tradition would command, but stressed the special quality of

[101] Caponera: Principles, *supra*, p. 71-76, details the various different water laws that describe a complex, sophisticated mechanism of water management. The effect of the Ottoman system on water regulation remains confined to Northern African and Middle Eastern countries; the very traditional nations on the Arab peninsula, upon independence, turned to the Sharia law to guide water use and did not develop water regulation.
[102] *Ibidem*, p. 75.
[103] *Ibidem*, p. 76.
[104] Hodgson: Modern water rights, *supra*, p. 9.
[105] Hodgson, *supra*, p. 15; Caponera: Principles, *supra*, p. 75 ff.
[106] Hodgson, *supra*, p. 9. For an overview of the evolution of customary and formal laws in India see M.S. Vani: Customary law and modern governance of natural resources in India – conflicts, prospects for accord and strategies; paper for the *International Congress on Folk Law and Legal Pluralism*, Chiang Mai, Thailand, April 2002; www.panchayat.org/downloads/Vani%20paper%202.pdf (Sept. 2002).

rivers as public water sources and addressed questions of **riparian rights** derived from land ownership rights. Unlike the Roman or civil law definition of private waters, the entitlement to using river waters was bound to specified rules.

The common law line is significant as it redefines water rights from a new perspective: the riparian. While not entirely new in the sense that territory again plays an important role, it focuses on the river flow, and less on other characteristics of a river, like water quantities or quality. That appears to make water management easier, as it makes water a subject of negotiation rather than the strict and static adherence to laws. Whether this will really translate into a measurable advantage in a given case will, however, have to be analyzed with scrutiny. The doctrine of **riparian rights**, or riparianism, developed in the 19th century, established the concept of *reasonable use*, referring to household and other essential water uses. Other uses, termed extraordinary, were legitimate up to the point that the riparian rights of neighbouring land owners were not violated. The actual extent of such uses, however, remained a matter of discussion or negotiation.

The vagueness of this concept would, for the lack of codification, require legal intervention by courts or *ad hoc* institutions for the settlement of disputes as the definition of *reasonable*, at least from the perspective of modern-day scenarios of water shortage. Not addressing levels of overall water consumption, let alone water conservation, this doctrine has not lived up to the demands of water management in the era of intensive agriculture and industrial water use.[107] The basic understanding of riparianism as a state of mutual dependence of water users on both the resource and each other does appear modern. It does, however, not go far enough: water users that depend on the particular resource (a river) without bordering the river, were widely ignored, regardless of the essential requirement to use water from any available source.[108]

Consequently, a new doctrine that would address the needs and conditions of water-scarce areas and river beds evolved: **prior appropriation**. Unlike the riparian concept, the new doctrine focused entirely on water use, not on land-based water rights. Water rights based on prior appropriation stem from particular beneficial uses: the right to water from a given source, i.e. its appropriation, is bound to a form of water use considered beneficial, as opposed to waste, within a period of time considered appropriate. This version of a *first-come-first-serve* water law allows those who make use of a water source before others to satisfy their needs, while those with later claims to water (due to the time of their arrival at the source) would be left to make do with the remaining amount of water.

This trend of water law, in principle designed in the U. S. where it continues to apply in many states, in spite of some shortfalls, has given rise to a new form of water management that is considered by many to be an important answer to water

[107] Chauhan, reflecting on the river disputes in post-colonial India, stresses that *this theory or doctrine … has never been accepted as basis for, or formal application in, the settlement of (international water law) disputes*. This was pointed out by several water tribunals, e. g. the Narmada Water Disputes Tribunal which, in its 1978 report, referred to the doctrine of riparian rights as an obsolete rule that impedes the development of farm land and leads to unfair water sharing and waste; see B. R. Chauhan: Settlement of international and inter-state water disputes in India; New Delhi: Indian Law Institute, 1992, p. 24-25.

[108] S. N. Jain, Alice Jacob, Subash Jain: Inter-state water disputes in India. New Delhi: Indian Law Institute, 1971, p. 149 ff.

shortages: water rights transfers. Again somewhat typical of the common law tradition, the problems emanating from this doctrine – namely *reckless* water use by senior appropriators – have been dealt with by way of negotiation, rather than law.[109] Hardly surprising, it did not gain much relevance in international cases because the blocking of water flows could have triggered international conflict. The principle of first use would have been much more difficult to ascertain than in intra-national cases.

In a departure from the prior appropriation formula, the **Harmon doctrine** redefined water rights on the basis of **territorial sovereignty** by transforming water rights to the *de facto* possession of all water sources within a given territory, and the right to use them without any concern for downstream water users. This radical formula, developed in the U.S. in the late 19th century, proved too controversial and divisive to receive wider recognition.[110] It nevertheless entered the discussion of water distribution in some cases overseas especially in the second half of the 20th century, when decolonization made it necessary to specify water rights in a new territorial context.

The **Indus Water Treaty** of 1960 between India and Pakistan, concluding a 12-year dispute that started right after the independence of both nations, is one of the few examples: the exclusive right to withdraw water from rivers of the Indus basin was, in the form of a comprehensive treaty, given on the basis of territory to both parties. The effective partitioning of a complex river system consisting of several major rivers plus a network of canals on territorial grounds alone meant that the downstream party, Pakistan, would be cut off from the water supply from some rivers originating in India. Through a long-term programme of basin development the negative effects of the treaty would therefore be balanced, providing Pakistan with major reservoirs and canals to increase water availability. This arrangement was made possible by the strong financial commitment of several leading economies, with a view to prevent a major conflict. The need to compensate the downstream riparian nation (Pakistan) for water resources that would almost entirely consumed by India was a signal that the concept of territorial sovereignty could not be implemented without taking into account legitimate demands of downstream water users.[111] Otherwise, the cost of ignoring such consequences might have to be paid in the form of unforeseeable destruction resulting from violent conflict.

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[109] Hedgson, *op. cit.*, refers to the mining boom in the late 19th century U.S. as a conditioning factor in the formation of this water doctrine, p. 12. It was in essence a rule based on customs that reflected the economic opportunism of that era. Giordano: International river basin management, p. 15, on the legal dimension of river development in the U.S. at the turn of the century. Considered more flexible with regard to water transfers and less costly with regard to administration, water regulation based on common law principles has proved particularly successful in North America. This continent, of course, provides a rare case of two vast countries with limited average populations with abundant natural resources at their disposal. The need to share water was not felt as acutely as in many other countries until the progressive industrialization and the mechanization of agriculture by the late 19th century, greatly pushing water consumption. For an overview of the ongoing water law discourse see George W. Sherk: East meets West: a tale of two doctrines; *Water Resources Impact*, vol. 5, no. 2, 2003; www.awra.org/impact (May 2007).

[110] According to Chauhan, *op. cit.*, p. 29, most U.S. states rejected the Harmon doctrine; it was not applied in the negotiations with Mexico over the Rio Grande and Colorado River either.

[111] F. J. Berber: Rivers in international law, *op. cit.*, p. 13 ff.; B. G. Verghese: Waters of hope. From vision to reality; Delhi: Oxford Publishing, 1999, p. 327 – 328; Kerstin Mechlem: Water as a vehicle for inters-state cooperation: a legal perspective; *FAO Legal Papers Online* no. 32, 2003; www.fao.org/legal/pub-e.htm (Jan. 2008), p. 10; Sergej Vinogradov, Patricia Wouters & Patricia Jones: Transforming potential conflict into cooperation potential: the role of international water law; *UNESCO PCCP* series, no. 2, 2002, p. 28 – 19.

The case of the Indus river dispute stimulated the development of international river law. Unlike disputed rivers in the U.S. that were to be shared among elements of the federation, the Indus dispute had, at least hypothetically, the potential to escalate into an international war. The principle of absolute sovereignty would have resulted in a dead-end position for Pakistan, putting the very existence of this downstream nation at risk.

The concept of territorial integrity, later to be incorporated in essence in the United Nations Charter (Art. 2), aimed at strengthening the sanctity of international borders and protecting legitimate interests of nations, thus protecting state sovereignty by laying down principles of international relations and international peace. The new theory of water rights effectively redefined the critical distinction between upstream and downstream water users. This aspect is crucial for several reasons: first, the status of water sources as an essential requirement was stressed in a more profound manner than before; second, the demand for water was considered equivalent to a human right which, if withheld, could bring drastic consequences not only for those who were denied their share of water, but also for those who blocked water supplies. In other words, a community of interests was implicitly established, acknowledging that all water users were linked by mutual dependence on water resources. Furthermore, the fact that the integrity not only of nations but of river systems, too, was outlined in this theory foreshadowed important reforms of water law.

Modern water law: from territory to river basin

Territorial sovereignty began to recede as a major factor in water rights development as a result of the understanding of river basins as indivisible entities. The natural flow of a river would have to be preserved in order to allow all riparian states or sub-national units to fulfil their legitimate demands. Interventions, through barrages or canals, could impede the natural flow of a river and almost automatically reduce, at least temporarily, the amount of water available to downstream users. The principle of equality between upstream and downstream users and their respective claims could only be sustained if the river was managed and developed in a comprehensive manner, taking into account potential effects on all riparian water users.

The theory of **equitable apportionment** centred on the concept of rivers as complex natural drainage systems. To draw maximum benefits from such basins would mean to apply a cooperative, or at least coordinated, approach to river use and development. Equitable use, or apportionment, would not necessarily mean equal shares in quantitative terms, but equal rights to benefit from the water source.[112] Apportionment, unlike appropriation, indicates that water users would be entitled to utilize rivers according to their needs, and rivers, like other water sources, were meant to serve these purposes, rather being the subject of landownership or political control. In a sense, the status of water sources, and especially rivers, was elevated to a position above that of individual governments or rulers.

This new perception had far-reaching consequences in legal, political, economic, social and environmental terms, though not all of these consequences became reality at the same time. In the post-World War II setting, the parameters of water law were

[112] Chauhan: Settlement, *op. cit.*, p. 31 ff.

development-related: the demand for energy, agriculture and industrial production was expected to rise sharply. Water was defined as the major driver of progress towards prosperity and defeating hunger and deprivation. The motivation to reform water laws stemmed from a new understanding of rivers as integrated natural systems as much as it was pragmatism. The role of rivers was to be defined by their collective economic, social and political benefits to the respective societies within or near their basins.

As Friedrich Berber points out, treaties on river basins, as examples of customary law, have contributed to the body of international law on water. At the same time, they reflect the state of legal discussions on water law as they have themselves been influenced by theories and doctrines of water management.[113] This on-going dynamic process has gradually fed into national as well as international water law in different forms.[114] In some countries, detailed water laws embody these norms, whereas in the case of many large rivers, particular treaties outline the principles of collectively utilizing water sources.[115]

The end of the Second World War saw the beginning of a new dialogue on international law, stimulated by the establishment of the United Nations. The need to formulate norms for river basins arose from the transformation of many countries, namely the former colonies, as a result of the outcome of the war. Cases like the Indus River, to be shared between newly independent India and Pakistan, posed challenges to the primary goal of the new international system, the preservation of peace and stability.

The process to establish water norms that would be globally acceptable thrived on the intensifying dialogue within the International Law Association. The ILA, itself not formally integrated into the UN system, represents the state of institutionalized communication on water laws. Like the International Law Commission, a United Nations body, it is dedicated to the development of international law, including its interpretation and codification.[116]

The discussion of the concepts of equitable apportionment and drainage basins, in the course of several conferences of the ILA between 1958 and 1966, raised critical questions as to the precise definition and treatment of drainage basins and equitable

[113] Berber: Rivers in international law, *op. cit.*, p. 129ff. The mere number of such treaties might, however, also be interpreted as a lack of globally binding rules, as Berber suggests.

[114] Among the first institutions for the discussion and promotion of water law on an international level is the International Law Association (ILA), founded in 1873, that has held 72 conferences on various fields of international law to date and issued widely renowned reports of its findings.

[115] The importance of river basin treaties is indicated by their growing number, especially in the 19th and 20th centuries, cf. the Oregon State University's Transboundary Freshwater Dispute Database (TFDD) by Aaron T. Wolf, at: http://terra.geo.orst.edu/users/tfdd/documents/allocations/annex1.html. The World Bank has focused on the relevance of river treaties with a view to promoting cooperation and stability in international relations, especially in Eastern Europe, Africa and Southern Asia; s. World Bank: International watercourses: enhancing cooperation and managing conflicts; *WB Technical Paper* no. 414, 1998.
Two norms that have received widespread recognition in many river treaties are the prevention of damage as a result of one-sided, uncoordinated water withdrawals and the potential economic benefits from preserving the natural condition of rivers; cf. Chauhan: Settlement, *supra*, p. 37-42.

[116] Cf. Chauhan, *ibidem*, p. 42, citing the growing acceptance of the Rules at the ILA conferences in 1976 and 1980.

sharing of water.[117] Though an agreement could finally be reached, the complexity of river basins in legal terms as well as the problem of sharing water in an equitable fashion remained as much a challenge as the legal status of this agreement.

The Helsinki Rules on the Uses of Waters of International Rivers, known simply as the Helsinki Rules, emanated from the ILA process in 1966.[118] This set of rules, laid out in 37 articles, was a first of its kind as it represented a common ground: all basin states should benefit from a river that borders their respective territories. The Rules – applicable to all drainage basins *except as may be provided otherwise by convention, agreement or binding custom among the basin states* (Art. I) – were to be taken as a formula that would grant that *each basin state is entitled to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin* (Art. IV).

This modification of the equitable apportionment theory, termed the **equitable utilization theory**, meant that equitable shares would not have to be equal in quantitative or qualitative terms, but reasonable and equitable in the context of several factors: geography, hydrology and climate, historic utilization, economic and social needs, potential alternatives, and compensation (Art. V).[119] This list of factors to be taken into consideration upon determining the actual shares includes the option of water transfers from one basin to another as well as the utilization of alternative water sources, like groundwater. In an implicit reference to the principle of territorial integrity, harmful acts, especially water pollution, are to be avoided (Art. V (k), X).[120] The solution of disputes is referred to negotiation, arbitration or tribunals.

The Rules reflected the state of international law on rivers, yet they were not a law in the strict sense of law, as Caflisch points out.[121] The need to have a law applicable on a global scale in times of growing shortage of water – and potentially, a growing number of water-related disputes – prompted the UN to seek a revision of the Helsinki Rules. The ILC, after 21 years of investigations and discussions, presented a draft which served as the basis for a convention on international watercourse management. The heated debates that followed illustrated more than anything else how serious the issue at stake was perceived to be by the members of the UN.

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[117] Charles Bourne: The development of international water resources: The 'drainage basin' approach, in: Patricia Wouters, ed.: *International water law. Selected writings of Professor Charles B. Bourne*; London: Kluwer, 1997, p. 5-8. In a parallel development, the Institute of International Law had arrived at a similar concept, a resolution on non-navigational uses of international waterways that underlined the importance of equitable utilization, ahead of the ILA's Helsinki Rules, yet with much less public attention.

[118] The text of the Rules is reproduced at: www.internationalwaterlaw.org/IntlDocs/Helsinki_Rules.htm. The Rules were adopted at the 52nd Conference of the ILA at Helsinki, 20 August 1966. The discussion, after their adoption, was by no means over, as Bourne, *supra*, stresses.

[119] The text of Art. V of the Rules appears vague as it lists *relevant factors which are to be considered, but are not limited to* …, adding that (in Art. VI) *a use or category of uses is not entitled to any inherent preference over any other use or category of uses*.

[120] This should not be read as a principle or obligation but only as *an element, but not the decisive element, for measuring equitable and reasonable utilization*, according to Lucius Caflisch: Regulation of the uses of international watercourses, in: Salman Salman and Laurence Boisson de Chauzournes, eds.: *International watercourses. Enhancing cooperation and managing conflict*; Washington, D.C.: *World Bank Technical Paper series* no. 414, 1998, p. 8-9.

[121] Caflisch: Regulation, *supra*, p. 9-11.

The main issues that caused division during the negotiation process were

- the status of river agreements and treaties concluded before the enactment of the Convention;
- the possibility to arrive at agreements that would deviate from the Convention in the future;
- the status of partial agreements between some riparian states that would ignore potential effects on other states that are not signatories of the agreement;
- the definition of equitable and reasonable utilization;
- the settlement of disputes.

Behind the concerns voiced by many governments was a clear determination not to threaten existing arrangements – *per se* norms of at least quasi-legal standing – and thereby maintain an established state of bilateral relations with other riparian nations.[122] The potentially destabilizing effect of water conflict was obviously realized by many governments. As the existing norms of water management were considered sufficiently solid, the motivation to cooperate over water, at this stage at least, appears to have been limited, despite of declarations to the contrary. The upstream-downstream dilemma was the most prominent symptom of this ambiguity.

Beyond Helsinki: equality and reasonable use

When the draft convention, in its final form, reached the UN, in 1997, it received the approval of the General Assembly.[123] This achievement, at once a milestone towards establishing a global water law and a workable present-day orientation for on-going negotiations, did also highlight the difficulties over the above critical points once again.

The **Convention on the Law of the Non-Navigational Uses of International Watercourses**, by its official name, represents the status quo of international law on rivers. By its formal status, as approved by the UN General Assembly, it is non-binding; to become a binding law, it would have to be passed by the UN Security Council. This formal status alone, however, does not indicate the actual relevance that the Convention will have on existing water arrangements and their implementation, nor on the conclusion of such arrangements in the future. McCaffrey, a former Special Rapporteur for the ILC during the drafting of the Convention, argues that (the Convention's) *influence is more likely to derive from its status as the most*

[122] The very definition of watercourse system or drainage basin was in dispute until the final stage of the draft, especially with regard to the introduction of canals and link canals that would extend the basin area and even join several basins, thus widening the riparian community; eventually, vague yet all-encompassing concepts were given preference – *comprehensive enough to cover all the elements involved in any given case and neutral enough for riparian states not to think that their interests were being neglected*: Yearbook of the International Law Commission 1983 Vol. 1, p. 186, para. 18. As one observer noted, the Helsinki Rules might have been more advanced in some sense than the ILC convention, as the former defined rivers as hydrological units, whereas the latter applied a geographical concept, *ibid*., para. 29.

[123] Document text reproduced in: Patricia Wouters: National and international water law: achieving equitable and sustainable use of water resources, in: Water International, Vol. 25, No. 4, 2000, p. 507ff. Wouters, p. 504, points out that one of the strengths of this concept lies in its flexibility, allowing for *unilateral development and power politics … where the substantive rules and procedural requirements … are missing*. In that case, of course, the potential negative consequences, like conflict over water, will have to be borne by all parties.

authoritative statement of general principles and rules governing the non-navigational uses of international watercourses and its *success does not depend on whether it enters into force*.[124] The Convention, regardless of its nominal status, has evoked a growing academic dialogue on the importance of water management, water sharing and water regulation in light of rising demand for water.

In the Convention, the problem of the upstream – downstream discrepancy, central to the stated goal of **equitable and reasonable utilization**, was addressed in an indirect form only, following the course set by the Helsinki Rules. Factors to be observed by all basin states are

- natural geographical, hydrological, climatic and ecological factors
- social and economic needs of the states concerned
- the dependency of people within the basin
- effects of utilization by one state on that of another
- existing and potential future uses
- conservation and development of the river, including the respective costs
- availability of alternatives.

In essence, these factors, detailed in Article 5 of the Convention, are in line with Art. 5 of the Rules. The obligation not to cause **significant harm** (Art. 7) especially (but not exclusively) points at upstream states, requiring all riparian states to *take all appropriate measures to prevent the causing of significant harm to other watercourse states*, in other words, measures to protect downstream states. A definition of *significant harm* is not given, but has to be interpreted in the context of Art. 5, i. e. the right to utilize a river in an equitable and reasonable manner. In the case where significant harm has been caused, *all appropriate measures to eliminate or mitigate such harm*, including compensation, are to be taken.[125] *The requirements of vital human interests* are to be given special regard (Art. 10).

The lack of precise definitions and directions, especially with regard to central demands of the Convention like equitable and reasonable utilization, involves the risk of arbitrary interpretation. This deficit can render some provisions of the Convention obsolete in a given case because the state actor easily evades accountability without openly counteracting respective provisions. As Beaumont points out, the list of *factors relevant to equitable and reasonable utilization* (Art. 6) lack priorities as each factor may be considered equal by any riparian state involved. Thus the provision is subject to open-ended debates undermining the main purpose: cooperative river management. The Convention's practical relevance suffers because it may be too difficult to establish a common ground on all the factors that actually are important in a particular case (river).[126]

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[124] Stephen McCaffrey: The contribution of the UN Convention on the law of the non-navigational uses of international watercourses; *International Journal of Global Environmental Issues*, Vol. 1, No.3-4, 2001, p. 250.

[125] This clause has been elevated to a separate, more detailed Article (7), from the previous provision within Art. 5 of the Rules, reflecting the growing attention given to this principle. Wouters points out that – contrary to the Helsinki Rules – the causing of significant harm might not constitute a breach of international law. Patricia Wouters: The legal response to international water conflicts: the UN watercourse convention and beyond; *German Yearbook of International Law* 1999, vol. 42, Berlin: Duncker & Humblot, 2000, p. 310.

[126] Peter Beaumont: The 1997 UN Convention on the law of the non-navigational uses of international watercourses: its strengths and weaknesses from a water management perspective and the need for

Interestingly, while the spirit of cooperation has been given special mention (unlike in the Rules), the issue of compensation has been treated with less attention. This may be read as reluctance on the part of some riparian governments to quantify water utilization and respective damages, thus opening a Pandora's box to complex legal battles. More likely, it was not elaborated in more detail because governments, through the agreements they would reach within a particular basin, would prefer to reserve their political freedom to arrive at a mutually satisfactory solution in such a case.

The overall picture of the Convention is that of a compromise. While equitable *sharing* (Art. 4 of the Rules) has been replaced by equitable *utilization* (Art. 5 of the Convention), **cooperation** is stressed as a *duty* founded in the collective interest to protect the watercourse as an ecological and hydrological system (Art. 5 of the Convention). As Scheumann and Klaphake point out, the delegates to the General Assembly clashed alongside the upstream – downstream divide of interests: downstream parties tended to stress the prevention of harmful activities whereas the upstream parties voted against unacceptable limitations on upstream water utilization, thus defining *equitable and reasonable* in an opportunistic sense.[127] In principle, to untie this knot would have meant to make precise statements in quantitative and qualitative terms. But that would only be feasible for individual rivers, not for rivers on a whole. As a result the clauses of the Convention are not as strict as some parties would have wanted them to be. Cooperation is but an appeal, not an obligation in legal terms, and there is no penalty for ignoring this appeal or for departing from the general principles laid out in the Convention. The exchange of river data as a means of river protection points as much at cooperation as it points at the environmental and economic dimensions of river management (Art. 9 - 18).

The settlement of disputes, in both the Rules and the Convention, is to be conducted in a peaceful manner, through negotiation or arbitration (Art. 33).[128] This provision is the lengthiest in the Convention, and it differs in some aspects from the corresponding articles in the Helsinki Rules (Art. 26 – 37). Most importantly, the Convention stresses the obligation of each basin state to work towards a peaceful, mutually agreeable solution of disputes, whereas the Rules merely *recommend* state governments to follow a peaceful course. This change in wording throughout the provision is significant and is to be seen in line with serious demographic and economic changes in many large river basins that foreshadow mounting pressure on existing water sources.

The procedure envisaged to settle disputes clearly underlines the sovereignty of riparian nations as the chief actors in all matters relating to river management. Negotiations are the primary instrument to arrive at an agreement, as each riparian state is entitled to request negotiations or the appointment of a fact-finding

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new workable guidelines; *Water Resources Development*, vol. 16, no. 4, 2000, p. 482. Kliot, *supra*, p. 266.

[127] Waltina Scheumann, Axel Klaphake: The Convention on the law of the non-navigational uses of international watercourses. Bonn: Deutsches Institut für Entwicklungspolitik, 2001, ch. 2.2.3.

[128] The formulation of this Article (33 in both the Rules and the Convention) is stricter in the Convention: *parties concerned **shall** seek a settlement .. by peaceful means*; the Rules simply **recommend** the states to form a commission etc.: *It is recommended that the states concerned agree to submit their legal disputes* to a tribunal etc. For a comprehensive comparison: Michelle R. Sergent: Comparison of the Helsinki Rules to the 1994 UN draft articles: Will the progression of international law be dammed? *Villanova Environmental Law Journal*, vol. 8, no. 2, 1997.

commission. This commission is to be in charge of settling the dispute. The high status of such a commission is indicated by the demand that its members be allowed access to the territories concerned and entitled to obtain all relevant information. Its report is to be seen as a binding decision to be implemented by the parties involved. Only in cases where a commission is unable to reach a solution, a supranational body may be resorted to, in the form of the International Court of Justice or an arbitrary tribunal. This means that state governments retain control over the process of settling a dispute. By choosing to establish a tribunal, they can avoid the International Court of Justice which would otherwise have to be involved.[129]

Aspects of resource preservation and environmental rehabilitation have gained due mention in the ILC Convention, reflecting growing international concerns over the state of water resources.[130] Rivers as ecosystems in their own right (Art. 20 – 24) have not been mentioned in the Helsinki Rules at all. The protection of water sources is assigned to the governments of riparian states as an element of their individual national responsibility, yet within the context of their riparian status: In order to apply appropriate measures for the protection of rivers, *watercourse states shall, at the request of any of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse* (Art. 21). Accordingly, the exchange of information on existing or planned water projects that might have an effect on other riparian states has obtained greater importance in the Convention (Art.11 – 19).

In sum, the Convention can be credited with establishing a *modus operandi* and a set of *guidelines* (Caflisch) that have received the widest possible recognition. [131] This fact may be more important than its formal status which is below that of a binding law.[132] The legal position of sovereign states – both as upstream as well as downstream parties – remains unchanged and unchallenged. To realize the virtues of cooperation is as much a prerogative of the sovereign state as the right to forego them. Rivers, by their hydrological nature, seem to induce riparian states to cooperate in order to reap benefits. These benefits may come in the form of economic potentials, direct gains from power generation or indirect gains from preventing costly environmental damage from floods. The scope and quality of cooperation is to be decided by the parties concerned. That also applies to existing treaties. The fact that, as Barandat observed, most states articulated particular national interests and preferred the *ex post* sanctioning of existing treaties does not

[129] Patricia Wouters: The legal response to international water conflicts: the UN watercourse convention and beyond; *German Yearbook of International Law* 1999, vol. 42, Berlin: Duncker & Humblot, 2000, p. 314, 316. The voting record of the Convention shows that, while many countries agreed on the basic principles of cooperative river management, some either preferred stronger rules regarding dispute settlement or demanded that this procedure should remain a prerogative of the parties concerned.

[130] The Convention's reference to environmental concerns is a direct outcome of the first UN Conference on Environment and Development (UNCED, Rio de Janeiro, 1992). Cf. Beaumont, *supra*, p. 478.

[131] Caflisch: Regulations, *supra*, p.10: an agreement on whether the Convention would have to be taken as *ius cogens*, or imperative law, could not be reached; instead, a "concession" was entered into the Convention, guaranteeing the status of existing treaties (Art. 3), yet in a vague manner.

[132] The WWF has called for a global water law – see http://assets.panda.org/downloads/wwf_un-watercourses_brochure.pdf (August 2008) – based on the UN Convention on the Law of the Non-navigational Uses of International Watercourses (1997).

as such curtail the Convention's standing.[133] The same countries would be the first not only to realize potential gains but also to pay for potential losses emanating from their river management. The national interest is not necessarily a counterpart to the interest to preserve a river system.[134]

Evaluation: the scope of the UN Convention

The water norms presented above have evolved into a framework not only for river basin management but for international relations over water, too. In the form of the UN Convention, the most comprehensive body of law has been established so far. The Convention is meant to be a set of guidelines to augment national laws and river basin treaties.[135] Individual riparian nations will remain, in the strict sense of the word, masters of their laws regarding water regulation. If states decide to ignore the Convention or act contrary to these guidelines, they may do so without automatically being forced by a UN Security Council move. The sovereignty of individual states remains untouched. It continues to be the deciding factor as laid out in the UN Charter. It is the governments of these states that are to conclude agreements on particular river basins, with detailed provisions that reflect the specific conditions of a given river.

The Convention implicitly promotes the conclusion of such agreements (Art. 3). While some governments have suggested that the establishment of a binding universal water law should be the ILC's objective, others have stressed the necessity to arrive at a universally acceptable basis of future river treaties, rather than making them obsolete. It appears doubtful whether such a global water law, with all necessary details, would in fact be feasible. To have an effect on river management practise, a global law might not be essential, as long as a commonly accepted set of rules exist to which all parties may refer in case of dispute. As Salman points out, the growing number of river treaties reflects a widespread awareness of the relevance of water norms in terms of progressive river utilization.[136] While disputes do exist over many river basins, very few have shown a tendency to escalate into violent conflict. That may be seen as a sign that the spirit of cooperation, as envisaged in the Convention, has taken hold. Some experts have taken a more cautious position, warning of the threat of conflict over water against the backdrop of growing water scarcity. Wouters points at river basins that lack binding agreements, like the Euphrates-Tigris (Turkey, Syria, Iraq) or those with agreements in place that have proven insufficient, like the Jordan River (Israel, Syria, Jordan, Palestine).[137]

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[133] Jörg Barandat: Wasser – Kooperation oder Konfrontation? Baden-Baden: Nomos, 1997, p. 413. The author participated in the discussions of October 1996 as an observer.

[134] The term *interdependence* has been introduced in later ILC discussions on the Helsinki Rules to describe the relationship of riparian states regarding groundwater aquifers that belong to a basin system (*hydraulic interdependence*). This term – applied in Article 2 of the ILC Seoul Rules on International Groundwater, 1986 – has not been entered into the UN Convention of 1997. See Kliot, *supra*, appendix 3, p. 286, for an excerpt.

[135] McCaffrey: The contribution of the UN Convention …, *supra*, p. 252.

[136] Salman A. Salman and Laurence Boisson de Chazournes: International watercourses: enhancing cooperation and managing conflict, in: S. Salman and L. Boisson de Chazournes, eds.: *International watercourses. Enhancing cooperation and managing conflict.* Washington, D.C.: World Bank, 1998, p. 168-170.

[137] Patricia Wouters: The legal response to international water conflicts: the UN watercourse convention and beyond; *German Yearbook of International Law* 1999, vol. 42, Berlin: Duncker & Humblot, 2000, p. 297-300.

When applied to particular river basins, the limitations as well as the potential of the Convention become obvious. Citing the cases of the Nile, Yarmuk-Jordan and Euphrates-Tigris rivers, Kliot states that neither the principle of equitable utilization or cooperation has played an important role in the management of these rivers, thus increasing the threat of violent conflict.[138] To establish quantities of water to be allocated to users even where agreements are in place may be very difficult as hydrological and climatic factors are subject to unforeseeable changes. Kliot stresses that – as provided in both the Helsinki Rules and the Convention – the factors to be taken into account regarding equitable utilization cannot simply be given equal importance at any time; instead in drought conditions, climatic factors would have to be given priority over other factors. The damage caused to co-riparians on the Nile as a result of Egyptian water projects would fall under the compensation provision in Article 7 of the Convention, yet many communities have instead been displaced and relocated to other areas, often without equivalent economic opportunities. The option of alternative resources (Art. 6 g) could not be used by some of the poorer riparian countries simply because of a lack of funds to develop them.

Wouters points at the built-in resilience of the Convention that allows *a flexible rule governing legal entitlement, with the added requirement of preventive behaviour supplemented by a comprehensive set of relatively detailed procedural rules*.[139] This flexibility would leave room for particular provisions, either to specify those outlined in the Convention, or to add further provisions.

In sum, the above criticism underlines both the importance of the Convention as a set of guidelines and the relevance of individual river agreements. The ongoing discussion of water laws in general and the Convention in particular can be summarized by **two antagonistic positions**:

a) the drive to regulate water management through binding global rules,
b) and the drive to retain final control over water regulation with the governments concerned.

Both are generally motivated by an awareness of the consequences of growing water shortage.

The Convention, though not covering all aspects of water utilization, does play an important role as it *defines the legal entitlement to water and identifies the rights and obligations tied to water use*.[140]

As the UN Convention of 1997 focuses on international watercourses and rules to be observed by the respective riparian states, it is not limited to state-to-state interaction over river management but implicitly includes **intra-state action**, too (Art. 1, 1). The perspective of river management established in the Convention is that of the river, i.e. the river is identified as a unit that requires coordinated management (Art. 2a). As a result, the UN guidelines in principle also apply to the case of the Indus River and the provinces of Pakistan which share its waters. That means that agreements concluded between the riparian governments – national and sub-national – should adhere to the principles outlined in the Convention. The riparian nations of the Indus Basin, namely

[138] Nurit Kliot: Water resources and conflict in the Middle East. New York: Routledge, 1993, p. 266-270.
[139] Wouters: Legal response, *supra*, p. 320.
[140] Patricia Wouters: The relevance and role of water law in sustainable development of freshwater: from “hydrosovereignty” to “hydrosolidarity”; *Water International,* vol. 25, no. 2, 2000, p.203.

Pakistan and India, have abstained from the vote on the Convention.[141] India stated that the provisions on dispute settlement curtailed the autonomy of the central and state governments of India to employ individual instruments of dispute management, as envisaged in Indian law, like in the Inter-State Water Disputes Act (1956). Pakistan, on the contrary, had expected the provisions of the Convention to be stricter. Both countries, as will be seen in the discussion of the post-1947 dispute, have developed a specific mechanism to handle open questions emanating from a treaty arrived at in 1960. This treaty is still in place, even though open issues between the two sides remain to be solved. Both sides have adhered to this agreement ever since, making the Indus Waters Treaty an often cited example of a solid water agreement.

Conclusion: the relevance of water law

The importance of the UN Convention as a global water law is reflected by the fact that it is the most comprehensive modern water law. It covers more elements of water management than previous norms of water management. It applies a long-term perspective focussing on future demand within the context of accelerated development and the need for environmental rehabilitation.

Through the General Assembly of the UN it has obtained a higher status than any other water law. Though not all UN member states have adopted it yet, the Convention's importance is expected to rise by the number of governments adhering to it. It is, however, not the only water law of global relevance. Many other norms remain in place having proven their suitability in a number of cases.

The Convention has not been adopted by all riparian nations. The settlement of the Jordan River dispute has progressed, yet through bilateral and multilateral negotiations and agreements and without explicit adherence to the Convention's principles.[142] Some of the principles of the Convention were heeded in this process, like the no-harm rule; disputes were settled not by a specialized facility but by direct talks. The norms formulated in the Convention may not be implemented in the form of precise rules. As Jägerskog suggests, their main effect lies in the **implicit adherence** by a growing number of governments.[143]

For the management of large rivers water rights have become more and more important, as the discourse on sustainable water use shows. These rights have their foundation in the legal norms discussed above and in economic propositions on efficient river utilization. The increasing demand for water that stimulates the ecological debate osn water management has also given rise to a wider dialogue on water rights, as will be seen in the next chapter.

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[141] The voting record is cited by Wouters: The legal response …, *supra*, p. 314. The stated reservations of both countries will be discussed in the empirical section of this study.

[142] Tony Allan: Middle Eastern hydropolitics: interpreting constructed knowledge (review article); *London School of Oriental and African Studies (SOAS) Occasional Paper series*, no. 18 (no date); www.soas.ac.uk/waterissues (July 2007), p. 2. This dispute will be discussed further in the chapter on water shortage and water conflict in this section.

[143] Andras Jägerskog: Why states cooperate over shared water: the water negotiations in the Jordan River Basin; Linköping: Linköping University, 2003, p. 90.

II.2 Entitlements, ethics and markets

Is water everybody's property – or nobody's? Does it belong to the state or the government or the nation as a whole? Is it priceless or "worthless"? Can it be sold and traded or is it a legally protected public commodity which each citizen is entitled to claim? Do water rights eliminate ownership rights? Is an entitlement to water limited to its economic utilization? The basic question – who is allowed to get water, where and how - has received renewed attention as a result of a growing human rights awareness and new approaches to socio-economic development based on cooperation, equality, and environmental sustainability. This chapter examines the role of water entitlements, ethical norms and market approaches vis-à-vis the problem of water sharing: Can they provide effective guidelines for water sharing?

Water as a human right

Is there a human right to water? Human rights define essential, inalienable and indispensable entitlements. A universal right to water would have inevitable consequences for the access to water by people all over the world. It could, at least hypothetically, serve as a political-legal instrument to empower people to demand that water is made available. Governments would have to commit administrative bodies to ensure regular water supply. A legal entitlement would not automatically increase the supply of water, especially in arid regions where water shortage is common, irrespective of a government's readiness and capacity to implement such a human right.[144] Even where water laws are in place and access to water is unhindered, the actual availability of this vital commodity is prone to natural obstacles or the lack of economic and technical resources to improve its supply. In this case, a right to water would positively prevent sections of the society from being denied their share in common water resources. Water could not – or at least not easily – be used as an instrument of power, neither on a national nor on an international scale. This is important because even where water supply is plentiful, not all water users can satisfy their needs.

The United Nations have identified water as a critical commodity on a number of occasions. **The Universal Declaration on Human Rights** (1948) does not name water explicitly, but stresses everyone's *right to life, liberty and security of person*.[145] That would imply access to water – in sufficient quantity and quality – with regard to the water resources within a person's reach because life is not possible without water. Acts that block that access would therefore be in violation of this principle. In the International Covenant on Economic, Social and Cultural Rights (1966), the

[144] Formulating a potential human right to water indispensable to prevent *large-scale human misery and suffering – every human being has an inherent right to have access to water in quantities and of quality necessary to meet their basic needs* – Peter H. Gleick concedes that such legal protection would probably not, or at least not immediately, improve conditions. One obvious reason is the cost involved. According to Gleick, its main purpose might rather be to further *a redirection of current priorities at international and local levels*. See: The human right to water; proceedings of the seminar *Towards upstream-downstream hydrosolidarity*, Stockholm International Water Institute, 14 August 1999 (www.siwi.org).

[145] Document text: www.un.org/en/documents/udhr/ (May 2008).

members of the General Assembly pledged to grant all peoples to *freely dispose of their natural wealth and resources* and stressed that *in no case may a people be deprived of its own means of subsistence*. The International Covenant on Civil and Political Rights (1966) reiterates this pledge.[146] Both agreements do not *per se* represent a law of the status of a UN Resolution, though, but do signal a universal awareness of the control over natural resources as an essential condition of development and part of national sovereignty.

The Declaration on the Right to Development, adopted by the UN General Assembly in 1986, extends this perception to the *rights of people to exercise full and complete sovereignty over all their natural wealth and resources* in the context of a new understanding of development as a *comprehensive economic, social, cultural and political process*. Development, in these terms, is an *inalienable human right*. [147] This means that all factors relevant to development deserve protection. That would, in theory at least, extend to territorial ground and surface water systems. Like the Covenants, these provisions are not binding international law but recommendations.[148]

The UN Millennium Declaration of 2000 explicitly defines development as a human right. By detailing all components, including natural resources, and aspects of resource management and utilization, it implies water (chapter V).[149] The protection of *our common environment* is termed an act of collective responsibility (chapter IV). This often cited Declaration, though it is not a binding regulation, has gained importance and status in an informal way, by being referred to in many political and scientific *fora*, influencing many national and sub-national policy decisions and agendas.[150]

Water, in sum, has been defined as a qualified or relative human right by its use for development. It has also been linked to political self-determination. It has, however, not yet formally been awarded the status of a human right as such. The same is true for similarly essential resources and commodities pertaining to a healthy environment, like air and soil. The Security Council has so far avoided a debate on the role of water with regard to its role in development and international peace, even though water has been named a potential object of conflict in many UN-sponsored publications.

Parallel to the agreements cited above, UN-affiliated institutions like the **Committee on Economic, Social and Cultural Rights** have given water a special status.[151] The prestigious World Water Forum recently acknowledged that water is *a basic human need*, an indispensable commodity, and that everybody's access to safe water sources is essential for public health and socio-economic stability. It stopped short of declaring water a human right that everybody would be entitled to access and

[146] Document texts : www2.ohchr.org/english/law/
[147] Document text: www.un.org.
[148] Günther Unser: Die UNO. München: Beck 1992, p. 40-41 (in German).
[149] Document text: www.un.org/millennium/declaration/ares552e.htm.
[150] S. Marchisio argues that sustainable development, as demanded in the UN declaration, will eventually lead to defining water as a human right; in: Sustainable management of water resources and international law; *Water Science and Technology,* Vol. 42, No. 1, 2000, p. 247.
[151] Salman A. Salman and Daniel Bradlow: Regulatory frameworks for water management. Washington: The World Bank, 2006, p.158. The World Health Organization, in its Constitution (1946), has added every person's right to health to its list of fundamental rights.

consume without conditions.[152] This omission received widespread criticism from social and environmental NGOs and many governments from arid countries. A number of Latin American, African and Asian governments declared water a human right in what was meant as a counter-declaration, in opposition to the official Forum declaration:

> *We recognise that access to water and sanitation is a human right and we are committed to all necessary actions for the progressive implementation of this right.*

The European Parliament declared water a *fundamental and universal right,* and the head of the UN General Assembly explicitly termed access to water *a public trust, a common heritage of people and nature, and a fundamental human right. I am convinced that we must challenge the notion that water is a commodity to be bought and sold on the open market.*[153] The EU Water Framework Directive (WFD, 2000) explicitly treats water as a resource that, though it may be transferred, requires special protection.[154]

The UN Declaration recognizes the authority of state governments over matters of national concern, including public health and economic activities. While expressing the universal meaning of common human rights, the UN Declaration is not designed to restrict the authority of state authorities. On the other hand, a human right to water would not automatically put those people who suffer water shortages in a position to claim adequate water services or access to this resource, nor would it as such improve water availability. A government's inability to provide sufficient water would in any case have to be assessed against a range of factors affecting water availability. As such, water would require a far more complicated handling than other human rights. A government failing to supply water may not simply be charged with a violation of universally valid human rights when adverse climatic conditions hamper the operation of public utilities.

The process to treat water as a human right has since continued on an indirect track aimed at raising pubic attention to the issue. The UN bodies like WHO have proven particularly vociferous in pushing governments to commit themselves to better water access, water quality and services like sanitation. It has been recognized that political measures to implement international water standards hinges on locally available financial and material resources.[155] The demand to declare water a human right, an entitlement, remains high on the agenda of international organizations and NGOs for a particular reason that has surfaced in recent years: the fear that market-based approaches to water management might exclude poor segments of a society from essential water services or subject them to inadequate water supplies.

Thus water must, as WHO and other organizations demand, be defined as an entitlement and a matter of government responsibility. Governments are called upon to provide water as part of their general duty to care for their citizens.[156] Water should

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[152] Quoted in Hilmi Toros: Troubled waters hard to bridge. *Inter Press Service*, 22 March 2009; www.ipsnews.net, www.worldwaterforum5.org (Istanbul, March 2009).
[153] Miguel D'Escoto Brockmann, UNGA, quoted in Toros: troubled waters … (above).
[154] Document text: http://europa.eu.int/comm/environment/water/.
[155] WHO: The right to water Geneva: WHO, 2004, p. 9.
[156] Many countries have entered environmental and public health protection in their constitutions; over 100 cases are cited by Dinah Shelton: Human Rights, Health & Environmental Protection: Linkages in Law & Practice; Geneva: WHO, *Health and Human Rights Working Paper Series* No. 1, 2002, p. 22.

therefore not be seen as a subject of international aid or charitable work. Linked to the prospect that poor people might suffer from deficient water supplies is the threat of water, or rather the lack of it, becoming a catalyst of societal division and unrest.[157]

Water ethics

In all major religions water holds a high status as a source of all life. It has an important religious function in Buddhist, Christian, Hindu, Islamic and Jewish rituals.[158] From the purifying effect of bathing in the Ganges, to baptizing, to cleaning oneself before prayer, water is indispensable in the daily practice of religion of billions of people as it symbolizes purity. The multi-faceted importance of water found its expression in political-legal moves to protect its status.[159] Interestingly, water's religious importance has not prevented the contamination, misappropriation or over-exploitation of water sources. The multi-faceted economic value of water has developed into an antipode to the cultural or ethical role of water early on.[160] The economic perspective of water has retained a dominant position to date, though it has been challenged by an increasing public awareness of the ecology of water resources and the ethically motivated responsibility to protect them.

Partly as result of this ethical understanding, economic development has come to be defined on a broader scale, including social and environmental aspects that directly or indirectly affect economic activities and performance.[161] This new orientation

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[157] WHO, *ibidem*. Poorer people tend to pay a proportionately higher price for water than richer segments of a society; see Patrick Webb and Maria Iskandarani: Water insecurity and the poor; Bonn: ZEF/Center for Development Research, 1998, p. 28-33.

[158] Ira Stubbe-Diarra: Die Bedeutung des Wassers in den Kulturen Asiens; in: Thomas Hoffmann: *Wasser in Asien*; Essen: Asienhaus, 1997, p. 82 – 99 (The importance of water in Asian cultures, in German).

[159] Referring to the Human Rights Charter of the UN (1948) cited before, Klawitter and Quazzaz term this *consensus on human rights a global moral conscience*. See Sabine Klawitter and Hadeel Quazzaz: Water as a human right: the understanding of water in the Arab countries of the Middle East; published by Israel/Palestine Center for Research and Information and Heinrich Boell Foundation (no date), www.ipcri.org (15 August 2007). Whether there is a universal morale, remains debatable as concepts of justice and injustice vary widely. For a discussion of the universality of ethical standards see Hans Küng: Projekt Weltethos. München: Piper, 1991 (Towards inter-cultural ethics; in German).
In partial opposition to the official World Water Forum, the Third World Water Forum has called for a world water parliament to be established in order to represent people's interests and guarantee a minimum of 40 litres per day for every individual; see: Alternative water future outlined; *BBC News* online, 24 March 2003. Wolf notes that water trading and pricing is a concept alien to some world religions, like Islam. The economic approach to water management and water conflict resolution, according to Wolf, relates to an entirely Western idea of water and society and runs counter to such values as equity, fairness and kindness; Aaron T. Wolf: Healing the enlightenment rift: rationality, spirituality and shared waters; *Journal of International Affairs*, vol. 61, no. 2, 2008, p. 58 -59.

[160] According to Hartmut Böhme, a cultural anthropologist specializing in water at the Humboldt University of Berlin, the introduction of sanitation services by municipal administrations in Europe in the 18th century faced strong public resistance because of the price to be paid by residents; see Interview with Böhme in *Fluter* 23/2008 (in German), p. 44.

[161] One major factor in changing the direction of large water development projects has been the public protest against ill-conceived dams in India and Southeast Asia, highlighting the drastic social and economic consequences borne by local communities displaced or deprived of their livelihoods; see World Commission on Dams: Dams and development; Cape Town: WCD, 2000. The conceptualization and implementation of water development projects has undergone operational changes, as Ronald Cummings, Ariel Dinar and Douglas Olson point out in: New evaluation procedures for a new generation of water-related projects; *World Bank Technical Paper* no. 349; Washington, D.C.: World Bank, 1996. The authors trace the *change from a construction to a*

towards sustainability is mirrored in a number of major international declarations.[162] The realization that a one-sided utilization of natural resources, among which water holds a special place due to its unique cultural, social and economic role, might not only lead to resource depletion but also to long-term economic stalemate or decline rather than growth, as the cost of resource rehabilitation exceeds potential gains, has become a increasingly prominent perception. In the public health sector, which is closely linked to clean water, the dependence of human societies and economies is exposed most acutely, making clean water an ethical demand as much as an economic requirement.[163] Falkenmark and Lundqvist, defining water scarcity and developing strategies to counter it, advocate a comprehensive, rather than exclusive, understanding of water management that includes ethical notions as much as scientifically tested methods to improve water management towards preserving a resource threatened by pollution and overuse.[164]

Markets and water

Market approaches to water have been presented as a means to solve the water shortage in areas where governments fail to provide minimum resources to people. Market mechanisms are expected to further effective and efficient water distribution, providing incentives for economic water use, higher resource productivity and – last but not least – business opportunities to private water companies.[165] Two elements

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management approach to solving a country's water problems… viewed in qualitative as well as quantitative terms, p. VII. Project evaluation is done in three modes: the inferential approach (cost-benefit reflecting the ecological sustainability of the project), the anecdotal approach (forecasting benefits drawn on similar cases), and the minimum impact approach (measuring expected damage, including the social costs). The World Bank, as a leading financier of much-criticized projects in the past, has pushed research into socially and ecologically sustainable water development through specialized water research departments. See also Ismael Serageldin: Towards sustainable management of water resources; *World Bank Directions in Development Series*; New York: WB, 1995, p. 10.

[162] Among the most important, besides the landmark UN Conference on Environment and Development (Rio de Janeiro, 1992), are the International Conference on Water and the Environment (Dublin, 1992) and the World Water Forum (bi-annually since 1998). As Mike Acreman points out, the concept of sustainable development has from the beginning included a strong ethical notion; see Acreman: Water and ethics, water and ecology; Paris: UNESCO 2004.

[163] For the economic cost of poor public health and the spread of water-borne diseases in many developing countries see World Health Organization: World Health Report 2008; Geneva: WHO, 2009, esp. p.15. Malin Falkenmark and Gunnar Lindh, without explicitly advocating the market approach, stress the financial and economic significance of water resources degradation, a fact that tends to be underestimated; see: Water and economic development, in: Peter Gleick, ed.: *Water in crisis.* Oakland: Pacific Institute, 1993, p. 80-82.

[164] Malin Falkenmark & Jan Lundqvist: Towards water security: political determination and human adaptation crucial, in: *Water Resources Journal*, Sept. 1998. Falkenmark has criticized the 1992 Rio conference for underestimating the impact of water pollution with regard to food production. The rehabilitation of vital water systems should be understood as the basis of food security in both developed and developing countries; see Malin Falkenmark: The greatest water problem: the inability to link environmental security, water security and food security; *Water Resources Development*, vol. 17, no. 4, 2001, p.540 ff.

[165] The concept of virtual water trade is the latest extension of the economic approach to water management. It is based on the realization that water-intensive farming in many countries does not correspond to the available water resources in these same places. In order to reduce the water shortage, or vulnerability to shortage, in these countries it is suggested that these countries rather import those very same products from water-rich countries where water productivity is higher. For a discussion of this concept devised by Anthony Allan, see Lena Horlemann and Susanne Neubert: Virtueller Wasserhandel zur Überwindung der Wasserkrise? In: *Aus Politik und Zeitgeschichte*

distinguish this approach from others: **pricing and transfer**. The basic principle of this approach is the assumption that the value of this indispensable commodity should be reflected in an appropriate price. Adequate pricing will encourage reasonable consumption, according to this logic, whereas not pricing it will lead to waste.[166] The concept of water markets has in some cases proved to be effective, thus easing the pressure stemming from water shortage.[167]

In water-short countries like South Africa, water pricing is used both to cover the cost of providing water resources and water services and also to regulate demand. Through differential rates that are adapted to seasonal variability in water supplies, the over-all consumption can be kept in check.[168] Another motivation behind the principle idea of pricing and trading water is the desire to limit or reduce the financial burden to be borne by governments. **Private water companies** have in some cases succeeded in improving the quality and performance of water management through public-private partnerships, easing the financial burden on governments and effectively spreading water services and supplies to sectors of the society previously neglected. A key factor determining success or failure is the price-tag. Where municipal authorities failed to regulate pricing, private companies were free to raise the charges to a level that made the indispensable commodity unaffordable for poorer segments of the society.[169] On the other hand, governments which fail to cover the enormous cost of water management might inadvertently cause or

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25/2006 (Virtual water trade a means to overcome the water crisis? in German), p. 26 – 31. It is considered a potential long-term, rather than a short-term remedy against the acute water shortage in regions like the Middle East because of structural hurdles like a lack of economic diversity in these countries, and trade barriers in industrial countries that make such imports economically unattractive, except for richer nations like Saudi-Arabia which could easily shift to other economic activities.

[166] Ariel Dinar and Yacov Tsur: Efficiency and equity considerations in pricing and allocating irrigation water; *World Bank Policy Research Working Paper* No.1460, 1995.

[167] *Ibidem.*

[168] D. Stephenson: Demand management theory; in: *Water South Africa*, vol. 25, No. 2, 1999. Stephenson, p. 117, cautions that the potential benefits from demand management are often spoiled by political interests contradicting the economic targets. The capacity to manage demand is primarily dependent on the general quality of the water service and delivery: consumers tend to disapprove of higher rates when services are unreliable or insufficient. This is particularly true for low-income sections of a society.

[169] Among the oft-cited positive examples is Chile where private investment has improved water services significantly. A negative example is the Bolivian town of Cochabamba whose citizens rioted against over-pricing leaving several people dead; see: Lukrative Geschäfte mit dem "blauen Gold", *Frankfurter Rundschau*, 1 Dec. 2001 (Lucrative deals with "blue gold"; in German); Wie das Wasser nach Happyland kam, *Die Zeit* (Hamburg), 21 August 2003 (How water reached Happyland, in German). One general observation is that private entrepreneurship tends to focus on modern urban areas, rather than peripheral rural areas, due to expected revenues from city dwellers; see: Die H²O-Geschäfte, *Die Zeit*, 6 March 2003 (Water business, in German). Not all business initiatives really improve the water supply: Nestle's introduction of bottled water in Pakistan has made clean drinking water widely available, yet bottled water takes huge quantities of water to produce; see: Eau, no: clean, healthy and pure? Hardly. Bottled water is killing the planet, *The Independent* (London), 12 February 2006; the problem of disposed water bottles is another concern.
The International Monetary Fund (IMF) has made privatization in the water sector one of its development strategies: loan approvals for several countries are tied to efforts at privatizing water management and cost recovery by governments that seek IMF loans; see: IMF-imposed water privatisation, *The Sunday Leader* (Colombo), 11 February 2001. The EU Water Framework Directive demands that, without specifically requiring privatization, water charges to be set so to fully cover the cost of providing services and maintaining the water supply system.

exacerbate water shortage due to, for example, leaking pipes that could not be repaired or purification facilities that could not be operated.[170]

Property rights, according to Skaperdas, are an essential precondition to exchanges over resources.[171] Property rights define institutionally sanctioned *rights of action* (Pritzl, Demsetz).[172] These rights include the right of utilization, the right to reap benefits, the right to alter or modify structures and forms, and the right to transfer. In their absence, by this theory, coercion and conflict are likely because the stronger side is expected to force the weaker side to agree to its conditions, or simply follow a selfish course.[173]

Water markets and water trade have criticism from advocates of water rights for dividing societies along income lines. Tsur and Dinar, analyzing pricing schemes in the agriculture sector of several countries, argue that water prices tend not to affect income distribution, but some pricing methods can help reducing income inequality.[174] Savenije and Zaag counter that pricing promotes efficient water use by shifting water from low-value sectors to high-value sectors.[175] If implemented consequently, however, some purportedly low-value sectors would not receive sufficient water even if they prove vital for the economy.

The market approach seems to be diametrically opposed to the **human rights** approach: some human rights defenders argue that once water is declared an entitlement, it could not be treated as a tradable commodity any more. This position tends to ignore the risk of shortages caused by inefficient water management, inappropriate distribution or lack of funds for water services. Entitling people to access water in sufficient quantities can go hand in hand with **pricing water**. The resource as such may not be charged, but the service to provide it. Studies have shown that even low-income households are willing to pay an appropriate amount of money for quality water supplies and services.[176]

From an economic point of view, the fear that poor people might find themselves at the bottleneck of water supplies, receiving insufficient water, can be countered by adjusting the financial burden in other categories: by lowering the tax on other commodities or services in a move to create incentives to consume water efficiently.[177] In the long run, raising the quality of water services means an

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[170] In many countries, only 10 – 30 per cent of over-all costs are covered through water charges; the bulk is financed through subsidies; see: Patrick Webb and Maria Iskandarani: Water insecurity and the poor; Bonn: Center for Development Research (ZEF), 1998, p. 28-34.

[171] Stergios Skaperdas: Cooperation, conflict and power in the absence of property rights; *American Economic Review*, vol. 82, no. 4, 1992, p. 720 – 722.

[172] Rupert Pritzl: 'Property rights', 'rent-seeking' und institutionelle Schwäche in Lateinamerika (Property Rights, rent-seeking and institutional weakness; in German); *Ibero-Amerikanisches Archiv*, vol. 23, no. 3 – 4, 1997, p. 373 - 377, referring to Harold Demsetz: Toward a theory of property rights; *American Economic Review*, vol. 57, 1967, p. 347.

[173] Christopher N. Gibbs & Daniel Bromley: Institutional arrangements for management of rural resources: common-property regimes; in: Fikret Berkes, ed.: *Common property resources: ecology and community-based sustainable development;* London: Belhaven, 1989, p. 22 ff.

[174] Ariel Dinar and Yacov Tsur: Efficiency and equity, *supra*, p. 27.

[175] Hubert Savenije & Pieter van der Zaag: Water as an economic good and demand management: paradigms with pitfalls; *Water International*, vol. 27, no. 1, p. 102.

[176] *The Economist* (London), special water edition, 19 July 2003.

[177] The purchasing power of consumers is critical as it directly determines access to water along strict economic lines. This means that low-income consumers effectively depend on some form of

investment in the social and political future of societies. Based on solid, reliable water management, a country's capacity to provide water to poorer segments of the society that have previously been left without water is expected to increase due to returns on investment in sectors of the economy that benefit from improved water services.[178]

Water demand management is a way to achieve *desirable demands and desirable uses*, as opposed to simply satisfying needs regardless of hydrological, social or environmental conditions, as Savenije and Zaag argue.[179] This approach intends to regulate, through economic stimuli, water demand towards balancing water consumption. Instruments are quota, licensing, tradable water rights for local water markets, use-specific water charges, subsidies, and penalties. Unlike supply management, it focuses on the user and concrete demands, rather than on maximum supplies regardless of actual needs. This approach means more of a general shift in attitude than an actual concept of management, but if this shift takes place on a wider scale, it will inevitably have a positive effect on over-all water availability. As Biswas and Tortajada conclude, assessing Spain's National Hydrological Plan, demand-focused management has important advantages in terms of both water availability and water sharing.[180]

Turton has analyzed the implementation of this approach: the shift from one form of water management to another, more progressive (like demand management) hinges on a number of factors, like the state of industrialization. The attention to water efficiency relates to the economic profile and development status of a nation. To effectively improve water management towards greater productivity requires an **adaptive capacity** based on social resources within an institutional framework.[181]

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government-regulated subsidies in case water prices exceed their purchasing power. In the case of irrigation, efforts at increasing efficiency and reducing waste have led to government subsidies for efficient technology; penalizing waste instead, as a negative incentive, may prove even more effective in terms of reducing waste and furthering higher productivity, as Ray Huffaker and Norman Whittlesey suggest: A theoretical analysis of economic incentive policies encouraging agricultural water conservation; *Water Resources Development*, vol. 19, no. 1, 2003, p. 37 – 53.

[178] The case of Singapore's rise to one of Asia's most prosperous country's, as a result of the government's decision to drastically improve its water management, is cited by Peter Wilderer, a water engineer of the Technical University of Munich and winner of the Water Nobel Prize, see: Keine sinnvolle Technik ohne Kulturverständnis (Useful technology requires cultural knowledge; in German), interview in: *Humboldt Kosmos* (journal of the Humboldt Foundation, Bonn), 82/2003, p.18.

[179] Hubert Savenije & Pieter van der Zaag: Water as an economic good and demand management: paradigms with pitfalls; *Water International*, vol. 27, no. 1, p.100. Not to be underestimated is the long-term effect of demand management in terms of raising public awareness of water, as the authors stress.

[180] Asit Biswas & Cecilia Tortajada: An assessment of the Spanish National Hydrological Plan; *Water Resources Development*, vol. 19, no. 3, 2003, p. 395 – 396. Among the advantages are direct savings in major dimensions from realizing alternative water sources (desalinated seawater instead of extensive river diversions). Combined with this approach are new pricing schemes that are to replace traditional subsidies which have led to inflated water demands, not least to rising pressure on the public purse. At the same time, desalination is expected to become cheaper whereas construction costs (as envisaged in the Plan) are due to rise. In addition, the need to save water for hydrological and ecological purposes (rehabilitation of the river system) means that less water is to be consumed – a demand formulated in the EU Water Framework Directive.

[181] Anthony Turton: Water scarcity and social adaptive capacity: towards an understanding of the social dynamics of water demand management in developing countries; *MEWREW Occasional Paper* no. 9 (School of Oriental and African Studies), 1999, p. 8 - 11, 19 – 21, referring to J. Allan and M. Karshenas: Managing environmental capital: the case of water in Israel, Jordan, the West Bank and Gaza, 1947 to 1995; in: J. Allan and J. Court, eds.: *Water, peace and the Middle East: Negotiating resources in the Jordan Basin*; London: Taurus, 1996.

For the problem of water sharing this means, countries at a lower stage of development, with less adaptive capacity, would demand greater amounts of water to fuel their water management yet face greater pressure to raise their water productivity and eventually reduce their demand. Following Turton's assessment, long-term water distribution is linked to both technological innovation and social change.[182]

Water trading has proved successful in several cases, involving both ground and surface water resources. In this case, the resource as such and the water service are charged. Water transfers can effectively improve water availability on the local level if ecological conditions are taken into account.[183] Groundwater, a source that requires a long time to replenish, is particularly volatile to over-exploitation. Legal provisions as well as the definition of property rights are essential in order to maintain basic market rules that allow for an effective allocation of resources, as Saleth points out.[184] Without these, groundwater markets can promote inequity and, directly and indirectly, lead to shortage.

For surface water transfers, the example of the Northern Colorado Water Conservancy District stands out as an elaborate institutional arrangement. Within the scope of this administrative unit, the right to withdraw water from a common source is subject to trade among water users, irrespective of the actual amount of water to be used. The actual available amount of water is announced by the district administration. Each owner of an allotment will receive a proportionate share on a yearly basis.[185] Kemper and Simpson highlight the fact that this system of water trading is effectively improving the water availability because its flexibility is flanked by a tight system of regulations designed to prevent water waste or transfer out of this district.

These allotments are **water rights** which are founded in contracts between the water user and the district authority. This system deserves detailed description because it addresses the particular problem of asymmetry in river utilization. The trade in water rights, or rather uses, is limited to fixed consumptive uses and bound to the no-harm

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[182] … for example, drip irrigation to lower water consumption, and a social readiness to relinquish economic activities that require too much water. The concept of adaptive management will be discussed further in the chapter on integrated water management in this section.

[183] India serves as a model for water markets; examples from several Indian states are presented by G. S. Ganesh Prasad: Water markets: public resource and private appropriation; in: *Economic and Political Weekly* (New Delhi), 5 January 2002; water charges typically are in kind, i.e. farmers return part of their crops for water. In the case of groundwater, the charge covers the installation and operation of pumps. Saleth, referring to groundwater, cautions that the spread of water trading, in the absence of legal regulation, has led to aquifer depletion in some areas; see: R. Maria Saleth: Groundwater markets in India: a legal and institutional perspective; *Indian Economic Review*, vol. 29, no. 2, 1994, p. 157 – 164.

[184] R. M. Saleth: groundwater markets, *ibidem*, p. 164. A potential framework for groundwater management on the local level, based on public participation, has been presented by Markus Moench: Approaches to ground water management; *Economic and Political Weekly*, September 1994, p. A135 ff. A particular obstacle to effective regulation is the lack of controls and transparency. Metering has so far proved to be unreliable.
Some states have enacted ground water laws, following guidelines by the Central Ground Water Authority; see: http://cgwb.gov.in/GroundWater/gw_regulation.htm (May 2010).

[185] Karin E. Kemper & Larry D. Simpson: The water market in the Northern Colorado Water Conservancy District – institutional implications; in: Karin Kemper, Manuel Mariño, eds.: *Institutional frameworks in successful water markets: Brazil, Spain, and Colorado, USA*; New York: World Bank, *Technical Paper* no. 427, 1999.

rule: downstream water users must be safe from losses or be compensated in case of changes in use patterns, as determined by a court. Transparency, clear rules and responsibilities, and authorities for the regulation of such transfers are a requirement of success.[186]

Summing up the wider discussion on **water as an economic good**, Perry *et alii* pointedly argue that the usefulness of economic approaches hinges on the definition of values: water as a private good treated according to market principles versus water as a public good that is to be treated as a basic human need regulated by government institutions.[187]

The latter position does not exclude pricing, though usually only services are priced, not the resource as such. Typical failures of public sector water management lie in the tendency to promote waste, with multiple adverse effects, as in the case of irrigation where head-end farmers receive and consume too much water, spoiling soils, whereas tail-end farmers face drought.

Private sector water management, in order to prevent divisive effects noted above, needs to balance costs and benefits which, in cases like irrigation, can be difficult to realize.[188] Unless several preconditions are met, market forces are not expected to render positive effects, notably:

- precise entitlements to all users,
- adequate infrastructure,
- controlled water transfers,
- effective institutional oversight and enforcement of regulations.

Dellapenna cites examples from the United States advocating a shift to public water management because it is allows greater efficiency and justice in water distribution.[189] An important condition, in line with Perry *et al.*, is the legal framework.

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[186] The system has been limited to that particular district, reflecting a legal set-up established in the 19th century; that makes water transfers to external districts virtually impossible even if there is a strong demand for water, like in the city of Denver; *ibidem*, p. 31. The early establishment of an institutional framework for water management is crucial to its further development into a successful water rights system, as well as instruments for the enforcement of rules. Similar systems are successfully in place in Brazil; see: Karin Kemper, José Yalay de Brito Gonçalves, Francisco Brito Bezerra: Water allocation and trading in the Cariri Region, Ceará, Brazil; in Kemper & Mariño: *Frameworks*, *supra*, p. 2 - 8. For a comparison of water markets in the U.S. and India see Nirmal Mohanty & Shreekant Gupta: Breaking the gridlock in water reforms through water markets: international experience and implementation issues for India; Delhi: Liberty Institute, 2002; www.libertyindia.org (March 2010).

[187] C. Perry, Michael Rock & D. Seckler: Water as an economic good: a solution, or a problem? Colombo: IWMI, Research Report 14, 1997; Hubert Savinje & Pieter van der Zaag: Water as an economic good: the value of pricing and the failure of markets; Delft: UNESCO & Institute for Water Education (IHE), 2006; Alfredo Sfeir-Younis: Economic policies and watershed management; in: K. William Easter, J. Dixon & M. Hufschmidt, eds.: *Watershed resources management. An integrated framework with studies from Asia and the Pacific*; Boulder: Westview, 1986, p. 76 – 78.

[188] Perry *et al*.: Water as an economic good, *supra*, p. 10 – 12, citing the need to take into account infrastructure costs and ecological damage to water basins.

[189] Joseph Dellapenna: Markets – ethics – law: what can each contribute? In: Saskia Castelein, ed.: *From conflict to cooperation in water resources management: Challenges and opportunities*; conference proceedings; Delft: UNESCO & Institute for Water Education (IHE), Nov. 2002, p.132. For a synthesis of economic and entitlement approaches within a clearly defined legal framework see Odeh Al Jayyousi: Water as a human right: towards civil society globalization; *Water Resources Development*, vol. 23, no. 2, 2007, p. 329 – 339.

Dellapenna realistically considers the role of ethical aspects to be limited: they can *mobilize the political will*, but fail to overcome economic interests to benefit from resource utilization: *A sound ethically based legal regime would incorporate economic incentives as a management tool, as well as, when necessary, a command and control system*, but warns of generalizing economic approaches as the principal solution: Economic incentives are created and operate differently as compared to markets.[190]

Water rights

Lundqvist considers *formal water rights essential* for improving water management because without them river basins would face degradation.[191] Advocating a comprehensive approach to water management, he links water rights to a **responsibility** over water: *Making water everybody's business* means if all water users share the same rights and responsibilities, they will cooperate towards utilizing the river in an ecologically sustainable way. Linking water rights based on a normative, ethical concept of water use to water law, Lundqvist implicitly refers to corresponding trends in international water law that stress equitable and reasonable use of water sources as a universal obligation.

The underlying fear of water rights advocates is that market mechanisms might effectively deprive people with lower purchasing power of their legitimate claims to this vital commodity simply by pricing them out of the market. To strengthen water rights, three elements are essential:

- defined quantities,
- timing,
- and quality, as Molle stresses.[192]

The development and forms of water rights vary according to the river basin and the respective conditions of water use: *In reality the practical distinction among property rights, regulations and liability rules becomes very fuzzy: they mutually determine what can be done with property*.[193] Howe's observation implicitly points at the vague difference between water rights, which by most definitions are rights of access and use, and property rights, which are rights of ownership allowing use and transfer of water.[194]

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[190] *Ibidem*, p. 133.

[191] Jan Lundqvist: Rules and roles in water policy and management. Need for clarification of rights and obligations; Proceedings of the seminar *Towards upstream/downstream hydrosolidarity*; Stockholm: Stockholm International Water Institute, 14 August 1999; www.siwi.org (3/2010).

[192] François Molle: Defining water rights: by prescription or negotiation? *Water Policy*, vol. 6, 2004, p. 211.

[193] Charles W. Howe: Property rights, water rights and the changing scene in western water; in: Chennat Gopalakrishnan, Cecilia Tortajada & Asit Biswas, eds.: *Water institutions: policies, performance and prospects*; New York/Heidelberg/Delhi: Springer, 2005, p.175.

[194] For an overview of interpretations: A.P. Lini Grima & Fikret Berkes: Natural resources: access, rights-to-use and management; in: Fikret Berkes, ed.: *Common property resources: ecology and community-based sustainable development*; London: Belhaven, 1989, p. 40. Meinzen-Dick distinguishes three types, or *bundles*, of water rights: use rights, control rights, and transfer rights; Ruth Meinzen-Dick: Water rights issues in agriculture; in: David Molden, ed.: *Issues of water management in agriculture*; Colombo: IFPRI, 2002, p. 65.

Meinzen-Dick and Bruns caution that principles of water allocation are not always formalized by conventional statutes.[195] Therefore the recommended understanding of water rights, *legal pluralism,* takes into account diverse legal or quasi-legal norms that guide water sharing, corresponding to a multitude of formalized laws as well as *people's own perceptions* of water rights. They should be seen as dynamic, negotiable entitlements rather than monolithic *prescriptions*.[196] Meinzen-Dick and Bruns add that as a result, conflict management has also undergone changes.[197] Where water rights are not sufficiently formalized negotiations – either within the institutional framework or outside – gain importance.[198]

An important aspect of water rights is the focus on the actual stakeholders, the water users. Common to most contributions in this debate is the implicit understanding of water as a collectively used resource on which all sides are equally dependent. Therefore an interest in the continued utilization is to be expected. What must be true for most if not all water users, or stakeholders, may not necessarily be true for higher levels like the governments of a state or province or even a nation. This discrepancy of affectedness could be a crucial factor in water management and water sharing – an aspect that will be looked into more closely in the empirical section.

Conclusion: entitlements versus markets?

The concepts presented in this chapter have one common denominator: they appreciate the multi-dimensional value of water as an essential, indispensable commodity. The value of this commodity is expressed in the high legal status that advocates of water entitlements call for and widening public concerns. At the same time, its economic value has received greater acknowledgment recently – both as a tradable resource and with regard to the economic potential attached to the availability of water and the flow of rivers. The ongoing discussion on natural resource economy is about to bridge the gap between classical economic positions and ecological arguments.[199]

Ethical arguments are important for this study because they shed light on the manifold uses of water, the question of participation of water users, and efforts at preserving water systems. As such, they can affect the political process of water distribution, though their influence is likely to be of an indirect manner.

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[195] Ruth S. Meinzen-Dick & Bryan Randolph Bruns: Negotiating water rights: introduction; in: Bryan Bruns & Ruth Meinzen-Dick, eds.: *Negotiating water rights*; Delhi: Vistaar, 2000, p. 25.
[196] Molle: Defining water rights, *op. cit.*, p. 207.
[197] Ruth S. Meinzen-Dick & Bryan Randolph Bruns: Negotiating transitions in water rights; *Water Resources Impact*, vol. 5, no. 3, 2003 (no page numbers); www.ewra.org/impact (May 2004).
[198] Much of the water rights/property rights debate centres on the local or community level, the level of the actual stakeholders. Therefore most of the findings and recommendations emanating from this debate have only limited relevance to higher levels, *e.g.* the provincial or national level. The discussion of these rights nevertheless has its rightful place in this study because it can further the understanding of diverse legal and normative approaches to sharing water and the positions taken by the parties in the dispute over water in Pakistan.
[199] The latest and certainly one of the most remarkable signals in this respect comes from an institution that has been known to promote a rather conservative understanding of natural resource economics: World Bank to lead economic push on nature protection*; BBC News* (online), 28 Oct. 2010. The World Bank acknowledges the limits of one-dimensional approaches to natural resources by pointing at the incalculable, yet economically significant consequences of overuse and ecosystem degradation.

The water rights debate has highlighted important aspects of water management that affect water sharing, especially the role of the government to ensure availability, quality, and resource protection. In order for water to further social and economic development, which has been identified as a universal right, the status of the resource and its utilization must be prevented from misuse, over-exploitation or diversion. Ethically motivated approaches to water have strengthened the call for a human right to water and development and cautioned against economic advances to treat water like any other commodity. Given the indispensability of water, it is obvious that any trade in water will have to adhere to strict rules in order to prevent conflict of illegitimate water transfers that may cause abundance in one place and shortage in another. The impression inherent in legal approaches to conflict-prone issues such as water sharing that clear-cut legal rules effectively prevent such conflicts will have to be confronted with political realities. As the discussion of rationality will show, action is not solely determined by rules, but also by interests, perceived gains and losses, and the particular circumstances in which each actor operates.

The market-based approach holds relevant findings for the problem of water sharing. In principle, it has shown that water distribution along market rules can be effective. The role of incentives, both negative (in the form of penalties or higher prices) and positive (rewards, e.g. lower prices or rebates), has the potential to improve water management without automatically sacrificing entitlements or a human right to water. One of its convincing advantages lies in its flexibility: water transfers, if administered appropriately, can satisfy demands according to time and place. Where gains can be made from transferring water, waste is expected to be minimal. This is true for leaking water pipes in many cities, too, that before could not be repaired due to lacking public funds. Most importantly, the **focus on potential benefits**, rather than simply quantities of the resource, helps broaden the perspective on water's manifold uses, the relevance of resource protection and the realistic dimension of water sharing.

The note on virtual water trade, exotic as it may seem, points in a similar direction: As it focuses on water productivity, i.e. the amount of water needed in different places to produce a given quantity of a selected produce, this concept questions economic policies. The political-economic decision to grow water-intensive crops in water-short areas tends to make water sharing more difficult, as stakeholders representing water-intensive farming compete with stakeholders that represent water-efficient farming. The idea of virtual water – i.e. the water needed to produce or manufacture a certain commodity – highlights the principle of appropriate water utilization: ideally, water utilization in any given place represents a balance between water needs (for any kind of economic activity) and the water resources available.

This situation forms part of the water dispute between the **provinces of Pakistan**: Punjab founds part of its claim to water on the assumption that irrigation techniques of Sindh, the lower riparian province, are inefficient and wasteful, thus aggravating the over-all water availability up to a point of severe shortage. Hypothetically, the country's water problem of sharing could be alleviated by introducing irrigation reform. That would, however, not affect the acute water situation, only the long-term water supply.

Economic concepts offer a way out of this dead-end. The critical question of **supply-versus-demand** is seen here from a less polarizing, less narrow angle than in the

water-shortage-water-conflict theorem. It offers to trade benefits or entitlements if an acute water situation may require it. **A shift to demand** (rather than supply) management implies a critical review of actual water needs, promoting a reorientation towards greater water productivity. This has an immediate effect on water sharing. The lesson from cases where water markets led to unwanted consequences is to install adequate legal provisions and **enforcement-cum-control mechanisms** that prevent adverse effects of pricing. It will be seen in the empirical section how some countries have incorporated flexible economic and political mechanisms for water sharing embedded in an effective institutional environment.

What is missing with the above discussed economic concepts of benefit sharing is the **question of negative outcomes**: How to account for damages? Will damages to the river system be treated along the same principle as gains? A full account of benefits to be realized from water utilization has to include costs for the rehabilitation of the river system in case of water pollution caused by one or more water users, which will have a negative effect on the benefits to be expected by other water users. Damages like water pollution from unchecked effluence from agricultural and industrial activities deteriorate the water quality and reduce the quantity of readily usable water. Though such damages tend to fully materialize in the long run, some negative consequences are likely to have a short-term effect on seasonal water use, too.

To further test the potential of economic approaches to water management, their influence on the political process of decision-making will be assessed: How do concepts of political economy explain political interaction over water sharing? How do political actors, like the governments of the Pakistani provinces, promote their interests? Water shortage is a central issue in the process of water sharing. But what does water shortage mean, and how can it affect water management? Which challenges does water shortage pose to water sharing? The issue of responsibility for damages will be addressed by discussing concepts of integrated water management that apply a long-term, comprehensive perspective on river use.

II.3 Integrated river management

Rivers have been understood as being either part of a demarcated territory or as a hydrological unit, as such independent of political boundaries. The latter definition, advocated by environmental and hydrological experts, has gained prominence in the light of dwindling water reserves, deteriorating water quality in rivers in many parts of the globe and a growing number of people suffering from a lack of water. These concerns have fuelled the debate over a comprehensive form of water management that would take into account all relevant aspects of water use.

While the former definition of rivers has been criticized for ignoring hydrological imperatives, the latter has been challenged for not sufficiently taking into account political realities. This chapter explores the concept of integrated water resources management (IWRM) in light of the problem of water sharing: can this concept which integrates diverse types of river utilization be a suitable framework for water sharing?

Integrated water management: a concept or a vision?

From a hydrological perspective, the question of water sharing is seen in line with the requirements of the river basin. The main objective of this approach which defines a water body as a complex hydrological system is to ensure future water supply through sustainable water use. Sustainability is a formula for environmental management that balances human economic activity with the natural requirements of ecological systems, such as rivers. Overuse or overexploitation threatens the ecosystem and thus the future availability. As a result, a sustainable mode of natural resource management would have to integrate economic and social factors as well as ecological imperatives into a comprehensive set of provisions and rules in order to ensure resource protection. As Biswas puts it, *the water problems are becoming increasingly more and more interconnected with other development-related issues and also with social, economic, environmental, legal, and political factors at local and national levels*.[200] According to the Global Water Partnership (GWP), IWRM is a *process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems*.[201]

Principles of Integrated Water Resources Management were formulated in the course of the 1992 Dublin Water Conference:

- Water is a finite resource that requires adequate management and protection
- Involvement of all stakeholders in river management
- Women's participation
- Water is an economic good and has multiple economic and other values.[202]

[200] Asit K. Biswas: Integrated Water Resources Management: a reassessment; *Water International*, vol. 29, no. 2, 2004, p. 248.
[201] GWP: Integrated Water Resources Management; Stockholm: GWP, *TAC Background Paper* no.4, 2000; quoted by Biswas, *supra*, p. 249.
[202] The Dublin Statement of Water and Sustainable Development, issued at the International Conference on Water and the Environment – Development Issues for the 21st Century; Dublin, 26 – 31

This conference is commonly credited for being the starting point of the wider IWRM debate. Besides promoting the understanding of water as an economic resource, as Zaag and Savenije note, it is the focus on benefits drawn from water, rather than the resource and its quantities, and the multi-dimensional value and importance of water that initiated a wider discourse on water management.[203]

Biswas, listing no less than 35 features of IWRM derived from various individual studies, counters that IWRM has not evolved into a methodical concept because it lacks a clear-cut definition, and doubts that a truly holistic concept that would incorporate all major issues of water management is feasible because of the very complex nature of water and the limited knowledge so far available.[204] Medema and Jeffrey, replying to Biswas, stress that IRWM should be seen as *a continuous process of balancing and making trade-offs*, rather than a state or an objective. Nevertheless, it *remains to be seen whether it is indeed possible for a single paradigm to encompass all the countries and regions* that each reflect specific conditions. [205]

Building on the Dublin principles, they suggest a set of **characteristics** that represent a widely acknowledged definition of IWRM:

- a systemic approach to rivers based on a catchment level understanding,
- relevance of environmental and social aspects of water use,
- stakeholder participation and supportive government structures,
- equitable water allocation,
- reliable, up-to-date information and forecasting,
- full-cost pricing.

The aim of IWRM is to *balance water for livelihood and water as a resource*.[206] In other words, IWRM expresses the desire to melt two seemingly contrary fields – ecology and economy – into one concept based on the understanding that in order to realize long-term economic gains from natural resources, ecologic aspects need to be recognized. The structural mechanism needed to implement a concept by this definition is not described here. Some authors mention vaguely an institutional arrangement that provides for cross-sectoral coordination, public participation, and implementation of agreements and regulations, and conflict settlement.

January 1992; reproduced in: Salman Salman & D. Bradlow: *Regulatory frameworks for water resources management*; Washington, D.C.: World Bank, 2006, Appendix 1.

[203] Hubert Savenije & Pieter van der Zaag: Water as an economic good and demand management: paradigms with pitfalls; *Water International*; vol. 27, no. 1, 2002, p. 98. A major factor in the development and spreading of this concept was the Rio Conference of 1992 focussing on sustainable resource use.

IWRM has since become a focus of professional education: the University of Biel, Switzerland, offers training courses for water experts, see: www.ahb.bfh.ch/ahb/en/Weiterbildung/. Other institutions like IWMI offer training courses in aspects of water management based on IWRM. IWMI has developed a strong reputation in Pakistan for hosting workshops for farmers on comprehensive water management; www.iwmi.org.

[204] Biswas: Integrated water …, *supra*, p. 252.

[205] Wietske Medema & Paul Jeffrey: IWRM and adaptive management: Synergy or conflict? *NeWater Report Series* no. 7, 2005, p. 8; www.newater.info. This definition is based on the Global Water Partnership's (GWP) concept of IWRM as outlined in *GWP Technical Advisory Committee Background Paper* no. 4 on Integrated Water Resources Management; Stockholm: GWP 2000.

[206] GWP: Integrated Water Resources Management and water efficiency plans by 2005. Why, what and how? *GWP Technical Advisory Committee Background Paper* no. 10; Stockholm: GWP, 2005.

Important elements of an IWRM mechanism are

- management instruments for assessment, information, allocation,
- an enabling environment (policies and legislation) and
- an institutional framework (central-to-local, basin-wide, public and private actors).[207]

The **coordination** between various administrative institutions is meant to increase efficiency by avoiding overlap from fragmented authority. This could undermine the perception of rivers as functional units and inadvertently further policies that would depart from comprehensive river management. In this context, decentralization has been stressed as a requirement of IWRM. Mody asserts that **decentralization** of authority is important to adequately address concerns on local levels, yet stresses that in order to implement IWRM successfully, some form of centralized decision-making might be required in some fields.[208] Financial authority is a requirement for decentralized institutions to work effectively, as is the participation of stakeholders and property rights. Changing centralized mechanisms to decentralized, as Mody cautions, may take decades due to competing political interests which means that the implementation of water sharing decisions may be hampered for a long period. A potential negative outcome of decentralization, if pushed to the lowest level, is that the solution of boundary problems may be made more difficult because coordination and consensus-building will take longer.

Jaspers cites a number of large river basins in which IWRM mechanisms have evolved, some with strong government backing, others more or less out of itself.[209] However the involvement of stakeholders, i.e. riparian communities, in the management process cannot be taken for granted: the Narmada River dispute in India is a prominent example of lacking stakeholder participation in major river development decision-making that has led to a long-standing confrontation between local communities, state authorities and construction companies. It is true that hydrological approaches, as opposed to territorial concepts or river management, allow efficient river utilization. But this understanding does not foreclose political interests tied to territorial demarcation. As will be seen in the next chapter, national interests in many cases dominate negotiations over collective river use – in spite of potential gains from integrated river management.

IWRM in South Asia

Mollinga describes the state of IWRM in Asia as *a concept looking for a constituency*. One reason is that IWRM lacks clarity; it is an *amalgamation* of different concepts, some of which has been in existence since long.[210] Mollinga, like Medema and Jeffrey, stresses the **particular objective of IWRM in Asia**, unlike that of IWRM in Europe: social-economic development and poverty reduction. Along with different

[207] GWP, *ibidem*.
[208] Jyothsna Mody: Management of river basin systems through decentralization; *World Bank Report*; Washington, D.C.: WB, 2001, p. 5 ff.; www.worldbank.org (May 2003), currently listed as unpublished, not available online any more (May 2005).
[209] F. G. W. Jaspers: Institutional arrangements for integrated river basin management; *Water Policy*, no. 5, 2003, p. 80.
[210] Peter P. Mollinga: IWRM in Asia: a concept looking for a constituency; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.: *Integrated water resources management: global theory, emerging practice and local needs;* London/Delhi: Sage, 2006, p. 28.

targets go different perceptions and approaches. Citing political and professional reservations against IWRM by the above standards, he challenges the somewhat optimistic and generalizing view of the Global Water Partnership which suggests that in all seven countries of South Asia, first steps at IWRM have been undertaken: *The participation discourse has not been able to enrol or force the government water bureaucracy, which is dominantly present in South Asia, into a process of rethinking some of the basic premises of its approach to water resources*.[211] As Mollinga points out, this *social idea* tends to conflict with more pragmatic approaches of the engineering community in the water bureaucracy of South Asia. Thus IWRM is *not a universal concept*, rather *part of a global debate*.[212]

Some examples nevertheless leave little doubt that water management has become more comprehensive, including many aspects of IWRM. **India**'s existing institutional arrangement covers a wide range of water management tasks, including conflict settlement.[213] To assess the state of water management, however, is not easy, as Bandyopadhyay notes.[214] One problem is *data secrecy* by official water institutions that prevents the transparency necessary for broad stakeholder involvement and for evaluating policies. The National Water Policy that evolved from a series of meetings of the National Water Resources Council in 2002 is a comprehensive plan that was followed by a government action plan to implement it. But the lack of institutionalized coordination has already drawn criticism from NGOs. The priority of irrigation over river basin ecology, according to the author, conflicts with the stated principles of IWRM.

Janakarajan, citing India's Cauvery River dispute over water shares, points at the institutional development towards solving the dispute between the riparian states but joins Bandyopadhyay in criticizing the lack of coordination between administrative units: the National Water Plan remains a mere statement of intentions because it is not supported by legislation, or by a *time-bound, concrete action plan*. Moreover, *unprincipled and myopic political ambitions* drive a *regional chauvinism* that undermines not only cooperation in the water sector but also *the very foundation of India's federalism*. [215] In **Sri Lanka**, coordination between water bodies is hampered by a multitude of institutions. As a result, duplication leads to confusion and

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[211] Mollinga, *supra*, p. 30 – 32; Global Water Partnership: Informal stakeholder baseline survey. Current status of national efforts towards sustainable water management using an IWRM approach; GWP 2004, p. 18; www.gwpforum.org (Aug. 2008).

[212] Mollinga, *supra*, p. 34. This view is supported by a more detailed assessment of Asian IWRM: Asit Biswas, Olli Varis & Cecilia Tortajada, eds.: Integrated water resources management in South and South-East Asia; Cambridge: Oxford University Press, 2005. Adding to the conclusion that IWRM does not represent a universal concept, Bruce Lankford & Nick Hepworth stress that while IWRM formulae have been exported from Western European countries, they can by no means simply adapted to just any river basin: The cathedral and the bazaar: monocentric and polycentric river basin management; *Water Alternatives*, vol. 3, no. 1, 2010, p. 92 – 97; www.water-alternatives.org (August 2010); citing the case of Tanzania, IWRM may have to be implemented on a sub-basin level in order to be successful, rather than on a state level, like in many industrialized countries of the temperate zone.

[213] S. Bhatt: Environmental laws and water resources management; Delhi: Radiant Publishers, 1986; p. 47 – 51.

[214] Jayanta Bandyopadhyay: Criteria for a holistic framework for water systems management in India; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.: *Integrated water resources management: global theory, emerging practice and local needs*; London/Delhi: Sage, 2006, p. 152 - 162.

[215] S. Janakarajan: Approaching IWRM through multi-stakeholder dialogue: some examples from South India; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.: *Integrated water resources management: global theory, emerging practice and local needs*; London/Delhi: Sage, 2006, p. 292-298.

inefficiency. While the *need for sector-based development activities in water resources to be planned and managed in an integrated and holistic manner is now accepted*, the institutional arrangement does not include *instruments for transactions between sectors and competing needs*.[216] Imbulana, while accepting this assessment in principle, reiterates that IWRM should be seen as a continuous process, rather than a status.[217]

Adaptive water management (AM)

The idea of adaptive management has been introduced recently to augment the concept of IWRM towards greater flexibility by adding institutional resilience. AM originates from systems analysis and has been applied to political processes. It has been used to address shortcomings of IWRM which is criticized for being too static to allow for flexible management of a highly dynamic and unpredictable resource.[218] **Uncertainty** is essentially a lack of information that hinders water managers from optimizing water use.[219] This means that *reflexive capabilities of individuals and societies* are important, as Medema and Jeffrey point out. **Communication** between all stakeholders and active **participation** in decision-making – as in IWRM – is essential to react to unforeseen changes in the river and also to provide the transparency necessary to ensure compliance of all sides with established rules or agreed treaties. This sets limits to long-term planning and stresses instead regular exchange of information and, if necessary, adaptation. Adaptive Management consequently focuses on the flow of information and coordination between all actors and institutions involved, through a constant process of monitoring, evaluating, adjusting, planning and acting.[220]

Raadgever and Mostert have examined a number of international river basins for the quality of their respective water management, applying a set of AM and IWRM characteristics which they term **River Basin Management (RBM) regimes**.[221] Rather than using IWRM as a conceptual starting point, they apply regime theory, a concept originally designed to explain international relations, to trans-national rivers.[222] An RBM regime, according to their definition, describes the interaction of

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[216] Ranjith Ratnayake: Inter-/intra-sector coordination as a means to IWRM: the case of Sri Lanka; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.*: Integrated water resources management: global theory, emerging practice and local needs*; London/Delhi: Sage, 2006, p. 250 – 256.

[217] Lalani Imbulana: Water allocation between agriculture and hydropower: a case study of Kalthota irrigation scheme, Sri Lanka; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.: *Integrated water resources management: global theory, emerging practice and local needs*; London/Delhi: Sage, 2006, p. 230 – 240.

[218] Medema and Jeffrey: IWRM …, *supra*, p. 21 - 22.

[219] Claudia Pahl-Wostl & Jan Sendzimir: The relationship between IWRM and Adaptive Water Management; *NeWater Report Series* no. 3, 2006, p. 6 -7; www.newater.info (April 2010).

[220] *Ibidem*, p. 25. Institutional adaptation has been widely discussed in response to perceived design faults of existing structures, particularly at the communal level; cf. D. J. Bandaragoda: "Institutional adaptation" for integrated water resources management: an effective strategy for managing Asian river basins; *IWMI Working Paper* no. 107, 2006, p. 14.

[221] G. Raadgever & E. Mostert: Transboundary river basin management; *NeWater Report Series* no. 10; Delft: Delft University of Technology, 2005; www.newater.info. The cases include the Nile, Orange, Amu Darya, Elbe, Rhine, Guadiana and Tisza rivers.

[222] Regime theory as a way to understand international river management has been proposed by Anders Jägerskog: Why states cooperate over shared water: the water negotiations in the Jordan River Basin; Linköping: Linköping University, Department of Water and Environmental Studies, 2003,

formal actors (government bodies) and informal actors (non-governmental institutions) over water policies and laws. The regime as such comprises *all institutions that significantly influence management of the relevant issues*. In order for a regime to become sufficiently adaptive, referring to the above mentioned definition of AM, the following **criteria** should be met:

- formal and informal actor networks (cross-sectoral cooperation, cooperation between different levels of administrative units, stakeholder participation)
- legal framework (appropriate and adaptive legislation)
- policy development and implementation (long-term focus, experimentation and testing of measures, oversight of actual implementation)
- information management (joint data collection)
- finance (sufficient budgets, cost-recovery from users)[223]

Their conclusions on the *adaptiveness* of the respective rivers present a diverse picture: the management of the Rhine and Elbe rivers has achieved a solid capacity to adapt to the dynamics of water, whereas the management of the Amu Darya and Nile rivers lacks the required cooperation, legal framework, implementation mechanism and communication of relevant information to allow for effective adaptation.[224] The regime concept does not bear striking differences to IWRM. More important is the focus on the **adaptive capacity of institutions**. The importance of information is an element of IWRM, too, as is coordination and cooperation. But to allow long-term water sharing, changing water availability has to be taken into account as well as potential effects from water utilization.

Jägerskog, advocating a regime theoretic approach, suggests that *the hydrological interdependence of international river basins provides a rationale for cooperation*.[225] The assumption that the mutual dependence of riparian nations would automatically lead to cooperation and indeed further a process of institution-building is tempting. But what if political interests override initiatives in the water sector? As will be seen in the case of Pakistan and other countries, progress in the water sector often depends not so much on other riparian actors but on wider political interests.

Decentralization

The institutional dimension of the IWRM discourse tends to focus on inter-sector water management. While some form of decentralization has been demanded by many IWRM proponents, the actual form of a decentralized system of river management is a subject of discussions. In principle, as Mody suggests, a **decentralized** system of river basin management is a preferential mode for

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p. 50 - 53; www.transboundarywaters.org (July 2007); A. Jägerskog: Explaining interstate water cooperation through regime theory; *School of Oriental and African Studies Occasional Paper* no. 31.

[223] Raadgever & Mostert, *supra*, p. 26 – 27.

[224] The fundamental importance of information exchange to coordination on all levels is underlined by Cecilia Tortajada in her examination of Brazilian and Mexican water management systems: Institutions for Integrated River Basin Management in Latin America; *Water Resources Management*, vol. 17, no. 3, 2001, p. 289 – 301.

[225] Anders Jägerskog: Water regimes – a way to institutionalise water co-operation in shared river basins; in: Saskia Castelein, ed.: *From conflict to cooperation in international water resources management: challenges and opportunities*; proceedings of an international conference; Delft: UNESCO & Institute for Water Education (IHE), 2002, p. 209 – 212.

economic reasons as it would reduce transaction costs.[226] For reasons of appropriate representation and participation of user groups, or stakeholders, Falkenmark *et al.* call for an institutionalization of shared benefits and responsibilities.[227]

From a political system perspective, decentralized water management puts administrative units at state and district levels in charge.[228] This means that those communities have a say in water decisions which are directly affected. Following the logic of Integrated Water Management, their motivation to seek solutions that promise long-term benefits from river use over short-term exploitation at the expense of overuse should be greater than that of higher administrative and executive units like the provincial government. Therefore water sharing decisions should at least consider the positions of riparian districts.

Decentralization to a lower level would also have a positive effect on the political asymmetry between upstream and downstream water users in the case of intra-national disputes, or disputes between federal subjects like provinces or states. In principle, as Richards and Singh state, decentralized water management inevitably affects the handling of **water disputes** as actors have to take into account sub-national stakeholders.[229] Molle *et al.* caution that the allocation of large budgets in the water sector, especially for large-scale irrigation projects in agricultural economies like India, tends to further the prevalence of a supply-oriented ***water bureaucracy***.[230] As a result, much of the positive potential of IWRM and decentralization in terms of efficiency falls victim to vested political-economic interests.

Decentralization of river management has to be viewed critically: it cannot be taken as a one-size-fits-all solution *per se.* As will be seen in the empirical section, water decisions taken at central as well as state government levels have faced opposition from the people, like in the oft-cited Narmada case (India) or the various dams and canal projects in Pakistan. In some cases, decentralization even had to be reversed.[231]

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[226] Jyothsna Mody: Management of river basin systems through decentralization; New York: World Bank, June 2001 (downloaded from www.worldbank.org, Feb. 2002 (not available online any more, as of Jan. 2010; currently listed as an unpublished report).

[227] Malin Falkenmark, L. Gottschalk, J. Lundqvist & P. Wouters: Towards integrated catchment management: increasing the dialogue between scientists, policy-makers and stakeholders; *Water Resources Development*, vol. 20, no. 3, 2004, p. 304 – 305.

[228] The case of Israel as a nation that shifted from centralized to decentralized water management due to public demands to contain vested interests, e.g. of the farming community, is presented by Eran Feitelson: A retreat from centralized water management? The Israeli case; conference paper no. 80, International Water History Conference 2001, Bergen, 10 August 2001.

[229] Alan Richards & Nirvikar Singh: No easy exit: property rights, markets, and negotiations over water, Santa Cruz: University of California, 2000, p. 22 - 25; http://econ.ucsc.edu/~boxjenk/noeasyexit.pdf (Aug. 2004).

[230] François Molle, P. Mollinga & P. Wester : Hydraulic bureaucracies and the hydraulic mission : flows of water, flows of power ; *Water Alternatives*, vol. 2, no. 3, p. 337 – 338; www.water-alternatives.org (July 2010). The occurrence of water bureaucracies will be discussed further in the empirical section in the case of Pakistan. The cited example, albeit focused on the complex water sector, deserves attention within the theoretical discourse on federalism; for a concise analysis of India's federal system in perspective see Subrata K. Mitra: The nation, state and the federal process in India; in: Ute Wachendörfer-Schmidt, ed.: *Federalism and political performance*; London: Routledge, 2000, p. 40 – 57.

[231] Molle et al., *supra*, p. 342.

Conclusion: water sharing through integrated systems

IWRM represents a convincing approach to the problem of water sharing, even though it is more of a quality standard or a vision than a concept. Applying a river basin perspective, the implied focus is on coordination of various using water economic sectors, on coordination of diverse forms of water use (consumptive, non-consumptive; cultural, economic, environmental etc.), on short-term and long-term use, on questions of access and entitlement. The need for cooperation is a central demand of IWRM. Similar to the water rights approach, it envisages participatory mechanisms. It stresses institutional arrangements required for its implementation.

IWRM, however, has its limitations. It has been argued that IWRM lacks clarity and precision, and that a detailed scientific method to assess river basin systems has not yet been developed.[232] As Biswas cautions, IWRM is one good – but not the best – way of managing water, simply because of the complexity of water management.

Medema and Jeffrey point out that the implementation of IWRM in a particular river basin will depend on *the development stage of the country*, especially regarding the existing institutional environment, finance, administrative structures, data collection, and participatory mechanisms.[233] The all-encompassing nature of IWRM does not mean that it would have the same purpose and harbour the same potential in each case. **Governance** is the crucial factor in the effectiveness of IWRM. It hinges on three conditions:

- a basis for private and public sector initiatives,
- a solid legal framework and
- a mechanism for stakeholder interaction.[234]

It becomes clear that IWRM as such has to be seen as a part of the wider political, administrative and socio-economic system. To imagine IWRM to be an isolated system somehow independent of any overarching structure would be unrealistic. To address some of these challenges, the authors advocate the concept of **Adaptive Management** (AM) as a less static form of water management. This is convincing because IWRM involves a number of conditions to be met in order to prove successful, some of which may not be feasible in many river basins.

AM may be employed in addition to or parallel to an IWRM process, or as a separate management tool. The threshold for AM is lower, allowing more countries to adopt it. AM is, however, not likely to result in quick successes in highly bureaucratic countries because, in theory, it confronts water managers with deficits of past management, prompting them to shift processes and structures towards greater flexibility and responsiveness. In this context the effectiveness of incentives to enable change should also be expected to be limited.

As implied by Medema and Jeffrey, the question of **political decision-making** and interaction over water sharing is not sufficiently addressed here. From an economic perspective, decision-making is guided by seeking gains from water use; actors are driven by interests, not necessarily the desire to collaborate. Rather than a long-term collective, ecologically advisable vision, actors strive to make short-term gains.

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[232] Biswas: Integrated Water …., *supra*, p. 250.
[233] Medema and Jeffrey: IWRM …., *supra*, p. 16.
[234] Medema and Jeffrey, *ibidem*, cite the GWP TAC *Background Paper* series, esp. no. 7/2003.

The availability of the contested resource either stimulates cooperation or confrontation, depending on the shortage or abundance of water. Intervening higher political interests might prompt actors to instrumentalize water in order to achieve goals not related to water. In this context perceptions of circumstances and potential gains and losses are factors that determine decision-making. This political-economic approach to understanding the conditions of water sharing will be examined in the following two chapters. It remains to be seen whether IWRM and AM can be synchronized with actor-centred concepts.

Finally, but most importantly for the case of Pakistan, the **dynamics of the federal system** require critical analysis. A federal mechanism for water management and water sharing is in place, yet it may be – in the light of the above presented hypothesis on decentralization (Molle *et al.*) – as much a part of the problem as of the solution.

II.4 Water shortage – water conflict

Does water shortage lead to confrontation, or even war? The indispensability of this resource, coupled with its limited availability and unstable political and socio-economic conditions in many countries, make the perfect environment for violent conflict. Cooperation, under these circumstances, seems most unlikely. This assumption is widely discussed in the field of conflict research and, more recently, in the field of water management, too. Given the number of international rivers, the occurrence of water shortage and the political-economic profile of the basin countries, the likelihood of water crises appears to be significant.

This hypothesis is partly rooted in new trends in conflict research emanating from an academic reorientation inspired by vanishing Cold War paradigms, and partly in the growing prominence of environmental and development research.[235] While natural resources have traditionally been perceived from a geopolitical perspective, developmental perspectives are a relatively new approach to problems of global importance. A lack of water is seen as a potential threat to the development especially, but not exclusively, of poorer nations where institutional mechanisms to direct water allocation tend to be deficient. Insufficient water supplies not only threaten agricultural, industrial and power production and public health, they can lead to environmental degradation and destabilize social and economic systems.

This chapter discusses the relevance of water and conflict vis-à-vis water sharing. A main purpose of water sharing is the regulation of limited resources and the prevention, or alleviation, of scarcity. If water shortage is found to be particularly conflict-prone, it would have to be taken into account in any water sharing arrangement.

Water shortage: How much water is enough?

What does shortage mean? The basic definition of water shortage – a lack of water – neither includes any explanation of its causes nor qualifies its scope over time and space. For an assessment of needs, water shortage must be qualified in order to distinguish chronic overall shortage from momentary localized shortage. In the wider development debate that routinely focuses on the state of vital resources, shortage

[235] The second Gulf War, following the Iraqi invasion of Kuwait, in 1990/1991, was widely considered to herald a new era of conflict. One characteristic element would be the aggressive competition for control over natural resources, especially water. In the wake of the Persian Gulf crisis, proponents of a water war theory have identified trouble spots where armed conflict over water was likely, threatening to merge with other conflicts, particularly over disputed territory, finally escalating to a regional confrontation; cf. Joyce Starr: Water wars; *Foreign Policy* 1/1991; Thomas Homer-Dixon: On the threshold: environmental changes as causes of acute conflict*; International security*, vol. 16, no. 2, 1991; Arnold Hottinger: Wasser als Konfliktstoff; *Europa-Archiv* 6/1992 (Water as a source of conflict; in German). For an overview of the water-and-development debate see Sandra Postel: Pillar of sand: can the irrigation miracle last? New York: W. W. Norton, 1999, and Christian Schütze: Umweltprobleme: Klima – Wasser – Land (Environmental problems: climate – water – soil; in German), in: *Peter Opitz, ed.: Weltprobleme*; Bonn: Bundeszentrale für Politische Bildung, 1995.

tends to suggest a crisis-prone situation.[236] However, a shortage of food, for example, is not automatically followed by famine. Assessing the availability of a critical commodity in a whole country represents a formidable challenge because – especially in the case of water – the actual supply of the commodity in a given location at a given time is difficult to measure. As supplies as well as consumption may differ significantly in diverse places and at different times, they cannot be extrapolated to the country-wide situation. In a country like Pakistan, even within one province the water supply differs markedly. Local water shortage exists next to water sufficiency, as is the case in Punjab, pointing at the distribution of water, rather than the availability as such. In this case, water transfers can, at least hypothetically, avert water shortages, as will be seen in the analytical section.

The condition of water shortage has been approached analytically using diverse measures to assess water needs and supplies. While some approaches rely on a minimal-needs concept based on statistical average quantities, others stress aspects of quality in the water supply and use system. A differentiated estimate of water needs has proven very difficult to arrive at because of the multitude of water uses in all sectors of society, each requiring specific amounts of water, subject to dynamic patterns over time as modes of utilization change, thus affecting water consumption. Assessments would also have to be country-specific due to the particular conditions of water use, the status of water productivity, and the available sources of usable water. Water shortage, as result, is not a narrowly defined term, but a rough mathematical calculation of demand versus supplies, rendering a vague description of a relative lack of water under given circumstances.

The per capita water availability is one common denominator of water shortage. This quantitative approach is derived from estimated average human needs and projected against the respective water availability in a given country. According to a World Health Organization (WHO) standard, an amount of 1,000 cm³ or 2,740 litres of internal renewable water resources marks the critical limit on a per capita, per annum basis.[237] Countries that fall below that line are classified as water scarce. This method serves as an indicator, not a precise instrument to measure a country's resources. Average water demand and consumption differs according to climate,

[236] A critical and sobering look at the treatment of food shortage in the case of Cambodia in the 1980s taken by William Shawcross demonstrates how widely perceptions can differ: What seemed to be a clear case of near famine turned out to be a gross misinterpretation of realities, though in many places and at certain times people did suffer from a dramatic lack of food. See his book: The quality of mercy, New York: Simon and Schuster, 1984, ch. 18. Assessing shortage, as Shawcross makes clear, is a difficult task. Even in a poor country like Cambodia then, many people did in fact not suffer from food deficiency while others were dependent on food aid.
Another aspect related to defining water shortage is the understanding of drought as a climatic phenomenon. Similarly disputed among academics, drought should be understood within the context of a particular region, as Asad Qureshi and Mujeeb Akhtar caution; see: Analysis of drought coping strategies in Baluchistan and Sindh provinces of Pakistan; *Working Paper* no. 86; Colombo: IWMI, 2004, p. 7.

[237] WHO: World Health Report: Life in the 21st century. Geneva: WHO, 1998. According to a report compiled by leading NGOs, the minimum daily household requirement is 50 litres per person, but the added water requirement to allow a diet of 3,000 kcal per day amounts to 3,500 l/day; see: Let it reign: The New Water Paradigm for Global Food Security. Final Report to CSD-13; Stockholm: Stockholm International Water Institute, 2005, cited in Malin Falkenmark: Towards hydrosolidarity: Ample opportunities for human ingenuity; Stockholm: SIWI, 2005; www.siwi.org.

physical activity, age, culture and other factors.[238] The overall water demand of a society and its economy is not within the reach of this method.

Internal renewable water resources include groundwater and river water.[239] The global map of water availability roughly resembles that of precipitation patterns, pointing at a dry belt comprising northern Africa, the Middle East, South Asia, central China and Australia.[240] A shortfall of this one-dimensional measurement is that it ignores water quality. Quality aspects are important because they affect the actual usability of water: While drinking water demands rank highest, for some industrial water uses, like water-cooled power generators, low-quality water is sufficient.

Rainfall assessments are based on a solid database of recorded precipitation covering several decades. The actual availability of recorded rainfall, however, hinges on other climatic factors, like monthly and local variations which affect specified water uses in agriculture. Pakistan is grouped into a low category of under 350 mm of rain water annually, alongside countries on the Arab peninsula and in the Sahara region.[241] The actual availability of rainfall in these countries, however, is dependent on facilities to harness rainwater. In the case of Pakistan, an extensive irrigation network allows for effectively utilizing rainfall; the peripheral agricultural systems of Saudi Arabia and the Gulf nations offer little potential.

Water consumption and water productivity by global comparison differs sharply. While overall water availability in the Middle East is very low, countries like Israel have increased water productivity through highly efficient drip-irrigation systems thus reducing the overall water demand. Living standards in some North American and European countries have led to high demands for water, through an overall change in consumer mentality, effectively offsetting the benefits from sophisticated water technology.[242] Hidden water uses, like in the form of industrial products that require high quantities of water (automobiles), push overall water demands.

The Food and Agriculture Organization of the UN (FAO) has issued the **Water Dependency Ratio**, indicating amounts of total renewable water resources originating outside a given country.[243] This method points at the interdependency of nations regarding water supplies. For Pakistan, the ration is 76%, i.e. this country to a significant degree depends on water supplies that are not completely within its own political control. The background of this finding is simple: it means that the sources of the main rivers of the Indus system lie in India and, to a lesser degree, in

[238] Falkenmark and Widstrand estimate the minimal per capita water needs to be around 100 litres per day (for household consumption): Malin Falkenmark & Carl Widstrand: Population and water resources: a delicate balance; *Population Bulletin,* vol. 47, no. 3, 1992.

[239] See World Resources Institute (WRI, Washington D.C.): World Resources 1996-1997, and 2002-2004. World Resources provides one of the most comprehensive records of available data, compiled mainly from FAO and related UN institutions. The accuracy of the given data, however, depends on individual measurements employed by national authorities. The given data is not based on standardized measurements.

[240] See FAO: Review of water resources by country (2003), based on Aquastat data (FAO): www.fao.org.

[241] See, among other sources, FAO review of water resources by country (2003), *ibidem.* The amount of water lost due to evaporation allows only a rough estimate; see Atlas of World Water Balance, Paris: UNESCO, 1977.

[242] Sandra Postel: Die letzte Oase. Frankfurt: Fischer, 1993 (Last oasis; German ed.); Sandra Postel and Aaron Wolf: Dehydrating conflict; *Foreign Policy* 3/2002.

[243] For Southern and Eastern Asia: www.fao.org/DOCREP/005/Y4473E/y4473e0d.htm (May 2004).

Afghanistan. This does not translate into potential conflict, though, as most of the world's rivers cross at least one international boundary. Only island nations, like Sri Lanka or Brunei, or very large territorial entities, like Mongolia and China, have low ratios.

The Water Poverty Index (WPI), developed at the Centre of Hydrology and Ecology, allows a more comprehensive, multi-dimensional assessment of a country's water situation, including its developmental profile.[244] Based on an analysis in five categories – resources and population; access to water; capacity (economic profile); use (consumption); environment (water quality, ecology) – the WPI renders a different picture: the highest scoring is awarded for a mix of abundant water supplies and favourable administrative and economic conditions.[245] While the inclusion of development-related aspects like infant mortality rates, pointing at water quality management, highlights the potential results of water shortage, it risks diverting attention from more fundamental questions of water availability. It may be less useful to indicate existing or imminent water shortages, yet it can serve as a profound basis for progressive water management.

Falkenmark and Lindqvist have developed a concept of **five categories of water scarcity** to explain water shortage.[246] Advocating an ecological perspective, the authors generally define scarcity as *a condition of insufficiency of water in usable condition in relation to demand for plant production and/or human activities*. An amount of 1,700 m³ of water per person per year is seen as a critical bottom line of water availability.[247] Water needs for all forms of utilization and all eco-systems are taken into account:

- 1) scarcity regarding plant production: insufficient rainfall and (over)dependence on irrigation;
- 2) demographic water scarcity: inadequate water demand due to rising populations;
- 3) technical water scarcity: water scarcity cannot be stemmed by (further) water resource development;
- 4) induced in-stream water scarcity: (over)withdrawals of water can lead to ecosystem failures (e. g. collapsing reproduction in fish);
- 5) use scarcity: low-quality water sources limit the utilization of available water.

This concept supplements the minimal-needs approach on which some of the UN-sponsored concepts are based with a systemic approach that includes agricultural and industrial water utilization and ecosystem needs, to arrive at a comprehensive instrument for assessing the water supply-demand situation in different regions. Their water management is to be oriented towards a long-term balance between demand and availability based on their specific water utilization and water generation patterns.

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[244] See Centre for Ecology and Hydrology, Wallingford: www.nwl.ac.uk/research/WPI/ (January 2003).

[245] Australia, for instance, assumes a high rank in spite of being a very dry country threatened by chronic water shortage; Brazil and Cambodia, countries of abundant water sources, score low because of infrastructural and economic deficits. This result is due to factors that do not directly relate to water, yet weigh in significantly, affecting the overall scoring.

[246] Malin Falkenmark and Jan Lundqvist: Towards water security: political determination and human adaptation crucial; *Water Resources Journal*, September 1998, p. 12, 14-15.

[247] World Water Council: Water vision; London: Earthscan, 2000, chapter 3; www.worldwatercoundil.org. See also the bi-annual World Water Forum, hosted by the World Water Council, a UN-affiliated body.

A concept of five Water Predicament Clusters is presented:

- A) The "close to the ceiling" group: countries in which demand is about to outgrow supplies, requiring a shift from food self-sufficiency to food imports in order to avert water shortages (South Asia, northern Africa, Middle East);
- B) The group with very high per-capita water use: progressive water resources development has led to high productivity and high over-all demand, now requiring greater efficiency and water saving (Central Asia, U.S.);
- C) The intermediate group: sufficient water supplies and efficient water utilization, plus moderate increases due to fairly stable demographic development (Western Europe, Southeast Asia, Northern China, Mongolia);
- D) The arid, water-short group: infrastructure shortcomings inhibit access to water; higher water productivity and efficiency needed to counter rising population (Eastern, Western and Southern Africa);
- E) The water-rich group: water demand is below water availability, yet ecosystems face deterioration due to water pollution (Scandinavia, Canada, Central Africa, most of South America).

The importance of this concept lies in the linking of water utilization patterns to hydrological characteristics of a given region.[248] Large parts of the United States, for example, face a technical water scarcity due to high levels of water withdrawals, coupled with high water productivity. The potential to further develop existing water resources is limited, thus water shortage can occur, yet without posing a fundamental threat. In this case, rather than expanding water-intensive economic activities, importing those very same commodities from countries or regions with lower over-all water withdrawals may be needed to avert scarcity. For a region like southern Africa, the arid climate might force water managers to intensify agricultural production towards greater water productivity because sharp rises in demand due to demographic dynamics will lead to water shortages.

In South Asia, for example, the inter-sectoral competition over water resources – hydropower versus agriculture – reflects the region's challenge to improve water sharing because demand is rising in all sectors due to dramatic population growth. This dilemma, in principle, is behind Pakistan's problems of water sharing, too. For these countries, a possible way out of this dilemma is to increase food imports in order to save water. This strategy would require balancing the increased expenses with income generated from exports that do not involve high water consumption. From an economic perspective, this means to effectively price water in a more consequential manner than before. This way the value of water would be reflected by the financial resources invested in preserving it or in raising its efficiency, e.g. through higher crop-per-drop ratios, or by the money saved due to a positive balance of trade.

Water and war

Approaching water conflict, research has focussed on **water as a direct and indirect cause** of conflict. Some scholars have addressed disputes over water shares on different administrative and political levels, whereas others are concerned with the social, economic and ecological dimensions of water use that may trigger conflict.

[248] Falkenmark & Lundqvist: Towards water security…, *supra*, p. 16.

Fröhlich, citing recent African disputes, identifies territory as a major factor and sees a higher likelihood of violent confrontation on sub-national levels.[249] Conca addresses factors of conflict that indirectly relate to water, like the displacement of people due to the construction of large dams.[250] Hsiang *et al.* conclude that there is a link between climate change and a rise in violence on various levels of society all over the world, particularly in times of drought.[251]

Haftendorn categorizes water-related **causes of conflict**:

1) conflicting uses (*e.g*. power generation versus irrigation)
2) pollution (degrading water quality)
3) distribution (uneven upstream – downstream withdrawals) resulting in relative shortage on one side (less than required supplies)
4) distribution resulting in absolute shortage on one side (no supplies at all)[252]

Haftendorn's approach, originating from conflict and international relations research, is actor-centred: certain forms of action, rather than the object (water), have a tendency to lead to dispute. Other authors seem to suggest that the commodity by itself is problematic.[253] Water shortage can trigger conflict – yet not because of adverse climate conditions but because of inadequate water consumption or water distribution. Sherk *et alii* point at **water shortage** and factors that determine water shortage (inefficient use, ecosystem degradation), especially in the case of international rivers.[254] The combination of shortage and trans-boundary distribution of this resource creates a delicate, conflict-prone situation that is aggravated in times of drought, turning neighbours into rivals. The assumption is that a dire situation may force one side to resort to violent action to acquire the commodity needed for survival.

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[249] Christiane Fröhlich: Zur Rolle der Ressource Wasser in Konflikten; *Aus Politik und Zeitgeschichte* 25/2006 (The role of water in conflict; in German). The land disputes in this part of Africa which have recently escalated into fierce violent confrontation are by no means a new phenomenon; *BBC News* (online), 8 March 2010, on the recent clashes in Nigeria. The role of territory has to be assessed carefully, as Wolf stresses. Analyzing the demarcation of territory in the Middle East, he finds that *water was uppermost in the minds of planners and political decision-makers … as boundaries were negotiated over the years … However, despite studies advocating the need for greater access to water through 1947, actual official advocation of sovereignty over such hydrostrategic territory ceased each and every time negotiations over legal borders were concluded*; Aaron T. Wolf: "Hydrostrategic" territory in the Jordan Basin: water, war, and Arab-Israeli peace negotiation; paper presented at the conference *Water: a trigger for conflict/a reason for cooperation*; Bloomington, IN, 7 – 10 March 1996; www.pnl.gov./ces/academic/midleas2.htm (Jan. 2001).

[250] Ken Conca: The new face of water conflict; *Navigating Peace*, no. 3, Nov. 2006; www.wilsoncenter.org.

[251] Solomon Hsiang, M. Burke and E. Miguel: Quantifying the influence of climate on human conflict; *Science*, 2013. This most recent study once more reflects the dilemma of most research into causes of conflict: the problem to pinpoint the factors that actually led actors to turn to aggressive action.

[252] Helga Haftendorn: Water and international conflict; *Third World Quarterly*, vol. 21, no. 1, 2000, p. 51 – 68. In line with this assessment is Kenneth D. Frederick: Water as a source of international conflict; *Resources for the Future*, no. 123, 1996. Le classifies potential conflicts into four spheres - environmental, economic, social and political – and three issue areas, water quality, water quantity and ecosystem: Le Huu Ti: Potential water conflicts and sustainable management of international water resource systems; *Water Resources Journal*, Sept. 2001.

[253] The Asian Development Bank (ADB), without explicitly naming water a source of conflict, warns of the consequences of shortage; see ADB: Water in the 21st century. Manila: ADB, 2000.

[254] See George Sherk, Patricia Wouters & Samantha Rochford: Water wars in the future? Reconciling competing claims for the world's diminishing freshwater resources; *Centre for Energy, Petroleum and Mineral Law and Policy Internet Journal*, vol. 3, no. 2, 1998; www.dundee.ac.uk/cepmlp/journal/html/article3-2.html (May 2011).

In the Middle East most of the countries suffer from chronic water shortage. This condition has invited a host of studies focussing on water as an element of the wider Arab-Israeli conflict. Schiffler identifies **power politics** over water in the Jordan River basin in which progress on the water issue depended on agreement in other areas.[255] In this case, negotiations were overshadowed by other, non-water issues. Water, though obviously a most critical issue from a social-economic perspective, figured as a secondary issue, as Jägerskog observes.[256] The solution of the water question was helped by earlier efforts at cooperation on the bilateral level, between Israel and Jordan, and measures towards greater water productivity, especially in Israel.[257]

Water has benefited from the overall *rapprochement* between the antagonists. It remains, however, a **highly politicized issue** on the sub-national level, especially in the territories occupied by Israeli settlers.[258] Accusations of intentional water shortage on the Palestinian side have been voiced. This would mean that water has effectively been turned into an instrument to exert political power.[259] Blocking a river's flow regime to withhold water reaching a downstream riparian neighbour, or otherwise reduce the water flow beneath an acceptable level would come close to an economic blockade within the context of aggression under Chapter 7 of the UN Charter, even though water is not specifically mentioned there. They would also be in violation of the principles of international relations laid out in Article 1 and 2 of the Charter, calling for international cooperation to avoid or end disputes.[260]

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[255] Manuel Schiffler: Konflikte um Wasser – ein Fallstrick für den Friedensprozess in Nahost? *Aus Politik und Zeitgeschichte* 11/1995 (Conflicts over water – a threat to the Middle East peace process? in German). The dominance of power politics partly explains why these states have not ratified the UN Convention on Non-navigational uses (1997). Cf. Peter Beaumont: Dividing the waters of the River Jordan: an analysis of the 1994 Israel – Jordan peace treaty; *Water Resources Development*, vol. 13, no. 3, 1997, p. 422 – 423.

[256] For an analysis of the negotiating process Anders Jägerskog: Why states cooperate over shared waters: The water negotiations in the Jordan River Basin; Linköping: Linköping University, 2003, esp. p. 98 – 105. Allouche's concept of *water nationalism* does not contradict this assessment: Water, originally being within control of the community (local level), has become a central government prerogative upon the beginning of nation-states in this region and thus a matter of delineating the former colonies and protectorates. The explanatory value of this concept appears limited. Jeremy Allouche: Water nationalism: an explanation of the past and present conflicts in Central Asia, the Middle East and the Indian Subcontinent; Geneva: University of Geneva, 2005; www.transboundarywaters.org, p. 270 – 283.

[257] Harald Neifeind: Wassernot im Nahen Osten – Gefahren für den Frieden (Water scarcity in the Middle East – threats to peace, in German); *Gegenwartskunde*, vol. 46, no. 4, 1996, p. 500 – 501 For an overview of techniques to reduce demand and raise productivity see Masahiro Murakami: Managing water for peace in the Middle East: alternative strategies; New York: UN University Press, 1995.

[258] Jochen Renger & Andreas Thiele: Politische Verteilungskonflikte um Wasserresourcen (Conflicts over allocation of water resources; in German); *Der Bürger im Staat*, no. 1, 1996, p.79 – 80.

[259] Annette van Edig: Verteilungskonflikte im Nahen Osten (Conflicts over water distribution in the Middle East; in German); *Blätter für deutsche und internationale Politik*, no. 9, 1998, p. 998 – 999. Edig cites several cases of virtual blackmail of downstream riparians by upstream nations (Sudan, Turkey) that have only deescalated because the weaker sides gave in to demands.

[260] Water may not specifically be mentioned in the UN Charter with regard to international peace and security – partly because at the time of its passing water wasn't a subject of international debate or of conflict – yet it holds a protected status in an indirect manner, reflecting its unique importance. With a view to guaranteeing human development and political stability, people's access to this commodity must not be blocked, waterways must not be contaminated, and water must not be used as an instrument of war. This rule has been widely accepted as a binding international customary law. In the Second Gulf War (1991) Israel has refrained from bombing Iraqi water systems, as proposed by some military advisers. Similarly, plans of the U.S. general staff to bomb dikes in North Vietnam during the

Cases like this illustrate the potential weight of power politics in water sharing. Legal regulations do not seem to effectively improve the water situation for either party involved. Instead, in spite of a set of legal norms demanding the protection of water in conflict, water becomes a hostage to overriding issues.[261]

Comparing several water conflicts in the Middle East/North Africa regions, Edig concludes that **water wars require three factors:**

- a negative state of relations between upstream and downstream nations,
- a lack of water regulations (especially treaties or other formal agreements) and
- the physical capacity of the upstream nation to withhold and store large quantities of water.

This conclusion explicitly sets aside external factors like international mediation or international law.[262] It highlights the importance of the actors involved and rejects the *functionalist* argument (Edig) that technical or institutional remedies might suffice to avoid conflict. Earle, reviewing recent literature on the water wars debate, pinpoints *issues of national identity and views of co-riparian states* as catalysts of conflict, whereas water disputes as such, citing Kalpakian, mostly are *secondary fora for conflicts rooted in national identity questions*.[263] Wolf, author of one of the most comprehensive databases on water-related conflicts, asserts this interpretation while stressing that *all water management is multiobjective and is therefore, by definition, based on conflicting interests*. Consequently, *water management is conflict management* (Wolf).[264]

Second Indochina War were refused by the government; Seymour Hersh: The prize of power. New York: Summit, 1983, ch. 23. Both cases were undoubtedly influenced by fear of a public outcry. In an earlier war, when media attention was not as acute, dams were indeed targeted to trigger a devastating flood; see Jon Halliday & Bruce Cumings: Korea – the unknown war; London: Penguin, 1988, p. 196. In the Afghan civil war of the 1990s a case of intentional water contamination is cited by Ahmed Rashid: Taliban. The story of the Afghan warlords; London: Pan, 2001, p. 62.

[261] For a concise overview of legal norms and deficits see Frederick M. Lorenz: The protection of water facilities under international law; *UNESCO PCCP* series no. 1, 2001.

[262] Water security has been defined as a status of water supplies sufficient to meet minimal health requirements; Patrick Webb & Maria Iskandarani: Water insecurity and the poor; Bonn: Center for Development Research (ZEF), 1998. Its analytical value, however, is limited as the minimal requirements in a given case are hard to quantify. Interestingly, it has gained some notoriety in politics, yet without enhancing it to a comprehensive concept: The U.S. Government, in 1993, has established the office of Environmental Security within the Department of Defense. Former Secretary of State Madeleine Albright has called for *an alliance for global water security in the 21st century*; http://usinfo.state.gov/topical/global/environ/latest/00041001.htm (Earth Day address, 10 April 2000. Whether an international law on water protection, as Boutruche suggests, would improve water availability, reduce water shortage, protect waterways from pollution, and avoid the risk of conflict over water appears doubtful: Théo Boutruche: The status of water in the law of armed conflict; *International Review of the Red Cross* no. 340, 2000, p. 887 – 916.

[263] Antony Earle: review article (John Kalpakian: Identity, conflict and cooperation in international river systems; Aldershot: Ashgate, 2004; Sanjeev Khagram: Dams and development: transnational struggles for water and power; Ithaca: Cornell University Press, 2004), *ECSP Report*, no. 11/2005; www.wilsoncenter.org (March 2010). This view is supported by Miriam R. Lowi: Political and institutional responses to transboundary water disputes in the Middle East; report for the *Environmental Change and Security Project* (Smithsonian Institution), no date; http://ecsp.si.edu/pdf/report2a.pdf (Feb. 2002), p. 6 – 7.

[264] Aaron T. Wolf: Shared waters: conflict and cooperation; *Annual Review of Environment and Resources*, vol. 32, no. 3, 2007, p. 4 – 5, 12 – 13. Recent developments in the water row between the Nile riparian states also point in this direction as the heated public debate in Egypt, the lower riparian state, indicate: Egyptian warning over Ethiopia Nile dam; *BBC news*, 10 June 2013.

Wolf provides a valuable addition to Edig's set of factors by identifying **factors of resilience** that decrease the risk of conflict, such as

- international agreements and institutions,
- experience of cooperation in other fields,
- positive overall relations, and
- a high level of economic development allowing alternatives to water-intensive production (farming etc.) -

as well as

factors of vulnerability that increase the risk of conflict, such as

- rapid environmental change,
- rapid demographic and/or rapid social-economic change,
- large unilateral development projects (dams that cause displacement e.g.),
- inadequate institutions and
- negative overall relations.

Wolf's refined set of factors represents a workable framework for assessing the selected case because it goes beyond the acute causes of conflict identified by other authors.[265] Allan, generally in line with Wolf, Edig and Haftendorn, adds another potential factor that defuses tension: some downstream nations (in the Middle East) have turned to importing **virtual water** (water-intensive crops), thus reducing their dependence on water supplies.[266]

In sum, the role of water in conflicts is ambivalent, as Wolf points out, advocating a differentiated look at individual cases rather than a grand theory of water conflict.[267] Conflict over water can turn violent, but is usually limited to the sub-national level. It can be both the result and the cause of political disputes on a higher level, as the case of the Ganges River dispute illustrates which had repercussions on the internal situation of Bangladesh and the state of West Bengal, India.[268] From an empirical point of view, the occurrence of water-related conflict is very limited.[269]

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[265] The relevance of internal factors like the state of the economy and the environment is confirmed by Bächler *et alii* who conducted an extensive research project: Günther Bächler, V. Böge, S. Klötzli, S. Libiszewski & K. Spillmann: Kriegsursache Umweltzerstörung. Ökologische Konflikte in der Dritten Welt und ihre friedliche Bearbeitung; Chur: Rüegger, 1996 (Environmental degradation as a cause of war; in German), 3 vols. The central hypothesis, in line with Wolf, is that environmental stress tends to promote conflict.

[266] Tony Allan: Middle Eastern hydropolitics: interpreting constructed knowledge (review article); *London School of Oriental and African Studies (SOAS) Occasional Paper series*, no. 18 (no date); www.soas.ac.uk/waterissues (July 2007). Allan strongly favours virtual water trade as a means not only to defuse conflict but also to preserve water sources: Tony Allan: Watersheds and problemsheds: explaining the absence of armed conflict over water in the Middle East; *Middle East Review of International Affairs (MERIA)*, vol. 2, no. 1, 1998; Tony Allan: Avoiding war over natural resources; conference paper, *Water and War*, 1 November 1998 (International Committee of the Red Cross).

[267] Aaron Wolf: Conflict and cooperation along international waterways; *Water Policy*, vol. 1, no. 2, 1998, p. 254 – 256. The threat to use force in order to reach a desired solution of water disputes has been expressed occasionally, just like predictions of future water wars. The Israeli Army has called the Lebanese plan to divert water from the river Hasbani a ground of war: Israel warns of war over water, *BBC news* (online), 10 Sept. 2002. Echoing the late Egyptian President Anwar as-Sadat, former UN Secretary General Boutros Boutros Ghali warned of water wars, especially in the Middle East.

[268] Wolf, *ibidem*; for a concise analysis of the Farakka Barrage dispute Ben Crow, Alan Lindquist & David Wilson: Sharing the Ganges: the politics and development of river development; Delhi: Sage, 1995; also Ben Crow & Nirvikar Singh: Impediments and innovation in international rivers: the waters of South Asia; Santa Cruz: University of California, 1999; http://econ.ucsc.edu/~boxjenk/wd_rev.pdf;

The problem of asymmetry as a factor in water-related disputes, i.e. the imbalance of upstream and downstream water availability, has drawn growing attention. This condition is prevalent in most large rivers and often means that downstream riparian locations receive less water and, in some cases, water of lower quality. Whether and how it translates into a factor of vulnerability, to use Wolf's concept, is a matter of specific analysis. As will be seen in the empirical section, water availability in the Indus Basin differs significantly between upstream and downstream positions; the case of the Ganges is similar. Asymmetry as a natural feature of rivers, however, is not a cause of conflict but rather a challenge in terms of water distribution. Zaag and Schiesler appropriately set asymmetry in context with achieving equitable water sharing.[270] This aspect will be discussed further in the ensuing chapter on the political economy of water sharing. In spite of such obstacles, water has been a catalyst of cooperation, as Wolf's statistics indicate. To test his observation and concept, some cases will be presented in the empirical section.

Conclusion: the relevance of the water conflict hypothesis

Assessing water shortage, as a starting point of the water war discussion, has exposed the intricate difficulty of water use. There is no definite, universally accepted and generally applicable standard of water shortage just as there is no standard for sufficient water supplies. Sectoral water requirements are hard to quantify, as are requirements in different locations. Rice farming requires differing quantities of water in different places and at different times, depending on the climatic and geographical conditions and the sort of rice, to name just one example. In general, the over-all water availability has shrunk, while water demand and consumption are on the rise, reflecting a strong growth in population and in agricultural and industrial production. Yet these assessments mainly relate to individual water availability. On a collective (district, state or nation) level the question whether water is short or sufficient will eventually be determined by a simple contrast of demand and supply. If supplies do not meet demands, water managers have to find ways of either generating more supplies or reducing demand.

The concept by Falkenmark and Lundqvist stands out as it qualifies water shortage according to types of use and environmental conditions, allowing for a specific assessment. As it addresses forms of water use under varying circumstances, it

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Nahid Islam: Indo – Bangladesh common rivers: the impact on Bangladesh; *Contemporary South Asia*, no. 1, 1992, p. 211 – 214, 219 – 222.

[269] Though lacking a precise definition of conflict, Peter Gleick's chronology lists disputes related to water as a single issue or combined with other issues, starting in 1503 A.D.: www.worldwater.org/conflict.htm. Out of 507 disputes, only 21 included military involvement (mostly involving Israel and its neighbouring states). Aaron Wolf's database of over 400 water sharing arrangements underlines the argument that cooperation is more likely than confrontation: www.transboundarywaters.orst.edu/projects/internationalDB.html. See also Aaron Wolf & Meredith Giordano: Sharing waters: post-Rio international water management; *Natural Resources Forum*, vol. 27, 2003, p. 163 – 165. According to the authors, there are 263 international river basins, involving 145 nations and around 40% of the world population. For the post-1945 period they count over 150 agreements – versus 37 conflicts that turned violent.

[270] Pieter van der Zaag: Asymmetry and equity in water resources management: critical institutional issues for Southern Africa; *Water Resources Development*, vol. 21, no. 1, 2007. Nora Schiessler, A. Renner & A. Lüth: Möglichkeiten und Grenzen partizipativer Verfahren zur Überwindung asymmetrischer Wasserkonflikte; Bensheim/Leipzig: Institut für Organisationskommunikation (IFOK) / Umweltforschungszentrum (UFZ), 2004.

renders a more accurate evaluation of existing water situations. It also shows the limits of one-dimensional quantitative concepts. For the problem of water sharing, aspects of water productivity, water conservation, water trade and water recycling affect the long-term water sharing process. For short-term, seasonal water sharing the primary question is: How do the actors involved cope with gaps between supply and demand?

The water – war nexus, from an empirical perspective, cannot be sustained – at least not generally. The absence of major conflicts over water, however, does not mean that serious disputes have not occurred at all. In several cases, especially on communal levels in arid regions, conflicts have erupted and are likely to occur again. In areas struck by regular water shortage, some people have resorted to emigration rather than facing conflict.

As a result, the potential of conflict may have diminished in the original locality, but at the prize of increasing it in the new locality. In theory at least, the migrants of water-short places face the same obstacles of other migrants: against a rising number of environmental refugees, countries of relative wealth have moved to tighten their borders.[271]

Internal migration – especially from the countryside to the urban centres - increases the pressure on city dwellers or on rural populations in other parts of the country, in turn affecting the existing water allocation in those places. From an economic perspective, avoiding conflict by migrating out of the conflict area only means changing the setting of the problem. For the country as a whole and the river basin the basic challenge – and the risk of conflict, or **vulnerability** – continues to exist.

In this regard, the Security Demographic concept, presented by Population Action International, is more helpful as it points at water shortage in conjunction with other *stress factors* like the prevalence of young people in the demographic set-up of a country, the urban growth rate and the availability of cropland. Pakistan, for instance, is rated in the *high risk* category, together with several African countries.[272] Water shortage, coupled with other factors, may very well become a factor in violent conflict where people are faced with several threats to their physical existence.

An inter-sectoral competition over water supplies can jeopardize the economic development of a country and its provinces or districts not so much in the form of a direct violent confrontation but with political and social repercussions. This fall-out of water shortage might in turn take the shape of public protests challenging the authorities. The necessity to find a solution that will satisfy demands does remain. Rather than shifting people authors like Ohlsson advocate an **economic shift** towards higher water productivity, e.g. by changing water-intensive crops for crops

[271] For a discussion of environmental degradation as a cause of migration, see Manfred Wöhlcke: Umweltflüchtlinge. Ursachen und Folgen; München: Beck 1992 (Environmental refugees. Causes and consequences; in German).

[272] Richard Cincotta, R. Engelman & D. Anastasion: The Security Demographic. Population and civil conflict after the Cold War; Washington, D. C.: Population Action International, 2003, p. 57, 59; www.populationaction.org (May 2011). The data on which the categorization is based is from UNDP and FAO. It is, however, sometimes misleading, e.g. where the cropland and water availability of Pakistan is rated below that of Afghanistan – a very dry country with very little arable land that is commonly listed well below Pakistan in terms of agricultural potential and water resources.

that consume less water.[273] Such an adaptive system of water management would not involve incalculable consequences.

In sum, the water wars scenario has proved valuable for this study because it highlights

1) the **dimension of politics** that overshadow water sharing and the difficulty to treat water issues separately;
2) the **capacity and limitations of legal instruments** to regulate water sharing and contain dispute;
3) the need for a reliable **conflict settlement facility**;
4) the importance of efforts towards **greater water productivity** in order to avert shortage.

The case of Pakistan, as a result, will have to be analyzed focussing on

- political disputes that may impact on water sharing,
- legal instruments for the regulation of water management and the handling of water disputes,
- mechanisms to prevent water conflict, and
- efforts towards greater water productivity in order to avoid shortage and conflict related to inadequate water supplies.

[273] Leif Ohlsson: Environment, scarcity and conflict: a study of Malthusian concerns; Göteborg: Göteborg University, 1999, p. 189 - 191.

II.5 The political economy of sharing resources

Economics define water as a finite natural resource.[274] Its use by one individual or state will inevitably reduce the amount of the resource available to other individuals or states. Consequently, this condition will lead, sooner or later, to an unfavourable situation for at least one actor, in the form of water shortage. As a result, actors compete over resources and benefits of all sorts in a basically self-centred fashion. Cooperation, from this perspective, is directly related to expected benefits. If they are not to be expected, cooperation is not likely to happen.

This part of the discussion on water sharing focuses on actors and interaction:
- How do political actors achieve individual targets?
- What makes actors consider sharing water?
- What are the prospects and likely gains from cooperative strategies?

Political economy presents a number of concepts that explain political interaction based on economic principles: Game Theory, Rational Choice, New Institutional Economics. What makes actors act in a rational way, or not, renders a multi-faceted picture that goes far beyond the limits of market economics.

Equality has been a central demand from normative sides. Asymmetry describes a condition of **inequality** which is a built-in feature of many rivers. The task of this chapter is to put to the test diverse concepts to explain if, and how, water sharing can take place under asymmetric conditions.

Why cooperate? A biological excursus

Recent neurobiological research counters the widespread tendency to approach water sharing from economic and conflict research perspectives arguing that cooperation is much more likely than confrontation. In a partial revision of some of Charles Darwin's quintessential observations on the principles of interaction, new findings claim that cooperation is in fact the **prime orientation of human interaction**. Man's *social brain,* according to this research, determines that cooperation greatly increases the chance of survival and reproduction, defined here as the primary drivers of human decision-making. Human evolution is understood as a process of adaptation to changing environmental conditions, not as the result of a struggle for survival. Consequently, human action is orientated towards acceptance. Struggle and competition over resources may occur, but rather as a tertiary factor, and only in a situation marked by severe shortage.[275] Related to this research is the

[274] A common definition of economics as the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses, by L. Robbins: An essay on the nature and significance of economic science (London: Macmillan, 1935), is used here, as cited by C. Perry et al.: Water as an economic good: a solution, or a problem? Colombo: IWMI, *Research Report* 14, 1997, p. 2.

[275] Joachim Bauer: Das kooperative Gen, Hamburg: Hoffmann & Campe, 2008 (The cooperative gene, in German). This research corresponds to earlier findings from evolutionary biology on primate social behaviour. Social primates like the Black-and-white Colobus monkeys of West Africa form a complex functional network that allows all members of a group to be safe from predators. Realizing the benefits

discovery of so-called mirror cells that are responsible for the human ability to communicate with other humans more intensely through empathy.[276]

The overall conclusion is that egoism as a factor in human interaction has to be viewed within a newly defined context of survival based on cooperative, rather than competitive, modes of action. This position is diametrically opposed to the basic economic perspective of a rationality of self-interest. Modern economic theories dominate the social science discourse of interaction, yet some economists voice concern over the underlying tone of this trend of concepts. Miegel warns that an overly interest-driven society of egoists will face inevitable decline.[277] The dissolution of society may be an extreme vision, but in essence the erosion of values related to achieving collective aims seems to be obvious. But a reckless drive to reach individual goals against the interests of other members of a group or society can quickly reach a dead end when other members of the same group or society act in the same way. Individuals facing conflict over colliding interests may find that some form of cooperation is the only way to reach the set target at least partly, if only because the perceived costs of confrontation are too high to bear.

Cooperation as a rational decision

Social science research has addressed the problem of cooperation drawing on economic concepts of **rationality**. Contrasting the findings of neurobiological research, cooperation is not perceived here as a predetermined mode of interaction, but one based on situational analysis and interest-, i.e. benefit-driven decision-making. Actors engaging in cooperation or confrontation are egotists by principle, choosing the strategy that promises the best returns. **Rational Choice Theory** (RCT) defines rationality as a set of defined goals that are to be achieved within perceived limitations by choosing those strategies or instruments that promise the best outcome regarding the set goal. Derived from micro-economic decision theory (consumer behaviour as one simple example), Rational Choice Theory represents a theory in

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from cooperation, both individual and collective, each member, in its specific function, assumes responsibility for the group. Utilizing food sources and feeding grounds collectively enhances the species' survival. This complex social interaction is reflected in the bigger brain sizes of these social primates. Cf. Peter M. Kappeler & Carel van Schaik: Cooperation in primates and humans: mechanisms and evolution; Heidelberg/Berlin/New York: Springer, 2006. Conflict, however, does happen; see Frans de Waal: Wilde Diplomaten. Versöhnung und Entspannungspolitik bei Affen und Menschen. München: Hanser 1991 (Wild diplomats. Reconciliation and détente among primates and humans; in German). I am grateful to Cornelia Paukert for pointing out this aspect to me. Weizsäcker, a biologist, contrasts one-sided, profit-maximization economics with the very ability of man to act jointly towards collective benefits as a decisive feature of man's survival: *Der außerordentliche Überlebensvorteil des Menschen gegenüber allen – auch den am höchsten entwickelten – Tieren besteht darin, dass er Solidargruppen zu bilden vermag, die den Gemeinsinn über den Eigensinn stellen. Für den nackten Egoismus als Hauptcharakterzug des Menschen ist die naturwissenschaftliche Grundlage extrem schwach* (The extraordinary evolutionary advantage of man over even the most highly developed species is his ability to form groups based on solidarity. Life science offers very little justification for the concept of naked egotism as a main trait of man); Ernst Ulrich von Weizsäcker: Eine neue Politik für die Erde (in German); Freiburg/Wien/Basel: Herder, 1999, p. 129.

[276] Joachim Bauer: Warum ich fühle, was Du fühlst. Intuitive Kommunikation und das Geheimnis der Spiegelneurone, Hamburg: Hoffmann & Campe, 2005 (Why I feel what you feel. Communication by intuition and the secret of mirror neurons; in German).

[277] Meinhard Miegel & Stefanie Wahl: Das Ende des Individualismus: Die Kultur des Westens zerstört sich selbst; München: MVG, 1994 (The end of individualism: Western culture is self-destructive; in German).

progress: *Homo oeconomicus*, originally guided by his (or her) interest in **maximizing benefits**, has come to be replaced – in a sort of economic evolution – by a more complex *homo sociologicus*, guided not only by self-interest but also by varying perceptions of other actors, common norms, collective and individual values and roles.[278] The initial, somewhat one-dimensional concept of man as seen by Thomas Hobbes proved to be too narrow to explain human behaviour. Instead of being egotistic to the point of aggressive despotism, human behaviour features altruistic facets. The critical question is: when and why? The promise of RCT is to predict likely behaviour and decisions. Axelrod takes an economic look at cooperation arguing that cooperation is a matter of gains versus losses, rewards versus costs.[279] In principle, any actor will favour cooperation if it reaps benefits or if unilateral, non-cooperative action is costlier than collaboration. Axelrod adds that cooperation is more likely under conditions that favour or alleviate cooperation.

Methodically, to **measure all determinants of human decision** is a major challenge to RCT.[280] Decisions can be influenced by information and by perceptions (of self, others, and objects) – both of which are subject to change. Decisions also can be influenced differently by diverse objects at stake. In some cases the readiness to cooperate might be greater than in others because the object is either considered rewarding it or not. The question of values that may guide action is also a matter of debate: do individuals adhere to the same values as political decision-makers? The reasons behind decision-making may be explicitly stated, but in other cases they may not. This leaves room for speculation. Reasons are not identical with causes. Reasons reflect an actor's awareness, while causes of action are not necessarily known to the actor.

The dynamics of these factors and the difficulty to measure them in a quantified manner has led to concessions. Osborne admits the limited *rationalizability* of some actions.[281] The degree to which RCT is confirmed by empirical data is in dispute, prompting a debate over the very essence of RCT.[282] The desire to quantify information on behaviour and express it in mathematical forms implies that this approach would render exact results, as in the case of numerical analysis. Simon has introduced the concept of **bounded rationality**, arguing that the capacity of individuals to perceive and understand their social environment and incorporate this information into their decision-making is limited and might over time lead to diverse, even contrary decisions.[283] This means that any effort at predicting decisions and

[278] For a discussion of different trends of RCT Karl-Dieter Opp: Contending conceptions of the theory of rational action; *Journal of Theoretical Politics*, vol. 11, no. 2, 1999, p. 173.
[279] Robert Axelrod: Die Evolution der Kooperation; München: Oldenbourg, 1987 (The evolution of cooperation; in German), p. 3 – 8, 131.
[280] Mathematical formulae, as used in the above economic approaches, have an appeal in itself for their clarity yet their explanatory value is limited, no matter how complex they are, because one critical factor in human decision-making, the individual person or the individual mind, has so far escaped man's ability to completely monitor, explain and predict human thinking. Thus the models discussed here merely serve to approach, but not to capture, human decision-making by simulation.
[281] Martin Osborne: A course in Game Theory; Cambridge: Massachusetts Institute of Technology Press, 1994, p. 54 – 77.
[282] See Gary W. Cox: The empirical content of Rational Choice Theory. A reply to Green and Shapiro; *Journal of Theoretical Politics*, vol. 11, no. 2, 1999, p. 151 – 157, referring to Donald Green & Ian Shapiro: Pathologies of Rational Choice Theory; *Critical Review*, vol. 9, no. 1 – 2, 1995.
[283] Herbert A. Simon: Models of Bounded Rationality; Cambridge: Massachusetts Institute of Technology Press, 1997.

actions is limited even further and that an analysis has to take into account the specific conditions of decision-making in any given case with greater attention.

An important dimension in understanding political action is the historical background of decision-making, for example **historical experiences** in relationships between neighbouring states. Assessing past experience in the case of the Indus water dispute between Sindh and Punjab provinces as well as between India and Pakistan is crucial to understanding today's political positions but how to fit it into a rational choice concept? Levi defines *path dependence* as a factor but cautions that its use in comparative analyses has been limited, mostly due to methodological vagueness.[284] Path dependence reflects internal and external expectations which in turn reflect a society's set of organized interests, among other aspects.

This example also reveals another important factor in decision-making, **perceptions**. The dispute between the provinces of Sindh and Punjab, as will be documented in the empirical section, is characterized by opposing perceptions of the causes that led to the dispute, and its main issues.[285] Applied to the case of water sharing, potential gains can differ widely depending on the way they are perceived.[286] If decision-makers are confronted with the prospect of long-term benefits that outweigh higher short-term gains, they might opt in favour of the former even if this decision might briefly put them in a less than beneficial position.

RCT describes not a single, unified approach but a community of approaches, some relying more on strict economic measures, others drawing on findings from psychology and sociology. Scott summarizes **three main challenges** to RCT approaches:

1) to understand and predict collective action;
2) the relevance of social norms that may direct actors to decide in favour of others or not;
3) the relevance of social structures and their potentially limiting effect on individual decision-making and action.[287]

The relationship between individual and collective interests is a subject of intense debate. The question is: what makes individual actors consider joining others in order to achieve benefits? Economically speaking, the cost of joining, i.e. any obligation from membership (fees, duties, compromising), should be rewarded by higher gains in one form or another. Scott cites the classic case of trade union membership with a view to getting higher salaries: for an individual actor (member) it

[284] Margaret Levi: A model, a method and a map: rational choice in comparative and historical analysis; in: Mark Lichbach & A. Zuckerman, eds.: *Comparative politics: rationality, culture, and structure*; Cambridge: CUP, 1997, p. 28.

[285] While the question of water shares between the provinces of Pakistan is – undisputedly – one of the main issues of inter-provincial relations, it is by no means the only one. The political and historical positions vis-à-vis water that are articulated in the provinces differ widely; see Kaiser Bengali, ed.: The politics of managing water; Islamabad: SDPI, 2003; P. I. Cheema, R.A. Khan, A.R. Malik, eds.: Problems and politics of water sharing and management in Pakistan; Islamabad: IPRI, 2007. This question will be discussed further in section V.

[286] Amos Tversky & Daniel Kahneman: Rational choice and the framing of decisions; *Journal of Business*, vol. 59, no. 2, 1986. Both authors have pointed at the limitations of a fixed set of criteria for decision-making. Individual perceptions are bound to be influenced by momentary personal situations and experience.

[287] John Scott: Rational Choice Theory; in: Gary Browning, A. Halcli & F. Webster: *Understanding contemporary society: theories of the present*; New Delhi/London: Sage, 2000.

is not clear how his or her single vote would have an effect on the outcome of the labour negotiations. Consequently, joining the union in the first place would not make a tangible difference if the expected result (pay rise) will be achieved regardless of his or her commitment.[288]

Does cooperation result from social norms? Social norms exceed the narrow scope of contracts and agreements between actors. Their precise effect is difficult to measure. The realization of actors that altruistic, rather than selfish behaviour may receive approval from other members of a group or society may be based in an awareness that being a member of a group or a society carries benefits in one form or another that will somehow have to be paid for by an individual commitment of one kind or another. Such norms have evolved over time, without any single incident causing this development. They are unintentional in the sense of rational action.[289]

The role of social structures is even harder to assess. Do actors act independently of other actors? The assumption that interaction, especially economic transfers (markets), creates structures is widely held but difficult to incorporate into a theory of action.[290] For the problem of water sharing this means that the decision to share water is to be understood as an element of a complex pattern of internal processes involving members of the executive and administrative sections of government. From an RCT perspective it means that the decision as such may be transparent but hard to predict because of the many variables involved.

Cooperation can take on many forms. According to Axelrod, one of the most frequent and most successful is on a **case-by-case** level. Actors engage in limited cooperation on a strictly reciprocal basis (tit-for-tat). Applying a strategic perspective, cooperative actors – in Axelrod's view – reduce the risk of losing due to other actors which don't stick to their commitment by reassessing the chances of winning in each new case. Interaction thus becomes easier to manage and oversee, and reciprocity implies fairness, inviting other actors to also try cooperative engagement.

Scharpf questions the principle of interest maximization. He advocates a more particularistic approach to rationality that incorporates **specific conditions**.[291] This argument is particularly important where it points at the growing interdependence of social, economic and political processes. Applied to water sharing it means to assess the role of water in diverse fields and re-evaluate non-water factors that influence water decisions. This interdependence not only requires analysts to put water (or any other issue) in perspective, but also to take into account the added pressure on decision-makers.

Braun concludes that the methodological effort to **differentiate rationality** leads to a more comprehensive understanding of the factors behind political decisions. This,

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[288] Scott, *ibidem*.

[289] Scott, *ibidem*, citing Anthony Heath: Rational choice and social exchange; Cambridge: Cambridge University Press, 1976, p. 64.

[290] On the ambivalent nature of methodological individualism criticized by many sociologists for an overly psychological interpretation cf. Douglas Heckathorn: The paradoxical relationship between sociology and rational choice; *The American Sociologist*, vol. 28, no. 2, 1997.

[291] Fritz Scharpf, Bernd Reissert, Fritz Schnabel: Politikverflechtung: Theorie und Empirie des kooperativen Föderalismus in der Bundesrepublik; Kronberg: Scriptor; 1976 (The intertwining of politics: theoretical and empirical dimensions of German cooperative federalism; in German), p. 13 – 18.

however, comes at a prize: a reduced theoretical capacity to predict decisions.[292] Hill counters that while *the theory of rational choice is typically employed to deduce the necessary consequences that result from the interaction of rational agents*, there may in fact be *more than one possible outcome from interaction* if conditions change.[293]

Using **Game Theory** (GT) to analyze and predict actors' behaviour in conflict towards realizing gains and avoiding losses, he simulates two principal types of games: cooperation and confrontation. One common game is the Prisoners' Dilemma: Applied to the collective use of water resources, the dilemma is that in order to protect the river from overuse, one or more water users have to compromise on their individual withdrawals.[294] When one user prefers to withdraw a maximum amount at the expense of other users in order to achieve higher gains in the short-run, it is uncertain whether the other users will stick to refraining from one-sided egotistic action in order to allow long-term benefits for all. If all users act egotistically, the long-term benefits would be eliminated because the status of the river as a resource system would soon deteriorate. In short, the readiness by some to act in a concerted manner towards collective benefits does not guarantee effective cooperation unless egotism by others will be punished. Hill tries to prove that rational actors are prone to unforeseeable changes (*fate*) that affect their decisions, thus making precise predictions difficult even where the sphere of the actor is transparent.[295]

The **Pareto Optimum** represents a situation in which all actors have achieved a level of gains beyond which at least one of them will suffer losses. At that level, any strategy that guarantees the existing gains and prevents losses is considered positive. This means that if further gains can only be achieved at the cost of suffering losses in other areas, actors will have to reconsider their priorities and may re-evaluate expected gains and losses. In the case of water sharing, this could mean

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[292] Dietmar Braun: Theorien rationalen Handelns in der Politikwissenschaft; Opladen: Leske & Budrich, 1999 (Rational action theories in political science, in German), ch. 3.3.3.

[293] Greg Hill: History, necessity, and rational choice theory; *Rationality and Society*, vol. 9, no. 2, 1997, p.190.

[294] Scott Barrett refers to the classic case of two riparian nations which, in spite of defined self-interests, effectively depend on each other regarding the choices each makes as interdependence: Conflict and cooperation in managing international water resources; *World Bank Policy Research Working Paper* no. 1303, 1994, p.3. This *interdependence* – demonstrating the actors' decision-making perspective – can be seen as mirroring their hydrological interdependence, according a common hydrological understanding by the IWRM community (see chapter II c). Interdependence, as convincing it may seem in ecological terms, does not preclude a principle one-sided dependence of lower riparian entities on the upper riparian. This may, as Barrett suggests, be set of by downstream facilities which may be useful to upstream riparian nations or states, too. As will be seen in the empirical section of this study, the upstream-downstream discrepancy in most cases is a major challenge and a test case for game theoretic concepts.

[295] *Ibidem*, p. 204 – 209. Mandel, in principle arguing along a rational choice course, has devised a counter-concept termed irrationality to explain, or rather assess, decisions that (a) run counter to stated policy goals, (b) are based on non-comprehensive search and evaluation, (c) are inconsistent with official statements and (d) are marked by passionate or emotional motives. See: Robert Mandel: Irrationality in international confrontation; Westport: Greenwood Press, 1987. It may be argued that such irrationality might in itself be a kind of rationality – one that sports a new form of rationality in the sense that expected benefits from such action might not be obvious to observers outside the decision-making forum, but do make sense on a more personal level, that of the decision-maker. A much discussed case is that of the personal rationality behind the official *irrationality* of the Nixon-Kissinger government (cf. the so-called madman theory, i.e. the apparent readiness to initiate nuclear warfare). The "rationality" of political decisions that were mainly aimed at increasing the personal status of these men has been examined in detail by Seymour Hersh: The prize of power. Henry Kissinger in the Nixon White House; New York: Summit, 1983.

that achieving higher shares might involve a greater risk of conflict with other riparian actors on other issues.

Game Theory implicitly suggests that both actors involved in the game are somehow linked by a degree of mutual dependence. The case of universally essential resources like water the dilemma of one-sided (over-) utilization that may cause shortages to some users, plus the ecological deterioration of the resource as such, is widely referred to as the *tragedy of the commons*.[296] This dilemma becomes particularly serious if one cooperative actor is confronted by several non-cooperative actors which seek short-term gains at the expense of long-term utilization of the resource by anyone. An effort to expand the capacity of GT is the concept of **Nested Games** (NG). Tsebelis defines his model as *a network of games* which an actor may be involved in at the same time. He finds that decisions which appear less than optimal regarding the maximum benefits to be reaped may in fact be optimal when perceived from a different perspective.[297]

Critics of mathematical models of political interaction state that *politics is not a game* (Warren) and not a closed system consisting of a given set of clear options and alternatives, while conceding that some kinds of political interaction, especially in their strategic conceptions, may be modelled through GT with some usefulness.[298] A major problem, from the perspective of qualitative social science, is that GT fails to adequately define **power**. Politics, from a behavioural perspective, can be seen as a quest for power. Alternatively, power may be seen as the ability to control the flow of resources or the authority over institutional mechanisms.[299] Skaperdas, methodically sticking to the mathematical model, finds that long-term political strategy, especially power projection on a global scale, tends to be underestimated.[300]

Wolf, applying GT to water sharing in the Middle East, strongly denies its capacity to explain complex decision-making processes.[301] Supalla presents the Platte River as a classic competition of water uses (environmental, power generation, irrigation), each requiring specified water supplies over time and space.[302] Its management is complicated by the multitude of stakeholders and objectives. GT, according to Supalla, exposed the failures of past efforts, like an open-ended dispute over

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[296] Garrett Hardin: Managing the commons; London: Freeman, 1977.

[297] George Tsebelis: Nested Games. Rational choice in comparative politics; Los Angeles: University of California Press, 1990, p. 7. Lynne Bennett, S. Ragland and P. Yolles on linked games: Facilitating international agreements through an interconnected game approach: the case of river basins; in: Richard E. Just & Sinaia Netanyahu, eds.: *Conflict and cooperation on trans-boundary water resources*; London: Kluwer, 1998, p. 61 – 84.

[298] Mark E. Warren: What is political? *Journal of Theoretical Politics*, vol. 11, no. 2, 1999, p. 211 - 217.

[299] Political power may have different notions, as Warren, *ibidem*, points out. The importance of this discussion for this study is the conclusion that a universally applicable concept of power is neither feasible nor desirable because it would narrow the analytical approach to specific problems down too much.

[300] Stergios Skaperdas: Bargaining versus fighting; *Defence and Peace Economics*, vol. 17, no. 6, 2006, p. 657 – 676. The author questions the logic of great power decisions taken in the First and Second World Wars, especially the Soviet Union towards Germany, and the U.S. towards Japan which cannot be explained using classic economic concepts of benefit realization. Instead, he finds, long-term visions of the post-war world were the likely motives for decisions that otherwise seemed irrational.

[301] Aaron T. Wolf: Hydropolitics along the Jordan River. Scarce water and its impact on the Arab-Israeli conflict; New York: United Nations University, 1995.

[302] Raymond J. Supalla: A game theoretic analysis of institutional arrangements for Platte River management; *Water Resources Development*, vol. 16, no. 2, 2000, p. 256 – 263.

assessments that could have easily been avoided if a neutral scientific analysis had been commissioned beforehand. As a result, the bargaining process degraded to a mere show of force; rather than water, political power seemed to be at the heart of the dispute. A major problem was the lack of a common goal that could have served as a starting point. From a GT perspective, a coalition of some stakeholders could be helpful to formulate common goals, thus making their position transparent and calculable for other stakeholders. Game Theory, in the Platte case, can serve to make actor positions clear, thus allowing other actors to adjust theirs in order to reach an agreeable solution.

Aiming to extend the reach of Rational Choice and Game Theory models, Levi and Bates highlight the importance of **context-added analysis** in order to adequately take into account the multitude of cases and circumstances of interaction. Their model, Analytic Narratives, adds a *detailed and textured account of context and process*, thus bridging the gap between abstract economic theories and particularistic historic approaches or area studies.[303] This model appears especially promising where political challenges of the present are overshadowed by open disputes or problems from the past. Another argument in favour of this approach is uncertainty associated with decision-making under conditions of dynamic and complex social processes. In such a situation, as Levi points out, actors may opt for a course they would not consider in a more stable situation where the outcome of their action is more foreseeable.[304]

The history of Pakistan – with its chronology of water-related conflict, clashes with India, shifts from authoritarian to participatory rule and back again – is not an example of a straight red line of development. The many turns in the process to establish a functioning state since independence suggest that a conventional model of analysis might not adequately factor in relevant dimensions and dynamics of the problem of water sharing and politics in this country. Therefore a closer look at the specific circumstances of the post-independence era, or the narrative, will be placed before the analysis of the water dispute.

Rationality and identity

The role of identity and culture has been discussed to explain action that appears to escape common notions of rationality. Wendt defines identity as *relatively stable, role-specific understandings and expectations about self* – identities are *inherently relational (…) within a specific, socially constructed world*.[305] This notion is important as, by relating identity to particular situations, it defines identity as a dynamic, rather than somewhat structural system. This identity is not only reflected in the actor's interests, it is the very basis of interests, according to Wendt. The underlying

[303] Margaret Levi: Modeling complex historical processes with Analytic Narratives; in: Renate Mayntz, ed.: *Akteure, Mechanismen, Modelle: Zur Theoriefähigkeit makrosozialer Analysen* (Actors, mechanisms, models: on the theoretical capacity of macro-level analyses; in German); Frankfurt: Campus, p. 112; Robert H. Bates, A. Greif, M. Levi & J.- L. Rosenthal: Analytic Narratives; Princeton: Princeton UP, 1998, p. 14 – 15, 36.
[304] M. Levi: Modeling …; *op. cit*., p. 116.
[305] Alexander Wendt: Anarchy is what states make of it: The social construction of power politics*; International Organisation*, vol. 46, no. 2, 1992, p. 397 – 398, with a reference to Peter Berger: Identity as a problem in the sociology of knowledge; *European Journal of Sociology*, vol. 7, no. 1, 1966, p. 110.

assumption is that political action is guided by individual cultural characteristics. Almond *et al.* define political culture as a concept based on three tiers, political system, political process and policy.[306] Legitimacy is a critical factor marking both the status of the government's authority as well as the reach of governmental control. Legitimacy may rest on democratic mechanisms in some societies; in others it rests on people's perceptions of whether their government makes good decisions. In methodological terms, this means that rationality has to be viewed in a specific national context. The capacity of game theoretic models to predict outcomes of interaction would thus be limited. To make it more complicated, political culture is to be understood as a multifaceted process rather than a general status.[307] In turn, however, culture, according to Ross, facilitates predicting decisions and actions because *it frames the context in which politics occur*.[308]

Espeland uses Max Weber's notion of *rationalism* – **instrumental** *versus* **value rationality** – to explain the dynamic nature of rationality, or *subjective rationalism*.[309] Following Weber, rationality becomes difficult to generalize, yet *just as there is no completely objective stance that can determine whether and how action is rational, neither is there a rational basis for defending our choice of substantive values*.[310] The concept of *homo sociologicus* (as opposed to *homo economicus*) presented by Hargreaves-Heap et al. points in a similar direction, explaining rationality from a behavioural perspective stressing the importance of social norms, rather than individual interest maximization.[311]

Mitra finds that the role of values in decision-making is subject to change according to the political circumstances: *transcendental issues* are a characteristic of the transitional period, up to the point of the establishment of a power base. At that point they are replaced by *the normal politics of "who gets what and how"*.[312] This model is important because it marks a way out of the methodological dilemma between over-generalization and over-specialization in the discussion of rational action.

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[306] Gabriel Almond, G. Bingham Powell, Russell Dalton, Kaare Strøm, eds.: Comparative politics today. A world view; New York, San Francisco etc.: Longman, 2010, p. 43 – 48.
[307] *Ibidem*, p. 49.
[308] Ross concedes that *culture complicates issues of evidence* by *raising serious unit-of-analysis problems for which there are no easy answers*; Marc Howard Ross: Culture and identity in comparative political analysis; in: Mark Lichbach & A. Zuckerman, eds.: *Comparative politics: rationality, culture, and structure*; Cambridge: CUP, 1997, p. 43, 47.
[309] Wendy Nelson Espeland: The struggle for water. Politics, identity, rationality in the American South-West; Chicago: University of Chicago Press, 1998, especially chapter 1: Contested rationalities. Referring to Max Weber's notion, *rationalism is a historical concept which covers a whole world of different things*, p. 34.
[310] Espeland, *ibidem*, p. 36.
[311] Shaun Hargreaves-Heap, M. Hollis, B. Lyons, A. Wheale: The theory of choice. A critical guide: Oxford: OUP, 1992, ch. 5. The authors conclude that *we have no theoretical paradigm that adequately integrates the two* (h. sociologicus *and* h. economicus*) – nor are we likely to have one*; p. 71. The importance of legitimacy, within the framework of a transparent process of decision-making, is obvious, as are the likely consequences in any participatory system. Hofmann and Mitchell have conceptionalized them using an opinion survey of water users in Canadian communities: Nancy Hofmann & Bruce Mitchell: The RESPECT model: evolving decision-making approaches in water management; *Water Policy*, vol. 1, 1998, p. 341 – 355; the concept as such, however, fails to provide any explanation of decisions, or water-related conflicts, but rather summarizes important elements that decision-making should incorporate, such as research, communication and equity considerations.
[312] Subrata K. Mitra: Sub-national movements of South Asia; in: Subrata Mitra, ed.: *Culture and rationality: The politics of social change in post-colonial India*; Delhi: Sage, 1999, p. 196 – 215.

Asymmetry: Water and power

Asymmetry is a condition of **imbalance**. In the case of rivers, asymmetry between upstream and downstream positions renders the upper riparian actor superior to the lower riparian, at least in theory, because of the control over water resources of higher quality and quantity. It is the hydro-geographical potential and the capacity to make use of this asymmetry that translates water into **power**. Privileged control over water resources, due to asymmetric conditions of water access, enables one riparian actor to push economic development on one side of a river or withhold water on the other side in order to compel a competitor to make concessions which he would otherwise not be ready to make.

From a Game Theory perspective, asymmetry is a methodical challenge because the antagonists act under vastly different conditions. One actor is able to refuse cooperation and still make gains whereas the other side might face losses without compensation, i.e. one side could simply escape the prisoner's dilemma altogether. The hydrological superiority of the upstream actor can hardly be offset because water cannot be replaced by any other commodity.[313] What is left for downstream riparian actors is to seek a detour – by either offering a pay-off or trying to connect water to other objects of interest to the opposing, superior side:

- A) **intra-issue linkage**: water supplies are linked to cooperation, or concession, on other water issues, like navigation, fishery, coastal security etc.;
- B) **inter-issue linkage**: water supplies are being tied to cooperation on non-water issues (trade, cross-border migration, regional security etc.);
- C) **financial compensation**: a pay-off is made to the superior side for water supplies.

The hope that is implied with such *linkage* strategies is that a common interest or benefit may be identified.[314] In principle, all theoretical schemes are rooted in observations from international conflict research, negotiation theory, and rational choice. Cooperation, as a general conclusion, is possible if the price is right and if there are no adverse circumstances. Strictly speaking, these strategies tacitly assert the realist assumption (of international relations theory) that cooperation is not the preferred mode of interaction, but rather dominance or superiority. To counter this negative position, the concept of **benefit sharing** (to be distinguished from water sharing) has been introduced to defuse the potential danger of water conflicts.

The linkage concept is convincing as it suggests that – at least in some cases where favourable conditions exist – water may simply be treated as any other issue. In a positive case, the downstream side will succeed in obtaining the required water supplies in turn for other commodities or services. By a rational choice standard, the trade-off should be roughly equal in terms of opportunity costs and direct value of the

[313] Nora Schiessler, A. Renner, A. Lüth: Möglichkeiten und Grenzen partizipativer Verfahren zur Überwindung asymmetrischer Wasserkonflikte; *Berichte des Umweltforschungszentrums Leipzig* (UFZ) Nr. 10, 2004 (Options, and limitations, of participatory strategies to overcome asymmetric conflicts over water; Report of the Environment Research Center, Leipzig, Germany; in German), p. 37 – 52. Another important aspect regarding game theoretic approaches to asymmetry is that the long-term nature of asymmetry – it is not supposed to end unless the river dries up. Theoretically, over a long period several *games* may be tried to further both sides' interests.

[314] Schiessler *et al*., *ibidem*.

commodities traded. It can be argued that cooperation as such is a beneficial action and should thus be preferred. This argument has been elevated from its initial normative status to a more pragmatic level referring to practical (quantifiable) as well as political advantages that reach *beyond the river*.[315]

In a negative case, the downstream side may not escape its inferiority because the price demanded by the upstream side is too high in one form or another or other, hidden demands make the downstream side essentially dependent for its very existence. Such a situation would result in a state of **hydro-hegemony**: water could thus be used as a lever to effectively suppress all downstream riparian actors at will.[316] The possibility of linkages would be reduced because no other commodity matches the value of water. Cooperation, by its actual meaning, would be almost impossible. Such an extreme situation depends on a near-absolute supremacy based on water, i.e. downstream actors would have no alternative water source available and could thus be blackmailed, and they would not have any means to counter such a threat, neither individually, nor collectively.

Given the expected political cost of such confrontational behaviour, as described in the water wars chapter, the chances for some form of cooperation – in the wider sense of the word – are greater. The Indus Waters Treaty, concluded by long-time antagonists India and Pakistan in 1960, is often cited as a successful example of financial compensation. While linkage options also existed, it was the direct financial pay-off (in this case by third-party commitments and by Pakistan) that made the agreement possible.[317]

Negotiations and dispute resolution

The Middle Eastern water conflicts have provided a testing ground for theories on water dispute management. A classic economic approach is based on valuing water

[315] Starting from a river basin or IWRM perspective, Sadoff and Grey (both from the World Bank), circumnavigate the problem of asymmetry by pointing at the positive potential of cooperation: Claudia Sadoff & David Grey: Beyond the river: The benefits of cooperation on international rivers; *Water Policy*, vol. 4, 2002, p. 389 – 402.

[316] Hydro-hegemony has recently become a hotly discussed topic. Identifying asymmetry as a major obstacle to inter-riparian cooperation, it is argued that conflict over water is much more likely than statistics suggest because of the widespread phenomenon of asymmetry and the growing shortage of water, especially when compounded by other volatile factors, like existing bilateral tensions. Jeroen Warner and Marc Zeitoun have tried to develop a concept of hydro-hegemony (HH) based on conflict research models; see: Hydro-hegemony – a framework for analysis of trans-boundary water conflicts; *Water Policy*, vol. 8, 2006, p. 442 – 452; J. Warner: Contested hydro-hegemony: Hydraulic control and security in Turkey; *Water Alternatives*, vol. 1, no. 2, 2008, p. 271 – 288. A condition of HH is measured in accordance with type of control over water, riparian interaction and intensity of conflict; p. 453. The main result from this effort is that water conflict has to be understood within the wider context of riparian relations, or politics. This finding is not surprising. Whether it required a new concept to reach this conclusion is questionable. The expectation that natural advantages tend to be used to generate power, and that power is used to generate benefits regardless of other nations' or groups' interests is well documented in the history of international relations. Water, as Warner and Zeitoun admit referring to T. Allan, has to be understood as an object of politics – see: Zeitoun and Warner: International relations theory and water do mix: A response to Furlong's troubled waters, hydro-hegemony and international water relations; *Political Geography*, vol. 27, 2008, p. 802 – 810.

[317] This example will be presented in detail in the empirical sections of this study.

and its opportunity costs on a monetary basis.[318] One constraining factor of this approach is that it typically centres on macro-level political decision-making. In the case of water sharing, distribution may be prioritized over efficient water use for reasons of political acceptance, as Just *et al.* point out.[319] This argument not only applies to democratic societies but to more authoritarian societies, with a degree of secrecy, as well because the consequences of water management decisions inevitably are felt by almost all citizens.

Colby and d'Estree note that water conflicts typically require a **long-term mechanism** of dispute resolution due to the changing, cyclic nature of rivers and their management: *The ongoing nature of water conflicts implies that parties have different behaviour than in a one-time dispute, knowing they will meet again*.[320] This applies in particular to river basins in the tropics, with strong seasonal variations. In terms of Game Theory, it means that actors might tend to find themselves in a position to try different games, rather than being caught in a dead-end.

Of the conventional forms of conflict resolution, court settlement (litigation) and bargaining, it is bargaining between the antagonists that allows for political power to yield favourable outcomes. If a judicial solution is sought, the result – especially in an asymmetric situation – might render a more balanced situation for both sides, which would turn into one big incentive for the powerful (upstream) riparian actor to try to avoid a legal decision.

At that point **Alternative Dispute Resolution** (ADR) might be an option in order to avoid confrontation (in the form of repercussions from an unfavourable legal verdict on the upper riparian side), a loss of face, and an over-all uncooperative position of the losing side. ADR employs third parties as mediators, either to reach a consensus on disputed issues, or to establish a neutral assessment of the problem (by way of an independent study, for example). ADR, as its proponents stress, has a proven track record, especially in the U.S., even though many conflicts continue to be approached in a classical fashion exerting pressure in one form or another on weaker sides.[321] Its *rising popularity* with state and federal authorities in the U.S. (Colby and d'Estree) reflects in part the public's attention to these disputes. A strong argument in favour of ADR, albeit psychological, is that in cases where positions are already hardened, a head-on process is not likely to yield positive results quickly, whereas a mediator can serve as a sparring partner of sorts while at the same time communicate both sides' positions step-by-step.

Shamir attempts to classify negotiation – based on power, established rights, and interest.[322] This differentiation renders the perspective of the negotiator, rather than

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[318] Franklin Fisher: The economics of water dispute resolution, project evaluation and management: An application to the Middle East; *Water Resources Development*, vol. 11, no. 4, 1995, p. 377 – 388.
[319] Richard Just, G. Frisvold, V. Harrison, J. Oppenheimer & D. Zilberman: Using bargaining theory and economic analysis as an aid to trans-boundary water cooperation; in: Richard Just & Sinaia Netanyahu, eds.: *Conflict and cooperation on trans-boundary water resources*; London: Kluwer, 1998, p. 415 – 423.
[320] Bonnie G. Colby & Tamra P. d'Estree: Economic evaluation of mechanisms to resolve water conflicts; *Water Resources Development*, vol. 16, no. 2, 2000, p. 240.
[321] Colby & d'Estree, *ibidem*.
[322] Yona Shamir: Alternative dispute resolution approaches and their application; UNESCO: *From Potential Conflict to Co-operation Potential (PCCP) series* no. 7, 2003, p. 6 – 17, 18 – 22 (on water); www.unesco.org/water/wwap/pccp/pubs/disciplinary_studies.shtml (Sept. 2008).

the decision-maker, yet it does not reach beyond conventional conflict analysis.[323] The outcome of negotiations does, of course, depend on the starting positions of the actors. Whether they rest on economic or military power or on established rights makes a difference, of course. The big question is: what to do if a powerful actor refuses to cooperate in terms of water sharing? Mediation and other negotiation techniques can bring two sides closer towards each other, but an agreement ultimately hinges on the readiness of both to seek a solution rather than sort out their difference by means of force.

Institutions

Institutions, from an economic perspective, are objects of rational action as much as limiting factors of it. **New Institutional Economics** (NIE) can be seen as a reply to criticism of classical economics, especially over the lack of rules in market-oriented interaction. Classical economics imply a set of rules that actors more or less automatically observe in their quest for maximum benefits. Institutional arrangements are introduced to provide a **framework for interaction**.[324] As an enabling component, they can also be designed to provide incentives to actors, according to North's principal definition of institutions as *the rules of the game in a society (…) that shape human interaction. In consequence, they structure incentives in human exchange*.[325]

These rules, as North points out, are subject to change and may reflect the particular object of an interaction as much as the position taken by the actors involved as well as their respective social values.[326] Institutions, consequently, can take different shapes: formal laws, administrative authorities, or simply informal codes of conduct or rituals. As such, they are the parameters of social, economic and political development.[327] More important in political terms, by regulating political interaction

[323] K.D.W. Nandalal & Slobodan Simonovic: State-of-the-art report on systems analysis methods for resolution of conflicts in water resources management; UNESCO *PCCP* series no. 4, 2001, p. 96 – 106. This mathematical approach simulates decision-making by modelling uncertainty. Within the strict logic of systems analysis, it may be convincing, but when compared to rational choice or qualitative analysis methods, its explanatory limits become obvious – even more so in the case of multi-dimensional water disputes.

[324] A more appropriate definition of institution may be convention, following Mary Douglas: How institutions think; London: Routledge, 1987, p. 46 – a very general, yet widely recognized understanding of the purpose of institutions. Douglas's theoretical discussion is particularly helpful where it touches concepts of rationality, e.g. the role of information in decision-making.

[325] Douglass C. North: Institutions, institutional change and economic performance; New York: Cambridge UP, 1990, p. 3. North has been widely credited for highlighting the design of institutions towards aiding decision-making by providing incentives for rational action. See also Jack Knight: Institutionen und gesellschaftlicher Konflikt (Institutions and social conflict; in German); Tübingen: Mohr-Siebeck, 1997, p. 11. For an overview of the methodological roots of NIE see Eva Terberger: Neoinstitutionalistische Ansätze: Entstehung, Wandel, Anspruch und Wirklichkeit (New institutionalism: evolution, change, demand and reality; in German); Wiesbaden: Nomos, 1994, p. 47ff.

[326] Douglass North: The new institutional economics and Third World development; in: John Harris, J. Hunter & C. Lewis, eds.: *The new institutionalism and Third World development*; London: Routledge, 1995, p. 18.

[327] Gerhard Göhler: Politische Ideengeschichte – institutionentheoretisch gelesen (A history of political thought: an institutionalist perspective; in German); in: G. Göhler, K. Lenk, H. Münkler & M. Walther, eds.: *Politische Institutionen im gesellschaftlichen Umbruch (Political institutions and social transformation;* in German*)*; Opladen: Westdeutscher Verlag, 1990, p. 7 – 20.

institutions, according to North, *reduce uncertainty in human exchange*.[328] A principal requirement of effective institutions to this end is **information**, as North details. Information, like institutions as such, is seen from a market perspective that takes into account both its availability and cost. Obtaining information, though theoretically essential for rational decision-making, may be costly enough for some actors to rather cut expenses, thus risking suboptimal results. Ideally, institutional design is oriented towards reducing this cost in order to allow optimal outcomes of decision-making.

One important quality of institutions is the **stability** they provide to political action.[329] Being frameworks, they function as reference points. This applies especially where one institution forms part of a network of institutions, e.g. a treaty or law and a bureaucratic mechanism in place to implement it. Both elements draw legitimacy from each other. This self-stabilizing effect has an inevitable consequence on politics: A drastic turn-around in (water) politics would require a fundamental change in the institutional set-up; the new policy, however, is not likely to be implemented as intended if the institutional apparatus is not functioning. In other words, the incentive to maintain the existing institutional mechanism comes from the institution itself. Finally, the stability of the government as a whole depends on an effective institutional arrangement, as Mitra demonstrates in the case of diverse Indian states.[330]

The relevance of NIE to assess rational decision-making has been discussed critically. Bates misses the political dimension, especially the acknowledgement of **power**.[331] This point, discussed above with regard to rationality, is important and deserves a closer look when it comes to institutional change. Institutions do shape political interaction as they regulate it; they may, at the same time, become an object of politics, too, as Göhler stresses, while in principle being the result of political will.[332]

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[328] North: new institutional economics, *supra*, p. 18.

[329] Rudolf Richter & Eirik Furubotn: Neue Institutionenökonomik. Eine Einführung und kritische Würdigung (New institutional economics. An introduction and critical appraisal; in German); Tübingen: Mohr, 1996, p. 459 – 460. The relationship between bureaucrats and decision-makers is referred to as *Organisationskultur* by the authors.

[330] Subrata K. Mitra: Effects of institutional arrangements on political stability in South Asia; *Annual Reviews of Political Science*, no. 2, 1999, p. 416 – 418. Identifying four factors of political stability (effective law-and-order institutions, acknowledgment of public demands; articulation of demands by political elites through protest plus participation; corresponding constitutional changes), Mitra explains the success of West Bengal's conflict management which is based on the ruling party's effective handling of existing institutions and the implementation of reform policies that respond to public demands, whereas (in 1999) the situation in Bihar entirely escaped the control of the government.

[331] Robert H. Bates: Social dilemmas and rational individuals. An assessment of the new institutionalism; in: John Harris, J. Hunter & C. Lewis, eds.: *The new institutionalism and Third World development*; London: Routledge, 1995, p. 42: "*Political facts" lurk just beneath the surface of the new institutionalism*.

[332] Gerhard Göhler: Wie verändern sich Institutionen? Revolutionärer und schleichender Institutionenwandel (How do institutions change? Revolutionary and creeping institutional change; in German); in: G. Göhler,ed.: *Institutionenwandel*; *Leviathan* no. 16, 1997 (Sonderheft /special edition; in German); Opladen: Westdeutscher Verlag, p. 21 – 25; G. Göhler: Zusammenfassung und Folgerungen: die institutionelle Konfiguration (Summary and conclusions: the institutional configuration; in German); in: G. Göhler, ed.: *Institution – Macht – Repräsentation: Wofür politische Institutionen stehen und wie sie wirken (Institution, power and representation: the role and functioning of political institutions; in German)*; Baden-Baden: Nomos, 1997, p. 579 ff.

As such they are *manifestations of power*.[333] Given the nature of some institutions, and in fact many political processes, it is often hard to clearly mark the effects that certain actions have on institutions, and vice-versa.[334] As both rational action and institutions are subject to change caused by the dynamics of communication, perception, shifting priorities etc., it becomes difficult to analytically separate causes from consequences – *institutional structures constrain and constitute actions*, at the same time actions give rise to new institutions.[335]

The causes of **institutional change** relate to both economic and political factors, as Feeny points out. The *supply of institutional change*, according to Feeny, principally corresponds to a respective demand, either on an economic (cost-related) or a political (interest-related) basis. The cited example is a classic case of economic benefit versus political interest: the improvement of an irrigation system (Chao Phraya River, Thailand) towards greater efficiency versus political concerns over national security and the business interests of an economic élite.[336] Generally speaking, change is motivated by potential gains to be realized from improved institutional arrangements.

Institutional change may come in the form of limited reorganization or a wholesale renovation. March and Olsen find that major reorganization efforts tend to fail.[337] A prominent reason is opposition from a bureaucracy that is fearful of losing influence and earnings. This attitude, of course, represents a case of rationality in itself, though it may collide with the rationality of a higher level of the administrative hierarchy, like that of the government.[338] This example illustrates the ambiguous nature of rationality as much as the ambivalence of institutions: they are the structural expression of politics, and they themselves promote structures by giving incentives to further institutionalization. In the given case this means the organized interests of those who oppose the reorganization planned by the government. It will be seen in the case of the water sector how such institutions-within-institutions affect the process of water sharing.

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[333] Gerhard Göhler: Der Zusammenhang von Institutionen, Macht und Repräsentation; in: G. Göhler, ed., *supra*, p. 39, citing Hannah Arendt: Macht und Gewalt (English edition: On violence); München: Piper, 1970/2006, p. 42.

[334] The relationship between institutions and action is *not a one-way street*, as Windhoff-Héritier points out: Institutions, interests and political choice; in: Adrienne Windhoff-Héritier & Roland Czada, eds.: *Political choice. Institutions, rules and the limits of rationality*; Boulder: Westview, 1991, p. 39- 40.

[335] Windhoff-Héritier, *ibidem*. The discussion of institutions, with its countless sub-theories, has caused some observers to question the analytical reach of NIE; see Oliver Williamson: The new institutional economics: taking stock, looking ahead; *Journal of Economic Literature*, vol. 38, Sept. 2000, p. 595 – 613. Williamson describes the theoretical stage of NIE as *a boiling cauldron of ideas*, p. 610.

[336] David Feeny: The demand for and supply of institutional change; in: Vincent Ostrom, D. Feeny & H. Picht, eds.: *Rethinking institutional analysis. Issues, alternatives and choices*; San Francisco: ICSG-Press, 1993, p. 166 – 170. The preference for national security concerns in 1930s' Thailand is linked to the perception of Japanese imperial policies (Greater Asian Co-prosperity Sphere) and, as an endogenous factor, the political influence of the big landowners and the near absence of political influence of the small farmers.

[337] James March & Johan Olsen: Rediscovering institutions. The organisational basis of politics; New York: Free Press, 1989, p. 83 – 85.

[338] Braun points at William Niskanen's understanding of bureaucrats as collective actors: their common rationality, according to Niskanen, is based on achieving, and securing, high budgets – regardless of actual needs – as a means to ensure high status, and along with it more staff (i.e. a bigger institution), vis-à-vis other branches of the administration; see Dietmar Braun: Theorien rationalen Handelns, *op. cit.*, p. 139.

Bureaucracy has widely been perceived as a typically negative feature of public institutions. The alleged lack of effectiveness and efficiency, however, is hard to assess. Whether goals are achieved and how organizations perform in order to reach these goals is, as Holmes concludes, impossible to measure because organizations as such are *not rational*.[339] Holmes instead offers an analytical clue in the form of the organizational ideology or **organizational culture**:

- Person culture (based on the professional profile of loosely linked group members)
- Power culture (strongly hierarchical, centralized)
- Task culture (project-oriented, flexible)
- Role culture (highly regulated)

The example of the Hong Kong Environmental Protection Agency, evolving from a *person culture* to a *task culture*, explains why private administrative units do not necessarily guarantee greater efficiency.[340] The key to organizational **effectiveness**, as observed in this example, are

- political will,
- sufficient resources,
- adequate time for institutional development (including recruitment), and
- management skills.

This institutional analysis does not suggest that there is a universal design of an effective institution, as Holmes cautions. To analyze institutional performance and policy implementation also means to assess the institutional process in a given case in detail. Such a qualitative analysis seems indispensable especially in times of crisis.[341] The cited example of the Iran crisis of 1978 illustrates the **role of individuals** in inter-institutional coordination and communication: Misperception of ground realities, inadequate communication with other institutions and – as a result – misguided policy recommendations have adversely affected decision-making.

What may be taken as a negative case of person culture points at the difficulties attached to effective management: collecting and evaluating information, communication with other individuals, coordination of activities, counselling leaders on policy-making *et cetera.* Also this example exposes a clash of opposing rationalities: Each participant in the governmental deliberations on the current crisis (both in Tehran and in Washington) represented well-founded rational proposals for action, yet the decision-makers on both sides found it difficult to make a choice.

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[339] Paul R. Holmes: Bureaucracy and effectiveness in water pollution control; *Water Science and Technology*, vol. 30, no. 5, 1994, p. 114.

[340] Holmes, *ibidem*, p. 116 – 118.

[341] Gary Sick, himself an advisor of the U.S. president at the time of the Iranian crisis of 1978, provides a critical look at the internal mechanism of government decision-making: All fall down. America's tragic encounter with Iran; New York: Random House, 1985. The failure of government branches to adequately evaluate the situation, coordinate with all institutions involved, and arrive at an appropriate policy is considered by Sick a *structural inadequacy of the system*; p. 42. There are, however, serious personal failures, too, like the U.S. Tehran ambassador's inability to reach and deliver a realistic assessment of the situation on the ground. Similar observations have been made in other crises like Vietnam and Cuba; see Irving Janis: Groupthink. Psychological studies of policy decisions and fiascos; New York: Houghton & Mifflin, 1982.

This dilemma reflects some of the limitations of institutional and rational choice theories:

- Rationality can take different shapes. It may be guided by established norms or assumptions about situation, appropriate (re-)actions and expected results.
- Not all factors that determine decision-making may be known in a given case.
- In some cases, actors try to manipulate institutions to further their interests (career, power) or simply circumvent them.

The gap between theory and reality points not so much at a failure of this particular theory but a fundamental inability to acknowledge every form of decision-making and action in all its complexity in a theoretical model.[342]

Synthesis: the case study as a model

The desire to explain a particular problem and extrapolate findings from this case to another can lead to new theoretical models. Conversely, applying an established theory to a particular case may yield new understanding that was not possible when a strict case-by-case approach was applied. Where is the middle ground between both approaches? Generalization carries the risk of superficiality, particularism does not reach beyond the chosen case.

The Analytic Narrative approach has been introduced to the discussion of economic models of interaction as an attempt at merging two different approaches, or even two disciplines.[343] Based on rational choice theory on the one hand and historical case analysis on the other, this method involves the actor's context more closely in the analysis than a typical game theoretic or rational choice approach might do. Hoping to bridge a gap, its authors intend to *transcend some of the current and unproductive "tribal warfare", especially between the new economic versus historical institutionalists and between advocates of unbounded and bounded rationality*. By developing *systematic explanations based on case studies*, they want to increase the range of existing economic models of interaction.[344]

The capacity of this approach depends in part at least on the chosen case to which it is applied. Levi stresses the importance of the specific context: *Once the context is sufficiently understood, the researcher can build a model that fits the particular case better and that captures the actual institutional constraints*.[345] Similar to historic methods and contrary to classic rational choice methods, the approach is mostly inductive rather than deductive. This tends to yield better results on the chosen case,

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[342] Elinor Ostrom: Rational choice theory and institutional analysis: toward complementarity; *American Political Science Review*, vol. 85, 1991, p. 237 – 243. Ostrom citing Jon Elster (*Solomonic judgments. Studies in the limitations of rationality*; New York: Cambridge UP, 1989, p. 181): *Individuals frequently "do not know what they want, or do not know what they know; or fail to do what they have decided to do"*.

[343] Robert H. Bates, Avner Greif, Margaret Levi, Jean-Laurent Rosenthal & Barry Weingast: Analytic Narratives; Princeton: Princeton UP, 1998.

[344] Robert Bates *et al.*: The Analytic Narrative Project; *American Political Science Review*, vol. 94, no. 3, 2000, p. 696.

[345] Margaret Levi: Modeling complex historical processes with Analytic Narratives; in: Renate Mayntz, ed.: *Akteure, Mechanismen, Modelle: Zur Theoriefähigkeit makrosozialer Analysen* (Actors, mechanisms, models: on the theoretical capacity of macro-level analyses; in German); Frankfurt: Campus, p. 117.

but at the expense of *generalizability*.[346] Downing notes that *the result* (of a conventional rational choice approach) *does not always add to the understanding of historical phenomena; it merely translates a historical narrative into the language of economics*. The analytic narrative approach, by contrast, aims to *fill in gaps in historical sources* by focusing on *the context of historical actors and construct a framework of capacities and constraints*.[347]

Conclusion: the rationality of sharing water

The most convincing argument of the concepts presented above is that water sharing in a rational manner means to realize **benefits** for the actors involved. Water as an indispensable resource and driver of socio-economic development carries a multitude of potential benefits. The aim of rational actors in the water sector, accordingly, is to realize such benefits – be it in the form of greater shares, more convenient delivery timings, for example, or in the form of any other substantial benefit in return for water. Cooperation will be seen as a successful strategy if such benefits outweigh the prize that has to be paid by the individual actor, either in the form of water or other commodities or assets given to other actors, or potential gains foregone. If cooperation does not pay, it will most likely not be considered.

For actors to engage in an effort to share water those expected benefits need to be identified. Since cooperation, even if the benefits seem so obvious, does not come automatically, there must be other aspects behind political decisions worth analyzing. **Stated interests** help identify an actor's expected water-related benefits and thus provide a guideline by which to measure when and how one actor might take to cooperate rather than seek confrontation. A central problem attached to political interests is the **decision-making**. The arcane sphere of executive decision-making inhibits the analysis of rationality and it conflicts with the desire of other actors seeking cooperation to identify and understand interests and positions. Besides the stated interests and political agendas, a number of psychological, societal, cultural and other factors determine decision-making which are highly dynamic and not transparent yet important for the understanding of government action.

To employ RCT effectively would mean to be able to evaluate these factors, at least as far as they can be identified, *before* actually entering the actor into an RCT model. Game Theory describes a clearly defined idea of rational action that – in theory – allows predicting patterns of action. As such, it exposes the methodical limitations of a strictly mathematical approach to understanding behaviour while at the same time exhibiting the importance of **qualitative analysis**.[348]

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[346] Levi: Modeling …., *op. cit.*, p. 121. This challenge has been faced by other social science disciplines, for example the sociological discussion of war as an integral part of theories on conflict and peace; cf. Hans Joas and Wolfgang Knöbl: Kriegsverdrängung. Ein Problem in der Geschichte der Sozialtheorie (Avoiding war. A problem in the history of social theory; in German); Frankfurt/Main: Suhrkamp, 2008.

[347] Brian M. Downing: Economic analysis in historical perspective: Analytic Narratives, by Robert H. Bates et al.; review article; *History and Theory* , vol. 39, no. 1, 2000, p. 90 - 91.

[348] Cf. Randy Simmons & Peregrine Schwartz-Shea: Method, metaphor …, *supra*, p. 6; the authors point at the limits of game theoretic approaches regarding group identities which tend to be mistaken analytically for collective interests.

Political decision-making in past crises reminds us of the difficulty to adequately assess and weigh the factors behind executive decisions. Some rational decisions may, on an individual level, even contradictory perceptions of ground realities, reflecting very different rationalities concerning the same subject.[349] A well studied case of **conflicting rationalities** is the Vietnam War management of diverse U.S. administrations. In this case, the government institutions involved in decision-making functioned as intended, yet several different rationalities emerged out of a complex set of personal and group interests, some individuals and groups arguing against, others arguing in favour of escalating the war. Both sides, while advocating diametrically opposed measures, regularly referred to the overall national security interest as a guiding parameter of their respective rationalities. In the end, many measures taken proved counter-productive or even *irrational* (Halberstam), yet the widespread belief in the righteousness of the decision-makers remained by and large intact.[350]

Cases like this serve to underline that a **general concept of rationality** does not exist. In other words, rationality is to be understood as dynamic and reflecting psychological, institutional and other aspects of decision-making, even public opinion. Today's rationality of a given actor might lead to cooperation with another actor, while tomorrow confrontation might serve that actor's interests better, just as perceptions of likely gains or costs might change due to factors not necessarily visible to people outside the decision-making body. This observation strongly supports a context-oriented narrative approach, rather than an approach that relies entirely on a general theoretical framework.

The role of **incentives** as a trigger of cooperation remains important. The above cited example, however, has marked the limits of an entirely incentive-based approach to rational action – not simply because it may be hard to identify likely incentives and their effect on the actor, but also because they do not necessarily constitute the main driver of rational decisions. Much of the decision-making in the Vietnam case is due to the unchecked belief of decision-makers and advisers that the policy enacted by the previous government was in essence successful and in line with stated interests. Moreover, the government itself had already limited its own options to a point where there were few potential benefits from a cooperative move, if any. When defeat on the battlefield had become inescapable, there weren't any possible incentives left. Consequently, confrontation, rather than cooperation – besides a half-hearted agreement on the withdrawal of foreign forces – continued until the end.

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[349] The American war against Vietnam illustrates the clashing rationalities expressed by leading political and military figures in a most dramatic fashion. Though regarded as a hopeless case by many senior advisers, presidents Kennedy, Johnson and Nixon have steadily escalated this conflict up to a level where it became increasingly unmanageable. Stated geopolitical interests were regularly given priority over more tangible arguments fielded by advisers, such as prohibitive costs, adverse economic and social consequences, and lacking prospects of any measurable military success. For a comparative analysis of the internal divisions within the respective U.S. governments see David L. Anderson, ed.: Shadow on the White House. Presidents and the Vietnam War, 1945 – 1975; Lawrence: University of Kansas, 1993; Robert Buzzanco: Masters of war. Military dissent and politics in the Vietnam era; Cambridge: CUP, 1996, especially ch. 8.

[350] David Halberstam: The best and the brightest; New York: Random House, 1969. See also Walter Isaacson: The wise men; New York: Simon & Schuster, 1986. Halberstam, citing policy-making with respect to Asia and China, remarks *that it was the irony of the Kennedy administration that John Kennedy, rationalist, pledged above all to rationality, should continue the most irrational of all major American foreign policies.*

The debate over rational action, benefits and incentives for cooperation will also have to address issues of responsibility, accountability and common interests. From a public perspective, the relevance of incentives may be seen as irrelevant because the elected government is expected to act in a responsible manner, serving a common objective beneficial to most, if not all members of the society, at least in a democratic system. Rational choice, in the above context, is typically applied to governments seen as executive bodies acting in a sphere of exclusive authority with a more or less exclusive right to define national interests. From a public perspective, the benefits from cooperation over water might include ecological long-term aspects not taken into account by the executive.

As systematic economic utilization of rivers inadvertently involves ecological damages to the river basin in one form or another that, in the long run, might lead to a deterioration of water supplies (in terms of quantity and quality), the cost of restoring the basin is set to rise. Avoiding such a burden can be translated into economic benefits to all users. As Ostrom has pointed out, if **transaction costs** like these are included in the calculation of potential benefits, the rewards of cooperation would have to be reassessed. This helps explain why, if all relevant information is available to decision-makers, it may pay to cooperate even if there are no significant immediate gains but instead important long-term benefits. This finding is crucial to the problem of water sharing in a case like Pakistan because it would hypothetically enable all actors (provinces) to find a common ground, *e.g.* the rehabilitation of the irrigation and storage network towards ensuring adequate long-term water shares for all parties. In terms of methodology Ostrom's extension of the classic NIE model widens the scope of rational choice instruments and narrows the gap between economic concepts and concepts primarily based on hydrological and ecological approaches, like IWRM, as well as the property rights approach.

Finally, the problem of **asymmetry** remains a major challenge in practical political as well as in methodical terms. Hydro-strategic advantages do not necessarily lead upstream sides to blackmail downstream sides – though, at least hypothetically, it is possible. Thus the perceived threat remains, as will be seen in the case of the Indus Basin shared by India and Pakistan. Whether water will be used as a means to exert power over the lower side is a matter of wider political considerations. Upstream positions do not always render an all-out advantage over downstream actors; turning the screws on a riparian neighbour involves potentially negative consequences for the upstream side, even if water blackmailing is feasible.[351] It is again economic theory that provides a clue to understanding decision-making by translating such opportunity or transaction costs into operational factors of political action.

[351] Halting the flow of a river requires upstream storage capacities; unless storage of significant dimensions is available, the threat cannot easily be realized. This aspect will be discussed in the chapter on the early post-independence conflict between India and Pakistan.

Introduction:
III. The Indus River and the importance of *pani*

Large rivers have been focal points of human development ever since the beginning of organized settlements thousands of years ago. The prospects of constant water supply, high-yielding agriculture and revenues from water-borne regional trade have been accompanied by the manifold challenges of river management which were particularly felt in arid places. Not surprisingly, it was Asian societies that have over the centuries developed a unique mastery in managing large rivers and adjusting their economies to the highly dynamic Monsoon cycles.

The Indus River Basin, with its tributaries and canals, its groundwater reservoirs and surface storage facilities, and its climatic and geological features, determines the way water is used in the countries that share this basin.

The people of Pakistan have been harnessing the waters of the Indus River for irrigation since ancient times. Rising demand for water, or *pani* (in Urdu), has necessitated a more economic utilization of water and the sharing of this vital resource among its many users. To find out why water sharing remains a hotly contested issue in a country whose experience with organized water utilization goes back over 4,000 years, this section presents a comprehensive profile of Pakistan that includes the historical, political, economic and hydrological circumstances of water management.

This context-oriented approach aims to identify the social, economic and political fault lines that run through the Indus River basin and define the relationship between the water users. Understanding the circumstances and conditions of water management is a precondition of understanding the way water is shared or why sometimes confrontation reigns.

III.1 Water management: an institutional history

The history of water management in the Indus Basin is very much a history of Pakistan as a nation. As the development of the Indus into a network of rivers and canals is accompanied by an evolving institutional framework intended to support systematic irrigation, Pakistan's transition from colonial entity to sovereign state is reflected by the development of administrative structures.

The hallmark of this dual process is the gradual expansion of the irrigation network begun during the colonial rule of the then Crown Colony of India. The desire to support increasing water consumption in the Indus region and beyond drove colonial water managers to regulate the use of the rivers and canals.

Institutions of various types have since emerged: acts and ordinances, committees and commissions, treaties and agreements. Their scope ranges from

- provincial (concerning only one particular province),
- inter-provincial (concerning relations between provinces) and
- federal (concerning Pakistan as a whole) to
- international (concerning India and Pakistan).

As the following table shows, a number of institutions covering both provincial and inter-provincial concerns have survived from the colonial era to this day. After independence, when political attention focused on the conflict with India, many institutional provisions in the water sector remained operational without much change, if any. It was not before the conclusion of the Indus Waters Treaty (IWT), in 1960, when the main problem – sharing water between India and Pakistan – finally seemed to be solved, that the road was cleared for the necessary modernization of the irrigation system that would allow for effective economic and political sovereignty. Though the IWT's consequence was not instantaneous institutional change, the Treaty can nevertheless be seen as a first step in this direction – all the more so because the former colonial patron, the United Kingdom, did not play much of a role in the IWT process, as will be seen in the chapter on the IWT process.

Further institutional steps that followed the IWT strengthened the role of the provinces. While federal structures took a long time to evolve into effective mechanisms of government, the problem of provincial water shares slowly appeared on the political agenda. When in 1991 a formula for the sharing of water within Pakistan was agreed, a basis for water distribution was established to last to this day.

The following chart presents a chronology of water management that is closely interwoven with the transition from colony to an independent nation. Institutions can be read as markings on the path towards sovereignty in water management as well as in governance.[352]

[352] The following table is primarily based on information provided by Arthur Aloys Michel: The Indus Rivers: A study of the effects of Partition; New Haven/London: Yale UP, 1967. Being the most comprehensive account of water management up to the implementation of the Indus Waters Treaty of 1960, Michel's work remains a reference on the subject even five decades after its publication. For developments after 1965 the main source are newspaper quotations (particularly *Dawn*).

Political system		Year	Institutional history of water sharing in the Indus Basin.	Type	Scope
Colonial rule	Colonial rule (various forms of partial autonomy)	1873	**Canal and Drainage Act** (No. VIII, 11 Feb. 1873). Punjab irrigation management (to be followed by similar acts for other territories). Comprehensive law on water supply from canal head; irrigation management becomes a provincial responsibility; provisions for dispute settlement.	L	Prov.
		1879	**Sindh Irrigation Act** (No. VII, 2 Oct. 1879). Comprehensive law on water supply from canal head and irrigation management, including dispute settlement.	L	Prov.
		1901	**Indian Irrigation Commission** (1901 - 1903). Report on irrigation as a system against famine (1903); designed to alleviate expected losses from Sutlej project for Sindh	C	Inter-prov.
		1905	**Punjab Minor Canals Act** (Punjab Act, No. III, 7 April 1905).	L	Prov.
		1919	**Government of India Act**. Partial autonomy to provinces over irrigation schemes. Coordination between upper and lower riparians if more than 2 affected. Decision by Governor General/Viceroy.	L	Inter-prov.
		1919	**Cotton Committee**. Report on Sutlej project of Punjab (11 canals)	C	Inter-prov.
		1919	**Tripartite Agreement**. Punjab, Bahawalpur, Bikaner. Coordination of Sutlej Valley Project (4 dams, 11 canals).	T	Inter-prov.
		1921	**Indus Discharge Committee** (Sept. 1921). Measurement of discharges; control of seepage and other effects on water. Inspector General of Irrigation.	C	Inter-prov.
		1929	**Nicholson Trench Report**. Assessment of potential effects of Bhakra Dam on Sukkur Barrage (on behalf of Indus Discharge Committee) by engineers from Sindh and Punjab; report and recommendations accepted by both provinces.	C	Inter-prov.
		1935	**Anderson Committee**. Report (1935) on Thal Canal irrigation capacity.	C	Inter-prov.
		1935	**Government of India Act**. Irrigation under full prov. authority. Governor General as mediator, to appoint commission or council.	L	Inter-prov.

		1941	**Indus Commission / Rau (Rao) Commission**. Direct Sindh – Punjab talks over Bhakra, Haveli and Thal projects, without central govt. representation or mediation. Report (July 1942) based on thorough examination of existing irrigation network, with references to Colorado River.	C	Inter-prov.
		1945	**Sindh – Punjab (Draft) Agreement** (28 Sept. 1945). Water sharing recommendation by Chief Engineers of Punjab and Sindh; recommends coordination on any project that may affect Sindh as downstream riparian; affirmed by Punjab (13 Oct. 1945) pending financial compensation arrangement; final agreement has not been reached, yet Draft is considered by some the basis of future Sindh-Punjab water sharing.	T	Inter-prov.
		1947	**Arbitral Tribunal** Part of the Partition Council, to divide assets among Pakistan and India and to settle disputes (- 31 March 1948).	C	Interntl.
Federalism	Civilian rule (1947 - 1958)		***Independence*** *(14 August 1947)*		
		1947	**1st Chief Engineers' Agreement / Standstill Agreement** (20 Dec. 1947). Chief engineers of East and West Punjab (India and Pakistan) agree on water supply from the Upper Bari Doab Canal for the Rabi 1948 season (- 31 March 1948).	T	Interntl.
		1947	**2nd Chief Engineers' Agreement / Standstill Agreement** (20 Dec. 1947). As above, on the water supply from the Sutlej Valley Canals.	T	Interntl.
		1947	**Committee B**, in coordination with the **Partition Committee** (20 Dec. 1947). Approval of Chief Engineers' Agreements.	C	Interntl.
		1948	**Inter-Dominion Agreement / Simla Agreement** (4 May 1948). India progressively reduces upper Indus flow to allow development of water-scarce areas in Pakistan. Integrated operation of the Indus has effectively ended.	T	Interntl.
		1952	**Punjab Soil Reclamation Act** (No. XXI, 14 July 1952). Rehabilitation of waterlogged and saline areas, including ground-water management and regulations for tubewell operation; later to become the basis for SCARP (salinity control) projects	L	Prov.
		1952	**Punjab Soil Reclamation Board.** Implementation of the resp. Act; later incorporated into the provincial Irrigation and Power Department.	A	Prov.

		1955	**(1st) Inter-Governmental Agreement between India and Pakistan for *Ad hoc* Transitional Arrangements for 1955 on the Use of the Indus River Waters** (12 June 1955). First of 4 transitional agreements concluded through World Bank mediation; for Kharif 1955.	T	Interntl.
		1955	**(2nd) Inter-Governmental Agreement between India and Pakistan for *Ad hoc* Transitional Arrangements for 1955 on the Use of the Indus River Waters** (31 Oct. 1955). Concluded through World Bank mediation in Washington, for Rabi 1955/1956.	T	Interntl.
		1956	**(3rd) Inter-Governmental Agreement between India and Pakistan for *Ad hoc* Transitional Arrangements for 1956 on the Use of the Indus River Waters** (24 Sept. 1956). Concluded through World Bank mediation in Washington, for Kharif 1956 – Rabi 1957.	T	Interntl.
One Unit		1958	**Water and Power Development Authority Act** (No. XXXI, 24 April 1958).	L	Fed.
		1958	**Water and Power Development Authority** (WAPDA). Overall responsibility for irrigation works, hydropower, reservoirs and water supply.	A	Fed.
	Military rule (1958 - 1971)	1959	**(4th) Inter-Governmental Agreement between India and Pakistan for *Ad hoc* Transitional Arrangements for 1959 on the Use of the Indus River Waters** (17 April 1959). Concluded through World Bank mediation in Washington, for Kharif 1959 – Rabi 1960.	T	Interntl.
		1959	**Indus Basin Advisory Board** (IBAB, from June 1959). Coordinated planning (WAPDA, Irrigation Dept. and IWT delegation).	A	Fed.
		1960	**Indus Waters Treaty** (IWT, 19 Sept. 1960). Effective division of Indus basin between India and Pakistan, with long-term river basin development plan; as such a compromise reflecting territorial disputes between I. and P.; mediated by World Bank, with political and financial support from US, GY, UK, CAN, AUS, NZL.	T	Interntl.
		1960	**Indus Basin Development Fund Agreement** (IBDF, 19 Sept. 1960). IBDF details funding for replacement works according to the IWT, effective 12 Jan. 1961. Supplemented on 31 March 1964 (additional funding).	T	Interntl.
		1960	**Permanent Indus Commission** (PIC). Arbitration body founded on IWT, for dispute settlement, with equal representation from PK and India.	C	Interntl.

Federalism		1968	**Akhtar Hussain Committee / Water Allocation and Rates Committee of West Pakistan** Report (June 1970).	C	Inter-prov.
		1970	**Fazl-e-Akbar Committee / Indus Waters Committee**. Appointed by Fed.Govt. (Oct. 1970). Report issued (Nov. 1971)	C	Inter-prov.
	Civilian rule (1971 - 1977)	1973	**Interim Accord** between Sindh and Punjab on Water Apportionment (3 July 1973).	T	Inter-prov.
		1973	**Constitution of Pakistan** (August 1973). Establishment of Council of Common Interests (Part V, Ch. 3, §153-155) and National Finance Commission (Part VI, Ch. 1, § 160ff), both with equal provincial representation.	L	Fed.
		1973	**Council of Common Interests** (CCI). Mandated to address and resolve water-related disputes.	C	Inter-prov.
		1974	**Inter-Provincial Coordination Committee** (IPCC) (first meeting 1 July 1974, since then ca. 30 meetings). Diverse issues within the provincial prerogative.	C	Inter-prov.
		1976	**Council of Common Interests** (31 Dec. 1976). *First meeting* on water sharing. Recommendation: to establish a commission.	C	Inter-prov.
		1977	**Anwar-ul-Haq Commission / Indus Waters Commission**. Appointed by President, based on CCI recommendation. No report.	C	Inter-prov.
	Military rule (1977 - 1988)	1978	**India-Pakistan Agreement regarding the Design of the Salal Hydroelectric Plant of River Chenab** (14 April 1978)	T	Interntl.
		1980	**Balochistan Canal and Drainage Ordinance** (10 Dec. 1980).	L	Prov.
		1981	**NWFP Water Users' Associations Ordinance** (No. XI, 14 Feb. 1981)	L	Prov.
		1981	**On-farm Water Management and Water Users' Associations Ordinance** (No. V, 22 April 1981). Irrigation management and stakeholder participation in Punjab under the prov. Agriculture Dept.	L	Prov.
		1981	**Balochistan Water Users' Associations Ordinance** (No. V, 30 April 1981)	L	Prov.
		1982	**Sindh Irrigation Water Users' Associations Ordinance** (No. X, 10 July 1982). Scope and purpose similar to the Punjab's ordinance.	L	Prov.

	1983	**Haleem Committee** (3 March 1983) Report rejected by Chief Justice of NWFP (15 April 1983).	C	Inter-prov.
Civilian rule (1988 - 1999)	1991	**Sub-committee on water apportionment** (2 Jan. 1991). Initiated by the federal govt., finalization of working paper on water sharing, brought before CCI.	C	Inter-prov.
	1991	**Council of Common Interests** (12 Jan. 1991). *Second meeting* on water sharing. Recommendation: establishment of inter-prov. committee on water apportionment.	C	Inter-prov.
	1991	**Inter-Provincial Committee on Apportionment of Indus Waters** (first meeting on 30 Jan. 1991, further meetings in February). Also referred to as the **Special Committee**. Assessment of disputed issues. Expert level discussions (technical representatives of provinces and Fed. Govt.).	C	Inter-prov.
	1991	**Inter-Provincial Committee** meeting (Lahore, 3 March 1991). Political level discussions (provincial Chief Ministers and representative of Fed. Govt.)	C	Inter-prov.
	1991	**Inter-Provincial Committee** meeting (Karachi, 16 March 1991). Political level discussions (provincial Chief Ministers and representative of Fed. Govt.). Consensus on accord.	C	Inter-prov.
	1991	**Council of Common Interests** (21 March 1991). *Third meeting* on water sharing. Adoption of the Water Apportionment Accord.	C	Inter-prov.
	1991	**Water Apportionment Accord** (WAA, 21 March 1991) Regulation of inter-provincial water sharing based on fixed quotas, including dispute settlement mechanism and long-term water planning. Approved by CCI, and with equal representation from all provinces. Establishment of IRSA.	T	Inter-prov.
	1991	**Council of Common Interests** (16 Sept. 1991). *Fourth meeting* on water sharing. Adoption of Annexure 2 to the WAA (10-Day Seasonal System-wise Adjusted Allocations for Rabi and Kharif seasons, for each province), as submitted by the provinces).	C	Inter-prov.
	1992	**Indus River System Authority Act** (No. XXII, 10 Dec. 1992). Establishment of IRSA to implement WAA; with equal representation from all provinces, rotating chair, technical and advisory committees; first body to focus on water distribution and river basin development.	L	Inter-prov.
	1992	**Indus River System Authority** (IRSA). Independent governing authority to decide water sharing; dispute settlement; issues water availability certificates for river development; directs reservoir and canal operations; coordinates exchange of river flow data;	A	Inter-prov.

	1994	**Inter-Ministerial Committee** (Lahore/WAPDA, 2 May 1994). Chaired by Min. of Water and Power, discussion of water sharing during shortage; *extra*-IRSA modus (*historic uses*) agreed.	C	Inter-prov.
	1997	**Provincial Irrigation and Drainage Authority Acts** (PIDA, 2 July – 15 Sept. 1997). Acts passed by all four provincial assemblies to distribute water from barrage level to lower end water users in accordance with the Canal and Drainage Act/Sindh Irrigation Act/Balochistan Canal & Drainage Ordinance.	L	Prov.
	1997	**Provincial Irrigation and Drainage Authority**.	A	Prov.
Military rule (1999 - 2008)	2000	**Indus River System Authority (Amendment) Ordinance** (No. XLI, 4 Sept. 2000). Shift of IRSA offices from Lahore to Islamabad.	L	Inter-prov.
	2002	**Sindh Water Management Ordinance** (XL, 16 Oct. 2002) Repeal of Sindh PIDA Act; comprehensive water management and drainage provisions.	L	Prov.
	2003	**Parliamentary Committee on Water Resources** (PCWR, established 10 Oct. 2003, first meeting 11 Nov. 2003). Initiative of the National Assembly to review the Water Accord with a view to new dams to increase water availability. Forum of Members of NA and Senate, headed by Senator Nisar Memon. Final report: 20 Dec. 2005.	C	Fed.
	2003	**Technical Committee on Water Resources** (TCWR, established 26 Aug. 2003, first meeting 11 March 2004). Presidential initiative to address disputed issues: feasibility of Thal Canal irrigation project; relevance and feasibility of large dams (Kalabagh, Basha); water requirements of provinces; prevention of seawater intrusion below Kotri (minimum release). Forum of appointed experts from the provinces, headed by A.N.G. Abbasi. Final report: Aug. 2005.	C	Fed.
	2007	**Inter-Provincial Coordination Division** (IPC, 19 March 2007); part of the Cabinet Division of the Federal Govt., headed by a federal minister; to be the new structural basis for IPCC meetings.	A	Inter-prov.
	2007	**Inter-Provincial Coordination Department** (IPC). Provincial govt. department parallel to federal govt. division, headed by the Secretary IPC.	A	Inter-prov.
	2010	**Constitution, 18th Amendment** (No. X, 19 April 2010). Revision of articles 153 - 155 regarding the composition, reporting, and meeting of the CCI	L	Inter-prov.

*Glossary: **A** - Agency; **C** - Committee, Commission; **L** - Law; **T** - Treaty, agreement*

III.2 From colony to sovereignty: Problems of governance and federalism

The transformation of Pakistan from colony to independent nation has been a long and complicated process. At the time of independence, the territory that had been the Crown Colony of India encompassed a host of ethnically, culturally, economically and politically diverse provinces, princely fiefdoms and other entities that were to merge into two sovereign nations, India and Pakistan. The Indus Basin has played an important role in this process both in terms of its resources and its territory. Used as a bargaining toll, it has been an object of politics in the relationship between the provinces of Pakistan and between the two nations, Pakistan and India. At the same time its water resources have impacted the interaction among the stakeholders.

The presence of the past in today's politics can be traced throughout Pakistan's history. People and policymakers alike show a keen awareness of the historical development of Pakistan. Its colonial history and troubled independence overshadow many political, social, cultural and economic aspects of the society, including the management of water. The country's unsolved dispute over hydro-electric works on the Indian side of the Indus River is just one example of the persistence of this heritage.

In analyzing such disputes it is not always easy to pinpoint the actual problem: Is it water that is at the heart of the problem, or is it the historic grievances between the provinces of Pakistan (or between Pakistan and India) which overshadow water issues? To assess the chances of cooperation, this chapter explores the political, societal and historical conditions of water management in Pakistan.

Roots of a nation

The remnants of the British Crown Colony of India marked the starting point of the new nation of Pakistan. British rule came to a formal end on 17 August 1947, after two centuries of colonization. Ordered to delineate the new country's borders within 35 days, the boundary commission of the British government in 1947 had carved two nations out of the vast colonial territory, India and Pakistan. An amalgam of majority-Muslim states was pieced together to what was to become Pakistan. States and fiefdoms populated by a majority of Hindus were to become modern India. Aspects of socio-economic integration, political governance or administration were by and large neglected in the process of transforming the former colony. Movable assets were roughly split on the basis of population.[353]

[353] For a concise history of the partition see Dietmar Rothermund: Delhi, 15. August 1947. Das Ende kolonialer Herrschaft (Delhi, 15 August 1947. The end of colonial rule; in German); München: DTV, 1998. The migration of millions of people, still rated as one of the largest in history, from their original state to the new nation in an atmosphere of uncertainty, tension and fear resulted in the death of countless people; hundreds of thousands became victims of massacres on both sides of the border. This traumatic experience continues to haunt Pakistanis to date, as Kreutzmann points out: Hermann Kreutzmann: 60 Jahre Pakistan. Begründung, Konsolidierung und Herausforderung für ein krisengeschütteltes Staatswesen (Pakistan at 60. Creation, consolidation and challenges to a crisis-

The single factor deciding over who will live where and own what after 14 August 1947 was the **religious adherence** of the population according to available demographic data. As a result, the formation of the new nations, more appropriately termed *partition* by Indians and Pakistanis, resembled patchwork, most drastically visible in the partitioning of Pakistan itself: a nation consisting of two large territories separated by over 1,500 km of Indian territory. Heated disputes that followed the decision of the commission could not prevent the implementation of the Partition. The widespread havoc that the abrupt Partition caused to communities that were left without proper information and guidance had not been anticipated by British officials. A chaotic migration of unseen dimensions – Muslims moving to Pakistan, Hindus moving to India – tore apart established economic and social systems, marking the ominous beginning of the troublesome post-colonial era in both India and Pakistan. The dramatic consequences hit the new governments without warning and would plague both nations and their mutual relations for a long time to come.

The fate of the **Indus River** mirrors the devastating nature of the separation: many waterworks, along with the accompanying economic infrastructure, were severed because the new border happened to cut through the river system in complete ignorance of hydrological conditions or socio-economic patterns of water use. Economic structures and social networks as well as sub-national identities that had developed over centuries were fractured. An arrangement for the further utilization of the river on which both new nations depended on was not in place.[354]

Internally, the newly independent nations would have to start from scratch in many fields, rendering the execution of political and administrative control a long uphill struggle against growing political instability, economic chaos and social unrest. Externally, what had been a neighbourly relationship for ages had overnight turned into a matter of foreign affairs. Yesterday's neighbour all of a sudden had become an independent nation with unclear objectives.

The process of nation-building

The establishment of the nation of Pakistan faced a number of practical obstacles. Much like in India, a political system had to be created from scratch, including working institutions of government, the legislature and judicature as well as the legal foundation of this new nation. In practical terms, the administration of national assets like infrastructure, natural resources, land etc. lacked an adequate legal environment, a professional bureaucratic system and parliamentary oversight. In the absence of these essential requirements, arbitrary rule of one kind or another threatened.

In theoretical terms, the **identity** of a nation that was the result of the so-called Two-nation Theory remained a thin conceptual framework. According to this theory, the British Crown Colony was to be separated along religious lines.[355] However, in the

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ridden nation; in German), p. 16 (quote translated by this author); in: Saeed Chaudhry, H. Kreutzmann, P. Lehrieder, N. Pintsch, eds.: *60 Jahre Pakistan. Aufbruch, Errungenschaften und Herausforderungen* (Pakistan at 60. Evolution, accomplishments and challenges; in German); Festschrift des Deutsch-Pakistanischen Forums, Berlin/Bonn, 2007.

[354] See section V of this study for details of the Partition and the early post-partition period.

[355] The idea goes back to revered poet Mohammad Iqbal and has become a formula for the political emancipation of the Muslim community in the late colony of India.

vision of the founding father of the nation, Mohammad Ali Jinnah, while Pakistan was to be the home of the subcontinent's Muslim population, it was not be to be governed by a theocratic state, but by a secular state. Islam would be the religion of most of the people, yet not a excluding factor in determining citizenship.[356] Similar to Ataturk's Turkey, religion was not to be an affair of the government, yet it formed an essential element of the nation's identity – even more so than in the case of Turkey because Pakistan as a coherent nation had not existed before 1947. The challenge to the nation's founding fathers was to build the country's sovereignty on an identity that exceeded the religious dimension.[357]

A more comprehensive concept of a nation-state had yet to be developed by the time the Partition did take place. The question of how the diverse ethnic groups, of which many had their own distinct traditions and languages and a history of cultural and political autonomy, would be represented in a nation that was built on one common denominator, the Islamic religion, remained largely unsolved.[358] **Religion**, as Malik points out, proved to be an ambiguous factor in Pakistan identity: *Pakistan's inception from an evolutionary communitarian ethos owed its rationale, amongst several other factors, to a growing recognition of cultural mutuality that eventually became a demand for political sovereignty based on territorial nationalism*.[359] As a result, Islam became a rather pragmatic formula for national identity, an instrument of nationalism, reflecting in part the unsolved debate over the political and cultural status of Pakistan and its originality vis-à-vis India.[360]

More important in practical and theoretical terms was that the concept of a Pakistan **nation** did not have roots in the existing societies at the time of unification. Instead, the princely states and provinces that joined Pakistan in 1947 had enjoyed different degrees of autonomy under British rule that reflected their distinct ethnic and cultural

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[356] In the famous words of Jinnah: *You are free, you are free to go to your temples, you are free to go to your mosques or to any other places of worship in the State of Pakistan. You may belong to any religion or caste or creed – that has nothing to do with the business of the State (…) My guiding principle will be justice and complete impartiality* …; Address to the Constituent Assembly, Karachi, 11 August 1947; quoted in: Kreutzmann: 60 Jahre …, *op. cit*., p. 15.

[357] Pakistan's identity has been a hotly debated issue, pitching the immigrants of 1947 against earlier residents of the territories that would form Pakistan after August 1947; another divide runs along religious lines; for an overview see Rai Shakil Akhtar: Media, religion and politics in Pakistan; Karachi: Oxford University Press, 2000, p. 2 – 8. Conrad points out that Islam was not mentioned in the key document on the planned creation of Pakistan, the Lahore Resolution of 1940: Dieter Conrad: Conflicting legitimacies in Pakistan: The changing role of the Objectives Resolution (1949) in the Constitution; in: Subrata K. Mitra & Dietmar Rothermund, eds.: *Legitimacy and conflict in South Asia*; Delhi: Manohar, 1997, p. 122.

[358] Jorge Scholz: Der Pakistan-Komplex. Ein Land zwischen Niedergang und Nuklearwaffen (The riddle of Pakistan. Between national decline and nuclear weapons; in German); München: Pendo, 2008, p. 36 - 37.

[359] Iftikhar Malik: Islam, nationalism and West: Issues of identity; London: Macmillan, 1998, p. 98. Malik points out that the debate over the creation of a Muslim state in the 1930s and '40s was led controversially. The theoretical state of Pakistan's identity, officially defined by religion, language and other facets, is expressed by various myths, reproduced in history textbooks. For a critical assessment see Khurshid Kamal Aziz: The murder of history. A critique of history textbooks used in Pakistan; Lahore: Vanguard, 1993, ch. 2 and especially p. 167 – 173. The effort made to communicate these myths reflects, among other things, the challenge that Pakistan's troubled origins mean to today's political leadership.

[360] Jinnah's idea of religion and the state in Pakistan – theocratic or secular – has been the subject of an ongoing debate, particularly as one of his major speeches appears to be missing; cf.: The search for Jinnah's vision of Pakistan; *BBC News* (online), 11 Sept. 2013.

identities.[361] They faced each other as *competing regional cultures*, without any reference to a higher authority, according to Eisenreich.[362] Kuhnen adds that *until the war against India, in 1965, the mass of the population had hardly developed any national feeling … for [them] the world was restricted to an orbit of a few villages*.[363]

The question of a national language was to become a source of division. Urdu, a language previously used by educated classes in India to express their resentment against British cultural influence, was chosen to be the official language though it was not spoken by a majority of people in any of Pakistan's provinces. English, likewise a language spoken only by few, would be used as a second language, especially for official use. These moves were mostly read as a challenge to ethnic identities beneath an artificial national surface, thus becoming an obstacle to effective political rule, rather than a factor in the new nation's unity.[364]

A lack of experienced politicians to construct the legal pillars of the new nation and the absence of an ideological consensus on the main character of the political system further impeded the establishment of a political authority that would be respected by all citizens.[365] Political power on the national level in the early years rested in the hands of a few popular leaders and a loosely organized party, the Pakistan Muslim League (PML). The PML, Jinnah's party, had not gained the status of a professional political organization of nation-wide reach when its leaders found itself in charge of a vast country with a heterogeneous population. The plight of the millions of people who had just arrived after a traumatic flight from their former homes in India, the chaotic economic situation, and the growing tensions with India over disputed territory nourished an atmosphere of insecurity.[366] The unresolved question of Kashmir quickly led to the first military confrontation of both nations, shortly after the independence. It has since proved to be a constant source of mutual mistrust and belligerence on both sides.

The social and political structures of the communities that entered the newly independent state of Pakistan were built on feudal and tribal systems of political rule. They had survived the British rule intact. Whaites points out that – especially in the early post-colonial period – these structures provided a degree of much needed

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[361] Sindh, Punjab and NWFP in 1947 had the status of a province; Balochistan was a Chief Commissioner's province initially made up of four states, later to be transformed from the Balochistan States Union to the province of Balochistan. Thirteen princely states were integrated into NWFP and Balochistan respectively; the Pakistan-controlled part of Kashmir and the Tribal Areas would retain a special status. Reetz points at the strong public awareness of regional ethnic identities: Dietrich Reetz: Strukturelle Konstanten der pakistanischen Innenpolitik (Structural continuity of Pakistan internal politics; in German); in: Dieter Conrad & Wolfgang-Peter Zingel: *Pakistan. Zweite Heidelberger Südasien-Gespräche*; Heidelberg: Südasien-Institut (SAI), 1992, p. 26 – 27.

[362] Petra Eisenreich: Die Situation in Sindh zu Beginn der 1990er Jahre (The situation of Sindh at the beginning of the 1990s; in German); in: Dieter Conrad & Wolfgang-Peter Zingel, ed.: *Pakistan. Zweite Heidelberger Südasien-Gespräche*; Heidelberg: Südasien-Institut (SAI), 1992, p. 58 – 60.

[363] Frithjof Kuhnen: The agrarian sector in Pakistan's development process; paper presented at the 6th Annual General Meeting of the Pakistan Society for Development Economics, Islamabad, 8 -10 January 1990, p. 3; www.professor-frithjof-kuhnen.de (Feb. 2005).

[364] Scholz: Pakistan-Komplex, *op. cit.,* p. 102 – 104.

[365] The early demise of the leaders of the independence movement, Mohammad Ali Jinnah and Liaqat Ali Khan (who died in 1948 and 1951 respectively) meant the loss of the actual founders of the nation.

[366] According to the 1951 Pakistan census, most migrants from India settled in the Punjab, making up 73.1 % of the population; cited in Hermann Kreutzmann: Die doppelte Teilung – Ursachen und Hintergründe der Spaltung Pakistans (The dual partition – causes and background of the separation of Pakistan; in German); *Geographische Rundschau*, vol. 55, no. 11, 2003, p. 7.

social stability and security that was not paralleled by anything the new nation could offer.[367] The PML was aware of its limited appeal to the people: To increase their following, the party had to gain the support of tribal leaders and the feudal élite.[368] Thus the PML gained popular support while the existing sub-national structures remained largely unaffected: *The combination of religion and ethnicity as formative primordial attachments within the new state was complimented in creating adverse conditions for political development* (Whaites).[369]

The PML had become the formal representative of the people of Pakistan without becoming an organization for effective political representation. By relying on its relationships with local leaders, it effectively extended a system of **patronage** to the national level.[370] This meant that the sources of political power in the largely rural regions, oligarchic large-scale land ownership, were by and large asserted.[371] As a result, the party was thus unable to drive the process towards creating a political system that would combine the capacity to rule with one voice and represent the interests of its diverse communities.

Political system and constitutional development

The acute requirements of the newly independent state of Pakistan led its leaders to rely on structural elements of the British colonial rule such as the bi-cameral parliamentary system (Senate and National Assembly), the bureaucracy, the federal division of authorities and the constitution. In essence, however, the nascent political system started as a highly centralized mechanism dominated by a **strong central government and bureaucracy**.[372] The early years of independent Pakistan were formative in the sense that the existing bureaucratic elite soon replaced the major party, the PML, as a centre of power. Firmly rooted in the colonial tradition, the

[367] Alan Whaites: The state and civil society in Pakistan; *Contemporary South Asia*, vol. 4, no. 3, 1995, p. 232-233.
[368] Syed Akbar Zaidi: Issues in Pakistan's economy; Karachi: OUP, 2005, p. 27 – 29.
[369] Whaites, *supra*, p. 233.
[370] For a detailed analysis see Stephen Lyon: Power and patronage in Pakistan; dissertation, University of Kent, 2002; www.eprints.dur.ac.uk/archive/00000020/01/Lyon_thesis.pdf (August 2008).
[371] According to Taylor, the original idea of nation state for all of the Indian subcontinent's Muslims, important as it still is in ideological terms, has not been able to replace loyalties based on region, group and language; David Taylor: Parties, elections, and democracy in Pakistan; *Journal of Commonwealth and Comparative Politics,* vol. 30, no. 1, March 1992, p. 97. The influence of landlords would remain strong in the decades to come, with a severe impact on the development of political parties, as Taylor notes, citing the example of the PPP, p. 105.
[372] Aitzaz Ahsan: Why Pakistan is not a democracy; in: Meghnad Desai & Aitzaz Ahsan: *Divided by democracy;* New Delhi: Roli, 2005, p. 99 – 100. On the colonial roots of the bureaucracy, the Indian Civil Service, see Ali Cheema & Asad Sayeed: Bureaucracy and pro-poor change; *PIDE Working Papers* (ed. By Pakistan Institute of Development Economics), no. 3, 2006, p. 6 – 8; www.pide.org.pk (Dec. 2010); the authors point out that India and Pakistan inherited one of the most developed civil service systems in the world (p. 7). Its virtually complete insularity allowed it to become a strong tool of the new government, and as a result, it did not face any political compulsions for accommodation of the public interest (…); *ibidem*.
The disputed territory of Kashmir consists of a Pakistan-controlled area – Azad Kashmir (free Kashmir) neighbouring the Northern Areas – the Indian controlled Jammu and Kashmir (central and southern parts) and Chinese-controlled northern sections (Aksai Chin and Trans-Karakoram Tract). Neither side acknowledges the authority of the others. A referendum on the legal-political status and territorial boundaries, as mandated by the UN Security Council, has not yet materialized; the actual borders are subject to a final resolution of the dispute. The Federally Administered Tribal Areas (FATA) and the Northern Areas hold a special status of semi-autonomy.

bureaucracy has been an organized institutional apparatus, similar only to the army which itself emerged largely unchanged from the transformation of 1947.[373] In the face of external crises and a lack of internal cohesion the belief that only a strong central government headed by a strong leader could provide the required stability to hold the nation together became a guiding principle of governance after 1947. For that purpose the bureaucracy proved essential.

The need to balance the authority of the provinces and that of the central government was not felt as a challenge in the early years. The federalist system of Pakistan that had been developed from the colonial system recognized in principle the autonomy of the provincial governments in certain areas, yet without allotting resources to exercise the power to act accordingly. The areas of provincial autonomy were very limited and would only slowly be extended. The Government of India Act (GIA, 1919) which itself marked a transition from a centralized to a more decentralized administrative system continued to be the de facto constitution of Pakistan until 1956. It had been amended in 1935, leading to greater provincial autonomy, especially in the water sector.[374]

Pakistan's first Constitution, of March 1956, reversed the existing system in that it established the "one unit", effectively abolishing provincial autonomy.[375] The first constitution also established the office of the President as the head of state.[376] The strong position of the president would become a cornerstone of the centralist system. The power of the head of state is manifested in the capacity to dissolve the federal and provincial governments and the legislative organs; even the judicature is subject to the president's decision as it is the president which selects the members of the Supreme Court. Provincial governors were not representatives of the provinces but of the President.

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[373] Taylor: Parties, *op. cit.*, p. 102 – 103. According to Shafqat, the influence of the bureaucracy (and of the military) suffered a marked decline following the 1971 conflict that led to Bangladesh becoming independent, with the army and administrative elite widely blamed for the military and political debacle; Saeed Shafqat: Pakistani bureaucracy: Crisis of governance and prospects for reform; *The Pakistan Development Review*, vol. 38, no. 4, 1999, p. 1005. This loss of credibility helped Zulfikar Bhutto gain power from 1972 on, as Hamza Alavi notes: Authoritarianism and legitimation of state power in Pakistan; in: Subrata Mitra, ed.: *The post-colonial state in Asia. Dialectics of politics and culture;* Lahore: Sang-e-meel, 1998, p. 20.
A major factor in the bureaucracy's strong influence in the post-independence years is the increasing politicization, underlined by the large scale postings and transfers after each change of government; Shafqat, ibidem, p. 1008 – 1009. Cf. also Syed Akbar Zaidi: Issues in Pakistan's economy; Karachi: Oxford U.P., 2005, p. 500.

[374] This aspect will be addressed in greater detail in section V of this study.

[375] The administrative structure of Pakistan was changed to comprise of two provinces (East and West Pakistan). In the course of the East Pakistan crisis (1970/71), the earlier system of four Provinces (Balochistan, Sindh, Punjab, NWFP) was reinstituted in the western part of the country; the eastern province would become the state of Bangladesh in 1971; see Hamid Khan: The division of functions amongst federal, provincial and local governments under the constitution; workshop paper; Federation, provinces and local governments: demarcation of roles, issues and possible solutions; workshop hosted by Pakistan Institute of Legislative Development and Transparency, Quetta, 16 – 17 July 2003; www.pildat.org/events/03-07-16/ (August 2008).
Conrad notes that a federation has been envisioned in the Objectives Resolution of 1949, the first partial draft of a Constitution for Pakistan: Dieter Conrad: Conflicting legitimacies, op. cit., p. 126.

[376] The Queen of England had remained the formal head of state until 1956. The Constitution of 1956 led to the election of Iskander Mirza to the office of President. Conrad doubts the legality of the Constitution of 1956, established by decree: Dieter Conrad: Zwischen den Traditionen. Probleme des Verfassungsrechts und der Rechtskultur in Indien und Pakistan (Problems of constitutional law and legal culture in India and Pakistan; in German); Wiesbaden: Steiner, 1999, p. 210.

The first military government (Gen. Ayub Khan, 1958 – 1969) led to a further centralization of political power, manifested in the Constitution of 1962. One the one hand, though, the new constitution established the **National Finance Commission** (NFC). Made up of provincial finance ministers, it gave the provinces a say in budget planning – however not as partners of the federal government, but merely as advisers. Appointed by the President, the actual influence of these provincial representatives was limited. Similarly, the **National Economic Council** (NEC), also with provincial representation, was established to make sure that budgets allocated for the provinces would take into account the population of the respective areas. In sum, this constitution did more to assert the power of the central government (especially of the President) than it provided a forum for the provinces to articulate their concerns and become actively engaged in policy-making.[377] In sum, the Ayub period strengthened the *bureaucratic hegemony* (Waseem), i.e. the rule of the three pillars of Pakistan politics – the bureaucracy, the military and the landlords.[378]

Finally, the constitution of 1973 which is valid to date gave a slightly more pronounced status to the provinces.[379] Reflecting the concerns over the civil war in the former eastern half of the country and its aftershocks in the western part, this constitution eased the relationship between central and provincial governments in the provinces' favour, at least hypothetically, as it allowed the centre to shift powers to the provinces.[380] More precisely, the Constitution distinguishes two areas of legislative authority, exclusively federal and potentially provincial. All policy areas, from foreign affairs to fisheries, are divided into two blocs, the Federal List and the Concurrent List, the former describing exclusive federal responsibility, the latter allowing provincial legislation. In practice, this means that provincial legislators can pass laws, but have to synchronize them with federal legislation. In case of conflict between provincial and federal legislation, the latter would prevail.[381] The control over taxes, however, remained unaltered. The provinces would continue to rely mainly on land revenue and tax on agricultural production. Issues not mentioned in either list but fall within the provincial prerogative would be referred to the Provincial Assembly.

Provincial participation was served more by a bi-cameral legislative body that was formalized through this Constitution. In the National Assembly (NA), the provinces are represented on the basis of demography which means a proportionally smaller participation of NWFP and Balochistan.[382] In the Senate, all provinces have an equal representation which offsets the demographic weight of the Punjab. In sum, the third Constitution includes provincial participation in the legislative process, yet under the control of the federal government and the President. More importantly, effective legislative action and participation in the policy-making process depend on the

[377] Hamid Khan: Division of functions, *op. cit.*
[378] Mohammad Waseem: Politics and the state in Pakistan; Lahore: Progressive Publishers, 1989, p. 156.
[379] The 1973 Constitution, unlike its predecessors, was passed by parliament. Its legitimacy is strengthened by the fact that it was passed unanimously by all parties.
[380] Hamid Khan: Divisions, *supra*.
[381] Syed Jaffar Ahmed: Overview of the Constitution of Pakistan. Briefing Paper for Pakistani Parliamentarians; Karachi: Pakistan Institute of Legislative Development and Transparency (PILDAT), 2004, p. 16; www.pildat.org. Ahmed concludes that with regard to legislation, the Constitution of 1973 represents a step back in history, behind the earlier constitutions and even the GIA. See also Hamid Khan: Constitutional and political history of Pakistan; Karachi: Oxford University Press, 2001, p. 494.
[382] The demographic shares, according to the last population census (1998), are: Punjab, 55.62 %, Sindh, 23 %, NWFP, 13.4 %, Balochistan, 4.96 % (FATA and Kashmir not included); www.statpak.gov.pk (Jan. 2011).

professional and institutional capacity of the Members of the Assembly to actively voice their positions, particularly in the form of qualified staff and a strong party base. At the start of the parliamentary period, 26 years into the independence of Pakistan, the elected members of the two Houses could not realistically be expected to start fulfilling their mandate perfectly armed to face a central government firmly built on the support of the country's bureaucratic, military and economic elites.

On the institutional front, the most significant change was the establishment of the **Council of Common Interests** (CCI). Its ominous name notwithstanding, the purpose of the CCI, according to the Constitution, is to mediate between the provinces in cases of dispute, to seek a solution to conflicts, and, implicitly, to represent the provinces towards the central government. Water sharing is explicitly mentioned as a particular cause for the CCI. The CCI, according to Chapter 3 of the Constitution, is composed of top-level provincial and federal government representatives, signalling, in theory, a readiness on the part of the federal government to meet provincial governments on an equal footing.[383] The CCI, which is answerable to the National Assembly, may be summoned in any case where *the interests of a Province, the Federal Capital or the Federally Administered Tribal Areas, or any of the inhabitants thereof, in water … have been or are likely to be affected* (Art. 155, 1). Decisions of the Council would, in case of dispute, have to be referred to the National Assembly. The N.A.'s decision would be final.

Whether the CCI, which has so far met only rarely, will develop into a strong mechanism for dispute settlement will depend on how the parties adhere to its findings. In a dispute between the central and provincial governments over budget allocation within the NEC, the Prime Minister in 1989 refused to convene the CCI, as requested by the provinces, on the ground that tying the NEC to the CCI would not be in accordance with the Constitution.[384] *The CCI is powerful in theory but weak in practice*, as Waseem notes.[385] Besides the CCI, the **Supreme Court** is mandated to have *original jurisdiction in any dispute between any two or more governments* (Art. 184,1). The position of the Supreme Court has in the past been ambivalent, as Ahsan notes, as it has often sided with the central government.[386]

Political parties as vehicles for the articulation and representation of interests and the recruitment of professional politicians have developed slowly. Their role in the political process effectively emerged after the authoritarian rule of General Zia ul-Haq (1977 – 1988), a period which saw the creation of several major parties that would compete in the parliamentary elections of 1988.[387] The major parties that have formed governments after the Zia period, the PML and the Pakistan Peoples Party (PPP), represent organizations that are primarily based on the loyalty of supporters to the respective party leaders. The main parties are commonly distinguished not so

[383] As described in articles 153 – 155, the federal government is represented by four cabinet members, the provinces by their respective chief ministers – all of which are appointed by the President.
[384] Ian Talbot: Pakistan: a modern history; London: Palgrave, 1999, p. 299; it wasn't until Nawaz Sharif assumed office (in late 1990) that the CCI convened again to solve the problem; p. 318.
[385] Mohammad Waseem: Federalism in Pakistan; paper published by the Forum of Federations, 2010; www.forumfed.org (Dec. 2010), p. 12.
[386] Aitzaz Ahsan: Why Pakistan is not a democracy; *op. cit*., p. 118 - 119.
[387] The election of 1985 was a non-party vote; cf. Ahsan, *supra*. The long military rule had a lasting negative impact on the parties' development into professional bodies of political articulation and representation of popular interests.

much by their individual programmes but by their leaders.[388] In the case of the various factions of the Muslim League (PML), it is usually the Sharif family, and in the case of the Pakistan People's Party's (PPP) factions, it is the Bhutto family. The frequently observed readiness of prominent members and elected representatives (Members of the National Assembly or the Senate) to change sides and aid the more successful party not only demonstrates the volatility of governing coalitions in the light of their members' opportunism, but also suggests a general lack of affinity with the party.[389]

The military in Pakistan rose to a strong political role as a result of early acute threats to the physical existence of the nation. A self-proclaimed saviour of national unity, the military has developed a strong belief in its political role, a **mission** that goes far beyond its constitutional responsibility for the physical integrity of the nation.[390] Competition with civilian leaders and institutions over political control became an inevitable characteristic of the political system of Pakistan. Throughout the history of independent Pakistan, the military has retained firm control of politics – both while in power and also without formally assuming power, as Rizvi observes.[391]

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[388] For a concise overview of the political parties of Pakistan see party profiles in *The Herald*, Oct. 2002, p. 30 ff.

[389] The widespread factionalism and highly dynamic alliances, a phenomenon of the pre-election phase, is analyzed by Syed Ali Dayan Hasan: Understanding the opposition; *The Herald*, Oct. 1999, p. 31.

[390] Rizvi highlights the organizational strength and the significant presence in the polity and the society as the basis of the military's role in politics – regardless of the actual government: Hasan-Askari Rizvi: The military; in: Anita M. Weiss & Syed Zulfikar Gilani, eds.: *Power and civil society in Pakistan*; Karachi: Oxford University Press, 2001, p. 186. Cohen, supporting Rizvi's findings, concludes that the army was reluctant to take an active political role but saw it necessary for the survival of the nation: Stephen Cohen: The Pakistan Army; Berkeley: University of California Press, 1984, p. 107. Tariq Ali stresses the foreign influence on the military system in Pakistan as a factor in promoting the army's political role: Tariq Ali: Pakistan. Ein Staat zwischen Diktatur und Korruption (in German; original title: The duel. Pakistan on the flight path of American power; New York: Scribner, 2008); Bonn: Bundeszentrale für Politische Bildung, 2008, p. 237ff. For an account of the army's view of politics see interview with defence analyst Eqbal Ahmed, *The Herald*, May 1999, p. 36 – 39; Ahmed concludes that the military, having saved the country from external attacks and natural disasters alike, sees governing as a military job: It naturally becomes a function of defence activity. Gen. Jehangir Karamat, former Army Chief of Staff, asserts the civilian role of the military in indirect terms*: Army chiefs can resist pressure only up to a point. Beyond that, their own position starts getting undermined because the army is after all a mirror image of the society from which it is drawn*; interview in: *The Herald*, October 2002, p. 14.

[391] Rizvi describes it as a power sharing arrangement between the military chiefs and the civilian government: Hasan-Askari Rizvi: Civil-military relations in Pakistan; *The Herald*, May 1999, p. 39. Interestingly the first nation-wide direct elections were held under General Yahya Khan, in 1970. Ahsan terms this arrangement a form of controlled democracy that has become a constant thread of Pakistani politics – often with the tolerance and even support of the Supreme Court: Aitzaz Ahsan: Why Pakistan is not a democracy; *op. cit.*, p. 104, 112. It is noteworthy in this context that the Kashmir dispute has developed into a factor of national identity above ethnic or clan affiliations; cf. Wolfgang-Peter Zingel: Stabilitätsanalyse Pakistan; in: Sigrid Faath, ed.: *Stabilitätsprobleme zentraler Staaten: Ägypten, Algerien, Saudi-Arabien, Iran, Pakistan und die regionalen Auswirkungen*; *Mitteilungen* no. 67; Hamburg: Deutsches Orient-Institut, 2003, p. 2.
The latest sign of the military's notorious refusal to subordinate itself to an elected government is manifested in its aggressive reaction to the sacking of defence minister General Kayani, threatening serious ramifications with potentially grievous consequences; see: *Pakistan* army warns PM Gilani over criticisms; *BBC News* (online), 11 January 2012; PM sacks secretary defence; COAS calls emergency meeting; *Dawn*, 11 January 2011.

Like in the case of the bureaucracy, the military benefited from a colonial legacy of well-organized institutional mechanisms. This institutional foundation provided a degree of political stability at a time when – due to external crises and internal frictions – Pakistan's very existence was at risk. The military itself has been perceived as a pillar of stability thanks to its structural continuity. In this sense, the representation of the military in civilian institutions, like WAPDA, has contributed to the political and social status of the armed forces.[392] On the other hand, the price for this outward stability came in the form of a slow development of civilian institutions (political parties, legislative organs, provincial representation).

The economic toll of the military's enhanced role has grown into a heavy burden on a country that can hardly afford excessive military spending.[393] Interestingly, military governments which have ruled for 34 years – longer than all civilian governments combined – have overseen some important steps towards water sharing among the provinces and with neighbouring India.[394] This seems to suggest that efforts towards cooperation (between the provinces / between India and Pakistan) require an authoritarian rule to overcome existing differences. However, the progress achieved in the water sector did little to solve the underlying feud between the provinces. The existing water sharing agreement has not succeeded in satisfying the stakeholders. Neither military nor civilian governments have managed to overrule provincial concerns regarding water distribution.

In sum, the role of the military in Pakistani politics has been mostly negative. The original concern for territorial integrity, nourished by early conflicts with India, has over the decades developed into what seems to be an obsession with security. For the military, the overall focus on alleged and widely circulated Indian designs to destabilize or attack Pakistan, whether real or not, has proved to be a very useful instrument to inflate the importance of the armed forces far beyond the constitutionally sanctioned defence of the country and to justify massive military spending – even at a time when nuclear armaments on both sides were supposed to

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[392] For an overview of civilian institutions currently run by members of the military (retired and active soldiers) see Mubashir Zaidi: The real military rule; *The Herald*, October 2003, p. 48 – 51. Another factor in the stability provided by the military is the social background of many military officers: Like many higher-level bureaucrats, they stem from the land owning class, as Alavi, *op. cit*., p. 26 – 27, notes.

[393] Wolfgang-Peter Zingel: Das Militär in Pakistan: Garant oder Bedrohung der nationalen Einheit und wirtschaftlichen Entwicklung? (The Pakistan military: guarantor of or threat to national unity and economic development; in German); in: Reiner Steinweg, ed.: *Militärregime und Entwicklungspolitik; Friedensanalysen* no. 22, Frankfurt: Suhrkamp, 1989, p. 245. The political weight of the military is partly based on its economic influence. According to Scholz, the military is the biggest landholder in Pakistan and a major shareholder, partly owning over a hundred companies: Scholz: Pakistan-Komplex, *op. cit.,* p. 54 – 57. Ahsan, *op. cit*., on the national security state, p. 108. Cf. Medha Bisht: The politics of water discourse in Pakistan; *ICRIER Policy Paper* no. 4 (no date), p. 8, citing a report on the Army-owned Okara farms in Punjab and the widely perceived *monopolisation of power and resources;* cf. John Lancaster: *Fighting an Army empire*; *Washington Pos*t 29 June 2003, p. A-19; www.icrier.org/pdf/Policy_Series_No_4.pdf (March 2013). Cohen estimates the current defence budget to amount to about 22 per cent of all government spending; cf. Stephen P. Cohen. Shooting for a century; Washington: Brookings, 2013, p. 6. Pakistan ranks among the top five arms importers, cf.: Siemon Wezeman & Pieter Wezeman: Trends in international arms transfers; SIPRI Fact Sheet, 2013.

[394] … most notably the Indus Waters Treaty (1960); the committees and commissions on water sharing between the provinces (Akhtar Hussain Committee, Fazl-e-Akbar Committee, Anwar-ul-Haq Commission, Haleem Commission) are steps towards the creation of a mechanism for water distribution, yet in the course of 15 years they have failed to reach a solution; see the following section of this study for a detailed assessment.

deliver a degree of mutual security through deterrence.[395] For the society as a whole, the wisdom of enormous defence budgets in times of severe financial constraints in critical sectors such as education, infrastructure, supply of electricity and water, food security or the modernization of irrigation works is highly dubious and may prove counter-productive in terms of internal security and long-term development.[396] Whether the constantly repeated scenario of an Indian attack will one day be read as proof of political incompetence of military leaders by the public will be seen.[397] What is more important is the fact that issues like Kashmir and nuclear weapons have received a disproportionate amount of attention.[398] Issues of a much more direct and acute national relevance – like water supply, economic development, education and employment – still tend to be seen as merely secondary. This distortion of realities – through the inflation of the Indian threat and the manipulation of the public – has made much-needed efforts to promote economic cooperation and bilateral trade more difficult.[399]

Inter-provincial relations

The distinct ethnic, cultural and social-economic identities of what today are the provinces of Pakistan – Balochistan, Punjab, Northwest Frontier/ Khyber Pakhtunkhwa Province (NWFP/KPP), Sindh – have marked the relations between them since 1947.[400] Before becoming a part of today's Pakistan, they had enjoyed different forms of government and different degrees of political autonomy. Federalism has not been the first choice of the founders of the nation, in a sense. Again, the reason lies in the colonial past, as Waseem explains. A basic form of federalism was

[395] This is not meant to support the widely-held belief of politicians, members of military and academics (not only) in India and Pakistan that nuclear arsenals provide stability and peace. The "rationality" of the South Asian nuclear arms race is discussed by Karsten Frey: State interests and symbolism in India's nuclear build-up; *Heidelberg Papers in South Asian and Comparative Politics* no. 8, 2002, p. 25; www.sai.uni-heidelberg.de/SAPOL/HPSACP.htm (May 2012).

[396] Pakistan's educational sector is marked by poor quality of education, malnutrition of students, and high numbers of out-of-school children; cf.: UNESCO: Teaching and learning. Achieving quality for all. Global Monitoring Report 2013/2014; Paris: UNESCO, 2014, p. 47, 54, 185, 197-198. Shahid Javed Burki: Educating the Pakistani masses; in: Robert M. Hathaway, ed.: *Education reform in Pakistan: Building for the future*; Washington, D.C.: Woodrow Wilson Center for Scholars, 2005, p. 16 – 20.

[397] The militarization of civilian institutions will be discussed in the chapter on "Managing the Indus". Cohen notes that despite its dubious political record, the military continues to enjoy a certain public support, particularly when compared to past democratically elected governments that were mired in infighting; cf. Stephen Cohen: The idea of Pakistan; Washington: Brookings, 2004, p. 279.

[398] The militarization of Pakistan includes the education sector, as Nayyar and Salim show: Glorification of war and the military; in: A. H. Nayyar and Ahmed Salim, eds.: *The subtle subversion. The State of curricula and textbooks in Pakistan*; Islamabad: SDPI, 2003, p. 80. On the introduction of militaristic curricula under pseudo-religious pretexts by Zia ul-Haq cf. Christopher Candland: Pakistan's recent experience in reforming Islamic education; in: Robert M. Hathaway, ed.: *Education reform in Pakistan: Building for the future*; Washington, D.C.: Woodrow Wilson Center for Scholars, 2005, p. 154.

[399] For a brief, yet concise discussion of the missed opportunities in India-Pakistan relations see Christian Wagner: Indien als Regionalmacht und Chinas wachsender Einfluss in Südasien; Berlin: Stiftung Wissenschaft und Politik (SWP), 2012 (India as a regional power and China's growing influence in South Asia; in German). The role of the media as a catalyst of public sentiment against India will be discussed in the chapter on the Indus Waters Treaty.

[400] NWFP was renamed Khyber Pakhtoonkhwa Province in April 2010 to express its ethnic links with Afghanistan. The original abbreviation is used throughout this study for the purpose of identification in the context of relevant parts of water management.

initiated during the colonial period, years before the vision of Pakistan became reality.[401]

Balochistan, a vast but thinly populated province, has a distinct rural and tribal profile. Its ethnically diverse people make up less than five per cent of the total population of Pakistan. This aspect, together with its low economic yield (due to the dry climate and lack of surface water resources), has been an obstacle to the political representation of the province on an equal footing with other, more productive provinces.[402] Development of the province which is composed of large tracts of mountainous terrain and dry deserts faces technical, financial and social obstacles.[403] Frequent violent clashes between the army and local tribal militias have overshadowed the federal-provincial relations and made an agreement on economic and political problems more difficult.[404] Balochistan holds rich deposits of natural resources (minerals, gas) but lacks infrastructure. The terrain and geographical extension require greater financial investment to develop this province than others.[405] Balochistan's government demands a greater contribution by the centre to exploit these resources and a greater share in the respective proceeds from the sale of natural gas.[406]

Northwest Frontier Province (NWFP), recently renamed Khyber Pakhtunkhwa Province (KPP), is a society largely organized on rural and tribal parameters. The population of this area has over a long period enjoyed special rights in terms of tax and customs and the judicial system. Many areas have strong ethnic ties to Afghanistan, and this province has hosted great numbers from the war-torn

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[401] Mohammad Waseem: Federalism in Pakistan; paper published by the Forum of Federations, 2010; www.forumfed.org (Dec. 2010), p. 5. The reach of Jinnah's Muslim League, before 1947, did not cover the respective provinces, so effective rule was in question.

[402] For an overview of the history of Balochistan see Noor ul Haq: Balochistan disturbances: causes and response; *IPRI Journal* (Islamabad Policy Research Institute), vol. 6, no. 2, 2006, p. 63 - 65, who points at the strategic significance of the province, especially its long border with Afghanistan. According to Haq, the province has been considered more or less irrelevant in economic terms and thus did not receive substantial development funds to raise production and living standards. This perception by central governments since the colonial era has furthered the alienation of Balochistan from the nation of Pakistan, as Haq concludes. Politically, Balochistan has been underrepresented. As a result the province-centre relations have been deteriorating.

[403] Balochistan ranks lowest in education, especially literacy and school enrolment; cf. Khadija Haq, ed.: Human development in South Asia. A ten-year review; Karachi: Oxford UP, 2007, p. 34.

[404] The International Crisis Group blames the central government's heavy-handed armed response to Baloch militancy and its refusal to negotiate demands for political and economic autonomy for the deterioration in relations since 2005; see ICG: Pakistan: the worsening conflict in Balochistan; *Asia Report* no. 119, 2006, p. 3, 8 – 9; www.crisisgroup.org (Jan. 2011); and: Pakistan quake highlights Balochistan ethnic fractures; *BBC News* (online), 1 Oct. 2013. According to Badini, the attitude of the central government towards Balochistan is perceived by many local leaders as colonialist. There is a strong reservation against the employment of Punjabis in the public sector and a fear of being outnumbered by migrants from Sindh; see: Yar Muhammad Badini: Provincial autonomy: another view from Balochistan; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.*: Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 64 - 66.

[405] On the relationship between population density and infrastructure investment see Gulfaraz Ahmad: Fiscal relations in Pakistan. Balochistan perspective on National Finance Award; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 86 – 92.

[406] See Shahid Hamid: The Aghaz-e-Haqooq-e-Balochistan Package. An analysis; *Background Paper*, PILDAT, 2009, p. 10 – 14, for an overview of outstanding issues, to be discussed in the National Assembly.

neighbouring country.[407] By its social-economic characteristics, it ranks below the provinces of Punjab and Sindh in economic output, literacy and education. Due to its upstream position in the north-western section of the Indus basin, this province is keen to develop its hydropower potential to create revenue. Similar to the Balochistan case, the sharing of revenues from the existing installations is the subject of an ongoing dispute with the central government.[408]

Punjab, by contrast, has since the colonial era been an economic centre in agricultural as well as industrial terms. Due to its strategic location, at the heart of the Indus Basin, the former colonial province of Punjab became a major focus of development efforts by the colonial rulers – particularly towards the drastic expansion of the Indus Basin irrigation system from the second half of the 19th century.[409] This development, along with the preference of Punjab over other provinces regarding recruitment in the bureaucracy and the army, provided the basis for Punjab's preponderance in post-independence Pakistan.[410]

Sindh, at the downstream end of the Indus Basin, is the second largest province in terms of population and economic output. Industrialization and urbanization is higher than in Balochistan and NWFP/KPP. With regard to water management, Sindh's rural population is particularly sensitive: The low lying areas prove vulnerable to flooding in the Monsoon season, and are prone to drought and salinity in the dry season as water – for lack of slope – fails to reach the tail ends of the irrigation canals. Its population has a history of rising in protest against the central government since the first military rule, particularly over perceived disadvantages in water sharing and revenue distribution and the preference of Punjab.[411]

The economic, socio-cultural and environmental differences between the provinces of Pakistan have over a long period translated into political disputes. The existing physical imbalance has been exacerbated by a long-standing political preference of the central government towards Punjab. The biggest province in terms of population and economic productivity has been the centre of power from the early days of independent Pakistan.[412] That became particularly obvious during the One Unit period when the federal system was upheld and Punjab's position, unlike that of

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[407] For the problematic relationship between KPP and Afghanistan see Jochen Hippler: Pakistan, seine Stammesgebiete und der Afghanistan-Krieg (Pakistan, its tribal areas and the Afghanistan War; in German); *Aus Politik und Zeitgeschichte* no. 21 – 22/2010, p. 7 – 8.

[408] Khalid Aziz: Provincial autonomy: a view from NWFP; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 30 – 31.

[409] For an economic profile of the provinces see Shafqat Munir: The provinces. Profile of agriculture and industry; *Himal*, vol. 15, no 7, 2002 (special edition on Pakistan), p. 40 - 44. The agricultural profiles of the provinces will be presented in more detail in the chapter on irrigation in this section.

[410] For the origins and the dimensions of Punjab preponderance and Punjab as a factor of Pakistan cultural identity see Iftikhar Malik: Pluralism, Partition and Punjabisation: Politics of Muslim Identity in the British Punjab; *International Journal of Punjab Studies*, vol. 5, no. 1, 1998, p. 4 – 12.

[411] Hamida Khuhro: Parameters of provincial autonomy – view from Sindh rural; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 56 – 60.

[412] Talbot: Pakistan, op. cit., p. 112, 123. Naseer traces the political dominance of the Punjab back to the Punjab National Unionist Party's influence on Jinnah; see Sajjad Naseer: Federalism and constitutional development in Pakistan; paper presented at an international seminar on Constitutionalism and Diversity in Nepal, Kathmandu, 22 – 24 August 2007; www.uni-bielefeld.de/midea/pdf/Sajjad.pdf (Dec. 2010), p. 6. Zingel adds that a substantial number of Punjabis reside in the neighbouring provinces, adding to the overall dominance of Punjabis: Wolfgang-Peter Zingel: Stabilitätsanalyse Pakistan, *op. cit.*, p. 3.

the other provinces, seemed unchanged. Though in theory a system of proportionate representation in the administration was to guide public job placements, in reality applicants from Punjab were frequently given preference.[413] According to Kreutzmann, the resulting predominance of Punjabis in the bureaucracy and the military gave rise to widespread regionalist tendencies in the other provinces.

Due to the geography of the Indus system, it was this province that became the focus of extensive colonial-era irrigation projects. The steep rise of agricultural production as a result thereof was another basis of its political preponderance. Works to further extend the **irrigation system**, which could not have been realized in low-lying areas of downstream Sindh, have continued into the 1970s, making the Indus the largest irrigation system in the world. Khuhro stresses that in Sindh the water sharing dispute with Punjab is commonly viewed as another example of pro-Punjab *favouritism* perceived in other policy areas. This *injustice*, as Khuhro explains, has prepared the ground for a general reluctance in Sindh to cooperate with the centre and Punjab.[414]

Political transformation and the state of federalism

Many observers perceive the political system of Pakistan as being primarily defined by a *military-bureaucratic oligarchy* (Alavi), *i. e.* a landed elite of senior officials, landlords and officers.[415] Khan points at the underlying system of governance, *the state*, which has proven stable and resistant to changes: *Governments in Pakistan have been weak, intermittent and fragile. The state on the other hand has been authoritarian and resilient and has succeeded in holding political governments hostage*.[416] The realization of a more active federalism, which would require equality among the provinces, has so far been hampered by the *Punjabization of the state* (Waseem).[417] Only recently *a long-term trend in favour of provincial subjects* has become apparent, according to Waseem who cites the latest amendments to the Constitution.[418]

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[413] Hermann Kreutzmann: 60 Jahre Pakistan (Pakistan at 60), *op. cit*., p. 19.
[414] Khuhro: Parameters, *supra*, p. 59.
[415] Hamza Alavi: Authoritarianism and legitimation, *op. cit*., p. 19. See also Syed Akbar Zaidi: State, military and social transition: improbable future of democracy in Pakistan; *Economic and Political Weekly*, 3 Dec. 2005, p. 5177; Omar Ashgar Khan: Critical engagements: NGOs and the state; in: Anita M. Weiss & Syed Zulfikar Gilani, eds.: *Power and civil society in Pakistan*; Karachi: Oxford University Press, 2001, p. 278 – 280; Aitzaz Ahsan: Why Pakistan is not a democracy, *op. cit*.., p. 141 – 142. Naseer perceives the development of federalism in Pakistan to be predetermined by the colonial heritage: Sajjad Naseer: Federalism, *op. cit.* Pervaiz Iqbal Cheema: Pakistan: The challenge of democratisation; in: Lidija Fleiner, H. Bhattacharyya, Th. Fleiner & S. K. Mitra, eds.: *Rule of law and organisation of the state in Asia. The multicultural challenge*; Geneva: Helbing & Lichtenhahn, 2000, p. 216. This view is backed by findings of Transparency International, analyzing land holdings by the military, especially through large foundations like the Fauji Foundation and the Shaheen Foundation, all under the control of active and retired members of the Armed Forces: Syed Adil Gilani: Pakistan; in: *Global Corruption Report 2008*; Berlin: Transparency International, 2008, p. 211 - 216; www.transparency.org/publications/gcr/gcr_2008 (March 2011). The Fauji Foundation has become a model for Bangladesh: Bangladesh army's advancing business interests; *BBC News*, 15 August 2010.
[416] Khan, *ibidem*, p. 278.
[417] Mohammad Waseem: Federalism, *op. cit*., p. 11.
[418] Waseem, *ibidem*. Cf. Hamid Khan: Constitutional and political history, *op. cit*., p. 499. The Constitution (Art. 145) defines the position of the Provincial Governor as an agent of the President, whose task in turn is to protect the provinces.

Fiscal federalism has remained a major source of dispute between the provinces and the centre as well as among the provinces. As Tahir points out, the failure to establish a reliable long-term mechanism of budget allocation has caused an early rift between the centre and the provinces.[419] As demanded by the Constitution of 1973 (Article 160), the National Finance Commission (NFC) Award determines the budget shares for the coming five-year period. Of the total tax revenue, 80 per cent would be allocated to the provinces, 20 per cent to the centre. Initially, the basis of the inter-provincial allocation was the size of the population, as estimated in 1961, rendering a share of 60.25 per cent for Punjab – a figure that was disputed by other provinces.[420] The NFC Award remained unchanged in principle until 1990 because the provinces failed to reach a consensus. Thus the allegedly inappropriate share of Punjab continued to cause division between the provinces. In 1991 and 1996 the Sharif government succeeded in securing a consensus among the provinces on the Award by raising the combined provincial share to 45 per cent, while reducing the respective share of the Punjab to 57.88 per cent.[421]

The Musharraf government followed that course by raising the **provincial share** by one per cent each year over the 2006 to 2010 period, having failed to reach a consensus. The critical difference, however, was not in the mere figures but in the mode to establish provincial entitlements: instead of relying wholly on population, social-economic criteria (poverty index), revenue generation and inverse population density were added. As a result the Punjab's share was reduced to 51.74 per cent, that of Sindh raised to 24.55, that of Balochistan raised to 9.09 and NWFP/KPP's to 14.62 per cent – with most of Punjab's cut to go to the weakest province, Balochistan. As Waseem underlines, this change plus the institutionalized changes prescribed by the constitutional amendment of 2010 equalled *a major breakthrough*.[422] From an institutional perspective, the legal requirement to review the implementation of the Award within the NFC and to present it to the legislative assembly means added transparency and accountability plus stakeholder involvement. This means, in theory at least, good conditions for cooperation.[423] As for provincial participation as such, however, there is room for improvement. In a recent initiative, the provinces approached the CCI demanding a 40 per cent representation in all federal bodies according to the Federal Legislative List.[424]

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[419] Pervez Tahir: Problems and politics of fiscal *federalism* in Pakistan; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 70 – 71. See also Rashid Ahmad Khan: NFC Award controversy: a broader perspective; *IPRI Journal*, vol. 5, no. 2, 2005, p. 123 – 130.

[420] According to Tahir, *ibidem*, the 1972 census put Punjab's population as 57.59 per cent of the total population of Pakistan – which means that this province had received a share higher than its actual entitlement. The figure of the 1981 census was 57.88 – yet the NFC continued to calculate Punjab's share on the basis of the original estimate for a total of 16 consecutive years.

[421] Waseem: Federalism, *op. cit.,* p. 11.

[422] Waseem, *ibidem*.

[423] The ground realities, however, are not free of dispute. Cf. the position of Syed Shahid Hussain that Sindh is entitled to a greater share in the collective provincial budget based on its tax contributions, among else: NFCs impoverishing provinces; *Dawn*, 15 Sept. 2003; a similar position is taken by Syed Asad Ali Shah: Fair NFC award vital for federation; *Dawn,* 3 June 2002.

[424] The CCI has agreed to convene a standing committee to assess the demand. If approved, the provinces would participate in the decisions of about 80 institutions ranging from railways and ports to electricity and natural resources, including water. In this case WAPDA is named as a prime target of the provinces: Provinces demand 40 pc representation in federal bodies; *Dawn*, 31 Dec. 2012. Meanwhile UNDP has signalled that it will promote this effort with a $12m grant under its Strengthening Participatory Federalism and Decentralisation program*; The News*, 18 Jan. 2013. The World Bank, in a move directed against WAPDA's growing status, has threatened to withhold funds if

The state of other issues between the provinces renders a similar picture: Whereas progress has been made on some fronts, other matters have evaded a solution. Discussions over law and order issues have resulted in closer coordination between provincial organs.[425] The dispute between Sindh and Balochistan over fishing, however, has proved resistant to efforts from both the centre and the provinces.[426] The latter case, like the dispute over water shares and the NFC formula, directly affects the economies of the provinces.

The existing disputes between the provinces have commonly been interpreted as indicators of division. As they concern issues vital to the provinces' social-economic existence, they inevitably affect the relations within the federation and make it difficult to reach solutions based on consensus. But do they translate into a threat to the federation, are they tantamount to secession? These disputes – particularly over water shares – can also be read as a symptom of **mutual dependence**. One-sided action, ignoring other provinces' interests, tends to trigger opposition and possibly obstruction.

Secessionist movements are marginal, as Hussain notes, pointing at an interesting social phenomenon: the **internal migration** of substantial dimensions leading to a shift in ethnic proportionalities.[427] Especially the urban centres, like Lahore and Karachi, are no longer centres that represent just one ethnic community, Punjabis or Sindhis, but an increasingly diverse composition of people from neighbouring provinces in search of work, income and opportunities. Hussain points at the Pashtun migration that has made Karachi – not Peshawar – *the world's largest Pashtun city*. Similar movements have occurred in Balochistan and Punjab. These migrations are likely to be reflected in political articulation in some form or another in the coming years, challenging positions that have so far been based on a province's distinct cultural identity.

Within the wider debate on federalism in Pakistan, **decentralization** and local government is both a part of the wider discourse over greater democratic participation as well as the desire to express the regional identities of the provinces. In recent years the process of *devolution* has become a central political issue, pushed forward by the government of Musharraf, with a view to strengthening the authority of the provinces.[428] The way this top-down process, intended to delegate political decisions to the lower tiers, was started has aroused criticism.[429]

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the federal government proceeds with its decision to place 16 private power companies under the supervision of this institution: World Bank threatens to block funds; *Dawn*, 23 March 2013.

[425] Cf. reports on inter-provincial conferences to combat crime: Balochistan, Sindh police to exchange data*; Dawn*, 28 May 2001; Provinces get green light for crackdown: terrorist activities*, Dawn,* 5 Aug. 2001; Sindh, Balochistan to fight crime jointly*; Dawn,* 25 June 2002; Inter-provincial conference on law and order today*; Dawn*, 28 April 2003.

[426] Cf. reports on claims by Balochistan against fishermen from Sindh entering Balochistan water illegally: NFDB to sort out fishing disputes*; Dawn*, 26 Oct. 2000; Sindh, Balochistan told to end row: fishing rights*; Dawn,* 1 Feb. 2001; Eighty vessels seized by Balochistan authorities*; Dawn*, 28 Sept. 2001; Fee levied on fishing in Balochistan*; Dawn*, 8 Oct. 2001.

[427] Syed Talat Hussain: Fire and the federation; *Himal*, June 2010. Pervez Hoodbhoy discards the notion of ethno-nationalism as a dominant force of Pakistani federalism, stressing the need for a pragmatic federalism that renders the provinces capable of managing their own development: Why Pakistan is not a nation; *Himal*, June 2010.

[428] Issued by the government's new National Reconstruction Bureau, the aim of the devolution plan is to end cronyism and corruption in politics, to rebuild national confidence and morale and remove inter-provincial disharmony, see NRB: Establishing the foundation of democracy: district government;

Another reason might have been a fear among established political parties of a loss of power to the districts. Inayatullah observes that many new district governments have experienced interference by provincial governments with their areas of responsibility.[430] Cheema *et al.* point out that a degree of accountability has been introduced to the sub-provincial administrations, and in some areas the district governments have taken on significant responsibilities previously held by the provinces.[431] Adeley concludes that recent initiatives, most notably the 18th Constitutional Amendment, mark only a first and overly cautious step that still does not take into account the existing cultural and societal differences between the provinces, rather implying that they are a potential threat to the internal stability of the nation.[432] Shah, while terming the Amendment a *landmark* and predicting *greater harmony in federal-provincial relations*, observes several deficiencies, particularly with regard to the implementation of the reform.[433]

From an institutionalist perspective, decentralization has brought the involvement of lower administrative tiers in decision-making, i.e. the stakeholders have become more directly involved. For **water management** in particular this is demonstrated by the delegation of water supply and sanitation services to the sub-district levels. In the field of irrigation management, this corresponds in principle to the establishment of Water User Associations in the 1990s.[434] Cheema *et al.*, however, caution that the devolution is not protected by the Constitution; in effect its implementation to a large degree depends on the provinces – again because of the control over budgets.

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www.nrb.gov.pk/archive/document-0001.htm (dated 24 March 2000; download: May 2001). Earlier efforts in this direction, especially in the form of Zia ul-Haq's decreed Local Government Ordinance of 1979, were not so much inspired by power sharing but by tightening the political control over the higher levels of power in the hands of the military; cf. Syed Akbar Zaidi: The political economy of decentralization in Pakistan; *Decentralisation and Social Movements Working Paper* no. 1, published by Swiss National Centre of Competence in Research North – South, Zurich, 2005, p. 19 - 25; www.nccr-pakistan.org/publications_pdf/Forests/Zaidi_2005_decentralisation.pdf (Jan. 2011). Zaidi observes that central and provincial governments exerted control mainly through budgetary means. Interestingly, this gave rise to the formation of new political parties.

[429] The plan for devolution of power, with a schedule for non-party elections of district, union and tehsil administrative levels, was announced by the President, Chief Executive Pervez Musharraf, in 2000, at a time when the National Assembly and Senate were still suspended; *Dawn*, 24 March 2000. In the absence of a working parliament, the general public was invited to voice its opinion within a period of five months, after which the final shape of the district governments will be decided. Most political parties, deprived of their capacity to make legislative decisions through parliament, rejected the plan; *Dawn*, *ibidem*, and 26 July 2000. Having assured the provinces that their autonomy would not be curtailed, the finalized plan was published: *Dawn*, 16 August, 2000

[430] Inayatullah: District government – province relations; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 94 – 98. All four provinces plus the capital city have passed local government ordinances in 2001.

[431] Ali Cheema, Asim Khwaja, & Adnan Qadir: Local Government Reforms in Pakistan: Context, content and causes; in: D. Mookherjee & P. Bardhan, eds.: *Decentralization and Local Governance in Developing Countries: A Comparative Perspective*; Cambridge: MIT Press, 2006, p. 395 – 400.

[432] Katharine Adeney: A step towards inclusive federalism in Pakistan? The politics of the 18th Amendment; *Publius,* vol. 42, no. 4, 2012, p. 558; constitutional document text: www.app.com/pk/en_/index.php?option=com_content&task=view?id=10026&Itemid=1 (Associated Press of Pakistan; May 2013).

[433] Anwar Shah: The 18th Amendment: Glue or solvent for nation-building and citizenship in Pakistan? *Lahore Journal of Economics*, vol. 17, Sept. 2012, p. 393 - 396 (the *reassertion* of the CCI and the NEC due to the shifting of many responsibilities from the Federal List to the provinces), p. 405 – 408.

[434] Institutions of irrigation management will be discussed in more detail in the chapter on irrigation in this section.

Conclusion

The analysis of the political system, history and institutions of Pakistan has provided an important insight into the potential and conditions of cooperation. First, the country's troubled past holds many obstacles to the **cohesion** of the nation. The challenge to integrate the various ethnic groups into the newly established nation has in some respects been greater than in neighbouring India where a functioning administrative system was taken over, allowing for effective governance more or less from the start whereas in Pakistan many administrative tiers had yet be established even years after formal independence. Many groups – especially in the tribal regions of Balochistan, KPP and Sindh – have historically owed their allegiance to local landlords or tribal chiefs; they are not used to be ruled by a higher authority, be it the provincial or the federal government. These long-standing traditional relationships continue to be founded in mutual social and economic benefits. Not surprisingly, the efforts of the central government to enforce unity have routinely been met with determined, sometimes violent opposition. To date, national unity remains a challenge in many parts of the country. Separatist movements in Sindh and Balochistan are a reminder that the cohesion of Pakistan remains fragile.[435]

Second, the political instability that resulted from the mass migration and the frequent demonstrations of the early years has furthered a **centralist style** and structure of government that would leave little room for the provinces to become actively involved. Wary of regionalist tendencies, the central government has been reluctant to let the provinces have a share in power. The provinces, on the other side, have – in the face of centralist domination and the preference given to Punjab in political, military and economic matters – shown a very limited readiness to cooperate with the centre and among them. Though there have been steps towards a more active concept of federalism, the political system in essence has not experienced much change.

The centres of power have largely remained the same: the bureaucracy, the military and the two major political families, Bhutto and Sharif, with their political formations, paralleled on the regional level by the large land holding families. As Waseem shows, periods of instability have benefited the established pillars of power.[436] The way in

[435] The sensitivity of the political elite regarding issues of national identity and cohesion has recently been exhibited by an incident that provoked strong reactions both inside and outside Pakistan – yet for entirely different reasons. The killing of Osama bin Laden, leader of the terrorist network Al Qaeda, in a secret U.S. commando raid in Pakistan in 2011 that was hailed by most outside observers as a positive development in the global fight against this group, triggered a wave of Anti-American rhetoric in the very country that allowed the man to hide on its soil for many years. Most tellingly, an internal government report on the incident calls the killing of the terrorist *a criminal act of murder*.
Similarly, a parliamentary investigation, while observing official *negligence and incompetence*, terms the raid an *American act of war* that resulted in the *greatest humiliation* since the secession of Bangladesh in 1971. The report is quoted in: Leaked Bin Laden report reveals Pakistan failures; *BBC News* (online), 9 July 20013. To view the developments that led to the independence of Bangladesh as a humiliation for Pakistan may be the most bizarre perception of the widespread carnage in then East Pakistan caused by the (West) Pakistan Army. To date, the large-scale atrocities committed by the Pakistan Army are common knowledge only outside Pakistan. Inside Pakistan, the public debate focuses on the Indian intervention that led to an end of that civil war – as just another example of Indian schemes to undermine the stability of Pakistan.

[436] Mohammad Waseem: Politics and the state in Pakistan; Lahore: Progressive Publishers, 1989, p. 142 – 147. Cf. S. Akbar Zaidi: Transition, *op. cit.*, p. 5174 – 5175.

which this power has been brought to bear, democratic/elected or authoritarian/military, appears to be of secondary relevance in this respect.[437]

Third, the legal scope of **provincial responsibility** remains limited. Though the provinces retain their colonial-era authority over water management, their financial means to fund the necessary maintenance and development works are bound by their respective economic output. Particularly the smaller provinces – NWFP/Khyber Pakhtoonkhwa Province and Balochistan – rely on federal support for major projects because an equalization fund that could balance the sharp economic differences between the provinces does not exist. The biggest province, Punjab, is in a much different position, due to its economic strength and its political position vis-à-vis the centre, and is thus less dependent on federal support. Instead it can turn its economic weight into a bargaining chip in order to gain concessions from the centre. For the weaker provinces the incentives to engage in cooperation with either the centre or the Punjab appear to be limited.

From a Rational Choice perspective, the stronger province (Punjab) and the centre benefit from upholding the existing system. The weaker provinces could benefit from a change that would help them offset the imbalance. Since they are neither politically nor economically in a position to counterbalance the predominance of the Punjab and the centre, they have little to offer in order to make Punjab and the centre move in their direction. The threat to leave the federation, uttered occasionally by sub-provincial movements particularly in Sindh and NWFP/Khyber Pakhtunkhwa Province (KPP), does not promise much leverage until the weaker provinces unite; as long as they act individually, their status is too small. It is all too obvious that any small-scale autonomy would be bound to fail.

For the Punjab, a change in the current system would likely mean to lose its dominant position and some of the benefits that are attached to it. Thus its inclination to agree to a change would only be likely if Punjab itself is to benefit from it in some form. In sum, to effect a change in the federal relations that would provide beneficial for the smaller provinces means that Balochistan, NWFP/Khyber Pakhtoonkhwa and Sindh have to take the initiative. The position of Sindh as the second biggest province in demographic and economic terms is crucial because it is the gateway of the country's international trade. The fact that the relevant seaport facilities are in Sindh could be turned into a bargaining chip. The smaller provinces have a difficult stand in terms of bargaining: Balochistan and NWFP/KPP are small by population and internally split on ethnic lines (KPP), their population scattered over a relatively large territory (Balochistan). In addition, the population of both provinces by and large is dispersed in rural areas, inhibiting effective political articulation and organization.

Fourth, the **institutional development** since independence has furthered a strong central government. The principal direction of the institutional process has been the stability of the nation. The central government is seen as the guarantor of the nation's integrity. This role includes a tight reign over all elements, including the provinces and lower administrative levels. In the water sector, the establishment of provincial and district institutions started only in the mid – 1990s.[438] Their main area of

[437] Waseem: Federalism, *op. cit.*, observes that federalism has progressed under civilian governments and suffered setbacks under military rulers, with both showing a tendency to control the purse and policy at the cost of the provinces, p. 23.
[438] This process will be the focus of the section on water sharing.

responsibility is irrigation. WAPDA, the central water authority, continues to play a dominant role in all other areas of water management, except water sharing. The provinces themselves do not seem to have been a strong driver in the institutional process, as the fate of the Council of Common Interests indicates. Hypothetically an important forum, the CCI had by and large not played a major role until 1990 – 17 years after its inception – when it facilitated the first inter-provincial water sharing agreement.[439]

The reasons of this **lack of provincial engagement** are not easy to pinpoint. One important aspect is the state of relations between the provinces. Sindh and Punjab share a number of disputed issues on which a consensual solution does not seem easy. While the Punjab is perceived negatively by the smaller provinces on several conflicting subjects, there are no signs of joint action by them to challenge that province's dominant position. The provinces can address the CCI, a constitutionally sanctioned body, which is then obliged to discuss the matter. If the CCI's solution is not acceptable, the matter can be transferred to the National Assembly for a final decision. Such a move has not been made yet.

It remains to be seen whether and how the declared intention to *make the CCI a more substantive body* (Waseem) will bear fruit.[440] The recent constitutional amendments provide for regular meetings of the Council, more high ranking members, and reports to be submitted to the National Assembly.[441] Such changes, which add a degree of **accountability and transparency**, mean that the National Assembly has taken on a greater and more active role by overseeing and controlling this constitutional body. In theory at least, this could provide a stimulus for the CCI to develop into a more active institution. Whether the Assembly's new role will have the desired effect on the settlement of inter-provincial disputes and disputes between the provinces and the centre will depend on the Assembly's ability and determination to claim its lawful right. The over-all state of government accountability, though, has been poor, especially during periods of military rule. Musharraf's initiatives – the inauguration of the National Accountability Bureau on the one hand, the Provisional Constitutional Order on the other – were ambiguous and created an impression of government manipulations, rather than attempts at thorough reform, particularly as they served to stabilize the military's role in politics, the economy and the society.[442]

Fiscal federalism has experienced progress. The NFC Award had so far proved a thorny issue and frequent cause of division between the provinces and the centre. The failure to arrive at a consensus led the federal government, i.e. the President, to uphold the previous Award. The President, in order to end the existing stalemate that

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[439] The 1956 Constitution had provided for an Inter-Provincial Council that would *investigate and discuss subjects in which the Provinces, or the Federation and one or both of the Provinces, have a common interest, or make recommendations …; the President may … establish such a Council and define the nature of the duties … and its organisation and procedure* (Art. 130). That council, however, never came into being. The reason was not so much the lack of initiative on the part of the President but rather the abolition of the provincial system altogether just two years later. It can thus not be seen as a precursor to the CCI.

[440] Waseem: Federalism, *op.cit*., p. 19, referring to the recent constitutional amendments (No. 18 of 2010).

[441] 18th Amendment to the Constitution (Dec. 2010): the Prime Minister is now a mandatory member of the CCI (Art. 153, 2); an annual report is to be submitted to the NA (Art. 153,4). The parliamentary Sub-Committee on Provincial Autonomy had earlier demanded that CCI would be required to meet at least twice a year; see Shahid Hamid: Balochistan, *op. cit*., appendix, p. 23.

[442] Global Corruption Report 2008, *op. cit*.

threatened to block action on other issues, agreed to a central demand of the provinces – to raise the combined provincial entitlement to 50 per cent (and above).[443] This move, together with the new formula which would take into account the social-economic problems of the smaller provinces, seems to have been pointed at the **cohesion** of the federation. This came at a time when the tribal areas of NWFP/KPP and Balochistan were particularly affected by the Afghan crisis and military responses to it by the Pakistan army. The calculus of this move might have been to lay to rest the calls for secession in these areas and to prevent further militarization of the dispute. The fall-out of this move is difficult to measure. The greater financial resources now available to the provinces would indirectly support provincial autonomy in budgetary terms by providing more room to manoeuvre.

The readiness to cooperate with the other provinces and the centre in order to solve other outstanding issues also has to be seen against the current security background. The ongoing political-military crisis in the tribal areas builds up pressure for the provincial governments to resist the federal government which is held responsible for the intervention of the armed forces. This again is widely perceived as an illegitimate intrusion in provincial, or rather tribal, interests. From a Rational Choice perspective, the provinces, sometimes moving together against the federal government, strengthened their position and reached concessions from the centre without having to withdraw any of their essential demands.[444] Cooperation – in part, i.e. in the form of small coalitions – thus proved beneficial to the provinces; to the centre it signalled the need to review its predominant position.

The great economic and political **discrepancies** between the provinces remain the biggest challenge to cooperative federalism. One-sided preferences by the centre favouring Punjab have repeatedly provoked criticism from the smaller provinces and tend to alienate them from the nation. The failure by the central government to address these discrepancies has in the past been viewed as injustice.[445] The central government has in the last several years responded by transferring funds towards the disadvantaged regions, through the Public Sector Development Programme (PSDP).[446] These include drought and flood relief and educational support schemes. These direct transfers aim to counter in part the inequality that result from small

[443] This step came only after a long stalemate; in 2001 the centre was ready to reverse the 1996 NFC formula in the provinces' favour from 50 to 62.5 per cent over-all; see: National Finance Commission set to evolve new formula*; Dawn*, 2 January 2001; in 2003 the centre's position was still firmly in favour of using only the population as the determining factor; see: Resource distribution on population basis; *Dawn,* 5 May 2003. In 2002 the President presented a comprehensive package of reforms, Proposals of the Government of Pakistan on the establishment of sustainable federal democracy, with provisions for a new NFC formula, p. 27; www.pak.gov.pk/public/const_amend.pdf (July 2002).

[444] For a detailed description of the lengthy process see Rashid Ahmad Khan: NFC Award controversy, *op. cit.*, p. 130 – 134.

[445] Rizvi underlines the need for confidence-building measures as a result thereof; see Hasan-Askari Rizvi: Federalism. Conceptual and practical issues; in: Pervaiz Iqbal Cheema & Rashid Ahmad Khan, eds.: *Problems and politics of federalism in Pakistan*; Islamabad: IPRI, 2006, p. 12, 14.

[446] Tahir: Fiscal federalism, *op. cit*., p. 78: respective of its population, Balochistan received by far the largest share (21.5 billion Rupees, 2005-2006, out of a total of 81.9 billion); Punjab's share, by comparison, was 22.7 billion). The PSDP's aim is to remove inter-provincial disharmony; see: Bigger uplift projects should get funds*: CE; Dawn,* 12 January 2001; this quote is attributed to the Chief Executive (the then title of President Musharraf). The budget and target projects of the PSDP are subject to approval by the National Economic Council, headed by the President; see: Rs 30 billion for provinces in Public Sector Development Programme*; Dawn*, 27 May 2001.

populations and low productivity. Indirect transfers are made through development surcharges on natural resources produced in Balochistan and NWFP/KPP.[447]

The recent amendments to the Constitution suggest that substantial progress is under way towards a more **active federalism**. Another, yet more ambiguous outcome of the current discourse on federalism, provincial representation and political participation are calls to reorganize the provinces into smaller, more numerous units. If agreed, this might mean – at least in theory – a levelling of the current physical discrepancies, especially if the Punjab was to be divided into two or more provinces. The challenge would then be for an enlarged parliament to agree on practicable solutions. In practical legal terms, any move to reorganize the federation would require a two-thirds majority in the Assembly which means that if Punjab does not agree, it seems unlikely to happen.

The danger that a reorganization of provinces might lead to an **inflation of autonomy demands**, and thus undermine the federation, is real. Dividing Balochistan into three federal units (provinces), as was suggested, would, on the one hand, give local leaders a greater political role, but on the other hand further reduce the limited resources and political status of this province.[448] Whether such units, consisting of a vast territory with very limited human and natural resources, can be governed effectively is questionable. The case of the so-called Seraiki Belt linking southern Punjab and northern Sindh has recently aroused attention. Economic challenges, coupled with demographic changes, add to a general feeling of being treated unfairly. Calls for a new province of *Saraikistan* and a general reorganization of the federation along ethno-lingual lines have been voiced.[449]

Any such move would likely put into question not only the federal system of Pakistan but the concept of the Pakistani nation and its very **identity** as such. From a practical political perspective, any reorganization would first mean to find and agree upon a legally solid and economically viable solution. The inevitable redistribution of national resources would be met with strong resistance from the existing provinces. For decision-making in the legislature and executive, it would mean that the higher the number of provinces, the more difficult it might be to reach an unanimous solution on national issues. With regard to water sharing, however, the removal of the existing great economic discrepancy between Punjab and the smaller provinces – by effectively cutting Punjab into several pieces – might aid cooperation. Moves to restructure Pakistan, in its present politically unstable condition, are not likely to be met with favourable reactions from neighbouring countries or among Pakistan's donor community.[450] The latter aspect would further reduce the economic viability of any such effort.

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[447] Tahir: Fiscal federalism, *op. cit*., p. 74.
[448] Waseem: Federalism, *op. cit*., p. 20.
[449] Muhammad Feyyaz: Demand for Saraiki province; Background Paper series, Islamabad: PILDAT, 2011; www.pildat.org (April 2011), p. 3 – 6. Kreutzmann notes that while this issue tends to come up occasionally, it has not led to a debate on an authoritative level; see Hermann Kreutzmann: Kashmir and the Northern Areas of Pakistan: Boundary-making along contested frontiers; *Erdkunde*, vol. 62, no. 3, 2008, p. 202 – 203.
[450] Threats to Pakistan's territorial integrity, whether real or imagined, have always stirred nervous debates. A typical example is the exotic suggestion by the chairman of the Indian Kashmir Committee to hand over Sindh and Balochistan in return for Kashmir; see: Mohsin Babbar: Jethmalani's secret threat worrying Pakistanis; *South Asia Tribune*, 17 – 23 August 2003; www.satribune.com/archives/aug17_23_03/P1_mohsin.htm (March 2004).

In sum, the overall relationship between the provinces and the federal government is an important factor in water sharing. Water sharing – like budget sharing – cannot be isolated from wider issues of identity, political interests, and socio-economic development. As the dynamics of these relations show, **inequality** and **lack of participation**, widely perceived as injustice, threaten to undermine the federation and continue to impede cooperation. The long-standing budget dispute indicates that political and economic interests are closely linked to the general readiness to cooperate. The cohesion of the nation, as regionalist movements show, is not strong enough to rely on a collective identity as a focal point of provincial politics. While distinct regional identities compete against each other, the authority of the centre is challenged. The federal system that could adequately represent these regional identities and interests has yet to take into account the social-economic realities of the provinces. Federalism is a dynamic process. The federal actors will, by voicing their interests, contribute to gradually changing the system.

To combine the required system stability with a desirable degree of resilience the **institutional mechanism** should be improved to allow better information, more effective participation and closer coordination. The existing institutional arrangement, with the Council of Common Interests and the newly established Inter-provincial Coordination Committee (IPCC), as such has a capacity for coordination and for conflict resolution. But its effectiveness has so far been limited. In the section on water sharing, its potential and deficits will have to be analyzed further. The same is true, in principle, for the **legislative organs**, the Senate and the National Assembly. Both have recently begun playing a more active role in the water sector. The performance of parliamentary committees and other newly established institutions will be examined in-depth. As this legal avenue to cooperation has long been blocked, it remains to be seen whether – in this short period since the reactivation of Senate and NA (2002, 2003) – any progress towards institutionalizing cooperation will be made soon.

III.3 Dynamics of a hydro-economy

Water is perhaps the one key resource that describes mankind's elemental dependence on nature as well as on fellow humans in a more fundamental way than any other resource. The quality and dimension of this dependence is exhibited most dramatically in South Asia, home to some of the world's mightiest rivers and to roughly a quarter of the world's population. Here this dependence is exacerbated by a widespread discrepancy between demand and supply which is due to

- large agricultural economies founded on complex irrigation networks,
- large and fast-growing populations, and
- highly dynamic climatic conditions that result in very uneven water supplies.

Pakistan, even more so than its neighbours, exhibits the ambivalence of water in Asia in a particularly dramatic fashion: Most economic activities depend on a single river system, the Indus. Water at one time and in one place may be plentiful when in another place and at another time there is critical shortage. This unevenness and dynamic creates asymmetry and necessitate very flexible water use. The natural discrepancies between water supply and demand are exacerbated by political conditions that often prove adverse to optimal utilization of available resources. The limited supply of resources regularly leads to shortages that command higher efficiency on the one hand and, on the other hand, a readiness to share whatever is available to satisfy the most basic needs. Both tasks – efficient water management and water sharing – require cooperation of one sort or another

- between water users (consumers),
- between water managers and decision-makers,
- between territorial entities (districts, provinces or states, nations).

The need to cooperate appears to be embedded in the water cycles of South Asia, especially in a semi-arid country like Pakistan that draws most of its water supplies from one source. Pakistan's lifeline in social, economic and political terms, the Indus Basin, is a common resource pool insofar as every province is a stakeholder in this large river basin.[451] All four provinces are a part of the river basin and rely on the waters of the Indus. They have a vital interest in securing sufficient supplies from this source. The nation as a whole in turn depends on the provinces for its overall economic performance and political and social stability. The provinces, on the other hand, compete over the limited water resources for diverse economic activities, each requiring specific quantities of water at specified times. This chapter looks at two variables of water management: the natural water cycle of the Indus River and the economic utilization of its resources.

[451] The definition of a river basin or drainage basin (also referred to as catchment area) used here is taken from Encyclopaedia Britannica: *area from which all precipitation flows to a single stream or set of streams*; www.britannica.com; including the main river and all tributaries and canals.

The Indus: river of extremes

The history of Pakistan goes back up to 3,000 years BC when the first organized settlements, complete with elaborate water management systems, were built.[452] The remnants of the cities of Harappa and Mohenjo Daro serve as impressive reminders of the economic and political importance of this river and of the status these civilizations had achieved by harnessing the waters of the Indus. Water supplies from the Indus Basin have since the days of the Indus Civilization (around 5,000 B.C.), the second oldest civilization of its kind after the Euphrates-Tigris civilization, formed the basis of the economy.

The water landscape of Pakistan can be divided into three distinct regions:

- a mountainous region that serves as a giant natural water reservoir; this area is largely within the province of Khyber Pakhtoonkhwa (KPP/NWFP) and Jammu & Kashmir;
- the central lowlands that make up the core of the Indus basin and form the centre of gravity of agriculture, economic activity and human settlement; this area covers most of the Punjab province;
- the delta region that leads the Indus River to the Arabian Sea; most of this area is situated in Sindh.

The Indus River, together with its main tributaries, forms one of the largest river basins in the world. Covering parts of Pakistan and India, it is the most important river basin in Pakistan.[453] It originates in the Himalayas, in the Tibetan plateau, at the Manasarovar Lake, at the confluence of the Sengge and Gar rivers at an altitude of over 5,100 m.[454] On its way southward to the Arabian Sea it passes the Himalayan watershed, the world's highest, indicating that the river is older than the mountain ranges themselves. The river stretches over 3,200 km (or 1,988 miles), 86 per cent (or 2,752 km/1,708 miles) of which are within the territory of Pakistan. The total catchment area of the Indus system is 654,332 km² (or 252,638 miles²), around 13 per cent of which are within the territory of Afghanistan and China. The Indus Basin encompasses roughly 566,000 km² - or 71 per cent of the total territory of Pakistan (796,095 km²).[455]

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[452] The official historiography of Pakistan cites archaeological findings that date back 500,000 years ago; www.pak.gov.pk/public/govt/history.html (Aug. 2000).

[453] Figures vary according to different references. The semi-official Pakistan Water Gateway (www.waterinfo.net.pk), sponsored by the Ministry of Water and Power (GoP) in collaboration with the International Union for the Conservation of Nature (IUCN), gives the size of the catchment area as 252,638 miles² (file: *Indus Basin: basic facts*) quoting WAPDA, the chief water authority of the country. According to Encyclopaedia Britannica (online, May 2004) the altitude of the river's origin is 5,500 m, its drainage area is 1,165,000 km² (450,000 miles²), and its length 2,900 km (1,800 miles) covering Pakistani and Indian territories. Cf. also Asif Inam, P. Clift, L. Giosan, A. Tabrez, M. Tahir, M. Rabbani & M. Danish: The geological, geographic and oceanographic setting of the Indus River; in: Avijit Gupta, ed.: *Large Rivers. Geomorphology and management*; Chichester: Wiley, 2007, p. 335.

[454] The source was discovered by Sven Hedin in 1907, according to A. K. Snelgrove: Geohydrology of the Indus Basin, West Pakistan; Hyderabad: Sindh Univ. Press, 1967, p. 17. The historic development and course of the river is subject to some discussion among geographers and geologists, due to the river's dynamic meandering over time, as Snelgrove remarks, p. 27 - 28. According to Khan, the respective altitude of the source of the Indus is around 5,500 m; Asim Rauf Khan: An analysis of the surface water resources and water delivery systems in the Indus Basin; Lahore: IWMI, 1999, p. 5.

[455] The exact size of the territory of Pakistan is subject to the solution of an ongoing dispute with India over the Kashmir region. The figure of 796,095 km² taken here is from Fischer Weltalmanach, 2002 (a standard German reference); cf. also Europe World Yearbook 1999 and Encyclopaedia Britannica World Data: Pakistan (2004).

The Indus system is fed by the main river, the Indus, and its **five large tributaries** – Chenab, Jhelum, Ravi, Beas and Sutlej. Of these, Chenab and Jhelum, with 1,242 and 825 km of length respectively, provide the bulk of the available water. Ravi (901 km), Sutlej (1,551 km) and Beas (398 km) play a secondary role in terms of water supply.[456] Of all basin rivers the Indus carries about half of the total amount of water, or 81 billion m³.[457] Together the rivers of the Indus Basin cover all four provinces of Pakistan, rendering each province a stakeholder in the management of this vital resource system.

The Himalayan and adjacent mountain ranges, home to the highest elevations on earth as well as the source of several of the mightiest rivers of Asia, play a pivotal role in the qualitative and quantitative dimension of water supply and availability.[458] Its vast reservoir of frozen water replenishes the Indus and its tributaries and the groundwater aquifers. The importance of these *water towers* cannot be underestimated.[459] According to the International Centre for Integrated Mountain Development (ICIMOD), an estimated 500 million people in South Asia depend on these sources of fresh water supply.[460] The sediment loads of the Indus River – among the highest of any river in the world – provide important nutrients vital to soil fertility.[461]

Water supply from the glaciers is lowest in winter, between December and February, and highest in summer, between May and August.[462] The glaciers affect the availability of the resource in the most dramatic way: The amount of snowfall in the cold season regulates the water levels of all rivers of the Indus basin in the ensuing hot season. Glaciers contribute up to 85 per cent of the water in the Indus Basin.[463] That means a short winter can lead to increased thaw that, combined with a strong monsoon, may be followed by devastating floods. Strong winter seasons often translate into a shortage of water in spring. All rivers of the Indus system carry the

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[456] Pakistan Water Gateway, *op. cit.*; Asim Khan: surface water resources, *op. cit.*, p. 5.

[457] Heinz Ahrens & Wolfgang-Peter Zingel: Interdependenzen zwischen gesamtwirtschaftlichem Wachstum und regionaler Verteilung in Pakistan (Interdependence between national economic growth and regional distribution in Pakistan; in German); Wiesbaden: Steiner, 1978, p. 495, referring to Nazir Ahmad: Ground water resources of Pakistan, Lahore, 1974.

[458] According to Kreutzmann, 28% of the Karakoram and 8-12 % of the Himalaya-Hindukush mountain ranges are covered by glaciers; Hermann Kreutzmann: Wasser für Pakistan: Bewässerungspraxis zwischen Ökologie und Ökonomie (Water for Pakistan: the ecology and economy of irrigation; in German); in: Rüdiger Glaser u. Klaus Kremb, eds.: *Asien*; Planet Erde series; Darmstadt: Wissenschaftliche Buchgesellschaft, 2007, p. 154.

[459] The contribution of mountainous water towers to the freshwater supply in arid regions ranges between 50 and over 90 per cent, according to a Swiss survey: Daniel Viviroli & Rolf Weingartner: The hydrological significance of mountains: from regional to global scale; *Hydrology and Earth System Sciences (HESS)*, vol. 8, no. 6, 2004, p. 1021. The Indus, along with the Nile, Euphrates-Tigris and Amu Darya Rivers, is rated as *extremely important*.

[460] See ICIMOD: Water resources of the Hindu Kush-Himalayas; www.icimod.org/focus/water/water_hkh.htm (May 2001).

[461] Liviu Giosan, S. Constantinescu, P. Clift, A. Tabrez, M. Danish & M. Inam: Recent morphodynamics of the Indus delta shore and shelf; *Continental Shelf Research*, vol. 26, 2006, p. 1668. Sediment discharge is estimated at 150 million tons annually.

[462] Asim Khan: Surface water resources, *op. cit.*, p. 9.

[463] Federal Bureau of Statistics: Compendium of Environment Statistics 2004; Islamabad: Government of Pakistan, 2005, p. 12. The glaciers, mighty as they are, recede at a rate of 30 to 50 metres p.a., according to the Pakistan Meteorological Department; the PMD's director-general expects accelerated melting around the year 2025, causing severe floods, and a period of drought thereafter, as a consequence of climate change; see Khaleeq Kiani: Water-related crisis feared in 20 years; *Dawn*, 4 Jan. 2005.

bulk of water in their respective upstream areas, near their sources.[464] The lower stretches of these rivers carry much less water because of the high degree of seepage and evaporation.

After meandering for more than 1,500 km at an approximate elevation of over 4,000 metres, the Indus descends into the **centre of the basin** at an increasing velocity. The plains of the Punjab benefit from the proximity of the river and its tributaries and the flow velocity of the water, easily reaching the tail ends of the irrigation canals. It is in this area where all five tributaries join the Indus, at the Punjnad conjunction in lower Punjab.

The situation in the river delta, in the province of Sindh, is much different from the upper reaches of the basin. Having passed the central plains, the river's flow velocity goes down significantly until it reaches the Arabian Sea. This has a marked effect on water management in this downstream province. First, the amount of water – and hence its flow velocity – is lower than at the upper reaches of the basin. Second, the reduced flow velocity of the water means that it reaches the low-lying ends of the irrigation canals with greater difficulty causing shortage to the tail-end farmers, evaporation and water-logging.[465] Third, this necessitates greater efforts at water management to maintain adequate farm-level water supplies and to preserve soil fertility.

The coastal ecosystem, especially the mangrove forests in Sindh, is closely linked to the Indus Basin. This area, breeding ground for a large number of fish species, is vital for coastal fishing in Sindh and Balochistan; it also serves as a shield against cyclones.[466] It is threatened by a lack of downstream water flows.[467] The lower delta is also an agricultural zone and the economic basis of coastal communities in lower Sindh. Its productivity is threatened by saltwater intrusion from the Arabian Sea, again due to a lack of river water flowing downstream.[468] The debate over how much

[464] Ahrens & Zingel: Interdependenzen, *op. cit.*, p. 496.

[465] Water-logging, due to standing water in irrigation canals, accelerates salinization of soils in arid tropical regions. This form of soil degradation is a widespread phenomenon of intensive irrigation and often exacerbated by lacking drainage. Cf. South Asia Technical Advisory Committee (for Pakistan Water Partnership, PWP): Draft South Asia Water Vision – Pakistan; Supplement to Framework for Action for achieving the Pakistan Water Vision 2025; Islamabad: PWP, 2001, p. 10 - 11 (Pakistan country report). PWP is a member of the Global Water Partnership (GWP) network. The tail-end supplies are often augmented by groundwater which in general is of lower quality, even hazardous (especially in Punjab), according to Abdul Ghafoor & Abdul Majeed: Tubewell water, soils and wheat yield in different reaches of a canal in the rice-wheat-cropping zone of Punjab; *International Journal of Agriculture and Biology*, vol. 1, no. 1-2, 1999, p. 5 – 8. The effects of water-logging, however, are disputed as there is no established criterion for the condition of being water-logged; cf. Umar Farooq, M. Ahmad & A. W. Jasra: Natural resources conservation for poverty alleviation by making farmers partner with empowerment; Islamabad: Pakistan Institute for Development Economics, 2011, p. 4; www.pide.org.pk/psde23/pdf/Umar%20Farooq.pdf (June 2013).

[466] On the manifold ecological functions of the mangroves see Amjad Ali Shah, I. Kasawani & J. Kamaruzaman: Degradation of Indus delta mangroves in Pakistan; *International Journal of Geology*, vol. 1, no. 3, 2007, p. 28.

[467] Shah *et al.*: Degradation, *ibidem*, p. 29.

[468] The delta is particularly affected in periods of drought; Naseer Memon: Indus delta reels from water shortage; *The News*, 8 April 2001.Cf. also: Decline in fresh water degrading Indus delta; *Dawn*, 13 July 2004. For an overview of the ecosystem see: IUCN: The lower Indus River: balancing development and maintenance of wetland ecosystems and dependent livelihoods; Karachi: IUCN Pakistan (no date); www.iucn.org/themes/wani/flow/cases/Indus.pdf (May 2006). A comprehensive analysis of the delta's condition and needs is provided by Peter Meynell & Muhammad Qureshi:

river water is needed to stem the salt water from spoiling the coastal lands is part of the wider dialogue on water management in this southern province. In the wake of extensive measures to exploit the river's resources, the delta has come to symbolize the classic conflict between development and environment.[469] In practical terms, the condition of the delta has developed into a **problem of water sharing** among the provinces: The sufficient quantities of water and water-borne nutrients (silt) that have been identified as vital to sustain the delta ecosystem will have to be included in calculating the water shares. In a sense the delta has become a stakeholder in its own right, competing against water demands based on the social-economic needs of the provinces.[470]

The second determinant of water availability of Pakistan is the **Monsoon cycle**.[471] The Monsoon system is characterized by extreme variations in precipitation. Dry and hot months (roughly October to May) are followed by humid and very hot months (June to September).[472] Average annual rainfall in the Indus basin ranges from 125 to 500 millimetres, with peaks between June and August, i.e. at about the same time when the inflow from the mountains reaches its climax in the heartland of the basin.[473] The rainfall meets about 15 per cent of the total crop demand of Pakistan agriculture.[474] The highly dynamic water supply in the Indus region is exemplified by the a sequence of water-short seasons (2002 to 2004), with low agricultural output, that were followed by a water-rich period (2005) which caused flooding in vast parts of the river delta, not to mention the devastating floods of 2010.[475] The shifts between

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Sustainable management of mangroves in the Indus Delta, Pakistan; in: T. J. Davis, ed.: *Towards the wise use of wetlands*; Gland: Ramsar, 1993, ch. 16; www.ramsar.org (online publication; Feb. 2003). The attention to the delta's condition has mostly been raised by NGOs like IUCN and WWF (*WWF Ecoregion 156*). An international initiative that has promoted research into delta conservation is the Ramsar Convention, with support from UNESCO, WWF, IUCN, BirdLife, and IWMI. The Indus Delta has been given the status of a Ramsar Site; www.ramsar.org.

[469] Most of the negative changes are attributed to the installation of barrages; the last downstream barrage on the Indus is Kotri; this barrage marks the southern end of the irrigation system below which there are no diversions. Cf. Sikander Brohi: Livelihood resources downstream Kotri Barrage and their degradation; in: Sikander Brohi, ed.: *Indus flow downstream Kotri Barrage: Need or wastage?* Karachi: Shaheed Zulifkar Bhutto Institute of Science and Technology, 2003, p. 8 - 14. Cf. also Shahid Hussain: Rubbing salt into the wounds of delta inhabitants; *Guardian Weekly*, 30 Jan. 2003, on the conflicting uses of river water and its effects on coastal communities.

[470] The water demands that are based on ecological requirements have entered the official discussion of water management in Pakistan, as will be seen in the water sharing section of this study. Falkenmark has defined the water quantities (and quality) needed to protect downstream ecosystems as *environmental flows*: Malin Falkenmark: More crops or more ecological flow? In search of a *Golden Section* in catchment rainwater partitioning; Proceedings of the international seminar *Towards Catchment Hydrosolidarity*, Stockholm, 18 August 2007; www.siwi.org (Jan. 2009).

[471] The origins of the Monsoon system are probably connected to the creation of the Himalayas and the Tibetan Plateau, around 15 to 22 million years ago, according to Peter Clift: Moving earth and heaven. Colliding continents, the rise of the Himalayas, and the births of the Monsoons; *Oceanus*, vol. 42, no. 2, 2005, p. 2 – 3.

[472] Hans-Georg Bohle: Ökologische Grundlagen: Naturraum und Klima (Ecological conditions: climate and physical regions; in German); in: Dietmar Rothermund, ed.: *Indien. Kultur, Geschichte, Politik, Wirtschaft, Umwelt*; München: Beck, 1995, p. 29 – 31.

[473] Encyclopaedia Britannica: *Indus River* (online edition, May 2004).

[474] Combined average for all of Pakistan, according to Asad Qureshi, T. Shah & M. Akthar: The groundwater economy of Pakistan; Lahore: IWMI, 2003, p. 1.

[475] For a record of floods and flood-related damages (1950 – 1995) see H. Rehman & A. Kamal: Indus Basin River system – flooding and flood mitigation; paper presented at the 9th International River Symposium and Environmental Flows Conference, Brisbane, 4 to 7 Sept. 2006; www.riversymposium.com/2005/index.php?element=38 (April 2007), p. 2.

drought-like conditions and floods affect most economic activities, particularly agriculture, and especially so in Balochistan, Sindh and southern Punjab.[476]

Floods are a recurring challenge. Depending on their dimension, they can amount to a fundamental threat to the very existence of human settlements in the basin. The flow regime of the river – the high elevation of its source and the dimension of the glaciers – combined with the rainfall patterns sometimes generate a massive force as immense quantities of water rush downstream undermining livelihoods on a large scale. From an ecological perspective, though, floods are a vital element of river basin hydrology. The importance of rejuvenating soils, replenishing groundwater aquifers and the transportation of silt from the river bed onto the fields is often overlooked in times of devastating floods.[477] Historical evidence suggests that the ancient Indus civilization has managed floods in a progressive manner, utilizing the nutrients to increase soil fertility. Settlements were protected by dikes and embankments, elevations and excess water canals and reservoirs.[478]

Flood management in Pakistan has yet to take into account lessons of past floods mainly because it is primarily understood as a form of disaster management, rather than a part of river management. The lining of river beds, the lack of reservoirs, the degeneration of wetlands, and deforestation have exacerbated the damage caused by floods.[479] Conflicting uses and demands for water and energy have hampered a comprehensive policy. From an institutional perspective, the lack of coordination and funding has limited the effectiveness of the Federal Flood Commission (FFC), created in 1977 as a consequence of devastation wrought by the floods of that same year.[480] Officially, the FFC, as a part of the Ministry of Water and Power, is the chief body to implement the National Flood Protection Plan, yet other federal, provincial and municipal authorities are also in charge of flood management measures, exhibiting an unclear hierarchy.[481]

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[476] Cf. UN flood reports: www.un.org.pk/undp/crisis_p/floods.html (July 2004).

[477] For a critical discussion of environment flows see Mike Acreman & M. Dunbar: Defining environmental river flow requirements – a review; *Hydrology and Earth System Sciences*, vol. 8, no. 5, 2004, p. 861 - 863.

[478] The Indus Valley Civilization has long been a subject of archaeological investigations. Even to unsuspecting visitors its scarce remains, in Moenjo-Daro near the town of Larkana/Sindh, give a vivid impression. For a detailed account see Henning Fahlbusch, B. Schultz & C. Thatte, eds.: The Indus Basin. History of irrigation, drainage and flood management; New Delhi: International Commission on Irrigation and Drainage, 2004, p. 22 – 23. I am grateful to Gul Baloch, from Larkana, for showing me the ancient site and for hosting me during my stay in 2003.

[479] Hartmut Jungius: Wälder und Wasser als Reichtum begreifen; *WWF-Journal* no. 3, 1991, p. 53 (German report of the World Wildlife Fund on sustainable forest management in Pakistan). The most recent floods, of 2010, have affected over 20 million people. The difficulty to pinpoint causes of Asian floods in general is highlighted by Jayanta Bandyopadhyay & D. Gyawali: Himalayan water resources: Ecological and political aspects of management; *Mountain Research and Development*, vol. 14, no. 1, 1994, p. 12 – 13, citing the controversial discussion of the impact of forest logging on floods. In sum, logging is generally considered to tend to aggravate harmful effects of floods; yet in many cases it is the particular land use patterns that turn floods into disasters.

[480] Rehman & Kamal: Floods, *op. cit.*, p. 5; T. A. Malik: Minister for Water and Power reviews flood control situation: All provinces complain of funds release delay; *Business Recorder*, 8 June 1999. Lacking inter-departmental coordination caused foreign assistance to be withdrawn: Japan suspends aid to Leh project; *Dawn*, 9 July 2000. Khaleeq Kiani: Inquiry holds irrigation department responsible: flood havoc in Badin; *Dawn*, 30 Aug. 2003. Ali Hasan: Blundering in Badin; *Herald*, Sept. 2003, p. 52 – 54.

[481] On the federal level: Emergency Relief Cell, National Disaster Management Authority, WAPDA; on the provincial level: Irrigation and Power Departments, Provincial Irrigation and Drainage Authorities; on the municipal level: Development Authority; cf. ESCAP (UN): Floods in Pakistan; *Water Resources*

Dynamics of water availability

The Indus system supplies an estimated 80 % of all water consumed in Pakistan, either through direct or indirect means, *i. e.* through the rivers or the reservoirs, canals and wells recharged by it.[482] The total **available amount** on average varies greatly, and exact figures are disputed, as Khan points out.[483] Minimum flows of surface water of 120 km³ and maximum flows of 230 km³ have been recorded.[484] On average, between 175 and 180 km³ are available annually.[485] **Water withdrawals** are estimated to total 170 km³ per year (2008).[486] Exact figures are not available, due to a lack of monitoring.[487] According to FAO statistics, Pakistan's status of water availability appears to be critical: 100 per cent of available renewable water sources (from rivers and groundwater) are withdrawn, proportionally the highest water use in South Asia.[488]

By its internal renewable water resources and rainfall, Pakistan is ranked as a **water-short** country.[489] The per-capita ratio has steadily fallen and is expected to reach the state of water scarcity by 2035.[490] This means that in terms of water, Pakistanis live on the edge: Statistically speaking, the continued rise in population – by more than 2 per cent annually – would, given constant sectoral water use and roughly constant river flows, fast **outgrow the water supply**.[491]

Journal (FAO), March 1992, p. 81 – 82. Several acts and ordinances include provisions for flood management: the provincial Canal and Drainage (Irrigation) Acts, PIDA Acts, Punjab Soil and Reclamation Act, and the IRSA Act on water sharing and water releases, according to Rehman & Kamal: Floods, *op. cit.*, p. 5. These acts, some originating in the colonial era, have not been synchronized with a view to efficient flood management. As a result, conflicting interventions have occurred: CDA told to take anti-flood steps: Musharraf issues directives; *Dawn*, 19 Aug. 2001; WAPDA, PMD evolve new plan to cope with floods*; Dawn*, 5 Sept. 2002. For a critical perspective on FFC flood management, or the lack of it, during the 2010 floods: Disastrous winds of change? *Newsline*, 30 Sept. 2010.

[482] Asim Rauf Khan: Analysis of surface water, *op. cit.*, p.1.

[483] Asim Rauf Khan: Analysis of surface water, *op. cit.*, p. 45.

[484] Asim Rauf Khan: Analysis of surface water, *op. cit.*, p. 15.

[485] Asim Rauf Khan: Analysis of surface water, *op. cit.*, p. 45. Water availability has risen by approximately 5 km³ p.a., to 180 km³, after the commissioning of the Tarbela reservoir.

[486] Peter H. Gleick, ed.: The world's water 2008 – 2009; Oakland: Pacific Institute Press, 2009, p. 202.

[487] World Bank: Pakistan Country Water Resources Assistance Strategy. Water economy: running dry; report no. 34081-PK; Washington, D.C. / Islamabad: World Bank Agriculture and Rural Development Unit, 2005, p. 29; www.worldbank.org.pk (May 2006).

[488] See World Resources Institute: World resources 2002-2004, p. 274, based on FAO (Food and Agriculture Organization, UN) data. The primary source of this Aquastat (FAO) data are measurements by national authorities. The data cited above is from 1991; http://pdf.wri.org/wr2002fulltxt_230-282_datatables.pdf (Feb. 2004).

[489] FAO: Review of water resources by country; Rome: FAO, 2003; www.fao.org (May 2004).

[490] World Bank: Assistance strategy, *op. cit.*, p. IX. Archer *et al.* estimate water withdrawals to be around 73 per cent *indicating a highly-stressed system*: D. R. Archer, N. Forsythe, H. Fowler & S. M. Shah: Sustainability of water resources management in the Indus Basin under changing climatic and socio-economic conditions; *Hydrology and Earth System Science Discussions* (HESS), no. 7, 2010, p. 1889; www.hydrol-earth-syst-sci-discuss.net/7/1883/2010/ (April 2011).

[491] World Bank: World Development Report 2000/2001; Washington, D.C.: WB, 2002, p. 288, not quoting notes on sources or year of issue. Various sources put population growth at between 2.1 and 2.8 per cent annually; World Bank: Pakistan data profile; www.worldbank.org (database download for Pakistan for 2006, Oct. 2007); B.H. Farmer: Pakistan, *op. cit*., p. 370 (based on the latest census of 1998). For a more current assessment of the dynamics of water availability see A.N. Laghari, D. Vanham & W. Rauch: The Indus Basin in the framework of current and future water resources management; *Hydrology and Earth System Sciences*, no. 16, 2012, p. 1064 – 1066.

In spite of this critical situation, a significant amount of water remains unused. Kreutzmann estimates that on average around 69 km³ could be utilized annually if **storage and regulation** was optimized.[492] In other words, more water could be made available and water shortage averted, at least in many cases. Ahmed *et al.* calculate that, based on demographic projections, corresponding food demands and current productivity and water availability levels (*business-as-usual*), the expected food production in 2025 will fall short by 28 million tons.[493]

Groundwater, as a consequence, has come to be appreciated as a more reliable water source than surface water sources, given the unpredictable dynamic of the Monsoon. Groundwater resources have been playing an increasingly important role in irrigated agriculture since the installation of tube-wells on a nation-wide scale in the 1960s. The utilization of groundwater was promoted under economic schemes like the Green Revolution throughout much of Asia and has indeed rendered high profits. Thanks to electric pumps major parts of Pakistan have experienced unseen wealth.[494] However, this source – like the river – is threatened by over-use and inefficiency.

Groundwater use for irrigation has increased in all provinces, particularly in Punjab where it contributes up to half of all water available at the farmgate.[495] The quality of this water, though, is of poor quality and considered unsuitable for irrigation purposes.[496] The number of tube-wells has risen from 355,840 in 1991/1992 to 768,327 in 2003/2004, 85 per cent of which are in Punjab.[497] The amount of water withdrawn from aquifers has risen from 4 km³ (1959) to around 60 km³ (2000).[498] The sharp rise in groundwater pumping threatens the sustainability of aquifers: By some estimates, the annual withdrawals in some areas already exceed the rate of

[492] Hermann Kreutzmann: Water towers for Pakistan; *Geographische Rundschau International Edition*, vol. 2, no. 4, 2006, p. 49. Seepage losses are estimated to be between 13 and 30 per cent, according to Asim Rauf Khan, M. K. Ullah & S. Muhammad: Water availability and some macro level issues related to water resources planning and management in the Indus Basin Irrigation System in Pakistan; paper presented at general assembly meeting of International Network of Basin Organizations (INBO/RIOB, Réseau International des Organismes de Bassin), ch. 6.3 (pages not numbered); http://ancien.riob.org/ag2000/pakistan.htm (Jan. 2011).

[493] Shehzad Ahmed, A. Qureshi, U. Amarasinghe & A. R. Khan: Projecting food and water demands of Pakistan for 2025 using policy dialogue model; paper presented at the 2nd South Asia Water Forum, Islamabad, 14 – 16 Dec. 2002; Islamabad: Pakistan Water Partnership, 2002, p. 616, 629. The authors have calculated a 40% increase in demand from 2002. On the link between nutrition, food pricing, agricultural yield gap and public health see Sohail Jehangir Malik: Food supply challenges and implications for food security; in: Michael Kugelman & Robert M. Hathaway, eds.: *Hunger pains. Pakistan's food insecurity*; Washington, D.C.: Woodrow Wilson Center for Scholars, 2010, p. 49 – 51.

[494] Tushaar Shah, A. Roy, A. Qureshi & Jinxia Wang: Sustaining Asia's groundwater boom; paper presented at the international conference *Water 2001*, Bonn, 3 – 7 Dec. 2001; Bonn/Colombo: DIE (Deutsches Institut für Entwicklungspolitik) & IWMI, 2001, p. 4. The authors estimate a six-fold return on tubewell investment and operation.

[495] Government of Pakistan: Statistical Yearbook 2008; Islamabad: GoP, 2008, ch. Agriculture, table 1.16, p. 65; tube-well use in NWFP and Balochistan has remained largely constant in the past decade. See also M. N. Bhutta: Sustainable management, *op. cit*., p. 452.

[496] According to the Ministry of Food, Agriculture and Livestock, Punjab draws 50 per cent of its irrigation water needs from underground sources; Zafar Samdani: Pumping out water from lower depths "dangerous"; *Dawn*, 8 May 2000. For a detailed assessment see Qureshi, Shah and Akhtar: Groundwater economy, *op. cit.*, p. 14, 16 – 17 for variations in groundwater quality.

[497] Federal Bureau of Statistics: Compendium of environment statistics, *op. cit.,* p. 86. The growing relevance of groundwater is indicated by the rise of tube-wells to a total of 355,840 in 1991/1992.

[498] Shahid Ahmad *et al.*: Groundwater management, *op. cit.*, p. 4.

recharge.[499] It is estimated that, by the current rate of withdrawals, the groundwater aquifers in Punjab might be exhausted in 50 to 100 years.[500] This is a devastating prospect, given the fact that Punjab makes up for some 90 per cent of agricultural production in Pakistan.[501] The quality of groundwater is also affected by industrial and household effluents, particularly in the industrialized urban areas of Punjab and Sindh, which are mostly untreated.[502]

Overall groundwater supplies in Punjab are estimated to be around 43 MAF, against 18 MAF in Sindh, 2 MAF in Balochistan and 3 MAF in KPP/NWFP.[503] This aspect of groundwater represents another facet of the discrepancies between the provinces of Pakistan. Balochistan's lack of surface water sources makes it almost entirely dependent on groundwater. But the rising withdrawals there mean sinking water tables, by up to 2 m annually.[504] This leads to the mining of the aquifer in some areas, as Ahmad *et al.* point out, resulting in fresh groundwater being mixed with poor-quality groundwater.[505] As the water tables fall rapidly, economic gains shrink due to the rising cost of deep-drilling and the declining effectiveness in terms of water quality. The groundwater quality in lower Sindh is highly saline due to the proximity of the sea. Areas closer to the river Indus are of better quality, with aquifers being replenished by the river. Groundwater aquifers in Punjab and KPP/NWFP, in the upstream half of the Indus Basin, benefit from higher precipitation contributing to groundwater replenishing. The seepage from the vast canal network in Punjab adds to replenishing the aquifers.

Forecasting the probable water supplies in the coming season is a complicated task due to the scope of the glaciers. Efforts to calculate the existing and prospective water availability have been undertaken in 1991 to support long-term planning of more efficient water utilization and to assist flood management.[506] The establishment

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[499] Shahid Ahmad *et al.*, *ibidem*.

[500] Shahid Amjad Chaudhry: Pakistan: Indus Basin water strategy – past, present and future; *The Lahore Journal of Economics*, vol. 15, Sept. 2010, 196; www.lahoreschoolofeconomics.edu.pk (Feb. 2011). Projections like this can only serve as a rough indicator because future consumption is subject to unforeseeable demographic development, varying forms of water use and technological innovations. See also Shahid Ahmad *et al*.: Groundwater management, *op. cit.*, p. 4. The existing groundwater resources are estimated to be 57 billion m³, 30 – 40 per cent of which are considered unsuitable for agriculture, according to Frank van Steenbergen & W. Oliemans: Groundwater resource management in Pakistan; proceedings of the ILRI workshop *Groundwater management: Sharing responsibilities for an open-access resource*, Wageningen, 13 – 15 Oct. 2007; Wageningen: International Institute for Land Reclamation and Improvement, 2007, p. 93; www.ilri.nl (May 2008). Cf. Geoff Bridges: Country chapter – Pakistan; in: *Asian Development Bank: Asian Water Development Outlook 2007*; Manila: ADB, 2007, p. 3.

[501] Qureshi *et al*.: Groundwater economy, *op. cit.*, p. 17.

[502] Shahid Ahmad et al.: Groundwater management, *op. cit.*, p. 9.

[503] Muhammad Nawaz Bhutta: Sustainable management of groundwater in the Indus Basin; paper presented at the 2nd South Asia Water Forum, Islamabad, 14 – 16 Dec. 2002; Islamabad: Pakistan Water Partnership, 2002, p. 450 - 451. Bhutta renders a differentiated picture of groundwater supplies, pointing at distinct hydrological zones with markedly different qualities of groundwater. Thus a generalized assessment of the groundwater situation in the provinces is not possible.

[504] Shahid Ahmad, Shams ul Mulk, A. Muhammad: Groundwater management in Pakistan; paper presented at the 1st South Asia Water Forum, Kathmandu, 26 – 28 Feb. 2002; Islamabad: Pakistan Water Partnership, 2002, p. 4, 14.

[505] *Ibidem*.

[506] See project report by Naser I. Faruqui: Snow and ice hydrology (Pakistan). Final report to CIDA; Ottawa: International Development Research Centre / Canadian International Development Agency, 1997; www.idrc.org (Jan. 2011; pages not numbered). I am grateful to Mr. Faruqui for pointing out this project (personal communication, April 2001).

of a monitoring facility across the Himalayas, together with information obtained from India, has enabled Pakistan to at least roughly assess the potential amount of water from alpine sources.[507] Nevertheless, the prospective over-all water availability to a great degree remains a vague estimate owing to the dynamics of the glaciers and the climate. Even if more metering devices were available, water utilization in the Indus region would still remain vulnerable to surprises.[508] This means that economic planning, even over a short period, faces limitations. Consequently, the more water an economic sector requires, the greater its resilience towards unexpected supplies, or the lack thereof, needs to be.

For the problem of water sharing, the lack of monitoring translates into a lack of **transparency**. If existing as well as prospective supplies are hard to assess, water distribution agreements are threatened by suspicion – either that promised supplies won't materialize or that shortfalls are not shared appropriately. This aspect, as will be seen later in this study, has become a central factor in the oft-cited mistrust between the provinces, particularly Sindh and Punjab, the biggest water consumers.

Irrigated agriculture: ambivalence of an economic lifeline

The basin has undergone dramatic changes, particularly in the wake of the colonial conquest by Great Britain. With extensive irrigation works starting in the 1860s, it has evolved to become known as the bread basket of the Crown Colony and, in post-independence times, the largest irrigation network in the world.[509]

In today's Pakistan, the **agriculture** sector is estimated to make up around 21 per cent of the Gross National Product and up to 91 per cent of exports.[510] It employs around 45 per cent of the total workforce, making it the most labour-intensive sector.[511] Beyond direct employment, the country's 62 per cent of the total population living in the countryside are economically associated with agriculture in some form or another. This social-economic dependence, in spite of its GNP share, which appears to be on the decline, makes agriculture the most important sector of Pakistan's

[507] The cooperation with India in this regard will be detailed in the water sharing section.

[508] Danial Hashmi & Muhammad Siddique: Influence of climate change on upper Indus flows; in: Pakistan Engineering Congress: *World Environment Day 2009*; Lahore: PEC, 2009, p. 31 – 32.

[509] See Food and Agriculture Organization of the UN (FAO): Aquastat database: Pakistan; www.fao.org/ag/agl/aglw/aquastat/countries/Pakistan/print1.stm (July 2006). Kuhnen describes the stages of agrarian development, from stagnation in the first post-independence decade, to the Green Revolution in the 1960s and '70s with mechanization and commercialization of agriculture, and the late 1970s with a diversification of the labour market stimulated by external factors such as the Afghanistan War and the labour migration to the Arab Gulf states: Frithjof Kuhnen: The agrarian sector in Pakistan's development process; paper presented at the 6th Annual General Meeting of the Pakistan Society for Development Economics, Islamabad, 8 -10 January 1990, p. 3; www.professor-frithjof-kuhnen.de (Feb. 2005).

[510] Government of Pakistan, Ministry of Finance: Economic Survey 2010, ch. 2, p. 13; before, the figure stood at 24 per cent, according to Asad Qureshi, Tushaar Shah & Mujeeb Akhtar: The groundwater economy of Pakistan; Working Paper no. 64, 2003, IWMI (Lahore), p. 1. Agricultural products make up 67 per cent of the country's earnings from exports; Government of Pakistan: Yearbook of Agriculture 2006 – 2007, Islamabad: GoP, 2007, p. 3. The export structure of Pakistan is very one-sided, as most commodities are raw goods (rice, wheat, cotton, fish etc.) and manufactured commodities (textiles/garments), totalling 91 per cent of exports; Fischer Weltalmanach 2010 (world almanac, yearly country data, in German); Frankfurt: Fischer, 2009.

[511] Federal Bureau of Statistics: Compendium of Environment Statistics 2004; Islamabad: Government of Pakistan, 2005, p. 75 (figure for 2004).

economy. It is also the most vulnerable, mainly due to climate variations that directly affect water supplies and agricultural production.[512]

Agricultural production, due to the mostly arid climate, heavily relies on **irrigation**. According to Farmer, *much of Pakistan would, in fact, be agriculturally unproductive in the absence of irrigation*.[513] Up to 96 per cent of all freshwater withdrawals, from surface and underground sources, are used for this purpose.[514] The Indus system supplies around 60 per cent of all water used for irrigation; the rest is drawn from groundwater sources.[515]

Like in most of South Asia, irrigation is tuned to the dynamics of the Monsoon, with special *Rabi* (winter season) and *Kharif* (summer season) crops being planted according to seasonal water supplies. Main Kharif crops are cotton and rice, the main Rabi crop is wheat, while sugarcane is a perennial crop.[516] In winter, the river's low flow is augmented by stored water released from reservoirs. On average, around 70 per cent of all surface water is available in Kharif, 30 per cent in Rabi. Total water availability (at canal head) has ranged from 98.2 km³ to 131.7 km³ over the past decade.[517] Water storage enables farmers in the Indus Basin to harvest up to three crops per year. Agricultural production dominates all provinces, but is markedly different in terms of crops, cropping patterns, irrigation techniques and, as a result, water needs.[518]

The total crop area is 21.2 million ha (2009), 19.3 of which are under irrigation.[519] The irrigated area has risen significantly over the past decades as a result of the

[512] Economic Survey 2010, *ibidem*; the critical situation of the agriculture sector is underlined by continued food imports.

[513] B. H. Farmer: Pakistan. Physical and social geography; in: *Regional Surveys of the World: South Asia 2004*; London: Taylor & Francis, 2004, p. 370. According to an IWMI study based on FAO statistics, cereal production in Pakistan, which makes up two thirds of the average diet, relies entirely on irrigation; rain fed areas amount to 0 %; cf. David Molden, U. Amarasinghe & I. Hussain: Water for rural development; *IWMI Working Paper* no. 32, 2000, p. 29, 78. This translates into an exceptionally high dependence on irrigation, higher than any other South Asian nation.

[514] Gleick: The world's water 2008 – 2009, *ibidem*. World Bank estimate: 97% of all available freshwater (1980-1998 average): World Development Indicators 2000; New York: WB, 2000, p.131.This leaves around two per cent each for industrial and household consumption. Pakistan's dependence on river and groundwater withdrawals for agriculture is only surpassed by Turkmenistan, Afghanistan, Myanmar and Cambodia. Unlike the two Southeast Asian nations which are located in the subtropical zone, the South and Central Asian nations are more vulnerable due to meagre rainfall.

[515] Asim Rauf Khan: An analysis of the surface water resources and water delivery systems in the Indus Basin; Lahore: IWMI, 1999, p.1. The Kabul and Kuram rivers, originating in northern Afghanistan, are not commonly described as tributaries in hydrological terms as they enter the Indus upstream of the main basin.

[516] Intizar Hussain, F. Marikar & W. Jehangir: Productivity and performance of irrigated wheat farms across canal commands in the lower Indus Basin; *Research Report* no. 44; Lahore: IWMI, 2000, p. 6

[517] Calculations based on overall water availability as in: Government of Pakistan: Statistical Yearbook 2009; Islamabad: GOP, 2009, table 1.15 (1 Million Acre Feet/MAF is equivalent to 1.234 cubic km).

[518] For a region-wise overview see Derek Byerlee & Tariq Husain, eds.: Farming systems of Pakistan; Lahore: Vanguard, 1992.

[519] This means that out of 79.61 million hectares of national territory (excluding disputed territories) 26.7 per cent are cultivated, 91 per cent of which are under irrigation; Government of Pakistan: Statistical Yearbook 2009, tables 1.1, 1.6; http://www.statpak.gov.pk/fbs/content/pakistan-statistical-year-book-2009 (Feb. 2011). According to the World Resources Institute, the percentage of irrigated land for 1999 was 82 per cent (based on FAO data): World Resources 2002 – 2004, *op. cit*., p. 250.

expansion of the Indus Basin irrigation network.[520] This development has been facilitated by the Indus Waters Treaty of 1960 and, in its wake, continued international assistance.[521] As a result, the sector has experienced steady **growth in production** – to the order of an average 3.7 per cent between 2003 and 2009 – yet with marked variations.[522] This expansion represents an effort to meet the demands of a rapidly **rising population** by increasing the base of agricultural production, i.e. the land to be brought under cultivation. However, according to World Bank calculations, the population is fast outgrowing the rates at which wheat yield and irrigated fields increase.[523]

An expansion of irrigation has taken place especially in **Punjab**: from 13.55 to 14.72 million hectares between 1998 and 2007 (8.6 per cent). The corresponding water has been drawn from tubewells, i.e. groundwater sources.[524] Two factors limit this effort: **land and water**. The efforts to produce more crops for a growing population have so far meant expansion of arable lands and intensified cultivation, especially through increased use of fertilizers and other crop-enhancing chemicals.[525] Both strategies imply side-effects: available land is short, further cultivation threatens the eco-system, as the loss of forests – with devastating consequences for flood management – shows.[526] Intensification comes at the cost of degrading **water**

[520] Joseph Makwata Wambia: The political economy of water resources institutional reform in Pakistan; in: Ariel Dinar, ed.: *The political economy of water pricing reforms*; New York: World Bank, 2000, p. 361. According to FAO records, the irrigated area in 1974 was 13.3 million hectares, 14.2 in 1979, 15.7 in 1984, and 16.2 in 1989; source: FAO Production Yearbook 1990, quoted in: Peter H. Gleick, ed.: *Water in crisis*; Oakland: Pacific Institute, 1993, p. 270. For a detailed illustration of the Indus Basin economic utilization see: World Resources Institute: Watersheds of Asia and Oceania; http://pdf.wri.org/watersheds_2003/as12.pdf , in particular slide AS 11 (Feb. 2004).

[521] Major multilateral agencies are the World Bank and the Asian Development Bank, with extensive long-term support schemes. The Indus Treaty will be discussed in detail in the water sharing section.

[522] Economic Survey 2010, *op. cit.,* p. 14.

[523] World Bank: Pakistan public expenditure management, vol. II; Washington, D.C.: WB, 2004, p. 4. Poverty remains a widespread phenomenon in many rural areas throughout the Indus Basin; cf. Sarfraz Khan Qureshi: Water, growth and poverty in Pakistan; in: John Briscoe & Usman Qamar, eds.: *Pakistan's water economy: running dry*; *World Bank Background Papers* series; Washington, D.C.: WB, 2005, p. 8; http://water.worldbank.org/water/publications/pakistans-water-economy-running-dry-background-papers. Rural poverty has been left largely unaffected by overall economic growth (in Pakistan as well as in most of South Asia); cf. Mahbub ul Haq Human Development Centre: Human Development Report 1998-2007; Islamabad: MHHDC, 2008, p. 24.

[524] Calculations based on Statistical Yearbook 2009, *op. cit.*, ch. *Agriculture*, table 1.16. Balochistan has increased its irrigated area from 0.8 mha to 1.31 mha – a 63.73 per cent increase. Irrigated areas in NWFP/KPP and Sindh have stagnated.

[525] The use of fertilizers and pesticides has increased drastically, threatening water quality and biological diversity; cf. Rashid Faruqee: Role of economic policies in protecting the environment. The experience of Pakistan; *World Bank Work Paper* no. 1757 (paper presented at Annual General Meeting of Pakistan Institute of Development Economics, Islamabad, 13 – 15 Dec. 1996); Washington, D.C.: World Bank, 1996, p. 17; IUCN et al.: Biodiversity, *op. cit.*, p. 29; Udo Schickhoff: Die Gebirgswälder des Himalaya und Karakorum: Sinnbild für Ressourcenübernutzung und Umweltdegradation (Mountain forests of the Himalaya-Karakoram: symbol of resource overuse and environmental degradation; in German); in: Rüdiger Glaser & Klaus Kremb, eds.: *Asien*; Planet Erde series; Darmstadt: Wissenschaftliche Buchgesellschaft, 2007, p. 148.

[526] According to IUCN et al., overgrazing and fire wood collection are the major causes of Pakistan's dramatic loss of forests: WWF, IUCN and Government of Pakistan: Biodiversity Action Plan for Pakistan; Rawalpindi, 2000, p. 13 – 18. Enhanced soil erosion, loss of soil fertility and exacerbated floods are among the more severe consequences.

quality as a result of chemical pollutants, with negative long-term effects on public health and soil fertility.[527]

The canal system has been developed to bring ever larger areas under cultivation. As part of the Indus Basin Project, a result of the Indus Waters Treaty agreed between India and Pakistan in 1960, three large reservoirs (Mangla, Tarbela, Chashma) and several smaller dams and barrages stretching over 44 canal systems were constructed.[528] The network of canals, totalling over 56,000 km in length, was improved by link canals (eight since 1960). The dramatic expansion of the canal network – made possible through external funding determined in the Indus Basin Fund Agreement (1960) – has enabled farmers in Pakistan to utilize the Indus River's resources in a much more effective way.

The rising production, especially in the wake of the so-called Green Revolution, has exhibited the need to adjust production techniques to available supplies of water.[529] Pakistan's agricultural **water productivity** (*more crop per drop*) has received criticism for being comparatively low, citing examples of other major river basins in arid zones in India and the United States.[530] Ahmed *et al.*, researchers of the International Water Management Institute (IWMI), have presented different scenarios for the development of Pakistan's agriculture against projected demands of basic

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[527] Water resources used for irrigation are also used for human consumption by around 40 million people in Pakistan. The contamination of water resources has only in recent years received heightened attention, especially because of arsenic-related deaths; cf. Jeroen Ensink, M. Aslam, F. Konradsen, P. Jensen & W. van der Hoek: Linkages between irrigation and drinking water in Pakistan; *IWMI Working Paper* no. 46, Lahore: IWMI, 2002; Zaigham Khan: Slow poisoning; *Herald*, August 2000, p. 39. It is estimated that 80 per cent of industrial and household effluents re-enter the water cycle untreated; World Commission on Dams: Pakistan water situational analysis, *op. cit.*, p. 2. Up to 60 per cent of infant mortality are attributed to unsafe drinking water, according to Shams ul Mulk & Khalid Mohtadullah: Water resources management policies in Pakistan; in: Guy LeMoigne, S. Barghouti, G. Feder, L. Garbus & Mei Xie, eds.: *Country experiences with water resource management. Economic, institutional technical and environmental issues*; *World Bank Technical Paper* no. 175; New York: World Bank, 1992, p. 211. The Water Planning Commission estimates that 80 million people lack clean drinking water and that 70% of all diseases are related to unsafe water: 80m Pakistanis have no access to safe drinking water; Dawn, 4 January 2011.
The low political relevance of public health in Pakistan is indicated by its share in the public budget of only 0.1 per cent – among the lowest by international comparison; United Nations Development Programme: Human Development Report 2006; New York: UNDP, 2006, p. 62. Major outbreaks of water-borne diseases have been recorded in the same year in several cities; *ibidem*, p. 63, 151.

[528] For technical details see: WAPDA Annual Report 2009/2010; Lahore: WAPDA, 2010, p. 17. The term *Indus Basin Settlement Plan* is commonly used in Pakistan; cf. Aloys A. Michel: The Indus Rivers. A study of the effects of Partition; New Haven/London: Yale U.P., 1967, p. 268. See also the chapter on the Indus Waters Treaty later in this study.

[529] Mubarik Ali & D. Byerlee: Productivity growth and resource degradation in Pakistan's Punjab. A decomposition analysis; *World Bank Policy Research Working Paper* no. 2480; New York: WB, 2000, p. 11, 20.

[530] World Bank: Assistance strategy, *op. cit.*, p. 30. Crop yields in wheat farming are 3.5 times higher in California (Imperial Valley) and almost two times higher in Bhakra (Indian Punjab). See also: World Bank: Pakistan public expenditure management. Vol. 1: Strategic issues and reform agenda; report no. 25664-PK; Washington, D.C.: WB, 2004, p. 14; www.worldbank.org (Oct. 2005). A detailed comparison, however, will have to take into account aspects like the chemical soil composition, water quality (at canal head and tail-end locations), hydrological information available to farmers etc. For a more profound comparison of Indian and Pakistani agricultural systems see Intizar Hussain, R. Sakthivadivel, U. Amarasinghe, Muhammad Mudasser and David Molden: Land and Water Productivity of Wheat in the Western Indo-Gangetic Plains of India and Pakistan: A Comparative Analysis; *Research Report 65*, Colombo: IWMI, 2003, p. -4 – 5.

food grains in 2025.[531] The potential for improvement is significant.[532] Comparing different strategies to reform agricultural production towards greater water productivity, they conclude that under the business-as-usual scenario, all provinces will fall short of needed levels. The so-called Technology, Economics and Private Sector Scenario (TECH) promises surplus production, enabling Pakistan to export food grains. This particularly applies to Punjab province. Interestingly, even under reformed conditions Sindh and NWFP/KPP will not meet the 2025 targets, highlighting the markedly different conditions of water use in the four provinces.

In this context, the large amounts of **unused water** have become a hotly debated issue. Kreutzmann points out that the system has been designed as a perennial irrigation system – not one that depends on seasonal supplies of water.[533] The high seasonal variations in water supply require a more versatile system in order to make the most out of the available water. Water storing is a necessity, and several large and medium reservoirs have been built; yet a lot of water remains unused.

The dimension of water use and potential water waste becomes obvious from comparing water availability figures: The agricultural year 1991/1992 (Kharif to Rabi) witnessed a record 212.4 km³ of water flowing downstream, 65.8 km³ - or roughly one third – of which flowed into the Arabian Sea unused. [534] The year 2001/2002 marked a low point, with water flows measured at only 119.9 km³, out of which 2.4 km³ reached the sea. The amount of unused water ranges from 0.95 to 113.3 km³. Overall water availability in 2003/2004 (a year of roughly average overall water availability) was 170.2 km³, yet at the canal head – the point where river water is fed into the irrigation system – only 127.3 km³ were available. Outflow to the sea was recorded at 24.7 km³ (most of during July/August), leaving an amount of 18.2 km³ unaccounted for, i.e. lost due to evaporation and seepage. The amount of 24.7 km³ that could – at least hypothetically – have been put to use in that crop year would have to be adjusted with environmental requirements which are expected to be around 12.3 km³.[535] This would leave roughly 12 km³ of usable water in that year alone. Its utilization depends on adequate storage. As is the case with existing reservoirs, the capacity to store water is limited and tends to shrink over time due to sedimentation – another factor that marks the limits of water use in the Basin.[536]

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[531] Shehzad Ahmed *et al.*: Projecting food and water, *op. cit.*, p. 629.

[532] The potential of water saving techniques deserves a differentiated look, as an IWMI study finds. In some cases progressive water management has indeed saved water – which in turn, however, has not been returned to the system (the aquifer), but put to use in other ways, thus again raising the demand for water; cf. Mobin-ud-Din Ahmad, H. Turral, I. Masih, M. Giordano and Zubair Masood: Water Saving Technologies: Myths and realities revealed in Pakistan's rice-wheat systems; *Research Report* no. 108; Colombo: IWMI, 2007, p. 20 – 23. The authors stress that such techniques require an appropriate institutional environment to actually reduce the overall water demand.

[533] Kreutzmann: Water towers, *op. cit.*, p. 50.

[534] Calculations based on WAPDA river flow statistics; www.wapda.gov.pk/htmls/water-index.html (April 2008). For canal head water availability see Statistical Yearbook 2009, *op. cit.*, table 1.15. Khan: Analysis of surface water resources, *op. cit.*, p. 16 - 19. According to Khan's detailed analysis, some areas (Attock / Kalabagh) show a much higher loss rate than others. The Indus River, accounting for about half of the basin's surface water resources, has a strong tendency of meandering, according to Ahrens & Zingel: Interdependenzen, *op. cit.*, p. 496.

[535] This figure is commonly cited as a minimum requirement in order to prevent sea water intrusion. The debate over this figure – and how it should be recognized within the water sharing mechanism – forms part of the water dispute between the provinces which will be highlighted in the water sharing section.

[536] Intizar Hussain, F. Marikar & W. Jehangir: Productivity and performance, *op. cit.*, p. 19.

Farm-level studies found that in some cases water productivity can be raised by adjusting crop patterns to water availability. Efforts in this direction require not only refined water management but also greater knowledge of specific factors such as soil conditions and effects of fertilizer use, as Hussain *et al.* point out.[537]

Another factor in inefficient water use is the low water charge. The price of water generally does not reflect its economic importance as a finite, indispensable resource and the cost involved in making available. Appropriate pricing schemes could encourage economic water use and prevent waste, as Hussain *et al.* argue.[538] Khan notes that a major cause of water waste is the long - established practice of unregulated water discharges that do not take into account seasonal and crop-specific water requirements. Another aspect is the *uneven irregular shaped field* that stands in the way of more efficient water use.[539]

Non-consumptive water use: power generation

Hydropower generation is a non-consumptive form of water utilization. Power generation through dams on the Indus River supplies around one third of electricity produced in Pakistan.[540] Hydropower generation is seen as a strategic asset in the country's development, providing energy free of cost; its abundant availability is significant to justify a whole range of studies into its future exploitation. However, much of the total hydropower potential has not been tapped yet.[541] Among the reasons are disputes between the provinces – an issue which relates to the wider dispute over water sharing and river development. The rise in electricity consumption has been met largely through increasing the thermal power production.[542] The social, economic and political relevance of hydropower rises against the spectre of steadily growing demands for electricity from a fast increasing population and hard-pressed

[537] Intizar Hussain *et al.*: Productivity and performance, *op. cit.*, p. 13, noting different productivity depending on crop sequences (higher wheat harvest, if wheat follows rice, rather than cotton).
[538] Maliha Hussain, J.L. Karmacharya, S. Mukherjee: Investment requirements for increasing water availability in South Asia; project on Water Security in South Asia (WASSA); Washington / Honolulu: Carnegie Corp. / Johns Hopkins University / Global Environment and Energy in the 21st Century, 2002, p. 84- 86; www.geo-21.org/publications/Investment.pdf (May 2006).
[539] Fateh Ullah Khan: Water problem, causes and solutions: a view from the North West Frontier Province; in: Pervaiz Iqbal Cheema *et al.* eds.: *Problems and politics of water sharing and management in Pakistan;* Islamabad: IPRI, 2007, p. 129. Much the same is true for land levelling by laser technology, a technique that could make irrigation more effective.
[540] Ministry of Finance: Economic Survey 2009/2010; Islamabad: GoP, 2010, p. 195. The installed power generation has remained roughly stable at 19,650 MW for the past six years (table 13.2; 2009 data).
[541] ICIMOD estimates 20,770 MW, cf. ICIMOD: Implications of the potential impacts of climate change on mountain environments in the HKH; www.icimod.org.sg/focus/water/water_climate.htm (online report, undated; access: May 2001). The actual figure is in dispute. The government of Pakistan puts it at 41,722 MW, not indicating whether all is in fact usable, cf. Ministry of Water and Power: Hydelreport; Islamabad: Government of Pakistan (undated; circa 2003), p. 99; www.ppib.gov.pk/report/HydelReport.pdf (March 2011).
[542] The development of hydropower involves international funding. As a result it is under regular scrutiny by international development organizations as the ADB and the GTZ; cf.: GTZ: Wasserkraft-Projekte in Pakistan. Verlaufsprotokoll eines Round-table-Gesprächs zwischen Unternehmen und pakistanischen Regierungsvertretern, 18 August 2000 (Hydropower projects in Pakistan; protocol of a roundtable discussion with entrepreneurs and the Pakistan Government; in German); Eschborn: GTZ, *Arbeitspapier* no. 3; www.gtz.de/ppi/docs/pakistan.pdf (Oct. 2003).

public finance.[543] The availability of electricity is a driver of many economic activities (agricultural and industrial), public health, communication and education, and effective public administration. In other words, cheap electricity – like water – is equivalent to social and economic progress.[544]

The province-wise hydropower generation highlights another facet of the uneven distribution of the river basin's wealth. About 57 per cent of the total installed capacity (3,767 MW out of 6,595 MW) is located in Khyber Pakhtoonkhwa (KPP/NWFP), 26 per cent in Punjab and the remainder in Azad Jammu and Kashmir (AJK) and the Northern Areas.[545] The untapped potential is estimated to be 32,585 MW; this means that only 16 per cent of the whole estimated hydropower potential of Pakistan has so far been used. Again the greatest untapped potential is in KPP (NWFP): 14,212 MW (44 per cent), followed by 12,295 MW (38 per cent) in the Northern Areas, and 4,102 MW (13 per cent) in Punjab.[546] These upstream locations benefit from the gradient of the higher elevation and the relative proximity of the rivers' sources, together making power generation much more profitable than in the downstream reaches. This form of water use, though non-consumptive, plays an important role in water sharing, too, turning hydropower into a **competitor** against irrigation – in both the downstream provinces and in the very same upstream provinces, too.

The resource as such may be inexpensive, but there are indirect costs attached to using it. The actual **price of this energy source** comes in the form of high installation and operation costs plus social and environmental side-effects.[547] These aspects are not unique to the Indus case. But it is the Indus River that exposes them in a dramatic way, due to the river's hydrological features. This is particularly true for hydropower facilities that are linked to reservoirs, like Mangla and Tarbela. While the operation of hydropower installations as such does not impede other economic uses, the storing of water in the wet season (*Rabi*) reduces the amount of water available downstream, requiring Sindh farmers to adjust their cropping patterns. In the dry season (*Kharif*), when the river flow is low and water is released from the reservoirs, disputes emerge over how much water to be released at which station and at which point of time.

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[543] The country's fossil fuels like oil and gas, by some estimates, are expected to be exhausted by 2017, according to findings of a conference hosted by the Alternative Energy Commission of Pakistan: *Oil and gas reserves to exhaust in 15 years*; *Dawn*, 20 Jan. 2002. Whether this estimate is accurate or not, the rise in electricity consumption by 70 per cent over a ten-year period (1996 to 2005) illustrates the challenge ahead; cf. Ministry of Finance: Economic Survey of Pakistan 2006/2007; Islamabad: Government of Pakistan, 2007, p. 237.

[544] So-called power outages have become an increasingly regular phenomon in Pakistan. While newspapers frequently report on the power supply (or rather, non-supply), official and academic interest has so far been marginal. Pasha notes that many companies affected by production losses due to the non-supply of electricity have turned to their own source of energy: power generators; cf. Aisha GhausPasha: The economic cost of "power outages"; research paper; Institute of Public Policy (no date); www.ippbnu.org/researchpapers-php (Sept. 2014), p. 3. Though the author quantifies the electricity shortage, the reprt is short on references.

[545] Ministry of Water and Power: Hydelreport; Islamabad: Government of Pakistan (circa 2003), p. 17; www.ppib.gov.pk/report/HydelReport.pdf (May 2003/March 2011).

[546] Calculation based Hydelreport, *ibidem*, p. 99; figures are rounded.

[547] Among the ecological effects is the impact on river fish species, especially migratory species whose reproduction patterns are disrupted. Among the social costs is the lack of economic compensation for displaced communities: Tarbela Dam: affected people not compensated; *Dawn*, 26 May 2001. For an assessment of the over-all consequences see World Commission on Dams: Tarbela Dam, Indus River Basin, Pakistan; WCD case studies; Cape Town: WCD, 1999; www.dams.org/docs/studies/pk/pk_finaldraft_intro.pdf (April 2001).

This is where the specific **provincial demands**, based on individual agricultural timetables, tend to collide. In economic terms, the alternating use of the river either to irrigate lands or to produce electricity translates into losses, direct and indirect – in the form of consumer and investor confidence in regular supplies. The **environmental costs** relate to the altered flow regime of the river as a result of damming. Some fish species have been driven to the brink of extinction because their migration and reproduction patterns have been disrupted. **Social costs** come in the form of the resettlement of villages. Uprooted communities which have seen their homes and lands inundated have in many cases not received adequate compensation.[548]

Not surprisingly, the debate over **additional storage** and **power generating capacities**, going on for many years, is highly controversial.[549] The principal need for more hydropower facilities is widely agreed, particularly as alternative energy sources compatible with the country's limited financial resources are not available. The design of new installations and their location, however, are the major points of dispute. Run-of-the-river designs, i.e. power generation without attached reservoirs, would reduce the flow variations, with positive environmental effects, yet without a facility to save water. Dams with attached reservoirs, in turn, promise power generation *cum* vital water supplies for dry season crops. Reservoirs are also a factor in flood control. Due to the geological characteristics of the Indus River, however, the reservoir capacity and the power generating potential of the large dams-cum-reservoirs at Mangla and Tarbela are in decline as much of the silt load of the river accumulates in the reservoirs.

In addition, water shortage often means that reservoirs either can't be filled adequately or have to be tapped ahead of schedule which means that the minimum water level required for power generators is not reached, leaving operators no option but to shut down the power system. Consequence: no electricity generation. It is estimated that Mangla and Tarbela lose around 1.5 and 2.5 per cent of their respective reservoir capacity each year.[550] A remedy for the removal of the constantly rising silt level is not at hand.[551] In response to this development, the height of Mangla Dam has been raised to increase the reservoir capacity.[552] But the benefits of

[548] WCD, *ibidem*. This problem, though fairly common in the case of large dams all over the world, has added to popular resistance against large dams in Pakistan and furthered mistrust in the government.
[549] The debate will be analyzed in detail in the water sharing section, as part of the inter-provincial dispute over water.
[550] Syed Nasir Hussain: Conserving water reservoir capacity – a solution; paper presented at the 2nd South Asia Water Forum, Islamabad, 14 – 16 Dec. 2002; Islamabad: Pakistan Water Partnership, 2002, p. 197.
[551] The adverse consequences also include accelerated turbine wear and degenerating dam stability, as Hussain notes. The dredging that he proposes for smaller dams could, as he suggests, be carried out by farmers using the collected silt to increase soil fertility; for bigger dams flushing the silt is recommended. This method has not been tested yet, but is expected to be financially favourable, as it would preserve the dam's capacity: Hussain: Conserving water reservoir, *op. cit.*, p. 200. The problem as such, however, cannot be eliminated: After flushing, silt will continue accumulating.
[552] WAPDA Annual Report 2009/2010, *op. cit.*, p. 19. This project has been accompanied by public protest over fear of lacking compensation for displaced villagers: Hundreds hold rally against extension of Mangla Dam; *Dawn*, 17 Feb. 2001; Committee formed to develop consensus: Mangla dam extension; *Dawn*, 10 Sept. 2002.

this costly measure are not certain, as critics note, because the available water supplies from the river are below those expected by the projects' proponents.[553]

Water profiles of the provinces

The provinces of Pakistan share a dependence on the resources of the Indus River. Their individual demands for water reflect their distinct social-economic profiles and the way water is used. Water use depends on specific soil and climate conditions which differ sharply from province to province and even within the provinces. Irrigation, the major water consumer in all provinces, accordingly is practiced in different forms, and with different water needs.[554]

Balochistan, though making up 44 per cent of the territory of Pakistan, is the smallest user of water resources from the Indus as most of its land is unsuitable for settlement and agriculture. Located on the periphery of the basin, the main river and its major tributaries do not touch its territory, making Balochistan dependent on a few small rivers and water supplies via Sindh canals.[555] The overall water situation of this mountainous, drought-prone province is considered serious.[556] Groundwater dependency is strong due to meagre rainfall; some aquifers already show symptoms of over-exploitation.[557] To allow for gradual aquifer recharge, delay-action dams that store excess water have been constructed. Irrigation is practiced partly by flooding and partly through canals and tubewells, allowing only one harvest per year, as opposed to two in Sindh and Punjab. Flood irrigation is a traditional technique used in Balochistan's tribal societies. This form of irrigation, used on a small scale, relies on flash floods in mountainous areas. The lack of vegetation means that the floods are forceful, yet brief (one to ten days).[558] The silt enhances soil fertility. The small dams

[553] Qamar-uz-Zaman Chaudhry: Optimal utilization of water resources at Mangla reservoir; in: M.M. Qurashi, ed.: *Water resources in the South: Present scenario and future prospects*; Islamabad: Commission on Science and Technology for Sustainable Development in the South, 2003, p. 55; www.comsats.org/Publlications/Books_SnT_Series.pdf (April 2011).

[554] Kreutzmann stresses the local variations in water supply and demand, necessitating a diversified assessment of water management; Hermann Kreutzmann: Scarcity within opulence: water management in the Karakoram Mountains revisited; *Journal of Mountain Science*, vol. 8, no.4, 2011, p. 526.

[555] Water from smaller rivers provide 69 per cent of irrigation water, water from the Indus System provide around 19 per cent, according to Asif Qayyum Qureshi & Abdul Majeed: Water resources and irrigation in Balochistan; in: Kaiser Bengali, ed.: *The politics of managing water in Pakistan*; Islamabad: SDPI, 2003, p. 57. The mechanism of water supplies from Sindh to Balochistan is part of the water sharing agreement reached in 1991, which will be the central focus of the section on water sharing.

[556] Lack of water regularly forces people in rural areas to migrate: Tribesmen leave their land in search of water; *Dawn*, 6 May 2000; Balochistan districts still under persistent drought; *The News*, 15 May 2002; A scarcity of huge proportions; *The News*, 2 Nov. 2002. It is noteworthy that the term drought is commonly used without much differentiation to describe conditions of water shortage in Balochistan and some parts of Sindh, though there is no universally accepted definition, as Asad Sarwar Qureshi and Mujeeb Akhtar point out; see: Analysis of drought coping strategies in Baluchistan and Sindh provinces of Pakistan; *Working Paper* no. 86; Colombo: IWMI, 2004, p. 7. For these two provinces, the years 1997 to 2001 are defined as a drought period because the recorded rainfall was less than 50 per cent of the average; see p. V and 15.

[557] Muhammad Ramzan Chaudhry: Water management in Baluchistan; proceedings of the roundtable meeting International Programme for Technology and Research in Irrigation and Drainage, hosted by FAO, Lahore, 10 – 11 Nov. 2000; www.fao.org/DOCREP/005/Y3690E/y3690e09.htm (Aug. 2007; no page numbers).

[558] John Morton & Hans van Hoeflaken: Some findings from a survey of flood irrigation schemes in Baluchistan, Pakistan; *Water Resources Journal* (published by FAO), Dec. 1995, p. 97 – 98.

constructed alongside waterways and the attached canals require regular maintenance.

An FAO survey of irrigation systems in Balochistan found that their **effectiveness** is very limited, for several reasons.[559] Poor maintenance, inadequate positioning and technical shortcomings mean that the floods do not reach all of the cultivated land that is to be irrigated (the so-called command area). Behind these deficits is a lack of hydraulic data – valid information that would mirror the causes of poor system performance. Data collection and application, as practiced in other provinces, typically does not involve a major effort. But in order to be effective, such data has to be communicated. Instead, the survey team found, the provincial Irrigation and Power Department, which did make some technical improvements, made no effort at **consultation** or **communication**.[560] Interestingly, some rich landowners did receive such information and put it to good use. This observation hints at a bureaucratic phenomenon noticed also in other areas of water management, particularly corruption, and social divisions that impede water cooperation at the user level.

Like in other provinces, there is a general **lack of drainage** of surface waters. Water quality is impacted by industrial and household effluents discharged into the drains without prior treatment. The practice of using such contaminated water for irrigation is common which points at lacking awareness of the serious public health problems attached to it.[561] In sum, the productivity of water in Balochistan is low due to inefficient irrigation, institutional deficits and social constraints.[562] Another FAO study reveals that particularly in the case of a tribal society like Balochistan, the importance of communication and shared decision-making cannot be underestimated. Such cooperation has to address not only specific group interests but also established property rights. The neglect to do so can result in confrontation that impedes not only water sharing but also cooperation in other areas.[563]

Khyber Pakhtoonkhwa Province (KPP, formerly Northwest Frontier Province, NWFP), the smallest province in territorial terms, joins Punjab province in being in an upstream location in the Indus Basin. KPP ranks third in terms of population and economic output. The agricultural sector, accounting for 44 per cent of employment and 25 per cent of provincial GDP, benefits from comparatively high precipitation which makes the province less dependent on groundwater.[564] A major source of public income are royalties from hydropower generation received from WAPDA.[565] Hydropower is expected to become ever more important due to strongly rising demands for electricity. Most prospective dam sites are located in this province.

The higher elevations of KPP which make up a major portion of the province's territory allow only small-scale, one-crop agriculture which is heavily dependent on irrigation. In spite of the vicinity to large rivers, the rugged terrain makes using these

[559] Morton & van Hoeflaken: Some findings, *ibidem*.
[560] Morton & van Hoeflaken: Some findings, *ibidem*.
[561] Chaudhry: Water management, *ibidem*. For an overview see: Matthias Paukert: Umweltengagement an der Wasserscheide (Environmental commitment at the crossroads; in German); *Südasien*, No. 2, 2008, p. 77.
[562] Asif Qureshi & A. Majeed: Water resources, *op. cit.*, p. 56.
[563] Robert Hecht: Land and water rights and the design of small-scale irrigation projects: the case of Baluchistan; *Water Resources Journal* (by FAO), June 1991, p. 56.
[564] Http://nwfp.gov.pk/nwfpgov/Departments/Irrigation/Objectives.php (official KPP website; 5/2010).
[565] Shafqat Munir: The provinces. Profile of agriculture and industry; *Himal*, vol. 15, no. 7, 2002, p. 43.

resources difficult and requires complex irrigation systems.[566] Watercourse management in this area relies on effective village-level cooperation. Similar to the situation in Balochistan, studies have found that initiatives that take into account local water and land rights and involve the water users directly can improve water management.[567]

Punjab as the biggest economic actor in the federation is the major consumer of water from the Indus Basin. The province's **upstream location**, covering the Indus's main tributaries, puts Punjab water users are in a very favourable position effectively controlling most of the basin's resources. The province's upstream position not only relates to one river but to several arms of the Indus system. KPP/NWFP is the only other upstream neighbour, and its position relates only to the Indus River.

Due to the small size of that province's economy and population, its limited withdrawals of water hardly affect water utilization in Punjab. The network of rivers and canals in Punjab – 14 major barrages, 21 main canal systems totalling 36,000 km in length – represent a network that allows for intensive irrigation on an unparalleled scale.[568] In plain figures, Punjabi fields make up roughly 75 per cent of all irrigated area, delivering between 59 and 78 per cent of the country's main food grain production.[569]

Being the biggest province in terms of population and economic activity, Punjab's water **consumption** is likely to grow more strongly. This demographic aspect will inevitably exacerbate the long-standing dispute between Sindh and Punjab over water distribution. At the same, Punjab has the greatest potential to save water, i.e. to increase its water productivity. Though Punjab commands the greatest agricultural area, its productivity in several crop varieties tends to be lower than that of Sindh.[570] One cause of this difference is the **uneven water distribution** within the province, with tail end farmers often receiving less than their entitled allotments, as an IWMI study revealed.[571]

Sindh, the downstream-most province in the Indus Basin, is in an unfavourable hydro-geographical position as it receives water from only one river, the Indus, which enters Sindh after the *conflux* of the tributaries, in Punjab. The Indus arrives in Sindh at a low flow speed, owing to the mostly flat terrain of this province. The surface water available in this province, plus groundwater supplies, irrigate only 2.37 million hectares, or 12.3 per cent of the total irrigated area and only twice as much as that of Balochistan. Its productive capacity accounts for 33 per cent of the country's rice crop, 24 per cent of total sugarcane production, 22 per cent of cotton and 16 per cent of wheat.[572] However, large parts of Sindh, like Balochistan, are drought-prone, exposing a significant economic vulnerability that results in highly dynamic

[566] Hussain Wali Khan & I. A. Hunzai: Bridging institutional gaps in irrigation management: the post *Ibex horn* innovations in northern Pakistan; in: Hermann Kreutzmann, ed.: *Sharing water. Irrigation and water management in the Hindukush-Karakorum-Himalaya*; Karachi: Oxford UP, 2000, p. 133.
[567] Hussain Khan & Izhar Hunzai: Bridging institutional gaps, *op. cit.*, p. 139.
[568] Javed Majid (Secretary of Irrigation and Power, Government of Punjab): Presentation for the Pakistan Development Forum 2004, hosted by World Bank; www.worldbank.org.pk (June 2008).
[569] Calculations based on: Government of Pakistan: Statistical Yearbook 2009, *op. cit.,* p. 1 - 13.
[570] See per hectare yields of rice, wheat, cotton and sugarcane in Statistical Yearbook, *ibidem*. Yields of maize, barley and *bajra* are higher in Punjab.
[571] Study quoted in World Bank: Water resource assistance strategy, op. *cit.*, p. 31 - 32.
[572] Calculations based on Statistical Yearbook 2009, *ibidem*.

productivity.[573] The surface irrigation water is channelled by three large barrages (Sukkur, Guddu, Kotri) and 16 main canals into a network of around 1,500 smaller canals reaching the farm level.[574] The second most populous province is the country's biggest industrial actor. Karachi alone is estimated to represent around 40 per cent of total national income from the manufacturing sector.[575]

Irrigation in Sindh, in the pre-colonial past, was based on seasonal inundation. The modern network of canals and barrages that had introduced perennial irrigation proved crucial in improving the livelihoods in areas that were prone to famine in dry years.[576] Drainage measures have been implemented since late 1970s in order to restore the system's performance. Through the Left and Right Bank Outfall Drains (LBOD, RBOD, commissioned in 1986 and 1995 respectively), saline water was discharged into the sea.[577] Salinity remains a big problem for this province: an estimated 50 per cent of all irrigated land in this downstream province is affected by salinity – a much greater share than in any other province.[578] This undermines the long-term fertility and productivity of soils.[579] Interestingly, water-logging, a major cause of salinity, has increased in parts of Sindh as a result of over-irrigation, pointing at the need to scientifically review crop requirements and communicate findings to farmers.[580]

One important aspect common to almost all irrigated areas in the provinces of Pakistan is the **highly dynamic water needs**. As studies have shown, even brief delays in water supply or a shortage thereof can cause significant losses in production. IWMI research confirmed that a *mismatch of water delivery schedules with optimum timing of irrigation is a major constraint to increasing the irrigation efficiency of wheat. (…) Irrigation scheduling for optimizing production with limited supplies is a bigger challenge than adequate water supplies.*[581]

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[573] Cf. Asad Qureshi and Mujeeb Akhtar: Drought coping strategies, *op. cit*., p. 15 – 18. Water shortage has been identified as a cause of migration of farmers in lower Sindh; cf. Aijaz Nizamani, Fauzia Rauf & Abdul Hakeem Khoso: Case study: Pakistan. Population and water resources; IUCN Pakistan, no date; www.aaas.org/international /ehn/waterpop/paki.htm (Feb. 2010).

[574] Intizar Hussain, F. Marikar & W. Jehangir: Productivity and performance of irrigated wheat farms across canal commands in the lower Indus Basin; Research Report no. 44; Lahore: IWMI, 2000, p. 4.

[575] Shafqat Munir: The provinces, *op. cit.*, p. 42. Mainstays are machinery, including cars, cement, steel, chemicals.

[576] Altaf Abro & Nafisa Shah: Water and conflict: the case of upper Sindh; in: Kaiser Bengali, ed.: *The politics of managing water, op. cit.*, p. 150.

[577] A total of 1,950 km of drainage canals have been constructed in this period, according to Sikander Brohi: Drainage crisis in Sindh: Environmental impact of LBOD and RBOD projects; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi: Oxford UP, 2003, p. 90.

[578] Kaiser Bengali: Water management under constraints: The need for a paradigm shift; in: Michael Kugelmann & Robert Hathaway, eds.: *Running on empty. Pakistan's water crisis*; Washington, D.C.: Woodrow Wilson International Center for Scholars, 2009, p. 55; www.wilsoncenter.org (feb. 2011). By comparison, only around 5 per cent of Punjab's lands are affected by salinity.

[579] Salinity levels vary greatly, as Kijne and Kuper note, stressing the link between controlled groundwater management and soil conditions: Jacob W. Kijne & Marcel Kuper: Salinity and sodicity in Pakistan's Punjab: a threat to sustainability of irrigated agriculture; *Water Resources Development*, vol. 11, no. 1, 1995, p. 84.

[580] Ahmad Fraz Khan: Over-irrigation ruining Sindh: waterlogging; *Dawn*, 26 May 2001. The report notes that water-logging in Punjab has gone down from 8.9 per cent of all irrigated areas to 6.2 (1959/1999), while in Sindh it increased from 12.4 per cent to 38.5 per cent in the same period.

[581] Intizar Hussain, R. Sakthivadivel, Upali Amarasinghe, Muhammad Mudasser and David Molden: Land and Water Productivity of Wheat in the Western Indo-Gangetic Plains of India and Pakistan: A Comparative Analysis; *Research Report* no. 65; Colombo: IWMI, 2003, p. 4.

Conclusion

This chapter has brought about a number of important findings. First, it has shown that the **patterns of water use** vary significantly. These variations reflect both the dynamics of the water and climate cycles in the Indus Basin and the distinct social-economic profiles of the provinces. Over-all water use in the provinces is determined as much by seasonal water supplies from the river as by specific groundwater conditions, irrigation techniques and local flow regimes.

Second, these variations raise the question whether various sources of water should be **treated separately** when it comes to sharing water on a national scale. Given the divergence of water availability from different sources, it seems that any water sharing arrangement should take into account all sources available in any one province, not just surface water extracted from the rivers and canals.

Third, specific water utilization patterns of each province translate into **distinctive water demands**. Different soil conditions as well as social, cultural and political conditions determine stakeholder positions. The perception of the actual water availability on the ground is not based on measurable factors alone. It is susceptible to assessments from other water users, state authorities and political actors. Though water needs are quantifiable and hence can be assessed on mathematical parameters, perceived injustice, or inequality, in water sharing – a claim regularly voiced in the dispute between the provinces – escapes one-dimensional methods and calls for a **qualitative response**. Whether and how these aspects should be addressed in a water sharing arrangement will have to be examined.

This chapter has shown the **facets of discrepancy between the provinces** of Pakistan that go beyond the upstream-downstream context. Punjab is not only the most populous province, it also commands the most water resources. Punjab's upstream location plus its territorial composition explain why Punjab's economy has grown much more than that of any other province, inevitably raising its over-all political importance. The economies of Sindh and Balochistan, on the other side, are based on a much smaller resource base. The situation of NWFP/KPP, the other upstream province, is marked by a great hydropower potential accompanied by modest agricultural prospects. It is this combination of geographical and political features which translates into a marked **asymmetry** between the provinces favouring Punjab.

Methodologically, the findings of this chapter and the previous one reward the continued application of an analytic narrative approach. The particular characteristics of both the Indus River system and the nation of Pakistan have to be taken into account in an appropriate manner in order to explain when and why cooperation happens. The paramount roles of the Indus River Basin in ecological, social and economic terms as well as its political relevance have exhibited the methodical limits of generalization. Unlike many other countries, water management, water politics and water research in Pakistan are to a great degree **basin-oriented**.

The next chapter will examine the institutional dimension of water management in order to show how the specific challenges of the Indus River have been approached.

III.4 Managing the Indus: institutional dimensions

The systematic development of the irrigation system of the Indus Basin began in the colonial era. As Gilmartin notes, *no technical innovation had more potentially transformative effects in colonial India than the extension of irrigation*.[582] This process which began in the Punjab, in the Ravi – Beas – Sutlej region of the basin, has since aimed to make more water available through greater efficiency and better distribution.[583] The institutional measures designed to support that effort mirror both the hydrological and economic requirements of the expanding irrigation system and also the changing political conditions and opportunities.

This chapter explores the link between politics and water management in the post-colonial state:

- Which institutions for the management of water have been established,
- how do they operate,
- which needs do these institutions address, and
- what effect do these institutions have regarding the problem of asymmetry?

Institutional development in the irrigation sector

The construction of the Upper Bari Doab Canal by the colonial administration (1859) marks the beginning of systematic canal irrigation on a large scale. This development, almost from the beginning, was accompanied by institutional arrangements to regulate water use. The first law of water management was the **Canal and Drainage Act** (VIII, 1873, CDA) which identified water management tasks like water pricing and canal operation and maintenance.[584] It delegated the authority to maintain and operate canals to the provincial government. This act has served as a legal and institutional basis for future water regulation in the Indus Basin which initially meant the province of the Punjab in its pre-independence territorial shape. In a sense, it also preceded the Government of India Act (1919) which would establish the **provincial autonomy** over water management throughout the colony (Art. 130 – 135).[585] Amended several times over the following decades, it continues to be valid

[582] David Gilmartin: Scientific empire and imperial science: Colonialism and irrigation technology in the Indus Basin; *Journal of Asian Studies*, vol. 53, no. 4, 1994, p. 1129.

[583] Wolfgang-Peter Zingel: Die Problematik regionaler Entwicklungsunterschiede in Entwicklungsländern: eine theoretische und empirische Analyse, dargestellt am Beispiel Pakistans unter Verwendung der Hauptkomponentenmethode (Problems of diverse regional development; in German); Wiesbaden: Steiner, 1979, p. 429 – 436; Klaus Dettmann: Agrarkolonisation im Rahmen von Bewässerungsprojekten am Beispiel des Fünfstromlandes (agrarian colonization through irrigation in the Punjab; in German); in: Hans-Jürgen Nitz, ed.: *Landerschließung und Kulturlandschaftswandel an den Siedlungsgrenzen der Erde*; Göttingen: Goltze, 1976, p. 182 – 183.

[584] The Canal and Drainage Act is colloquially referred to as the Punjab Irrigation Act. Document texts of all colonial water laws are reproduced in: Mehdi Khan Chauhan, ed.: Complete manual of canal and drainage laws in Pakistan; Lahore: Khyber Law Publishers, 2002; available online from the Punjab Laws Database: www.punjablaws.gov.pk (May 2011).

[585] Document text: Gazette of India Extraordinary: The Government of India Act 1935; Simla, 9 Sept. 1935.

reflecting its relevance in terms of river management as well as in institutional terms.[586]

On the surface, the element of decentralization is important as it allows a degree of stakeholder participation, even down to the farm level (Art. 4a). In reality, however, the provincial government retained control, without much involvement in daily canal operations by the farmers or water users.[587] The Act's comprehensive regulations detail the provincial governments' authority and responsibility to operate the canals and distribute water. In the post-independence era, the newly established (West Pakistan) **Irrigation Department** (1951) took over this task.[588] Provisions toward the economic use of water include water charges and penalties for waste (Part V). A dispute over water allocations is to be addressed to sub-division canal officer who might settle disputes out of his own initiative, too (Art. 68). The CDA's status as a *general law* means that its validity extends to all canals in Punjab except those specified in the Minor Canals Act (Punjab Act III, 1905).[589]

The CDA's institutional and political status has gained further from similar laws like the Sindh Irrigation Act, passed six years after the CDA (VII, 1879), modelled on the CDA in terms of scope and responsibility.[590] It also includes a dispute settlement mechanism roughly identical to the CDA's. Balochistan has enacted a similar law for its own legal authority, again based on the CDA.[591] Like its predecessors, it asserts the provincial government's authority over all water sources, surface and underground. For the Khyber Province (KPP / NWFP) the CDA has been adopted in an amended form to cover the respective provincial canals.[592]

Mustafa identifies the Canal and Drainage Act as a piece of colonial legislation designed not only to increase irrigation output in the face of expected famines but also to provide additional state revenue and – most importantly – to serve as a **political instrument** designed for *the creation and cultivation of new layers of local elites, through the settlement policies that followed the development of the irrigation system*.[593] In what was a highly hierarchical system of power and patronage, the position of each farm within the canal area was essential when it came to water

[586] Several amendments were made between 1952 and 2006; cf. Chauhan: Manual, *op. cit*. The scope of the CDA, through a series of specific amendments by provinces and states adjacent to Punjab, has been extended. Besides the provinces of Pakistan, it is also valid in parts of India, e.g. Uttar Pradesh; cf. Government of Uttar Pradesh, Irrigation Dept., http://upgov.up.nic.in/irrigation/irrig_manual.html (May 2004).

[587] Waqar Jehangir & V. Horinkova: Institutional constraints to conjunctive water management in the Rechna Doab; *IWMI Working Paper* no. 50, 2002, p. 9. The lack of farmer organization has been documented on a wider scale by the Colorado State University in collaboration with WAPDA and USAID; cf.: Max K. Lowdermilk, David M. Freeman & Alan C. Early: Farm irrigation constraints and farmer's responses: comprehensive field survey in Pakistan; Lahore: WAPDA, 1979, p. 176 – 186.

[588] Before 1951 the administrative division in charge of irrigation was the Irrigation Branch of the Punjab Public Works Dept.; cf. Aloys Arthur Michel: The Indus waters. A study of the effects of partition; New Haven/London: Yale U.P., 1967, p. 247, 343.

[589] See preamble.

[590] Document text in Chauhan: Manual, *op. cit*.

[591] Balochistan Canal and Drainage Ordinance (10 Dec. 1980). Document text in Chauhan, *ibidem*.

[592] Several amendments between 1969 and 1978 have extended the reach of the CDA to the Bannu District, with only minor procedural alterations, especially regarding the rank of the respective canal official in charge of settling disputes; document texts published on the official KPP Government website: www.khyberpakhtunkhwa.gov.pk (May 2011).

[593] Daanish Mustafa: Colonial law, contemporary water issues in Pakistan; *Political Geography*, vol. 20, 2001, p. 821.

supplies. As a result, **water distribution** was not so much – or at least not exclusively – determined by legal regulations but by political assessments.[594] The role of the Irrigation Departments and its officials, according to Mustafa, has been and remains ambivalent: *At present, as in colonial times, the administration of the system is an ongoing balancing act between the imperatives of acknowledging the privilege of the indigenous elite, which were and continue to be important allies of the colonial and post colonial state, and the engineering concerns with irrigation efficiency*.[595]

From an institutional perspective, the Canal and Drainage Act's resilience has been tested throughout Pakistan's long and at times tumultuous history. The Irrigation Department, based on the CDA, remained in place until late 1955. The One-Unit rule, to last until 1970, during which the provinces as such were held in abeyance, brought a new central body, the West Pakistan Irrigation and Power Department (IPD, 1962) with responsibilities roughly equivalent to that of the former Irrigation Department.[596] The Act has remained valid throughout this period, with only minor changes, and in the coming authoritarian and democratic periods.

The Canal and Drainage Act, defining irrigation water as a **public good**, has led to an all-encompassing administrative system that has in recent years received criticism because of institutional deficits: Instead of allowing market mechanisms to determine canal water use, public water management has expanded to a degree of over-regulation which has been blamed for inefficiency, inequitable allocation and unreliable supplies.[597] Masood and his World Bank team of researchers point at the economic losses incurred due under-pricing of irrigation water and also at the adverse consequences of stagnating institutional development, in particular low productivity of water and the lack of economic incentives.[598]

In spite of these troublesome aspects of the CDA, the Act has survived largely unscathed over a long and dynamic period of time. This leads to the conclusion that – from both a water management and a political point of view – the challenges in the water sector seemed to have been unchanged, or at least the government's perception of them. Another conclusion could be that the Act served post-independence water-related interests well.

In fact, the irrigation authorities that were established on the basis of the CDA, as Mustafa finds out, have over time changed by name and range of tasks, *but their basic structure, functions and mandate remain the same*.[599]

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[594] *Ibidem*, p. 823 – 824. These assessments classified people and tribes according to their political and economic usefulness for the British rulers, as shown by their loyalty and martial talents. This system formed part of a queer *science of the empire*; cf. Gilmartin, *op. cit*., p. 1130 – 1132.
[595] Mustafa: Colonial law, *op. cit*., p. 824.
[596] Michel: The Indus waters, *op. cit*., p. 247, 343. The Soil Reclamation Board, established for the Punjab in 1952 and extended to all of West Pakistan in 1957, was formally a part of the Irrigation Dept., but gained increasing importance as it assumed control of groundwater management; *ibidem*, p. 344.
[597] Masood Ahmad, R. Hunt, S. Bell, J. Hentschel *et al.*: Pakistan irrigation and drainage: issues and options; World Bank Report no. 11884-PAK, Washington, D.C.: WB, 1994, p. 2, 9 – 10.
[598] *Ibidem*, p. 10.
[599] Mustafa: Colonial law, *op. cit*., p. 824.

Given the dramatic expansion of the Indus irrigation system after 1947, it will have to be seen

- whether and how the changing irrigation system created new challenges to water managers,
- how such changes have been met with institutional responses, and
- how effective these responses were, i.e. how did these institutions perform.

Irrigation and power: centralism *versus* provincial prerogative

The move to unite the original provinces and states into a single unit, West Pakistan, was motivated by the desire to prevent regionalist movements from becoming a threat to the unity of the newly independent nation, as Michel points out.[600] NWFP, Balochistan and the tribal areas (FATA, Northern Areas) were by and large left out due their highly specific, community-based systems of water management which were not part of the Indus Basin development yet, as Wescoat *et al.* note.[601]

A new institution to oversee and steer this process in the water sector was established: The **Water and Power Development Authority** (WAPDA), founded in 1958, would mark a centralized approach to water management in Pakistan.[602] Originally named the West Pakistan Water and Power Authority, it represented the most significant departure from the provincial prerogative in water management as established by the Canal and Drainage Act. Being directly answerable to the federal government, WAPDA is in charge of planning and executing *schemes for a province or any part thereof* in the following areas:

- irrigation, water supply and drainage,
- the generation, transmission and distribution of power,
- flood control,
- the prevention of water-logging and reclamation of waterlogged and salted lands and
- inland navigation.

This wide range of authorities (Art. 8) makes WAPDA the **predominant institution** in the water sector. According to the WAPDA Act, the Authority has control over all water sources and an almost unlimited authority to initiate and implement water development schemes. Following the conclusion of the Indus Waters Treaty in 1960, WAPDA has since overseen the expansion of the colonial irrigation system to a network of unseen dimensions, with Punjab at the centre of development. Being the sole executing agency in the water and power sectors and thus in charge of implementing the projects envisaged in the IWT and the accompanying Indus Basin Development Fund Agreement, WAPDA's role has inevitably been strengthened.

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[600] This need was felt on both sides of the new border, in Pakistan as well as in India; cf. Michel: Indus Rivers, *op. cit.*, p. 345.

[601] James Wescoat, S. Halvorson & D. Mustafa: Water management in the Indus Basin of Pakistan: a half-century perspective; *Water Resources Development*, vol. 16, no. 3, 2000, p. 394.

[602] WAPDA was established through the Water and Power Development Authority Act (XXXI, 1958). The Act was published in the Gazette of West Pakistan, 24 April 1958. I am grateful to Chaudhry Mazhar Ali, advisor to the Irrigation and Power Dept. of the Punjab, for providing me a copy of the Act. Cf. Hermann Kreutzmann: Wasser aus Hochasien (Water from the Himalaya-Hindu Kush-Karakoram); in German); *Geographische Rundschau*, vol. 50, no. 7 – 8, 1998, p. 407 – 409.

WAPDA, with a workforce of over 130,000 employed in its Water and Power wings making it the country's biggest employer after the military, WAPDA operates the water reservoirs and power plants and maintains the irrigation network.[603] It is responsible for water releases and power supply. Led mostly by active and retired officers, WAPDA to date represents the military's hold on power, the nation's *hydraulic mission*, an attempt to overcome inter-provincial disputes by centralized decision-making, and a determination to raise the country's stature through economic development. Headquartered in Lahore, near the governor's mansion, WAPDA has also become another symbol of Punjab's political and economic dominance.

Following the end of the One Unit system in 1971, the governments of the reinstituted provinces regained their authority over water management. In a step that marked the beginning of a gradual decentralization of water management, the provincial governments obtained some of the responsibilities they had before the One Unit came into being. The newly created provincial **Irrigation and Power departments** (IPD) – one per province – assumed responsibility of irrigation services, including operating and maintaining the canal network, and intra-provincial water allocation.[604] Later their authority was extended to groundwater; in the Punjab this was realized by way of integrating the Punjab Soil Reclamation Board into the IPD (1973).[605] Groundwater management, however, lacked precise regulations (for licensing and registration etc.), as Jehangir and Horinkova point out, and did not cover the whole range of groundwater pumps, limiting the effectiveness of the Soil Reclamation Act which regulated groundwater utilization.[606]

The expansion of the irrigation system multiplied existing problems like water-logging, the silting of barrages and dams and water allocation.[607] **Systematic drainage** was introduced in 1963 – under the aegis of WAPDA – with the Salinity Control and Reclamation Project (SCARP).[608] Under SCARP, executed in three phases between 1960 and 1999 according to the Soil Reclamation Act, nearly 20,000 deep tubewells were installed. Draining the used water in a way that will not affect soil fertility or fresh water inflows is vital to preserve the system's productivity. The problem of water-logging and insufficient drainage is found throughout the Indus Basin, yet with marked differences according to the type of irrigation in operation and the gradient of

[603] WAPDA Annual Report 2002 – 2003, p. 11. Details of the Treaty and the settlement plan will be discussed in the water sharing section.
[604] Power generation, in spite of the name, would by and large remain within the authority of WAPDA.
[605] The Board was exclusively charged with groundwater management, as envisaged in the Punjab Soil Reclamation Act (XXI, 1952). Cf. Jehangir & Horinkova: Institutional constraints, *op. cit.*, p. 9. Document text: Chauhan: Manual, *op. cit.*
[606] *Ibidem*, p. 10.
[607] For an overview and assessment of drainage measures cf. Sam H. Johnson, III: Large-scale irrigation and drainage schemes in Pakistan; in: Gerald T. O'Mara, ed.: *Efficiency in irrigation. The conjunctive use of surface and groundwater resources. A World Bank symposium*; Washington, D.C.: WB, 1988, p. 69 – 72. For an overview of SCARP cf. Shahid Amjad Chaudhry: Pakistan: Indus Basin water strategy – past, present and future; *Lahore Journal of Economics*, vol. 15, Sept. 2010, p. 190. Cf. Fred Scholz: Bewässerung in Pakistan (Irrigation in Pakistan; in German); *Erdkunde*, no. 38, 1984, p. 221. Sophisticated monitoring enables researchers to pinpoint waterlogged and saline spots, thanks to research done at IWMI; cf. Salman Asif & Mubeen-ul-Din Ahmad: Using state-of-the-art RS and GIS for monitoring waterlogging and salinity; Proceedings of the Roundtable Meeting of the *International Programme for Technology and Research in Irrigation and Drainage*, Lahore, 10 – 11 November 2000; www.fao.org/DOCREP/005/Y3690E/y3690e0a.htm (Aug. 2007). For a geographical overview of SCARP see: Government of Pakistan: Atlas of Pakistan; Rawalpindi: Survey of Pakistan, 1986, p. 85.
[608] M. Akhbar Bhatti & J. Kijne: Irrigation allocation problems at tertiary level in Pakistan; *Water Resources Journal* (FAO), June 1991, p. 49

the terrain. According to Azad, **Sindh**'s lands are particularly affected as nearly 50 per cent of all irrigated fields lack drainage and are therefore particularly prone to water-logging which in turn translates into falling productivity.[609] Azad notes that this problem tends to be underestimated as one can see from inadequate budget allocations which are commonly based on *arbitrary* estimates rather than scientific assessments.[610]

But again this aspect of water management is more complex, as McCready points out.[611] Drainage, just like water allocation, has a marked **provincial dimension**. Drainage in Sindh, identified as a challenge as early as 1932, at the time of the construction of the Sukkur Barrage, faced particular obstacles due to the low water table and the disposal of flood water in summer. After a series of studies, the Left Bank Outfall Drain (LBOD) was started in 1974, then the largest project, to improve irrigation in the eastern part of Sindh, downstream of Sukkur.[612] The LBOD is generally considered a costly, yet successful project that enabled farmers to reclaim vast tracts of already abandoned land.

In a move that signalled greater provincial authority, water management was extended to the farm level in the late 1970s and 1980s. Launched in the Punjab in 1976, the **On-Farm Water Management** (OFWM) Directorate, under the supervision of the provincial Agriculture Department, initiated farm-level water works like land levelling and watercourse lining in cooperation with farmers.[613] The On-Farm Water Management concept is credited with raising the productivity of water and contributing to greater equality in water allocation.[614] This step, in principle, was important for the over-all performance of the irrigation system because, as World Bank researchers have found, *the largest percentage losses in the irrigation system occur below the level of canals on watercourses and fields.*[615] From an engineering perspective, the hardening and lining of canals in order to increase flow velocity have succeeded in raising the water availability at the farm gate while decreasing salinity

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[609] A. Azad: Sindh water resources management – issues and options; *FAO Investment Centre Occasional Paper* series, no. 15, 2003; Rome: FAO, 2003, p. 11; http://ftp.fao.org/docrep/fao/008/af1050/af1050e00.pdf (March 2011). Cf. Kaiser Bengali: Water management under constraints: the need for a paradigm shift; in: Michael Kugelman & R. Hathaway, eds.: *Running on empty. Pakistan's water crisis*; Washington, D.C.: Woodrow Wilson International Center for Scholars, 2009, p. 55; www.wilsoncenter.org (March 2011).

[610] *Ibidem*, p. 13. Cf. also Khalid Hussain: Poverty alleviation through protection of water resources – integrated approaches. A case study of the IMT process in the IBIS; paper presented at the international conference *Water for Life*, Coimbatore, India, 19 – 21 Sept. 2001), p. 6; www.kkstiftung.de/Entwicklungszusammenarbeit/dokucontent.htm (April 2003).

[611] W. McCready: Left bank outfall drain in Pakistan; *Water Resources Journal* (FAO), March 1988, p. 68 – 70.

[612] *Ibidem*, p. 69; Asian Development Bank: Project completion report on the Left Bank Outfall Drain project (Stage I); Manila: ADB, 2000; www.adb.org/Documents/PCRs/PAK/pcr_pak17055.pdf (August 2002).

[613] The On-Farm Water Management and Water Users' Associations Ordinance (V, 1981) defines the scope of OFWM and the role of WUA; document text: Chauhan: Manual, *op. cit.*, p. 504 ff. Cf. Jehangir & Horinkova: Institutional constraints, *op. cit.*, p. 15; Henning Fahlbusch, B. Schultz & C. D. Thatte: The Indus Basin – history of irrigation, drainage and flood management; New Delhi: ICID, 2004, p. 318. The cost of water works were shared between farmers and the Directorate. The other provinces have enacted similar ordinances; cf. Ministry of Food, Agriculture and Cooperatives: Co-operatives and Water Users' Associations; Islamabad: GoP, 1987, p. 5 – 10.

[614] *Ibidem*, p. 82 – 85, 94.

[615] Masood Ahmad & G. Kutcher: Irrigation planning with environmental considerations. A study of Pakistan's Indus Basin; *World Bank Technical Paper* no. 166; Washington, D.C.: WB, 1992, p. 84.

levels and water losses through seepage.[616] From a rational choice perspective, the reason of effective maintenance of water works and better allocation of water to tail-enders is the active involvement of the stakeholders (farmers).[617]

In a further step, again under the auspices of the Irrigation and Power Department (IPD) of the Punjab, farmers were encouraged to form **Water User Associations** (WUA) to jointly operate farm level water works. This move, expected to lead to a shift of responsibilities from the IPD to the farmers, failed because of institutional obstacles built in the respective ordinance. In effect, the government's determination to preserve the control over irrigation works down to the farm level blocked WUAs from taking over legal responsibility of canal operation and water management.[618] The Asian Development Bank (ADB), a major supporting agency in Pakistan's water sector, concluded that *there is limited scope for broadening the activities of WUAs*.[619] One reason, according to ADB, is the provincial government's focus on infrastructure, rather than on water supplies. Another reason is the status-orientation of the personnel. Performance-oriented incentives – positive and negative – are not employed, furthering a tendency to ignore farmers' concerns.[620]

The National Drainage Programme (NDP), initiated in 1997, was designed as a more comprehensive approach to drainage than the Left Bank Outfall Drain. Based on World Bank recommendations, the NDP was formalized by **Provincial Irrigation and Drainage Authority** Acts that would replace the Irrigation and Power Departments, in an effort to further decentralize water management and enhance private sector participation in management and financing.[621] The PIDAs' purpose is water allocation at the canal level, to operate tubewells, to execute drainage and to formulate water management policies.[622] Area Water Boards (AWB), canal level organizations initiated and overseen by PIDA, link the Authority with Farmer Organizations (FO), groups of farmers that are responsible for the distribution of water allocated to them by the PIDA. In theory, AWB and FO would be linked through agreements on the services to be provided by PIDA, ensuring a degree on transparency and allowing for active cooperation between AWB officials and farmers.

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[616] Asian Development Bank: Second On-Farm Water Management Project. Project performance audit report; Manila: ADB, March 2000, p. 11. The report cites the motivation of the farmers to maintain their watercourses as a major factor in OFWM's success.

[617] *Ibidem*. This assessment applies to the second OFWM stage. The World Bank finds that *privatization of SCARPs in Punjab by replacing government owned and operated large tube wells with community owned and operated small capacity shallow tube wells was perhaps the most successful and path breaking investment supported by the Bank;* cf. World Bank: Pakistan country water resources assistance strategy. Water economy – running dry; report no. 34081-PK; Washington, D.C.: WB, 2005, p. 99.

[618] World Bank: Punjab private sector groundwater development project. Staff appraisal report, no. 15207-PAK; Washington, D.C.: WB, 1996, paragraph 30 (no page numbers).

[619] ADB: Second OFWM, *op. cit.*, p. 11.

[620] *Ibidem*. Cf. Waheed Chaudhry: Water Users' Associations in Pakistan: institutional, organizational and participatory aspects; PhD dissertation, Institute of Rural Development, University of Göttingen, 1997; http://webdoc.sub.gwdg.de/diss/1997/chaudh/thesis.pdf (July 2011), p. 90 – 94. Chaudhry traces this orientation back to the colonial administration.

[621] Waltina Scheumann & Yameen Memon: Reforming governance systems for drainage in Pakistan. Toward an interdisciplinary and integrated approach to agricultural drainage in Pakistan; *Agriculture and Rural Development Working Paper* no. 11, 2004 (World Bank), p. 48 – 49. Cf. International Bank for Reconstruction and Development & International Development Association: Management report and recommendation in response to the inspection panel investigation report: Pakistan National Drainage Program Project; Washington, D.C.: IBRD/IDA (World Bank), 2006, p. 13.

[622] Document texts of all four Acts: Chauhan: Manual, *op. cit.*, p. 567 ff.

The implementation of the programme, however, faced a number of obstacles, as a World Bank review found: The existing Irrigation and Power Departments (IPD) proved unwilling to hand over *control over provincial water resources*, as stated in the PIDA Act (Art. 8 of Punjab's PIDA Act).[623] A look at today's provincial water management in fact finds PIDA and IPD existing side by side – a symptom of incomplete reform, as even the government partly admits.[624] Jehangir and Horinkova observe that legal fragmentation, i.e. the existence of parallel, partly overlapping laws, hinders the implementation of the reform as much as one-sided regulations favouring the provincial authority and the AWB, at the expense of the farmers which are, in a sense, answerable to the AWB (and thus the government), but in a position of uncertainty regarding the water services they are entitled to.[625] The Farmer Organizations are limited to landowners, adding an economic hurdle to participation that effectively excludes tenants.[626]

Behind this deficient institutional change is the vague wording of the PIDA Act which does not mention the existing IPDs which are the starting point of the reform, nor any procedure of transferring responsibilities. The reference to the Canal and Drainage Act (Art. 5) is noteworthy in this context, as the CDA, valid since 1873, only asserts the provincial government's prerogative.[627] Understandably, at least from an institutional and rational choice perspective, the expected loss of influence of IPDs was not welcomed by IPD staff, nor by the provincial governments which would face smaller budgets as a result of the reform. Correspondingly, at the canal level, the farmers identified a lack of qualified information and professional interest on the part of the officials as a major hindrance.[628] Recently, Sindh and Punjab have issued regulations detailing the implementation of the programme. The original PIDA Act of Sindh, a fairly brief law lacking – like the other PIDA Acts – provisions on the implementation of PIDAs, was revoked in 2002 and replaced by the much more comprehensive Sindh Water Management Ordinance (XL, 2002).[629] This Ordinance is significant because of its detailed provisions regarding the authority of PIDA, AWB and FO, a *modus operandi* for the transition period (Art. 96, 97) and even a dispute settlement mechanism (Art. 83). Punjab has upheld its original PIDA Act and added official rules for its implementation, like the Pilot Area Water Board Rules (2005).[630]

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[623] World Bank: Pakistan country water assistance, *op. cit.*, p. 99. Cf. Muhammad Junaid Usman Akhtar: Institutional reforms in irrigation. Review of National Drainage Programme (NDP) in Pakistan; proceedings of the *1st South Asia Water Forum*, Kathmandu, 26 – 28 February 2002; Islamabad: Pakistan Water Partnership (PWP), 2002, p. 111.

[624] Ministry of Water and Power, Office of the Chief Engineering Advisor and Chairman of the Federal Flood Commission: Pakistan water sector strategy. Detailed strategy formulation, vol. 4; Islamabad: GoP, Oct. 2002, p. 20, 166, 182, 231; http://cms.waterinfo.net.pk/?q=wss (July 2011). As of July 2011, the PIDA of Punjab is in the process of *implementing wide ranging reforms under its economic vision and water strategy* in order *to provide adequate equitable and reliable Irrigation supplies to the culturable lands of Punjab, aiming of enhanced agricultural productivity*; Punjab's PIDA has held over 40 meetings, and five AWBs are operating; http://pida.punjab.gov.pk. Within the responsibility of Sindh's PIDA five AWBs are in place; www.sida.org.pk.

[625] Waqar Jehangir & V. Horinkova: Institutional constraints, *op. cit.*, p. 18.

[626] *Ibidem.*

[627] This CDA reference applies to the PIDA Act of the Punjab. All four Acts, differing mainly in structure and sequence of provisions, contain the same article.

[628] For the findings of an IWMI farm survey cf. Ralf Starkloff & Waheed-uz-Zaman: Farmers' participation and empowerment in Pakistan's institutional reform of the irrigation sector: the farmers' view of the process; paper presented at Deutscher Tropentag 1999, Berlin, 14 – 15 Oct. 1999, p. 5; http://ftp.gwdg.de/pub/tropentag/proceedings/1999/referate/IOR2.pdf (April 2010).

[629] Document text: www.sida.org.pk/ordinace/default.asp (7/2011).

[630] Government Notification, Lahore, 24 Feb. 2005; www.pida.punjab.gov.pk (July 2011).

The general institutional weakness in the overall reform process, according to the World Bank, is *poor governance, especially the lack of accountability and transparency in water management organizations.*[631] The result is a lack of trust of farmers in the government and a failure to meet set targets. Taken together, the institutional deficits and the self-interests of the major institutions (i.e. the IPD/PIDA staff), at last the provincial governments themselves, are the most significant reasons why the NDP has not been a greater success. Drainage in some parts has been improved, taking advantage of additional international funding and technological-scientific support. But inefficient operations, delays and poor planning have hampered progress and undermined the NDP's financial viability.[632]

It is not surprising that an **inter-provincial drainage accord**, or national drainage accord, as envisioned by the World Bank, has not materialized yet. Though from the perspective of integrated water resources management (IWRM) that focuses on the river, such an agreement that binds all stakeholders of the basin together would undoubtedly make sense, it is the political concerns that stand in its way.[633] Further decentralization and partial privatization of irrigation services mean a gradual withdrawal of the state, translating into loss of status, loss of budget, loss of influence. Stalling the reform process, in other words, is a matter of survival for the public sector – even at the price of exacerbating the water crisis.

Water allocation and the problem of asymmetry

Water allocation at the canal level is the second major task of water management bodies. Primarily a responsibility of the Provincial Irrigation and Drainage Authority (PIDA, previously a responsibility of the Irrigation and Power Dept.), water is allocated on the principle of *warabandi*, a rotational system of water distribution. This system, in theory, provides a degree of equality in terms of water supplies as each farm is entitled to a fixed amount of water once a week.[634] Two types of *warabandi* allocation exist, *pacca warabandi* – rotation fixed by the canal officer – and *kacha warabandi*, a temporary rotational schedule determined by the farmers in collective decision.[635] *Pacca warabandi* is credited with *reducing the opportunities for conflict among the farmers* because the schedule of water supplies is set by officials.[636] It is, however, another example of **supply management** (as opposed to demand management) that does not take into account the status of the resource as such.

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[631] IBRD/IDA: Management report, *op. cit.,* p. 41.
[632] IBRD/IDA: Management report, *op. cit.*, p. 100 – 103.
[633] The gap between theory and reality is exposed by the many pledges in favour of IWRM, like Hafeez A. Randhawa: Water development for irrigated agriculture in Pakistan: Past trends, returns and future requirements; Proceedings of the international conference *Regional Consultation on Investment in Land and Water,* hosted by FAO; Bangkok, 3 – 5 Oct. 2001, p. 279. When it comes to practical steps, political or status interests dominate water concerns.
[634] Each farm is entitled to withdraw water from the canal once a week for a fixed period – usually up to a full day, according to the farm size, which means that each farmer can withdraw as much water as he needs within his time frame. Cf. Don Jayatissa Bandaragoda: Design and practice of water allocation rules: lessons from *warabandi* in Pakistan's Punjab; *IWMI Research Report* no. 17, 1998, p. 5 – 8. Cf. Fahlbusch *et al*.: The Indus Basin, *op. cit.*, p. 294 – 298, 306.
[635] Bhatti & Kijne: Irrigation allocation, *op. cit.*, p. 50.
[636] *Ibidem*. Gadi remarks that this system, introduced by the colonial administration, has replaced the traditional community-based water allocation system, a move which has caused *a wave of protests* among farmers; cf. Mushtaq Gadi: Re-colonizing the Indus Basin irrigation system; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi: OUP, 2003, p.100.

Its lack of flexibility may lead to insufficient water supplies as well as over-supply because it does not correspond to the needs of the individual farmer, as Bhatti and Kijne point out: *The rigidity implicit in the warabandi system prevents farmers from maximising private and social net benefits from scarce water*.[637] *Kacha warabandi*, in turn, reflects the individual farmer's needs and effectively renders water supplies a collective private-sector responsibility. But both types, as Bandaragoda concludes, are based on a universal, constant flow regime, ignoring the great variations in water availability over time and space.[638]

The political dimension of water allocation is most acutely felt at the canal or farm level as this practice of water allocation tends to benefit large farms at the canal head disproportionately more than small farms at the tail end of the canal.[639] Officially, *inequitable distribution* has been termed a problem, but in practical terms reform has not altered the condition of small farmers.[640] While big landowners at the canal head are in a position to convert their economic dominance into political influence, the economic situation of smaller farmers, especially at a lower canal position, is at risk.[641] At the downstream canal level, the combination of lack of land and lack of water is the major determinant of poverty among farmers.[642] The economic vulnerability of tail-end farmers rises with the uncertainty of getting the necessary supplies.[643]

This asymmetry between canal head and tail end users is a replication of the upstream – downstream discrepancy on the level of the provinces. At both levels, canal and river, the hydrological factor is exacerbated by the political factor. Though in theory, there is be no distinction between upstream and downstream water users, in reality it is always the downstream users that are prone to receive less water, with corresponding economic disadvantages. Studies have found that the widespread inequality in water supplies and the poverty among farmers resulting from it is to be blamed not only on social-economic patterns but on institutional deficits of water

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[637] *Ibidem*.

[638] Bandaragoda: Design and practice, *op. cit.*, p. 23. Fahlbusch *et al.* remind us that the initial objective of the Indus irrigation system was to *spread water over a maximum possible area*: Henning Fahlbusch *et al.*: The Indus Basin, *op. cit.*, p. 284.

[639] Syed Akbar Zaidi: Issues in Pakistan's economy; Karachi: Oxford U.P., 2005, p. 76 – 77 and 27 – 29 (on the early political status of landlords). The allocation of water on the tertiary (farm) level, by no means static, brings specific social structures (tribal affiliations, traditional legal systems) into the equation, as Abro and Shah point out, often resulting in conflict between villages: Altaf Abro & N. Shah: Water and conflict: the case of upper Sindh; in: Kaiser Bengali, ed.: *The politics of managing water*; Islamabad: SDPI, 2003, p. 155 – 156. For a list of similar cases: Daanish Mustafa, M. Akhter & N. Nasrallah: Unterstanding Pakistan's water – security nexus; *Peaceworks* no. 88; Washington, D.C.: United States Institute of Peace, 2013, p. 19. Another threat to the stability of fixed allocation are illegal diversions of water, cf. Azad: Sindh water resources, *op. cit.*, p. 23.

[640] E.g. on the website of Punjab's PIDA (as of May 2001).

[641] Mustafa: Colonial law, *op. cit.*, p. 832.

[642] Zaidi: Issues, *op. cit.*, p. 77.

[643] Even in dry months, canal head farmers can expect that they will get at least some water of whatever is available in the system.

allocation, too.[644] Ironically, small farms are found to achieve higher water productivity than large farms, as Zaidi points out.[645]

Assessing the existing system of water allocation, Meinzen-Dick has discussed the potential of **market mechanisms** to raise water productivity and avert water shortage.[646] Privatization has obvious advantages over water management that is entirely state-run. Privately controlled tubewells have on average demonstrated a higher productivity than publicly owned and operated wells as they allow more precise and more reliable irrigation.[647] As most tubewells are privately owned, a market has evolved, with positive effects not only on water productivity but also on water distribution to previously disadvantaged farmers.[648] The limits to groundwater use are only dictated by the rising of the water table which causes waterlogging and salinity, and the question of ownership. The latter is a case of legal pluralism as water rights in Pakistan are not clearly defined and often overlapping.[649] This means that in conflicted cases ownership is a matter for negotiation.

In sum, the system of groundwater markets is highly informal, according to Meinzen-Dick. Its main advantage is that it provides water in a much more flexible way than the fixed pattern of *warabandi* regulation. In other words, it is demand-oriented, rather than supply-oriented.[650] Dinar *et al.* reiterate the most important criteria from the water users' perspective:

- flexibility in water supplies,
- security of tenure of water rights/entitlements,
- equitable opportunities, and
- predictability of allocation patterns.[651]

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[644] United Nations Development Programme: Human Development Report 2006; New York: UNDP, 2006, p. 188 - 191. The report finds that people living within the basin area are as much affected by poverty as people outside the basin. In other words, while some farmers, particularly those operating at or near the canal head, enjoy economic benefits associated with the availability, for others there is no material benefit at all.

[645] Zaidi: Issues, *op. cit.*, p. 76 – 77.

[646] Ruth S. Meinzen-Dick: Public, private, and shared water: groundwater markets and access in Pakistan; in: Bryan Bruns & R. Meinzen-Dick, eds.: *Negotiating water rights*; Delhi: Vistaar, 2000, p. 248, 252.

[647] *Ibidem*, p. 248.

[648] Ruth S. Meinzen-Dick: Groundwater markets in Pakistan: Participation and productivity; International Food Policy Research Institute *Research Report* no. 105, 1996, p. 9. The transferability, however, is limited by space: water cannot be transported over a great distance because of the heat, insufficient infrastructure and lack of lack of large vehicles; cf. Meinzen-Dick: Public, private water, *op. cit.*, p. 259. The capital required for tubewell installation and operation can be obtained from the Agricultural Development Bank which is open to all landowning farmers; the actual access to credits is limited because of formalities which seem to deter many small farmers from applying, according to Meinzen-Dick: Groundwater markets, *op. cit.*, p. 64.

[649] Meinzen-Dick: Public, private water, *op. cit.*, p. 258 – 259.

[650] Murgai notes that *warabandi* is commonly adjusted informally to requirements at the farm level whenever individual needs require farmers to do so; cf. Rinku Murgai: Skirting the rules: collective management and informal exchange of formal water rights in Pakistan; paper presented at the conference of the *International Society for the Study of Common Property*, Vancouver, 10 – 14 June 1998, ch. IV; http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/2088/murgai.pdf?sequence=1 (July 2011).

[651] Ariel Dinar, M. Rosegrant & R. Meinzen-Dick: Water allocation mechanisms – principles and examples; *World Bank Policy Research Working Paper* no. 1779; Washington, D.C.: WB, 1997, p. 4 – 5.

These expectations can best be met, according to their argument, through market mechanisms. Markets as allocation modes require transparency and information in order to make trading (and saving) water profitable. The role of public water allocation should be guided by *equity, sovereignty and the greater public good*, that is, a general interest in economic development and prosperity.[652] Major investments in system infrastructure have to remain within the government's responsibility. Full public authority over water allocation, however, tends to further inefficient water use, under-pricing of the commodity and misallocation.[653]

Water bureaucracy: institutional interests

Besides the formal criteria relevant to institutional analysis, like transparency and accountability, aspects of culture and mentality deserve attention in order to assess the performance of an institution – and its ability to change. Like politics, administration depends on the professional quality and attitude of the people employed. Molle *et al.* point out that the **bureaucracy**, the *rule of the office*, in the water sector of many agrarian societies has attained a special political role within the context of nation-building.[654] Their *hydraulic mission*, especially in former colonies, has come to be closely linked to the very legitimacy of the state. In today's Pakistan the status of WAPDA, the chief water management body, is expressed by the size of its staff and budget and the scope of authority. Reflecting the ties between the bureaucracy, the military and the government, its management includes numerous retired military officers. Being responsible for the initiation and operation of landmark projects like the large dams at Tarbela and Mangla, WAPDA symbolizes the nation's progress in the energy and water sectors. WAPDA, in spite of institutional changes in recent years, most notably the establishment of a separate water sharing institution (Indus River System Authority, IRSA), has by and large maintained its position and status.

Mustafa, tracing the role of current water institutions back to the colonial era, finds that the heritage of the once prestigious Indian Civil Service – with its **elitist bureaucratic culture** – tends to further a *development gap between the state and the civil society*.[655] As a result, bureaucrats in the water sector act less as civil servants but rather masters of a colonized population. This, according to Mustafa, is particularly obvious in the case of irrigation officials who exhibit a *general allegiance to science of the empire* which leads them to *distance oneself from the natives,*

[652] *Ibidem*, p. 10. Cf. Muhammad Arif Raza: An economic analysis of institutional reforms in irrigation sector in Punjab, Pakistan; PhD dissertation, Faculty of Agricultural Economic and Rural Sociology, University of Faisalabad, 2008, p. 165; www.prr.hec.gov.pk/Thesis/735.pdf (April 2011).
[653] Jean-Daniel Rinaudo, P. Strosser & S. Thoyer: Distributing water or rents? Examples from a public irrigation system in Pakistan; *Canadian Journal of Development Studies*, vol. 21, no. 1, 2000, p. 4.
[654] François Molle, P. Mollinga & P. Wester: Hydraulic bureaucracies and the hydraulic mission: flows of water, flows of power; *Water Alternatives*, vol. 2, no. 3, 2009, p. 336. The authors note that the role of the bureaucracy in water management, including the phenomenon of corruption, requires further study; p. 344.
[655] Daanish Mustafa: Theory versus practice: The bureaucratic ethos of water resources management and administration in Pakistan; *Contemporary South Asia*, vol. 11, no. 1, 2002, p. 42. Mustafa's study is particularly significant as it is based on a series of qualitative interviews with officials of various tiers of the water administration. To my knowledge, this represents the most in-depth study of administrative culture in the water sector of Pakistan to date.

treating them as irrational and prone to causing trouble, and something to be controlled rather than served.[656] In addition, *the engineering bias makes many of the bureaucrats consider social aspects of their job as vexing distractions rather than an integral part of any resource management paradigm*.[657]

As a result, a degree of isolation occurs which not only inhibits the flow of important water-related information, but also undermines the professional management of water. In recent years, the staff of water management bodies, particularly that of WAPDA and the Irrigation Departments, has been criticized for a **neglect** of important tasks and the misallocation of allotted funds.[658] While the water management sector, particularly the operation and maintenance of the irrigation network, is widely considered to be insufficiently funded, available funds have not been used towards improving system performance. Instead, three quarters of the total budget are allocated for salaries and other administrative expenses.[659]

At the provincial level (Irrigation and Power Departments) the great number of personnel – estimated by Chaudhry at over 80,000 – however does not reflect a high degree of professionalization.[660] Manig and Kuhnen note that, except for the higher echelons which require engineering degrees, most employees receive poor salaries and have little competence because of the strictly centralized hierarchical structure of decision-making. Consequently feedback from farmers on the effects of water management is unlikely to reach the decision-making level.[661] According to van der Velde and Tirmizi, this isolation occurs even within the bureaucracy, between civil engineers (administrative staff) and mechanical engineers (on-site work) of the same department (IPD).[662]

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[656] *Ibidem*, p. 53.
[657] *Ibidem*. Cf. Gilmartin: Scientific empire, *op. cit.*, p. 1129.
[658] The failure to engage the local population on important water works is widespread. An Asian Development Bank funded project, the Chashma Right Bank Irrigation Project, has been threatened by a *lack of consultation with affected people*, namely the residents of several villages that were to be flooded in the process, on the part of Irrigation Dept. officials who did not inform the villagers before the works began; cf. Ahsan Wagha: ADB Briefing Paper 7: Chashma Right Bank Irrigation Project; prepared for the International Rivers Network (not associated with ADB); no date given; www.irn.org/programs/mekong/adbbp7.htm (Oct. 2007). A frequently voiced concern is the lack of attention of water management officials to agricultural requirements; cf. Peter Wolff: Bewässerungsprobleme am Indus. Eindrücke und Ergebnisse eines Besuchs in Pakistan (Problems of irrigation in the Indus Basin. Impressions and results from a visit to Pakistan; in German); *Technical Reports in Rural Engineering and Resource Management* no. 41, 1996 (Universität-Gesamthochschule Kassel), p. 9.
[659] World Bank: Pakistan country water resources assistance strategy; report no. 34081-PAK; New York: WB, 2005, p. 58.
[660] Waheed Chaudhry: WUAs, *op. cit.*, p. 95. This figure represents the total staff employed by the irrigation departments of all provinces. Statistically, one employee is responsible for 88 – 215 ha of irrigated land, as compared to between 122 and 496 ha in other Asian countries.
[661] Winfried Manig & Frithjof Kuhnen: The case of Pakistan; in: Klaus Klennert, ed.: *Rural development and careful utilisation of resources. The case of Pakistan, Peru, and Sudan*; Baden-Baden: Nomos, 1986, p. 24 – 25.
[662] Referring to the SCARP projects: *This administrative, almost caste-like separation of officers (and their respective support staff) typically meant that at field level in SCARP project areas, canal and tubewell operations were rarely if ever coordinated for effective conjunctive use of irrigation water*; cf. Edward van der Velde & J. Tirmizi: Irrigation policy reforms in Pakistan: Who's getting the process right? In: Peter Mollinga & A. Bolding, eds.: *The politics of irrigation reform: Contested policy formulation and implementation in Asia, Africa, and Latin America* ; London: Ashgate, 2004, p. 209.

This may in part explain why the public sector staff has frequently been accused of **corruption**.[663] Rinaudo notes that corruption and nepotism, coupled with vested interests of the bureaucracy (preservation of job, status and influence), are major causes of reform failure.[664] The phenomenon of corruption can be read as a symptom of **institutional weakness**. A lack of transparency and accountability, among other factors, and a lack a precise regulations and authorities invite misuse.[665] Mustafa, in his analysis of the Canal and Drainage Act, concludes that certain institutional deficiencies such as a failure to precisely define periods and quantities of water supplies (and cuts) provide *rich grounds for corruption*.[666] For these reasons, the role of the public sector as such has been reviewed critically. Major funding institutions, like the World Bank, have advocated the introduction of private actors, especially in the area of irrigation services at the canal command level.[667]

As these institutional aspects of water management in Pakistan inevitably affect water availability (due to inadequate canal maintenance and water allocation), they overshadow the relationship between water users. Specifically, they exacerbate the **asymmetry** between canal head and tail end users, rich and poor farmers. More generally, they serve to undermine popular trust in public institutions on all levels, particularly among the majority of farmers who lack the capacity to exert their influence on water bureaucrats. Mistrust, as will be seen in the water sharing section

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[663] Assessments of corruption in Pakistan's public sector focus on selected branches, including major water institutions like WAPDA, which – according to Transparency International (TI), has received around 15,000 complaints from individual citizens in 2002; cf. Global Corruption Report 2008; Berlin: TI, 2008, p. 211 - 215; www.transparency.org/publications/gcr/gcr_2008 (Jan. 2011). The report highlights the role of the military as the biggest landowner. Efforts to introduce accountability to a system that rewards retiring military officers with high-value plots and prestigious civilian positions (*e.g.* managing posts in WAPDA – outside of any qualification-based selection) have so far failed. On lower administrative levels, some progress has been achieved in the form of an *integrity pact* signed by the Karachi Water and Sewerage Board and TI and provincial regulations for greater transparency in Sindh; *ibidem*. Corruption in general remains a big obstacle to development and governance, as Khan notes, citing widespread cases of bribery in the case of irrigation tax collection; see: Feisal Khan: Water, governance, and corruption in Pakistan; in: Michael Kugelman & Robert Hathaway, eds.: *Running on empty. Pakistan's water crisis*; Washington, D.C.: Woodrow Wilson International Center for Scholars, 2009, p. 96; www.wilsoncenter.org (Feb. 2011).

[664] For a game-theoretical approach to the *defensive lobbying* of irrigation officials by landlords in order to obtain water originally allotted to poorer farmers see Jean-Paul Azam & Jean-Daniel Rinaudo: Encroached entitlements: Corruption and appropriation of irrigation water in southern Punjab; *Development Studies Working Papers* no. 144, University of Oxford, 2000, p. 27; www2.qeh.ox.ac.uk (May 2006). In essence, the actual water distribution in this case, as a result of corruption, is subject to the financial reach of the farmer or its social network (the homogeneity of his ethnic group). For an in-depth analysis of corruption in the water sector see Jean-Daniel Rinaudo: Rentes, corruption et lobbying politique (Rents, corruption and political lobbies; in French); PhD thesis presented at University of Clermont-Ferrand, 2000, p. 32 – 33; http://cemadoc.cemagref.fr/exl-php/util/documents/accede_document.php (April 2011). I am grateful to Dr. Undala Alam for pointing out this study to me and to Dr. Rinaudo for his permission to use it as a reference.

[665] See the case of corruption in the Karachi Water and Sewerage Board, giving rise to a water tanker mafia that steals water from public sources in order to sells it; cf. Peter Gizewski & Thomas Homer-Dixon: Environmental scarcity and violent conflict: the case of Pakistan; Occasional Paper; Washington, D.C.: American Association for the Advancement of Science/University of Toronto, 1996; www.library.utoronto.ca/pcs/eps/pakistan/pak1.htm (Sept. 2000; no page numbering).

[666] Daanish Mustafa: Colonial law, contemporary water issues in Pakistan; *Political Geography*, vol. 20, 2001, p. 829. Cf. also A. Haroon Akram-Lodhi: *Like an act of God*: Land, water and social power in northern Pakistan; *Contemporary South Asia*, vol. 10, no. 3, 2001, p. 331. Cohen states that WAPDA had been an early and marked example of official corruption; cf. Stephen Cohen: The idea of Pakistan; Washington: Brookings, 2004, p. 90.

[667] World Bank: Water assistance strategy, *op. cit.*, p. 72.

of this study, is a factor in inter-provincial relations, too. It very likely affects behaviour and decision-making, including the willingness to share water.

Faruqee observes that, in sum, the benefits that farmers on average drew from public water management have been very limited due to a number of **institutional deficits**, in particular

- inadequate records on land holding and use,
- insufficient funding of important research in agriculture, and
- inadequate engagement of farmers, communication of relevant crop information and training.[668]

The government, having extended its authority and presence to the farm level, has failed to provide important incentives for improving water utilization. Faruqee, stressing the need to strengthen market mechanisms, recommends that water user associations (WUA) take over responsibilities from the provincial irrigation authorities (IPD/PIDA), rather than simply participating in deliberations with officials as practised to date, and that the government withdraws to sector-wide tasks like infrastructure and environmental protection.[669] Such a move would, of course, directly target the bureaucratic stature and political status of the water administration, not to mention its economic links with big landholders.

Bandaragoda, analyzing the institutional consequences of modernization in the irrigation sector, finds that technical improvements in canal operation and cropping patterns etc. have received positive reactions by the farming community. At the institutional level, however, they have created challenges to the staff, in particular a decline in control over the water distribution in the system. Unclear regulations and a general *lack of management capacity to cope with the operation of the remodelled system* have exposed an insufficient **resilience** to adjust to new organizational conditions.[670] Behind this lack of flexibility is both a failure of coordination between water managers and water consumers and a widespread scepticism towards new techniques due to the fact that the existing *warabandi* distribution system is so *deeply embedded in the social norms associated with irrigation*.[671] In other words, the bureaucrats in this respect are not much different from water users in their reluctance to consider change as a potential road towards progress. In the case of the farmers, however, their readiness is determined by knowledge and participation; in the case of the bureaucrats, it is determined by potential effects on their institutional position.

Institutional reform

The most active driver of reform has been the Government of Pakistan, not the provincial governments, as Wambia notes.[672] This is surprising because most

[668] Rashid Faruqee: Government's role in Pakistan agriculture: major reforms are needed; *World Bank Policy Research Working Paper* no. 1468; Washington, D.C.: WB, 1995, p. 18 – 20.
[669] *Ibidem*, p. 31.
[670] D. J. Bandaragoda: Need for institutional impact assessment in planning irrigation system modernization; *IWMI Research Report*, no. 21, 1998, p. 9.
[671] *Ibidem*, p. 12.
[672] Joseph Makwata Wambia: The political economy of water resources institutional reform in Pakistan; in: Ariel Dinar, ed.: *The political economy of water pricing reforms*; Washington, D.C.: WB, 2000, p. 369. The provinces' reluctance to water pricing reforms, as suggested by the federal

criticism of the existing water management system has focused on the provincial and sub-provincial levels. The federal government, not being a riparian stakeholder as defined by the standard water law (Canal and Drainage Act), does not have a legally sanctioned responsibility for provincial watercourses, apart from the tasks of WAPDA. It has, however, strengthened its institutional capacity to contribute to **policy-making**, in the form of the newly established Project Management and Policy Implementation Unit within the Ministry of Water and Power. This unit's aim is *to support capacity development, analytical work and detail feasibility studies in order to ensure effective management and development of the Indus River system*.[673] On the one hand, these initiatives can be read as a sign of central government interference in the water sector; on the other hand, they can also indicate either a lack of motivation on the part of the provinces or a lack of capability.[674]

The quality and direction of reform initiatives is a different matter. The federal government, in response to World Bank recommendations, presented the **Pakistan Water Sector Strategy** as a guideline for institutional reform (2002).[675] The Strategy signals an understanding of the merits of integrated water management and the role that stakeholders, i.e. water users, especially farmers, should play. As a *collaborative document* that *adopted a participatory approach to ensure that all stakeholders of water have been consulted and have contributed to this Strategy*, however, it exhibits a number of familiar traits of the existing system.[676] The role of the private sector is barely acknowledged, but not defined.[677] The chapter on agriculture is marked by a generalized, planning-oriented, classic supply management approach, rather than a diversified, potential-oriented approach that would take into account specific plant requirements, varied demands and markets. Regarding participation, it remains unclear which non-state institutions and stakeholders have been involved, and whether their involvement made any impact.

In the same year, the **National Water Policy** – a product of the National Workshop on Water Policy, again involving water experts, NGOs and farmers – went a little further, specifying the guiding principles, such as

- equitable distribution
- decentralized planning, development and management
- delegation of specific water services to *autonomous and accountable public and/or cooperative agencies*
- sustainable use *within a transparent policy framework*
- *participatory and consultative water sector activities at each level.*[678]

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government (on recommendations by the Bank), has recently been reiterated: Centre, provinces agree to set up water commission; *Dawn*, 22 April 2011.

[673] Ministry of Water and Power: www.pakwater.gov.pk/objective.aspx (May 2010). Major activities include a seminar on *Water conservation, present situation and future strategy* (21 May 2009), feasibility and capacity building studies (funded by ADB), and a seminar on Public-private partnerships: Mode of financing and implementation of water sector and hydro power sector projects (5 Jan. 2009).

[674] The latter seems unlikely, given the size of staff and the fact that water management since the colonial era has been a provincial prerogative.

[675] Ministry of Water and Power: Pakistan Water Sector Strategy; vol. 4; *op. cit.* The Strategy was presented in 5 volumes, including a National Water Sector Profile and a Medium Term Investment Plan.

[676] Ministry of Water and Power: Strategy, p. II.

[677] Ministry of Water and Power: Strategy, p. 47, 52.

[678] Government of Pakistan: National Water Policy; Islamabad: GoP, 2002, p. 18; http://cms.waterinfo.net.pk/pdf/NationalWaterPolicy.PDF (July 2011).

The document, which is still a draft and not yet adopted as an official policy, is more analytic as the Strategy, despite being much briefer. It pinpoints institutional deficits like

- overlapping responsibilities and poor coordination between institutions,
- a lack of clearly divided authorities,
- ineffective new institutions like PIDA and AWB.[679]

As such, the document features important elements of progressive reform, by and large in line with recommendations. A critical appraisal of these guidelines finds that a crucial aspect of institutions, accountability, receives little attention. PIDA, with its responsibility for both policy formulation and implementation, effectively sets targets in isolation from water users. Jehangir and Horinkova propose a representative Provincial Water Policy Council for policy, and a regulatory commission to monitor PIDA and AWB.[680]

The implementation of the Policy eventually depends on whether federal and provincial governments will reach a consensus on institutional reform and improved water management. So far – nine years after presenting the Policy and fourteen years after the start of the National Drainage Programme – the provinces have only agreed to form a commission tasked with formulating a national water policy.[681] From a rational choice perspective, the potential gains from collaboration towards improvements in the water sector seem to be insufficient to motivate stronger and swifter action, or the feared losses outweigh the benefits.

Scheumann reminds us that *reforms are not politically neutral* if they involve loss of power and status or simply *uncertain outcomes*, i.e. the mere risk of such losses.[682] A closer look at the attempt by the World Bank and the federal government to shift some irrigation management responsibilities to the private sector reveals that the vested interests of politically affiliated landowners led to a *coalition against privatization*.[683]

The negotiations between the World Bank (as the major lender) and the Government of Pakistan (as the primary recipient of funds for the NDP), viewed from a rational choice perspective, present an interesting game: The Bank, using prospective funds as a leverage or incentive, exerted pressure on the GoP to push forward comprehensive NDP legislation by a given deadline. The GoP, in turn, presented a revised NDP that was expected to raise less opposition from the big farmers. The incentive to the farmers: the prospect of retaining some, if not most of their influence. The possible loss of essential funding for this project and even future projects as well, the GoP finally received the consent from the provincial

[679] *Ibidem*, p. 35.
[680] Waqar Jehangir & V. Horinkova: Institutional constraints, *op. cit.*, p. 21.
[681] *Centre, provinces agree to set up water commission*; *Dawn*, 22 April 2011. No reference is made to the existing draft of 2002. The federal government initiative towards a national water policy will be discussed in more detail in the water sharing section.
[682] Waltina Scheumann: Institutional Reform in the Irrigation Sector: the case of Turkey and Pakistan; in: Susanne Neubert, W. Scheumann, A. Edig, eds.: *Reforming Institutions for Sustainable Water Management*; Bonn: German Development Institute, *Reports and Working Papers* 6, 2002, p. 5 – 6.
[683] *Ibidem*, p. 8. Misinformation and manipulation of small farmers proved crucial in getting their support for a campaign that would preserve the status of big farmers. Cf. van der Velde & Tirmizi: Irrigation policy, *op. cit.*, p. 213.

governments.[684] To please the big farmers, several loopholes were planted in the legal foundations of the reform, hindering the proper implementation of the reform, particularly the establishment of autonomous mid-level water institutions.[685]

The relevance of the underlying legal foundation, the Canal and Drainage Act, was identified as a central obstacle by the donors, but the GoP and the provinces opted to keep it unchanged. Explicitly referred to in the PIDA Acts, it remained what it had ever been, *a particularly powerful piece of colonial legislation, which vested virtually all meaningful control of the irrigation and drainage system in government institutions, specifically the provincial irrigation departments*, as van der Velde and Tirmizi note.[686]

Rinaudo and Tahir point out that the full implementation of the Bank proposal would *significantly affect the existing economic interests and power relationships in the irrigation sector*, in particular threaten the **status of the rural** elite fearing the loss of privileged upstream water supplies, and of the irrigation bureaucrats.[687] The outcome, by a purely political assessment, on the surface resembles a win-win situation: The landlords and bureaucrats retained their positions of influence; the GoP remained in control of the process, without the threat of continued opposition from the provinces and the landed elite. From a water management perspective, the result is a zero-sum situation: A small group of politically established farmers secured economic gains at the expense of the majority of farmers which are very likely to receive as little or less water than before.

The small and medium farmers, representing the greatest combined land area, would have been the beneficiaries of the reform. Had the reform been implemented, more water could have been made available more evenly. It is at this point that the deficits of the public water administration become the critical factor in reform failure.

The narrow self-interest orientation of the bureaucracy strengthens the landholders and at the same time weakens the smaller farmers because it exacerbates the existing **asymmetry** in water supplies. As future water shortages will affect downstream farmers more severely than upstream farmers, the failure to initiate partial privatization is likely to have a significant impact on the overall water situation of Pakistan.

The PIDA process exposes two types of deficits:

- **institutional** (inconsistency of legal framework, lack of transparency, accountability, coordination and communication) and
- **behavioural** (misinformation, personal and group self-interest over administrative responsibility).

[684] Van der Velde & Tirmizi: Irrigation policy, *op. cit.,* p. 214 – 215.
[685] *Ibidem*, p. 215.
[686] Van der Velde & Tirmizi: Irrigation policy, *op. cit.*, p. 223.
[687] Jean-Daniel Rinaudo & Zubair Tahir: The political economy of institutional reforms in Pakistan's irrigation sector; in: Phoebe Koundouri, P. Pashardes, T. Swanson & A. Xepapadeas, eds.: *The economics of water management in developing countries. Problems, principles and policies*; Cheltenham/Northampton: Edward Elgar, 2003, p. 43 - 44.

Bandaragoda, reviewing institutional change in large irrigation systems, summarizes the crucial **institutional characteristics**:

- legally secured and politically supported water rights,
- access to financial resources for operation and maintenance,
- measurable benefits that exceed costs,
- clearly defined areas of responsibility and institutional autonomy.[688]

Focussing on property rights, he finds that concepts which turn water into an either fully private or state property have both failed in Pakistan, but a system of shared, clearly defined responsibilities based on water as a common property, combines equitable allocation, adequate maintenance and cost recovery.[689]

Mellor stresses the need for a judicial body to oversee and sanction democratic procedures in water user groups and the separation of public finance from the daily operations in order to counter corruption and misuse of office. Transparency and accountability as well as adequate information for all user groups plus clear and precise tasks are indispensable features of reformed institution.[690]

The implementation of such reforms, according to Rinaudo and Tahir, could follow a **four-phase schedule**:

- agenda-setting involving all potential actors,
- public debate, consensus-building and legal foundations,
- implementation according to pre-established guidelines and rules,
- enforcement.[691]

The behavioural dimension may even be more important. Rinaudo and Tahir agree with Mellor, van der Velde and Tirmizi that **information and communication** have been a major factor in the successful campaign of the landlords. In effect, the government's failure to counter their propaganda effort – which in fact led many small farmers to oppose the reform in the beginning – helped their cause.[692] The reform programme that intended to improve water availability, allocation and productivity ironically appeared as threatening the very opposite. Had the GoP used information and communication to at least passively involve the small farmers, it might have had a lasting effect on the public's trust in the government and the proposed reform.

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[688] D.J. Bandaragoda: Institutional design principles for accountability in large irrigation systems; *IWMI Research Report* no. 8, 1996, p. 4.

[689] D.J. Bandaragoda: Institutional change and shared management of water resources in large canal systems: results of an action research program in Pakistan; *IWMI Research Report* no. 36, 1999, p. 6 – 7, 16 – 19.

[690] John W. Mellor: Accelerating agricultural growth – is irrigation institutional reform necessary? *Pakistan Development Review*, vol. 35, no. 4, 1996, p. 411.

[691] Rinaudo & Tahir: Political economy, *op. cit*., p. 45 – 46. Dinar *et al.* stress that the most important step in order to reduce the risk of reform failure is to regain the confidence of small and medium farmers through publicizing the positive results of successful Farmer Organizations; cf. Ariel Dinar, T. Balakrishnan & J. Wambia: Political economy and political risks of institutional reforms in the water sector; *World Bank Policy Research Working Paper* no. 1987; Washington, D.C.: WB, 1998, p. 21.

[692] Rinaudo & Tahir: Political economy, *op. cit*., p. 53. Idrees Rajput, former Secretary of Irrigation and Power, Government of Sindh, points out that the NDP showed the limits of decentralization, as farmers tend to concentrate on their own lands and lack the capacity to perceive their plot as part of a wider, ore complex system. According to Rajput, the provincial governments held strong reservations against the reform, *only the federal government was for it*; personal discussion, Karachi, 18 December 2002.

The fact that the GoP failed to advertise the reform as a step towards empowerment of the people appears to either reflect a degree of aloofness regarding the value of democratic processes or simply well-known official neglect. By failing to discuss **compensation** schemes for farmers which would lose subsidies as a result of the reform and pay raises for PIDA officials who are exposed to corruption attempts, the GoP wasted another opportunity to further the reform.[693]

The PIDA process also showed **two types of water-related rationality**:

- the performance-oriented argument with a view to increase productivity and
- the status quo-oriented argument of officials fearing the loss of employment and opportunities of illegitimate enrichment.

Under the existing circumstances, bridging this **antagonism** appears unlikely because the status quo offers more benefits to irrigation officials than the reform. As the large landowners would also face losses rather than gains, the unholy alliance of reform-opponents becomes the biggest obstacle to reform. Following the rational choice logic, these losses would have to be balanced in one form or another. For the irrigation officials this would mean finding other jobs. The problem of corruption is a different matter though intrinsically linked to the civil service.

Asymmetry has turned out to be of an ambivalent quality in the water management procedure as well as in the NDP process. It is at once a great obstacle to some stakeholders, and at the same time it serves as a decisive factor in the economic and political status of other stakeholders.

Managing supply or demand?

The evaluation of the water management system necessitates a new look at the problem of water shortage. Meissner distinguishes two types of water shortage: **hydrological water shortage** and **economic water shortage**.[694] Pakistan's water economy fits in both categories, i.e. water shortage is both a problem of resource supplies and resource management. From a physical or hydrological perspective, vast supplies in the Monsoon period (in summer) and after the release of stored water (in winter) do provide temporary abundance. But this abundance is accompanied by frequent periods of shortage as supplies reflect highly unstable physical conditions which are beyond the reach of human intervention. The capacity of the water works to absorb the temporary water wealth in order to make it available for use in the dry period is limited for both natural and technical reasons.[695]

While significant increases in agricultural production over the last decades seem to suggest that sufficient water will be available to support similar increases in the

[693] *Ibidem*, p. 54.

[694] Dirk Messner: Klimawandel und Wasserkrisen der Zukunft (Climate change and water crises of the future; in German); *Sicherheit und Frieden (Security and Peace)*, vol. 27, no. 3, 2009, p. 168.

[695] For an early, officially sanctioned assessment of the sustainability of water withdrawals see Planning Commission: The report of the Indus Basin Research Assessment Group; Islamabad: Government of Pakistan, 1978, p. 8. According to this report, completed at a time when both large reservoirs (Mangla and Tarbela) were fully operational, *it is not possible to increase the level of withdrawals much further while maintaining reliable irrigation water supplies*. At that time, the population of Pakistan was estimated at 73 million (1977). As of 7 July 2011, it stood at 176 million (official *population clock*; http://www.census.gov.pk/index.php.

future, the **state of water management** points in the opposite direction. The estimated system losses, as detailed before, cause recurring shortfalls of water which are partly due to poor management of water courses and inadequate storage.[696] Low water productivity, again a result of management deficiencies, adds to the economic water shortage.

Efforts to make more water available are not very promising. The Government of Pakistan expects shortfalls to range between 23.5 and 39.1 per cent in 2010/2011, based on an increase in irrigation efficiency from 40 to 45 per cent.[697] Faruqee finds that the limits of agricultural production might have already been reached as the per-capita productivity is on the decline, largely due to the drastic rise in population.[698] Further extension of the cropped area is effectively limited by the availability of land and water as well as hydrological conditions.[699]

The implementation of recommended reforms, such as
- productivity-oriented land use and efficient crop selection,
- gradual redistribution of land and improved land tenure and access to credit,
- comprehensive drainage and canal management,
- water education and research,
- elimination of government intervention in agricultural commodity markets,
- privatization of water services and reduction of public micro-management,

is a prerequisite to raising productivity.[700]

But Faruqee cautions that even with these steps taken only marginal increases seem realistic. The consequences of this condition are reflected in a critical state of nourishment and overall public health.[701] According to UN estimates, a large part of Pakistan's population regularly suffers hunger and diseases related to malnutrition.[702]

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[696] Mustafa *et al.* estimate that the existing storage can take up only 30 days worth of water supplies, as compared to India's 120 to 220 days and Egypt's 700 days; cf. Daanish Mustafa, Majed Akhter & Natalie Nasrallah: Understanding Pakistan's water – security nexus; *Peaceworks* no. 88; Washington, D.C.: United States Institute of Peace, 2013, p. 9; www.usip.org/files/resources/PW88_Understanding-Pakistan's-Water-Security-Nexus.pdf (May 2013).

[697] Ministry of Water and Power: Pakistan Water Sector Strategy, vol. 4, *op. cit.*, p. 171 – 172. Projections were made in 2002.

[698] Rashid Faruqee: Pakistan's agriculture sector: Is 3 to 4 percent annual growth sustainable? *World Bank Policy Research Working Paper* no. 1407; Washington, D.C.: World Bank, 1995, p. 4, 7 – 8. A critical factor is Total Factor Productivity per crop which is decreasing in most crops in both Punjab and Sindh.

[699] *Ibidem*, p. 11 – 12.

[700] *Ibidem*, p. 26 – 29. For a concise overview of measures to raise water productivity see David Molden, U. Amarasinghe & I. Hussain: Water for rural development; *IWMI Working Paper* no. 32, 2001, p. 7.

[701] The Global Hunger Index 2009 lists Pakistan, along with India and Bangladesh, in a category of alarming food insecurity. South Asia as a whole has *some of the highest levels of hunger and gender inequality worldwide*. See International Food Policy Research Institute, Welthungerhilfe, Concern Worldwide: Global Hunger Index 2009; Washington, Bonn, Dublin: IFPRI, 2009, p. 13, 18, 23; www.ifpri.org/publication/2009-global-hunger-index (Sept. 2011).

[702] Michael Kugelman: Pakistan's food insecurity: roots, ramifications, and responses; in: M. Kugelman & Robert Hathaway, eds.: *Hunger pains. Pakistan's food insecurity;* Washington, D.C.: Woodrow Wilson International Center for Scholars, 2010, p. 6 - 7, citing World Food Program data. Toor, referring to the same source, concludes that abouth 50 percent of Pakistan's population consumes less the minimum required for average human need; Saadia Toor: The structural dimensions of food insecurity in Pakistan; *ibidem*, p. 99. Parts of NWFP/KPP, FATA and Balochistan are affected the most, central parts of the Punjab the least.

The potential effects of climate change on water availability are difficult to estimate.[703] Studies of climate change may lack accuracy, mainly due to the complex nature of climate and its effects, and their findings may as such be scientifically debatable. But the region's vulnerability to rising temperatures and lack of rains should serve as a warning strong enough to make sophisticated water management a top priority – not only, but especially in countries like Pakistan.

Alternative strategies are fraught with manifold risks. Raising irrigation efficiency is prohibitively expensive, as Shiklomanov cautions.[704] Charcoal spraying of glaciers to accelerate melting does not render significant additional supplies of water, but involves environmental risks.[705] Artificial rain is another method, yet again with limited effect.[706] Seawater desalination is very costly – the main reason why it is only practiced by a few very rich economies, particularly on the Arabian Peninsula. Industrial water recycling is cost-intensive, too. Building extra reservoirs to store water that would otherwise be left to flow of into the sea in summer appears to be the most feasible option. Politically, however, it is highly controversial, as will be seen in the water sharing section of this study. From a water management perspective, the fact that this controversy has been lasting for more than two decades means that in this period the discrepancy between water needs and water supplies has grown.

Trading water among stakeholders might be an option, provided both sides – *e.g*. Sindh and Balochistan – agree on a transfer mode that would bring benefits to both sides. Extra-basin trading seems unrealistic as long as the relationship between India and Pakistan remains unfavourable. Archer *et al*. conclude that the only way to avert serious water shortage is to cap sectoral demand in one way or another through much more economic water utilization and integrated water management that prevents the further deterioration of existing sources of water.[707]

Implementing water sector reforms hinges on **public perceptions** of the water situation. Individual perceptions of water availability might conflict with official or academic assessments as local realities perceived by common water users typically

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[703] Assessments of the current and prospective water – climate nexus in Pakistan rely on weather and river data that go back around 50 years, allowing for only limited interpretation, as Hashmi and Siddique point out. A qualified analysis of climate change would have to be based on a complex set of data, spanning a long period of time, and on metering in different locations. Cf. Danial Hashmi & Muhammad Siddique: Influence of climate change on upper Indus flows; in: Pakistan Engineering Congress: *World Environment Day 2009*; Lahore: PEC, 2009, p. 31 – 37. Also D. Archer *et al*.: Sustainable management; *op. cit*., p. 1885.

[704] Igor A. Shiklomanov: Water transfer as one of the most important ways to eliminate water resources deficits and solve water management problems; in: *Proceedings of the UNESCO international workshop Interbasin Water Transfer, Paris, 25 – 27 April 1999*, p. 206; http://hispagua.cedex.es/documentacion/documentos/interbasin_water_transfers.pdf (Feb. 2011). Water transfers, from one basin to another or within a basin, have been implemented in several large river basins. Pakistan, through several link canals, actively practises intra-basin water transfers. As the Indus is the only major river basin in Pakistan, the potential of river links is limited.

[705] This method has been given some consideration in Pakistan: Charcoal spraying on glaciers proposed; *Dawn*, 28 March 2001; Melting of glaciers under study; *Dawn*, 27 April 2001; Water shortages and artificial glacier melting; *The News*, 9 Sept. 2002. To date this method has not been implemented, mostly due to the potential destabilization of glaciers.

[706] Cloud-feeding, originally a military tactic employed by the U. S. Air Force during the Vietnam War to create adverse battlefield conditions for the enemy, was applied in Pakistan in 2000 on an experimental basis: Artificial rain arranged; *Dawn*, 5 July 2000. It has not been used on a regular basis as its effects are expected to be marginal in the case of large-scale irrigation.

[707] D. Archer *et al*.: Sustainable management; *op. cit*., p. 1889, 1892.

do not take into account the overall hydrological state of the water source (groundwater aquifer, river or tributary). Thus the causes of water shortage are often not fully realized. This lack of transparency, compounded by deficient official information, prevents people from realizing the consequences of overuse or of dumping garbage into drains and rivers. The high rate of water-borne diseases in Pakistan, many of which relate to the consumption of untreated water, is only one symptom of a widespread lack of water awareness.[708]

Additionally, while basic **water resource information** is available, the specific supply - demand relationship in any particular location is too complex to be reflected in plain statistics, making it difficult for individuals as well as institutionalized decision-makers to draw adequate conclusions. In-depth assessments, like the World Bank commissioned studies or research conducted by IWMI, are published in English and typically circulated in the political and academic spheres, limiting their potential effect to a very small group.[709] The role of professional **water knowledge** has been central to the country's water management. The Partition of 1947 has left Pakistan with a shortage of trained water management experts, as Kreutzmann notes.[710] Though this shortfall had been balanced by the 1970s when Pakistan had gained a reputation for its expertise in hydraulic engineering, water knowledge has not kept up with development.[711]

Another aspect of water information and communication – and the lack thereof – is the continued focus on the **supply side** of water management. While the demand for water is expected to rise strongly over the coming years, little attention is given to the principal source of this development: reproduction.[712] From 1951 to 2010, the

[708] The need to provide water-related public education was realized only a few years ago when the government inaugurated a UNDP sponsored Mass Awareness Project on Water Conservation; cf. Government of Pakistan press release: Sherpao to chair steering committee on water resources conservation; *Dawn*, 24 June 2003.

[709] Though English is the most widely spoken foreign language in Pakistan, it is by no means an asset of a majority of people in Pakistan, particularly not in the countryside.

[710] Hermann Kreutzmann: Water towers for Pakistan; *Geographische Rundschau – International Edition*, vol. 2, no. 4, 2006, p. 55. Cf. also Michel: The Indus Rivers, *op. cit.*, p. 346 – 347.

[711] World Bank: Water assistance strategy, *op. cit.*, p. XVI. Lack of education has an adverse effect on agricultural productivity, cf. Faruqee: Pakistan's agriculture, *op. cit.,* p. 20. Wolff notes that knowledge transfer in the water management sector has failed to produce expected results in Asia, unlike in other world regions, because research is focussed on improving medium-scale irrigation systems, rather than the problems affecting the large-scale systems in India and Pakistan, especially the allocation and delivery of water within the irrigation system; Peter Wolff: Irrigation in the world – challenges for the future; in: Constanze Engel, G. Burkard, H. Hemann, W. Troßbach & P. Wolff, eds.: *Development – organization – interculturalism*; *Supplement no. 91 of the Journal of Agriculture and Rural Development in the Tropics*, Kassel: University of Kassel, 2009, p. 77 – 78; http://www.uni-kassel.de/upress/online/frei/978-3-89958-642-8.volltext.frei.pdf (July 2011). Lowdermilk notes that a disregard for field research, *aloofness British-style*, is partly to blame for inadequate irrigation expertise; Max K. Lowdermilk: Major institutional constraints in Pakistan's agricultural development; in: Richard A. Stanford, ed.: *Rural development in Pakistan*; Durham, N.C.: Carolina Academic Press, 1980, p. 150.

[712] Calculations for the 1995/2025 period by IWMI researchers expect an average population growth of 1.9 % p.a., leading to a rise in cereal consumption of 2.2 % p.a. The expected rise in cereal production, by contrast, is only 1.6 %. As a result, an estimated 10 % of consumption will have to be met through imports. Cf. Rob de Nooy: Water management for agriculture in priority river basins; *WWF Living Waters Programme*; Zeist, NL: 2003, section 3 (South Asia – Indus River Basin), p. 9; http://wwf.panda.org/about_our_earth/all_publications/?9201/Water-Use-for-Agriculture-in-Priority-River-Basins (June 2008); The report is based on David Molden, U. Amarasinghe & I. Hussain: Water for rural development; *IWMI Working Paper* no. 32, 2000, p. 50, 74, 78.

population has risen five-fold while the per-capita water availability has statistically shrunk to one-fifth, according to official estimates.[713] This means that progress in water management, particularly by harnessing more water in reservoirs, has failed to compensate for this dramatic rise in demand. Prospective water demands from a steadily growing population put a huge stress on the existing water management system threatening its ecological sustainability.[714] The hydrological state of water sources in the Basin (ground and surface water) advises caution with regard to expected supplies.

Human reproduction being a socially sensitive issue not only in Pakistan, the **demographic factor** has so far been largely underestimated.[715] While the public discussion of water-related challenges grows in scope and detail the world over, the individual awareness of this problem has not led to a change in behaviour – both on the part of individuals and on the part of corporate, government, religious and other social institutions.[716] The fact that high rates of reproduction occur in many arid world regions indicates that demography is disconnected from the state of natural resources and the wider economy.[717] This phenomenon requires in-depth enquiries into the state of water knowledge and awareness and the flow of water-related information, particularly between urban and rural areas.[718]

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[713] Ministry of Finance: Economic Survey 2009/2010; Islamabad: GoP, 2010, p. 34 – 36. WAPDA, in a presentation by its chairman to the Pakistan Development Forum 2007 (Islamabad, 27 April, 2007), referred to the same statistics to underline its demand for new reservoirs; http://siteresources.worldbank.org/INTPAKISTAN/Resources/Presentatiion-Chairman-Wapda.pdf.
Shahid Ahmed, of the Pakistan Agricultural Research Council (PARC), using the same data, estimates that in order to meet the projected population increase (from 168m in 2010 to 209m in 2025) water availability will have to rise by 31%; presentation to seminar *Water conservation, present situation and future strategy,* Islamabad, 21 May 2009; cf. executive summary, www.pakwater.gov.pk (July 2010).

[714] A.N. Laghari, D. Vanham & W. Rauch: The Indus Basin in the framework of current and future water resources management; *Hydrology and Earth System Sciences*, no. 16, 2012, p. 1079.

[715] With the exception of the Persian Gulf monarchies, Pakistan and Afghanistan remain the only Asian countries whose population has risen fourfold in the 1960 – 2012 period; http://data.worldbank.org/indicator/SP.DYN.TFRT.IN/countries?display=default (May 2013).

[716] There is no shortage in official statements decrying the water situation: Minister admits country facing water shortage; *Dawn*, 14 Dec. 1999; CE cautions against water shortage; *Dawn*, 4 Oct. 2000; Water resources depleting: minister; *Dawn*, 4 July 2002 – to cite only a few. Countless newspaper articles document the critical observation of government action in the water sector and, in a remarkable demonstration of freedom of expression and media, demand determined and comprehensive water management. In this, the country's English language publications, like *Dawn*, *The News* and *Daily Times*, are exemplary.
Education and access to information are among the critical factors in reproduction as well as water utilization; cf. Khaleda Manzoor: An attempt to measure female status in Pakistan and its impact on reproductive behaviour; *The Pakistan Development Review*, vol. 32, no. 4, 1993, p. 919, 925.

[717] Hammond World Almanac. World Fact Book; 1st ed., 2008, München: Langenscheidt, p. 16 – 17. In this context, two other critical factors commonly underestimated are the labour market, *i.e.* the lack of jobs, and the lack of a social security system that would provide a means of income to retired people who have traditionally been relying on younger family members for their livelihood.

[718] A major factor in the dramatically rising population seems to be the widespread poverty, particularly in the country-side, that forces millions of low-income families to make their children contribute to the family income. Given the complete lack of public welfare, social security and pension schemes (except for public sector employees), the joint family has only its members to rely on for economic survival. Any initiative towards slowing the upward demographic trend has to address the lack of economic opportunities, i.e. jobs, and retirement schemes. The growing number of jobseekers inevitably exacerbates the existing tough competition, causing wages to fall and work conditions to deteriorate, creating a vicious circle. According to UN estimates, 60% of the population live on only two Dollars per day; cf. UNESCO: World Water Development Report 2012; Paris: UNESCO, 2012, p. 823. At current (May 2013) rates, 2 Dollars equal 200 Rupees. My regular personal communication with residents of Lahore and Islamabad confirms this. For office assistants and school teachers it is not unusual to earn

The failure of public and private institutions in Pakistan to analyze and discuss the causes of this massive population growth stands in the way of progressive water management. The separation of resource management from social policy (family planning, education, health care etc.) has adverse effects on water availability.[719] The water cycle, more acutely than other resource system, commands people to live within their means – not only, but especially in countries like Pakistan. Consequently, popular awareness of the personal and societal consequences of inadequate reproduction will have to become an essential element of progressive water management, particularly in the rural areas which tend to be disconnected from the urban centres in many ways, not least in terms of information, education and communication. A shift from supply management to demand management is inevitable if drastic consequences on large parts of the population are to be avoided.

Conclusion

This chapter has rendered important findings relevant to the problem of water sharing. First, the **institutional development** of the Indus Basin irrigation system has demonstrated the presence of strong political factors in water management. The role and status of the state and the bureaucracy have in part determined the shape of water institutions since the colonial era. This **continuity** is manifested both formally, as several colonial-era institutions remain effective to date, and informally, as reflected in the culture of today's water management. This continuity, not surprisingly, explains why some colonial-era problems survived well into the era of independence.

The water sector continues to be a highly status-oriented example of **top-down government**. On the downside, a combination of over-administration and micro-management, misallocation of funds, corruption, a lack of up-to-date research and a lacking willingness to communicate important information to water users (particularly at the lower end of the watercourse) and other institutions marks the negative quality of public water management in Pakistan. Institutionally, the failure to link up with stakeholders (water users), aggravated by a combination of self-interest, neglect and arrogance, furthers the **isolation** of the bureaucracy. In rational choice terms, the institutions reflect a bureaucratic interest in maintaining the *status quo* for personal and collective gains in the face of a growing need for reforms.

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around 10,000 Rupees a month (as of 2010). Even college graduates rarely seem to earn more than 30,000 Rs, except for those with IT qualifications or the very few who work for an international employer. But even these professionals find it increasingly difficult to get a job. Given the dramatic rise in consumer prices, even middle-class households face severe constraints.

[719] The Chinese version of compulsory family planning has recently been challenged by a voluntary, incentive-based strategy employed in the Indian state of Maharashtra. The program which entitles young couples to receive cash rewards for delaying reproduction, while being enrolled in family planning seminars that inform on the use of contraceptives, has received scant media coverage in Pakistan: *Dawn*, 28 April 2011. The critical factor in the Chinese case was a combination of determined government intervention, administrative supervision and economic incentives. India, a much more democratic society, also exhibits a political dimension of demography. In a move to prevent being outnumbered by Muslims local Catholic priests have turned to offering financial benefits to Christian families; see: Kerala churches reward big families; *BBC News* (online), 7 October 2011. Statistics on school enrolment and formal education have long been suggesting a strong link between poor education or virtual illiteracy and early marriage and large families; latest data on Pakistan confirm that trend; cf. UNESCO: Teaching and learning. Achieving quality for all. Global Monitoring Report 2013/2014; Paris: UNESCO, 2014, p. 54, 185.

Second, the **role of the provinces** has undergone gradual changes that are likely to affect inter-provincial water sharing. The once near-total authority of WAPDA has been reduced, allowing the provincial governments a greater say in irrigation management, including water allocation. The provincial authorities, however, exhibit the same bureaucratic culture as the federal institutions, shying away from efforts to increase transparency, accountability, performance-orientation and privatization. Their motivation to reform the system of water management is smaller than that of the federal government which started most reform initiatives – to the effect that the federal government continues to play a central role in water management. One reason for this political reluctance is the economic and political interests of the rural landed elite. Consequently, it is the provinces that are mainly responsible for the **lack of progress** in water management. The insistence to keep water management by and large within government control – in spite of declarations advertising private sector engagement – is the primary obstacle to a necessary shift from supply to demand management. By blocking important reforms, improvements in water management have effectively been sacrificed to institutionalized group interests.

Third, **asymmetry** as such, prevalent on the river level as well as on the canal level, has not been identified as a problem in itself. Several studies have documented the existing discrepancy between upstream (or canal head) and downstream (or tail end) positions in the river and canal system. Efforts to reduce this asymmetry have not been made. The conditions of the downstream or tail end water users remain considerably worse on average than that of upstream or canal head water users. Just as, on the political-administrative level, the dominant position of Punjab has remained untouched, on the canal level the dominant position of the **big farmers** and the social-political status derived from it has by and large remained the same.

Again, the failure to implement the National Drainage Programme, with its private sector participation, is critical because it could have opened access to water management for all farmers, not only the privileged. It is doubtful whether, with the existing asymmetry, equitable water allocation – as demanded in the government's Water Sector Strategy – is realistic. Instead, given the prevailing status-oriented culture of administration, big farmers are likely to continue to exert an inadequate influence over water management decisions, thus alienating the majority of other farmers. In other words, the hydrological asymmetry is combined by a political-economic asymmetry effectively promoted by the bureaucracy.

Forth, the **problem of water allocation** has been put into context. Water allocation and water sharing cannot be separated from the question of water availability. Water availability affects the way water is shared and allocated. It will be seen whether the prospect of water shortage affects the readiness of decision-makers to act. The failure to put water management in a wider social and economic context – by synchronizing water policies, social-demographic initiatives, education, labour market approaches and social security – reflects an inadequate awareness of decision-makers.

The **limits of water availability** have a fundamental importance for Pakistan:

- agricultural production is bound by sufficient water availability;
- if the rise in population is not paralleled by an equivalent increase in agricultural production, the consumer price of agricultural products is likely to rise, aggravating the already tense financial situation of the majority of the

population, adversely affecting purchasing power, public health and the education of children, thus reproducing the cycle of poverty;
- the inter-sectoral competition over water allocation is likely to increase due to falling incomes from agricultural production, again leading to higher consumer prices for agricultural products.

On the positive side, these limitations can act as **incentives**
- to promote greater efficiency in irrigation,
- to strengthen participatory and market-based water management,
- to utilize greater amounts of unused water,
- to reassess the economic viability of producing crops against importing them.

Fifth, this section has provided a **methodological test** which asserted the relevance of political economy approaches for the understanding of political behaviour, especially in the case of the National Drainage Programme. Equally important is the analysis of institutions and – at least for the problem of water management – the property rights concept.

Lastly, the manifold importance of *pani*, or water, has been put into context. Given the overwhelming importance of irrigated agriculture in a country like Pakistan, control over water at all levels of the agricultural system translates into unparalleled political power. The analysis of water management, and particularly the water bureaucracy, has revealed the **ambivalence of institutions**: They are important for the regulation of water use, but they also act as instruments of power. They can alleviate water management, but they can also inhibit important changes in water management. Likewise, water is a means of basic livelihood to some, and a source of power to others. For the ensuing section on water sharing, this ambivalence is foreboding: If water serves different, even opposing interests, how realistic is cooperation? If **asymmetry** means a disadvantage to some but an asset to others, will both sides find a common objective for future water use?

Introduction
IV. Sharing Indus waters: cooperation versus confrontation

The systematic, large-scale utilization of the Indus River for irrigation, initiated in the colonial era, has driven rapid economic, social and political development in the whole basin region. It has turned river water into a precious commodity and a focus of growing political interest of governments of the states and provinces and – after independence – the newly established nations of India and Pakistan.

Ever growing thirst for water has since required **mechanisms of water distribution** that would satisfy competing demands. A series of committees and commissions have since the beginning of the 20th century sought solutions to a widening dispute over water shares between the riparian provinces and states. With inter-provincial rivalries going on, the independence of India and Pakistan converted this dispute into an international affair. Overshadowed by territorial conflict, the water dispute has since evolved into a major **political challenge** to decision-makers on all sides – India and Pakistan plus the provinces involved. Fair shares of the common resource have been playing as much a role as have motives of power and status.

In the absence of a mechanism for dispute resolution, the now independent stakeholders have confronted each other facing hydrological and political conditions that inhibit a cooperative solution. The new post-independence environment has created additional obstacles for the provinces of Pakistan, too, even though they have become members of the same nation.

This section traces the **roots of the dispute** over water shares in light of the expanding irrigation system in the Indus Basin. It assesses the steps taken to find a solution that would (or would not) satisfy stakeholder demands. The independence of both nations has changed the rules of water management that were available before. It will be seen what the stakeholders have done since the beginning to the present in order to achieve their stated goals, and what role politics have played in water management. Key questions are:

- Which interests are linked to water?
- What makes cooperation desirable?
- Which structural or institutional arrangements facilitate (or inhibit) cooperation?

IV.1 Water management and hydro-politics: Partition and confrontation

The development of the Indus Basin into an economic lifeline of the Crown Colony of India turned neighbouring provinces and states into stakeholders vying for benefits from large water projects. The alteration of river flow regimes through a network of irrigation canals forever changed water supply patterns. While more water was made available in some places, others received less water than before. The dispute between upstream Punjab and downstream Sindh exemplifies the intricate problem that water managers, engineers, legal experts and political decision-makers had to confront.

The Partition of 1947 suddenly transformed river management into a subject of trans-national relations and an acute challenge for Pakistan and India. Colonial-era mechanisms had to be replaced with a new arrangement for collective river use – a task which the new leaders had failed to tackle before the scheduled end of the colony.[720] At the same time, the upstream – downstream discrepancy of water supplies in the Indus Basin confronted the provinces of Punjab and Sindh with a complex of political, economic, hydrological and legal challenges – many of which had originated in the colonial era.

Economics and politics of hydrological asymmetry

The initiation of a large-scale irrigation system in the Indus Basin in the 1850s had confronted the riparian provinces with the challenge of sharing water. With the opening of the first major canal, the Bari Doab Canal, in 1859, the stage was set for the coming dispute over water shares. This canal, the first in a series of large water works in the Indus Basin, laid the groundwork for the future dominance of the Punjab province in economic and political terms.[721] It diverted water to a host of Punjabi farms near the Ravi River thus greatly expanding the agricultural heartland of the then Crown Colony.

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[720] Aloys Arthur Michel: The Indus Rivers. A study of the effects of Partition; New Haven/London: Yale U.P., 1967, p. 164. The suggestion of the Boundary Commission's chairman, Cyril Radcliffe, to agree on a joint water utilization mechanism was rejected out of hand by both leaders, Nehru and Jinnah; cf. also Asit K. Biswas: Indus Water Treaty: the negotiating process; *Water International*, vol. 17, 1992, p. 203, citing Leonard Mosley: The last days of the British Raj; New York: Harcourt Brace, 1962, p. 198. The conditions under which the Boundary Commission would have to operate were, as Michel adds, less than favourable, given the inadequate terms of reference, the tight deadline (the date of independence was only five weeks away when the Commission began), and the failure to include the water issue in the agenda in the first place. Nevertheless, if the importance of the water issue had been realized, a mechanism might have been reached. A convenient and unfortunately widespread interpretation of events sheds the entire blame on the outgoing colonial government; see for example Zaigham Habib: Water: Issues and politics in Pakistan; *South Asian Journal*, no. 8, April – June 2005, p. 3; www.southasianmedia.net (March 2008).

[721] For an unmistakable impression of the hydro-economic weight of the Punjab see the hydrological map of the basin in the Water Resources eAtlas, published by IWMI, IUCN, WRI and the Ramsar Convention on Wetlands, chart AS11 (Watersheds of Asia and Oceania), www.wri.org (Aug. 2004). For an authoritative account of the water works see Michel: Indus, *op. cit.*, p. 58 ff.

The Punjab's strong natural advantage was obvious: its location in the centre of the Indus Basin, with most of its tributaries running through it – *a country eminently adapted for canals*.[722] Further projects strengthened the economic weight of the Punjab though this, according to Michel, was not the main interest of the colonial irrigation planners. Rather it was the growing population, not only in the Punjab, that necessitated a steep rise in agricultural output.[723] A series of major projects over the coming decades, particularly the Triple Canals Project (1905 – 1915) achieved the desired economic returns, in spite of significant technical obstacles, turning the Punjab into a model for irrigation projects in other parts of India.[724]

The downstream view from Sindh was less promising because the interests of the lower riparian states and provinces were not given adequate consideration. The Sutlej Valley Project, again prioritizing Punjab, involved water losses for the downstream region.[725] Yet the first commission to address problems associated with water projects, the Indian Irrigation Commission (1901 – 1903), did little to take into account the potential impact of the project on the downstream side. Rather than including Sindh, it prepared the road for the Tripartite Agreement, to be agreed between the upstream provinces and states of Bahawalpur, Bikaner and Punjab (1919), effectively implementing the envisioned project.[726] These early projects, in the perception of many Sindhi activists, mark the beginning of the Sindh – Punjab water dispute.[727]

Behind the failure to reach a satisfying mode of water sharing were not only political, but mainly technical, agricultural and hydrological problems. As Michel points out, the **requirements of irrigation** in the Indus Basin exceed a fixed seasonal allocation of water (*Kharif,* April to September – *Rabi,* October to March), particularly in the dry summer season (*Kharif*). In the case of a weak or brief Monsoon, water supplies for *Rabi* sowing in November/December might be short: *The most critical period begins in late February and March and continues until the rapidly rising temperatures produce a corresponding rise in the rate of snowmelt. Runoff increases accordingly, and by May 1 there is usually enough water … to supply the needs of the newly sown Kharif crops*.[728] But it isn't until the beginning of July that agriculture is *safe*.[729] The situation in Sindh, before large reservoirs were available, was even more critical as the overall amount of water available downstream is generally less than that in the upper reaches of the river, i.e. in Punjab.

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[722] General Report on the Administration of the Punjab, for the years 1849 – 50 and 1850 – 51; printed for the Court of Directors of the East-India Company, London: J. and H. Cox, 1854, p. 96; quoted in Michel: Indus Rivers, *op. cit.*, p. 65. Michel, p. 66, cites the prevention of famines and potential political destabilization as a strong motive – besides the intention to prevent a rebellion of Sikhs, by offering them to become farmers on the newly irrigated lands.
[723] Michel, *op. cit.*, p. 76.
[724] Michel, *op. cit.*, p. 76 – 82.
[725] From 1847 to 1935 Sindh was a part of the Bombay Government, and the State of Khairpur was the other downstream state affected by upstream water works; see Michel: Indus, *op. cit.,* p. 99ff.
[726] Michel: Indus; *op. cit*., p. 99ff.
[727] A widely respected representative of the movement stressing Sindh's rights as a downstream neighbour is Rasool Bux Palijo, lawyer and leader of the Awami Tehrik party; see his book: Sindh – Punjab water dispute 1859 – 2003; Hyderabad: Center for Peace and Human Development, 2003. The year 1859 marks the beginning of the Bari Doab Canal; p. 10.
[728] Michel: Indus; *op. cit.*, p. 115.
[729] Michel, *ibidem*.

Sindh's position in the beginning water dispute, on the surface, was based on the fear of over-withdrawals upstream (by Punjab). However, the real concern, according to Michel, was not the withdrawals as such, because they in fact did not necessarily affect Sindh irrigation, but the availability of water below Sukkur. The barrage at Sukkur, conceived in 1920 and inaugurated in 1932, changed the water supply and its timings and thus effectively dictated irrigation planning in Sindh. It is for this reason that Michel links the beginning of the Sindh – Punjab dispute to the Sukkur project.[730] The colonial administration, from 1921 on, started collecting data on water withdrawals in preparation of further water projects in Punjab and with a view to avert losses in Sindh.[731]

At the same time, the Indus Discharge Committee was established to assess water availability. Eight years later, it concluded that the data so far collected was still insufficient to allow for an exact assessment of expected water availability in the context of the planned Thal canal, again highlighting the complexity of water supplies in the Indus Basin.[732] As no adverse consequences were expected, the Thal project and the planned Bhakra dam were approved. Sindh, however, feared losses at Sukkur – a claim that a neutral investigation later proved to be unfounded.[733] The assessment of water availability would remain a delicate issue in the decades to come, adding uncertainty to almost all future water projects, at least from the stand-point of Sindh.

The provincial authority over water management, as established by the Government of India Act of 1935, meant that Sindh would now face Punjab on an equal footing in any further disputes over water.[734] After a redesign of the Bhakra dam project on the Sutlej by the Punjab government in 1939, Sindh, expecting a significant impact on water supplies downstream, demanded a reassessment of the project on the ground of major changes. In accordance with the Government of India Act, a judicial solution – instead of a governor-appointed technical committee – had to be found. The Indus Commission, headed by Justice Benegal N. Rau, was independent of the colonial administration and represented the first **legal approach** to the water problem.[735]

The work of this commission is important for both the Sindh – Punjab case and the problem of water sharing in general, as it would later provide an input to the so-called Helsinki Rules, adopted by the International Law Association in 1966 as a set of

[730] Michel, p. 117.
[731] Michel, p. 119.
[732] Michel, *op. cit.*, p. 122.
[733] The Nicholson – Trench Report of 1929 was later accepted by Sindh, allowing works on the Bhakra dam on the Sutlej; cf. Michel, *op. cit.*, p. 122, 129. Due to technical alterations of the dam design by Punjab, the Anderson Committee was tasked to assess the hydrological impact (1935).
[734] The Act qualifies the framework of dispute settlement, essentially putting the Governor General of India in charge; cf. §§ 130, 131; an inter-provincial council, in which – hypothetically at least – both sides would be heard, could only be invoked by the British Government, again on the initiative of the Governor General (§135); document text: The Gazette of India Extraordinary: The Government of India Act 1935, Simla, 9.9.1935; online: www.echr.net/const/history.goi.htm (July 2001).
[735] The so-called Rau Commission (in some sources referred to as Rao Commission) was initiated in September 1941 by the Governor General of India and included two water engineers; cf. Scott Barrett: Conflict and cooperation in managing international watercourses; *World Bank Policy Research Working Paper* no. 1303, 1994, p. 11; Michel: Indus, *op. cit.*, p. 129 – 130.

guidelines for collective river utilization.[736] The case at hand was considered a precedent.[737]

The Indus Commission's report, delivered in 1942, asserted the right of the upstream riparian province, Punjab, to conceive and realize the further development of the Indus irrigation network, but emphasized the right of the downstream province, Sindh, to receive water supplies on the basis of **equitable apportionment**, i.e. to share some of the benefits to be reaped from the current project and not to suffer losses. Should losses be suffered by Sindh – which the Commission saw as likely – compensation was envisioned.[738] The recommendations of the Commission were based on a detailed assessment of existing irrigation schemes, the seasonal water needs (*Kharif, Rabi*) of both provinces, and an evaluation of existing principles of international water law. The principle of equitable water sharing, as was shown in the theoretical discussion, had already entered the legal discourse, yet without an agreed definition of the respective river or drainage basin.

In this sense, the report, though comprehensive, lacked precision as there was no precursor that could have served as a solid model. Exact figures for water shares were not given, and also not a formula by which they would have to be calculated. Also there was no provision for an institutional mechanism to oversee the implementation of the recommendations – which, of course, would depend on the consent of the two parties concerned. But more importantly, the basic principles for water management, especially the sharing of benefits and the prevention of significant harm to the downstream riparian, were established. Thus the Indus Commission's report constituted, in theory at least, a **new set of norms** for the utilization of rivers. The fact that both provinces took part in the proceedings of the Commission underlines the legitimacy and status of the report.

The recommendations of the report extended to future projects and advocated a technical commission to look into ways to avoid damages to Sindh's inundation canals.[739] Confirming Sindh's apprehension as to the already conceived projects, the planned water works in Punjab were seen as *likely to cause material injury to Sindh's inundation canals, particularly in the month of September*.[740] To alleviate these adverse effects in the long term, the Commission recommended the construction of two new barrages in Sindh, to be financed in part by Punjab.[741] The Commission, comprehensive and forward-looking though it was, finally failed because its report did not receive the consent of either party. Both Sindh and Punjab appealed to the Government of India, thus in a sense going back in time instead of asserting their newfound status as granted by the Government of India Act.

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[736] Cf. International Law Commission: Summary Record of the 1786th Meeting; Topic: Law on the Non-navigational Uses of International Watercourses; vol. 1, 1983, p. 178; www.un.org/law/ilc/index.htm (May 2007).

[737] Michel; Indus; *op. cit.,* p. 129 – 130. See also International Law Commission: Yearbook of the International Law Commission 1983, vol. 1, 1786th Meeting, 21 June 1983, p. 187. Helmut R. Külz: Further water disputes between India and Pakistan; *The International Comparative Law Quarterly*, vol. 18, no. 3, 1969, p. 730- 731.

[738] John G. Laylin: Principles of law governing the uses of international rivers. Contributions from the Indus Basin; *Proceedings of the American Society of International Law*, vol. 51, 1957, p. 25 – 26. Laylin was to become a member of the team of legal advisers to the Pakistan Government in 1952.

[739] Michel, *op. cit.*, p. 130, with a reproduction of important parts of the report; Laylin, *ibidem.*

[740] Michel, *op. cit.*, p. 132, quoting from: Draft Outline as Prepared by the Indian Designee to the Indus Basin Working Party, annexure 1, p. 35.

[741] Michel, *op. cit.*, p. 132

A draft agreement on water sharing within the context of existing and planned water works was presented three years later, in 1945, by the Chief Engineers of both provinces.[742] This document, representing an engineering (not so much a legal) approach, further elaborated the recommendations of the Indus Commission as to the construction of dams, reservoirs and canals. It aimed to

- provide stability on existing withdrawals from the Indus and the five rivers and
- establish future supplies for envisioned projects.

The draft set out five priorities, with existing supplies per season ranking first. Potential *additional supplies for projected canals*, *storage water and other subsequent allocations*, and *balance supplies* were also listed as priorities.[743] A striking aspect of this document is the **detailed regulation** of supplies to Punjab and Sindh per location (river and canal off-take) and per season. Allocations were quantified canal-wise on a monthly basis, either in actual quantities (acre feet) or proportionally, and even time lags and shortages due to hydrological dynamics were taken into account.[744] The typical irrigation method practised in Sindh (inundation) was taken into account by allowing as much water as *river levels permit*.[745]

The fate of this draft agreement was overshadowed by the impending independence of India and Pakistan and the vast political and administrative challenges attached to it. As Michel plainly puts it, *decisions on irrigation schemes and allocation of water … were losing priority to decisions on constituent assemblies, interim governments, and boundaries*.[746] In retrospect, the 1945 draft nevertheless marks a step forward as it

- allocates water on the basis of a **transparent**, **precise** and **long-term** schedule,
- sets **clear targets** and names **priorities**,
- establishes **norms** of water sharing based on equitable utilization and the prevention of significant harm to downstream stakeholders,
- underlines the **economic rationale** of water utilization by detailing compensation in case of losses suffered by one side due to projects implemented by the other, and
- provides for an **dispute resolution mechanism** in the form of an independent arbiter.

The draft did not receive approval from either side. The objections raised in the following months initially focused on the compensation issue.[747] The critical point was the **lack of precision** regarding the amount that Punjab would have to pay to Sindh.

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[742] The *Draft Agreement between the Punjab and Sind regarding the Sharing of the Waters of the Indus and five Punjab Rivers* was presented to the colonial administration on 28 September 1945 by the Chief Engineer of Sindh, J. L. Grant, and the Chief Engineer of Punjab, E. L. Protheroe. I am grateful to Chaudhry Mazhar Ali, adviser to the Punjab Irrigation Dept., for providing me a copy of the document.

[743] Annexure I.

[744] No less than 17 tables were attached to the draft agreement, detailing allocations according to priorities established in the main text.

[745] Annexure I, 8

[746] Michel, *op. cit*., p. 132. The author notes that the much delayed process to implement Bhakra not only meant a loss of projected income over many years, but also that the chance to arrive at a comprehensive agreement on water rights and canal operation in time before Partition was missed.

[747] Cf. correspondence between the chief engineers of both provinces: letters of 13 Oct. 1945 (Punjab to Sindh), 25 Oct 1945 (S to P), 22 Nov. 1945 (P to S), 7 Dec. 1956 (S to P), 7 Jan. 1946 (P to S), 30 Jan. 1946 (S to P), 22 June 1946 (P to S), 16 July 1946 (S to P), 26 Aug. 1946 (P to S), 28 Dec. 1946 (P to S), 26 Feb. 1947 (S to P), 18 Mar 1947 (P to S).

In a suggested alteration offered four weeks later, Punjab plainly agreed to compensate Sindh in the case of *financial loss* with a *sufficient sum*, reserving the right of its government to examine the Sindh's estimate or *make its own estimate,* rather than accepting the *productivity* of a project as a reference, as it was demanded by Sindh.[748] A mode by which such losses would be calculated could not be agreed upon in the further discussions. Thus the draft continued to lack a solid basis for further discussions. Interestingly, many decades later, the 1945 document is frequently referred to as *a milestone in water apportionment* (M. A. Shaikh) and *an instrument of great significance* (G. K. Soomro) which provided for *true historic distribution* (Mir Atta Talpur).[749] Hakro and Lashari even claim that *it has been followed, both in letter and spirit, up to the break-up of One Unit*.[750]

After a couple of months of fruitless dialogue, another issue – water supplies – was raised by Punjab.[751] As no understanding could be reached on the level of engineers, representatives of both sides – members of the provincial governments and their chief engineers – met for **direct talks** for the first time from 26 to 28 August 1946 at Simla. The conference went over the whole draft of 1945 and addressed the disputed issues, yet without arriving at an agreement. The Punjab stuck to its demand to *make its own estimate of an equitable contribution* to the projects in Sindh, whereas Sindh maintained its demand of financial compensation based on the *productivity* of the projects.[752]

The debate over the draft agreement has highlighted a general problem of agreements on water sharing: the **quantification** of gains and losses incurred by both sides – as well as the economic potential of an irrigation system, for that matter. It seems to be a difficult, if not impossible task to establish solid figures – not only but especially in a complex case like the Indus Basin, with its many tributaries and canals. A large river basin, particularly in a developing environment like the fledgling economies of Sindh and Punjab, is a highly dynamic setting. Dispute over the figures – first the financial compensation for lost economic opportunities, then the water shares – was inevitable.

As the 1945 draft had not specified the *financial issues*, the Simla meeting only arrived at a *draft of the financial clauses*, yet leaving the actual amounts open to further discussion.[753] An offer from Punjab, put forward in December 1946, was rejected by Sindh.[754] Thus an 18 months period of bilateral dialogue over the draft

[748] Memorandum of Understanding, attached to letter of 13 Oct. 1945.
[749] Mohammed Ali Shaikh: Keynote address; in: SZABIST Center for Information and Research, ed.: *The Indus irrigation issues. A seminar report on water shortage in Sindh. Cause, consequence and cure*; Karachi: SZABIST, 2001, p. 9 (M.A. Shaikh is director of SZABIST); M. Talpur: Water shortage in Sindh: causes and consequences; www.geocities.com/indusfarming/issues/wsis.htm (March 2001; the author is a member of the World Sindhi Congress); G. K. Soomro: Indus water allocation; 1980, p. 53, quoted in Palijo, *op. cit*., p. 22.
[750] Ahmed Nawaz Hakro & Azhar Lashari: Greater Thal Canal. Another misadventure; Islamabad: Sungi Development Foundation and Actionaid Pakistan, 2005, chapter VI, p. 78; www.sungi.org/publications/reports/GreaterThalCanalStudy.pdf (July 2008). Reference is made to Palijo, *op. cit.*, p. 20. This reference, however, is inaccurate; Palijo, p. 20, only reproduces parts of the 1945 document, referring to the Soomro book (see previous footnote) as the respective source. Unfortunately Soomro's book could not be located in the course of this study for further verification.
[751] See letter of 22 June 1946.
[752] Cf. correspondence, as quoted above, especially letters of 25 Oct. 1945 and 22 Nov. 1945.
[753] Cf. Sindh Punjab draft agreement of 1945, para. 18; Draft of the Financial Issues, 27 Aug. 1946.
[754] Cf. correspondence of 28 Dec. 1946 and 26 Feb. 1947.

agreement ended with neither side showing any sign of compromise towards the higher goal of reaching a practicable agreement on which future water plans could be built. No effort had been made to eliminate or circumvent the intractable problem of quantification. By making themselves dependent on precise figures, both stakeholders – once again confirming their near-chronic mutual mistrust – found themselves in a dead end.

In sum, several characteristic aspects mark the early**,** pre-independence phase of the dispute between Sindh and Punjab:

- the intricate problem of **adjusting water supplies** from Punjab to water needs in Sindh in terms of timing and quantity;
- the hydrological **asymmetry** manifested itself in the further development of the irrigation network and was paralleled by an increasing economic asymmetry with every new water project in the upstream region of the basin;
- **technical committees** led by water experts delivered recommendations based on hydrological assessments that took into account the potential impact of upstream water works on downstream water supplies; these committees represent a degree of **coordination** through a higher authority (the colonial administration) proved acceptable to both sides; their recommendations proved by and large acceptable to both sides;
- a **strong mistrust** of Punjab's intentions by Sindh, expressed in an almost automatic suspicion of water losses perceived as an inevitable result of any upstream water works;
- a **limited readiness** of both sides, Sindh and Punjab, to engage in a cooperative process to establish the principles for long-term water sharing, indicated by a tendency of demanding concessions that have already proved unacceptable to the other side;
- a fixation on **exact figures** regarding water supplies;
- the sharing of benefits (water supplies, economic potentials, financial contribution or compensation) did not prove to be an agreeable solution, indicating that **political, rather than economic interests** might have been a priority.

At the beginning of independence, Sindh and Punjab found themselves empty-handed. Two important opportunities had been missed, even though both the Rau Report and the Draft Agreement had provided practicable answers to the demands of Sindh without compromising the plans of Punjab. While the speed of the independence procedures could not have been foreseen by the stakeholders, there still was an acute **need for a pragmatic solution** if one believes the frequent reminders of Sindh regarding the recurring losses from upstream withdrawals and Punjab's stated desire to increase the irrigation network in order to reap economic benefits for a quickly growing population.

Consequently, due to the **inability of Sindh and Punjab to reach a consensus** on the utilization of the Indus the future of water supplies to both sides was uncertain. Clearly, even a compromise would have served the interests of both sides better because it would have been much easier to renegotiate an existing agreement (in the case of new projects, for example) – by relying on an already agreed *modus operandi* – than starting from scratch at every new development, not to mention the confidence built by a first agreement. The reasons for this inability can only be guessed. On the part of the Punjab, it might have been the hope that its already existing dominance

could be used politically to more or less dictate the further development of the whole river basin without regard for other provinces' interests. On the part of Sindh, it might have been the hope that an even better outcome could be in the cards, as the Indus Commission had already put a particular focus on the situation of Sindh.

From a Rational Choice perspective, both positions were somewhat understandable to a degree – especially that of Punjab, as it had well-founded hopes that the promising irrigation network would be developed further. The historical turn of events, however, would soon demand a reassessment on all sides. The introduction of **compensation** as a scheme to balance benefits was an important step that could have helped to alleviate the one-sided effects of hydrological asymmetry.

With regard to the institutional aspect of the draft agreement, the observation that **precision** (in wording and figures) can have a positive or negative effect is important. Precision at first seems to make cooperation easier, yet in the special case of water and water-related development it might sometimes obstruct cooperation, as the early Sindh – Punjab dispute indicates. It remains to be seen whether and how this aspect has been dealt with in the course of events after independence.

Independence: India versus Pakistan, Punjab versus Punjab versus Sindh

Independence meant the discontinuation of the drainage basin concept of water management in engineering as well as legal terms. India and Pakistan found themselves in the same position as the now divided portions of Punjab as well as Pakistan's provinces of Punjab and Sindh. India was in control of the upper reaches of the basin as well as the head works of some of the main rivers.[755] Most of the canals, however, were on Pakistani soil.[756]

The need for an agreement with India, now a sovereign neighbour and the legal successor to the former colony, seemed evident, yet the circumstances were extremely unfavourable for any form of cooperation. Internally, in Pakistan the institutional environment was not yet in place to communicate – much less negotiate – the management of water supplies from the Indus system. The mass migration of millions of people, often under conditions of violence, had created a chaotic situation. Externally, the conflict over Kashmir exploded onto the scene, subordinating almost all other bilateral issues to concerns of security.

Four months after Partition, two **Standstill Agreements**, agreed by the Arbitral Tribunal which consisted of the Chief Engineers of the Indian and the Pakistani Punjab, determined water sharing between both countries on the Upper Bari Doab

[755] Pakistan throughout this and the next chapter is synonymous with West Pakistan in terms of water as the then province of East Pakistan (later to become Bangladesh) is not a part of the Indus system.

[756] René Klaff: Der Induswasserkonflikt – Ansätze einer pragmatischen Wasserpolitik in der Konfliktregion Südasien (The Indus water dispute – in search of a pragmatic water policy in the troubled region of South Asia; in German); in: Jörg Barandat, ed.: *Wasser – Konfrontation oder Kooperation*; Baden-Baden: Nomos, 1997, p. 246 – 249; Gulhati: Indus Waters Treaty, *op. cit*., p. 59, 454. The migration of large numbers of people from West to East Punjab shifted the pressure to develop the water infrastructure to the East; cf. Arnold W. Knauth: The Indus River System; *Proceedings of the American Society of International Law*, vol. 54, 1960, p. 135.

Canal and the Sutlej Valley canals for the Rabi 1948 season, i.e. until 31 March 1948, on a *status quo ante* basis, effectively prolonging the pre-partition mode, implying that *the parties may execute a further agreement*. The so-called Committee B, in coordination with the Partition Committee, approved both agreements which then became effective.[757] Its recommendation stated that there should be *no interference whatsoever with the then existing flow of water*.[758]

For the Pakistani provinces this meant that water supplies remained unaltered – at least for the time being – while the negotiations between India and Pakistan would continue, yet without provincial participation. Given the overarching Kashmir dispute and the still unstable social, political and economic situation of the provinces, active participation in the water talks was not realistic, and it was not necessary either – at least not yet. It even seems that both the central government of Pakistan as well as those of the provinces considered the interim agreements somewhat sufficient. Hectic diplomatic activity, in any case, did not take place. As Niranjan Gulhati, a witness to the process, observes: *Joint control by the East and West Punjab of any installation in either country was … out of the question under the conditions which followed partition … But the immediate problem of continuing water supplies to the numerous canals … was relatively simple*.[759]

The interim agreements of December 1947, concluded along the lines of the previous, colonial-era mechanisms, had basically frozen the pre-independence *status quo* in order to give both sides time to reach a long-term solution. Significantly, the **issue of compensation** by the upper riparian (India / East Punjab) to the lower riparian (Pakistan / West Punjab) was excluded, reflecting an awareness that the stumbling bloc in the pre-1947 negotiations might cause trouble in the now developing bilateral relationship.[760] As will be seen, this aspect would indeed surface again and again on the road to a comprehensive bilateral agreement, finally to be reached in 1960.

Water finally and inevitably did get adequate attention from decision-makers in Pakistan when the 1947 interim agreements expired. East Punjab cut off water downstream supplies, leaving most canals in West Punjab without water.[761] While the actual physical effects in Pakistan were minimal, this sudden, though not unexpected closure of the canals would have a lasting **psychological effect**. Throughout the decades to come, and even after the conclusion of the comprehensive Indus Treaty of 1960, this incident would be referred to in Pakistan as proof of India's alleged intention to exert political pressure on its antagonist neighbour by harming its

[757] Excerpts from both documents, done on 20 Dec. 1947, are quoted in B. R. Chauhan: Settlement of international and inter-state water disputes in India; New Delhi: Indian Law Institute, 1992, p. 83 – 84.
[758] The Tribunal's chairman, Patrick Spens, quoted in Laylin: Principles, *op. cit*., p. 27.
[759] Niranjan D. Gulhati: Indus Waters Treaty. An exercise in international mediation; Delhi: Allied Publishers, 1973, p. 58. Gulhati, providing a rare and balanced inside account, was the Indian member of the Working Party to negotiate the Treaty of 1960.
[760] Art. 3 of both the Upper Bari Doab Canal Agreement and the Sutlej Valley Canals Agreement, reproduced in Chauhan: Settlement, *op. cit.*, p. 83 and 84.
[761] This action apparently was not coordinated with the central government. Prime Minister Nehru was reported to have been furious at the provincial government; cf. Gulhati: Indus Treaty, *op. cit*., p. 64; it was, however, announced to West Punjab in advance. Gulhati adds that the first closure, of December 1947, did not cause major damage because *the critical period for sowing the summer crops begins only towards the latter half of April*, p. 67.

economy. In turn, as will be seen, this incident served to justify Pakistan's defiant and often intransigent position in bilateral relations.

The disruption of water supplies, officially justified with a lack of clarity regarding the status of ownership, compelled Pakistan to negotiate with India. As there was indeed no legal provision applicable to the case at hand, nor a higher authority to decree a solution, both sides were left to enter the diplomatic path. In a sense both sides thus confirmed what the Indus (Rau) Commission in 1942 had anticipated – that *the most satisfactory settlement of disputes of this kind is by agreement*.[762] A political, rather than a judicial, solution would be the likely outcome – in the Commission's words, *once there is such an agreement, that in itself furnishes the law governing the rights of the several parties*.[763] This would require both sides to state and actively pursue their interests, exposing a specific rationality determining each side's moves.

Further developments would show, however, that the Rau Commission's central postulate – that water should be distributed on the basis of **equitable apportionment**, allotting each side a *fair share* – has not been adhered to.[764] Throughout most of the coming years, the positions of both sides stuck to the territorial principle, leaving little actual room for negotiations. Two weeks after the expiry of the interim agreements, the **Inter-Dominion Agreement**, of May 1948, in seven brief paragraphs determined the continuation of water supplies from East Punjab to West Punjab on the basis of territorial rights and the payment of fees by the lower riparian (Pakistan).[765] Interestingly, this Agreement did address the delicate issues of water supplies and fees, yet without establishing precise figures. This aspect is reminiscent of the draft agreement of 1945 as it was this particular point that proved to be a particularly thorny issue. Besides, there was no arrangement for an institutional oversight, thus the implication would rest with the central and provincial governments of either side, with no means of transparency, let alone a facility for the settlement of a dispute. This agreement marked the point that both sides were ready to reach at that time.

Politically, this path was a dead-end road because there was little substance to build on, and the lack of precision and transparency was like an invitation for further dispute. In principle, the downstream riparian essentially would have to accept the demands of the upstream neighbour unless – according to basic game theory – the downstream side had something to offer that would at least equal the expected benefits. Pakistan's approach, however, as well as India's was not guided by a market formula. **Territory** would become the legal foundation of water management. This marked a departure from the late colonial-era in which the principle of equitable apportionment was introduced. The Indian government referred to the Harmon Doctrine of territorial sovereignty as the guiding principle of its position in the dispute with Pakistan. This formula had been widely rejected by scholars and lawmakers

[762] Rau Commission report, quoted in Chauhan: Settlement, *op. cit.*, p. 183.
[763] Chauhan, *ibidem*.
[764] Quote in Chauhan, *ibidem*.
[765] Inter-Dominion Agreement between the Government of India and the Government of Pakistan, on the Canal Water Dispute between East and West Punjab, sometimes referred to as the Simla Agreement, signed by the federal and provincial governments of both sides on 4 May 1948; www.internationalwaterlaw.org/RegionalDocs/Punjab-Canal.htm (May 2001).

elsewhere, as Laylin points out.[766] But in the absence of a legal norm on trans-national rivers, any judicial approach was hampered.

A second Inter-Dominion Conference, in August 1949, ended by recommending a joint technical commission in order to assess water needs of India and Pakistan. In the following months, a negotiating committee, during three meetings in 1950, was supposed to agree on details of the technical commission's procedure, yet did not reach a consensus.[767] Pakistan stuck to its prior-use formula - which India rejected, insisting on the technical commission. The establishment of a **quantitative basis** could have introduced demand management (rather than supply management) and – at least hypothetically – helped an engineering approach that might have staved off political manoeuvring and manipulation. Water sharing could then have become a more technical (rather than psychological) issue, requiring mainly a reliable allocation mechanism and a transparent mode of supervision.

Making matters worse, the next problem brought up were those waterways that were not mentioned in the agreement of 1948. Curiously, the 1948 Agreement remained valid in principle even though Pakistan did not consider itself bound to it any longer, yet continued to receive water supplies on that very basis while at the same time questioning the water charges demanded by India.[768]

A critical look at stakeholder positions and dispute handling up to that point finds several deficits. From a water management perspective, the failure to establish a quantitative basis for future water allocation – mainly due to Pakistan's refusal – blocked an engineering solution. Pakistan's approach, understandably, was to secure the supplies of the pre-1948 level. The need to save water with a view to drastically rising populations was not yet realized. From an institutional perspective, the lack of precision and transparency regarding water supplies and corresponding water charges undermined the relationship between both sides.

On the political front, the Kashmir conflict served to exacerbate the water problem, and both sides used the territorial dispute to assert their new-found autonomy. The implicit linking of both disputes inevitably made the handling of either conflict more complicated. In sum, external conditions for a cooperative water agreement were as unfavourable as could be. Outside observers familiar with the water dispute even feared *another Korea* – a major Asian war which Western powers might be drawn into.[769] Third party engagement was not an option as India categorically rejected

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[766] Laylin: Principles, *op. cit.*, p. 27 - 28.

[767] Gulhati, *op. cit.*, p. 76.

[768] Gulhati, *op. cit.*, p. 84, 86. For a detailed analysis of this period see Undala Z. Alam: Water rationality: mediating the Indus Waters Treaty; unpublished PhD thesis, University of Durham, 1998, p. 53 – 57. This study also reproduces some of the World Bank correspondence with both sides. The study was temporarily published online at www.transboundarywaters.orst.edu/publications/ (download: June 2003). Permission to quote was kindly granted by the author in Dec. 2010.

[769] David E. Lilienthal: Another "Korea" in the making? *Collier's*, 4 Aug. 1951. Lilienthal was a former Tennessee Valley Authority (TVA) chairman. His warning that *no army, with bombs and shellfire, could devastate a land as thoroughly as Pakistan could be devastated by the simple expedient of India's permanently shutting off the sources of water that keep the fields and people of Pakistan alive*, dramatic as it sounded, has been referred to by many activists in Pakistan in order to keep the Indian threat alive. According to Jawaharlal Nehru's biographer, the Indian Prime Minister was willing to be *generous on other matters such as the flow of the Indus canal waters to Pakistan*. Yet Kashmir and the political system of Pakistan proved to be intractable: *… all these efforts at better relations were lost to sight with the overthrow of the democratic system in Pakistan and the declaration of martial law*;

outside involvement, including the International Court of Justice – a step continuously advocated by Pakistan.[770] In a show of force, Pakistan had tried to compel India to accept a legal solution by announcing that further payments were contingent on India accepting an ICJ ruling.[771] This **power game** added to what had become a confrontational, rather than cooperative approach to the water problem. River development, meanwhile, continued without any degree of coordination on both sides.[772]

Pragmatism and compulsory cooperation: enter the World Bank

The 1950s saw some progress towards cooperation, mainly due to **external intervention**. The World Bank, in 1951, issued a proposal for a comprehensive plan for the development of the Indus River system.[773] This initiative was at least partly triggered by the fear of a wider war between the two antagonists and – in this context – a desire to stress the relevance of the United Nations as the chief supranational forum of dispute prevention.[774] The Bank followed a rather pragmatic, strictly water management-oriented path in dealing with the increasingly antagonistic parties, advocating an integrated river management approach based on the recommendations of water engineers.

The starting point of this approach was the assumption that the existing availability of water in the basin was sufficient to satisfy the current needs of both countries. The task ahead was to find a **cooperative mode** for the joint utilization of these resources. From the Bank's perspective, the solution was comprehensive long-term river development planned and executed by water management experts from both sides, with technical and legal assistance from the Bank.[775] As this plan would take time to be developed and discussed, both sides agreed that the existing supplies should be upheld, without pre-empting legal rights. The Inter-Dominion Agreement thus remained in effect, yet without being referred to in the tri-partite negotiations.[776]

For the provinces of Pakistan, the Working Party set up to devise the plan was the first forum in which they were actively involved. Though the Chief Engineer of the Punjab was to lead the Pakistani team, engineers from Bahawalpur, Sindh and NWFP were included as advisers.[777] Before that, Sindh, not being represented in the central water management apparatus, had no effective means of participation. Sindh, at the bottom end of the hydrological system and the political hierarchy as

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Nehru, on 16 Aug. 1958, quoted in Sarvepalli Gopal: Jawaharlal Nehru. A biography; Bombay: OUP, 1979, vol. 2, p. 28 and vol. 3, p. 86 respectively.

[770] John G. Laylin: Indus River System; *Proceedings of the American Society of International Law*, vol. 54, 1960, p. 146.

[771] Alam, *op. cit*., p. 56, referring to Gulhati, *op. cit*., p. 83.

[772] Gulhati, *op. cit*., p. 85 – 86.

[773] This process was initiated by Lilienthal's approach to the Bank's chairman, Eugene Black; cf. Gulhati, *op. cit.*, p. 93 – 94.

[774] Laylin: Indus, *op. cit.*, p. 149, referring to the New York Agreed Recommendation no. 1, of 1958, demanding that *co-riparian states should refrain from unilateral acts or omissions that affect adversely the legal rights of a co-riparian state in the drainage basin*, and invoking *the procedures envisaged in Art. 33 of the UN Charter*. This article basically requires nations to apply peaceful means to resolve disputes.

[775] Gulhati, *op. cit*., p. 98.

[776] Gulhati; *op. cit*.; p. 99 – 102, 183 - 186; Michel, *op. cit*., p. 204.

[777] Gulhati, *op. cit*., p. 103.

well, depended on a solution of the India – Pakistan and Punjab – Punjab dispute and would effectively be left to receive whatever water was left in the system after the upper riparian stakeholders had withdrawn their shares because Sindh (as well as the other provinces of Pakistan) was not mentioned in the agreement of 1948. The Bank initiative, on the surface, diminished the role of the provinces (i.e. East and West Punjab) as it was the central governments of both countries that were the partners of the Bank. Yet in reality it would in the long run open the road to a more active engagement of all riparian provinces by including them into the integrated basin concept.

In the coming years, water management in both countries followed a **parallel course**: On the one hand, the bilateral engineers' discussions went ahead as planned by the Bank; on the other hand, the unilateral water projects of both countries, initiated soon after independence, took shape: on the Indian side, the Harike project, crucial to harness the Sutlej waters for diversion into the wider Bhakra-Beas-Rajastan scheme; on the Pakistani side a series of link canals designed to avert water shortages in the event of a sudden canal closure upstream in East Punjab.[778] Theoretically speaking, this was a **combination of egotistic and collaborative action**. Practically speaking, it was the World Bank's pragmatic approach which was stringently oriented at a technically feasible solution acceptable to both sides that saved the day. The Bank's recommendation of 1954, based on the chief engineers' findings, focussed on the infrastructure to be built; the original recommendation for a joint river management was discarded as unrealistic in the face of the growing antagonism.[779] Instead, it was suggested that the basin should be split giving India full control over the eastern tributaries and Pakistan full control over the western tributaries.

The Bank's constructive approach succeeded in keeping both sides at the negotiating table. Though the 1954 plan had to undergo changes – due to Pakistan's objection to the concept of link canals which was seen as insufficient – it made further interim agreements possible which were necessary until a comprehensive long-term solution would be found. This fact might have been underestimated by the Pakistan government which, while turning down the Bank proposal without offering an alternative solution, still set its hopes on yet another *ad hoc agreement* with India.[780] It may be speculated whether such an agreement – which mainly brought benefits for Pakistan, less for India – would have been forthcoming in the absence of the third party. India had in fact signalled that unless Pakistan agreed to the Bank's plan in principle, its consent with another interim agreement could not be expected.[781] The Bank, of course, had already made it clear that a solution to the water issue was a *top priority*.[782] Thus Pakistan in a sense had less of an incentive to

[778] Michel, *op. cit*., p. 205 – 210.
[779] Gulhati, *op. cit*., p. 136 - 138. The original plan drew on suggestions from Lilienthal, the former TVA chairman.
[780] Gulhati, *op. cit*., p. 158, citing a letter of the Government of Pakistan to the Government of India, 5 June 1954.
[781] G. T. Keith Pitman: The role of the World Bank in enhancing cooperation and resolving conflict on international watercourses: the case of the Indus Basin; in: Salman A. Salman & Laurence Boisson de Chazournes, eds.: *International watercourses. Enhancing cooperation and managing conflict; World Bank Technical Paper* no. 414, 1998, p. 161.
[782] World Bank President Eugene Black, December 1954, cited by Gulhati, *op. cit*., p. 172. The opinion of Klaff that the 1948 war over Kashmir had promoted both sides' realism as to the rewards of an agreement and the costs of ongoing conflict appears to be overly optimistic given the lacking

contribute towards an agreement – *e.g.* by compromising on the financial issue – because its government could expect the Bank to seek a solution even without much of a Pakistani (or Indian) contribution. This situation was almost tantamount to an offer of free-riding, in game theoretic terms. Pakistan's last-minute efforts to raise the stakes for India and the Bank, as will be seen later, seem to point in that direction.

While both sides would take years to reach a comprehensive long-term settlement, four **interim agreements** were arrived at, regulating the water supplies on a seasonal basis between 1955 and 1960.[783] From a water management perspective, these interim agreements meant a step forward not so much by securing water supplies for yet another fixed period, but by establishing the **principle of replacement**, as Gulhati points out.[784] On this basis the 1954 proposal was revised to envision further construction projects that would be implemented in the years to come, while the water supply was maintained. As India had signalled its readiness to contribute financially to replacement works in downstream West Punjab, further contributions from third parties were secured through extensive World Bank diplomacy. The discussion of the projects would be the task of the Indus Basin Development Commission, jointly manned by representatives from India and Pakistan.[785] Following a review of claims by Pakistan that the surplus water from the Western rivers was not sufficient to replace the Eastern rivers (which would go to India), the 1954 replacement scheme was augmented by a set of storage facilities and link canals. This brought significant additional costs which India was not prepared to cover.[786]

The financial assurance, secured by the Bank in 1959, meant that Pakistan was left with no practical argument against the plan.[787] The hydrological conditions, however, remained a challenge. Pakistan was concerned about the Indian control of the upper reaches of the Indus Basin. While the proposed water works would make more water available, the main water supply from the rivers was still – hypothetically at least – subject to Indian non-interference with the natural flow regime of the western rivers. The **asymmetry** of water supplies meant that Pakistan was dependent on India. This problem, fully realized by the Bank, could not simply be solved through an agreement or a treaty, as this would only represent a political measure too weak to alleviate *Pakistan's extreme suspicion of Indian intentions towards her*.[788] An international

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readiness to compromise particularly on the Pakistani side; cf. Klaff: Induswasserkonflikt, *op. cit.*, p. 259.

[783] The document texts of the four Inter-governmental Agreements are reproduced in: Ministry of External Affairs: India Bilateral Treaties and Agreements, vol. II (agreements of 12 June 1955, 31 October 1955 and 24 Sept. 1956) and vol. III (agreement of 17 April 1959); New Delhi: Government of India, 1994.

[784] Gulhati, *op. cit.*, p. 187. The fact that the prestigious Ghulam Mohammad Barrage in Sindh proved to be an *unmitigated failure, ill-conceived in the extreme* in the words of Michel, *op. cit*., p. 213, might have added pressure on Pakistan to seek at a long-term solution.

[785] Gulhati, *op. cit*., p. 257.

[786] Syed Salal Kirmani: Water, peace and conflict management: the experience of the Indus and Mekong River Basins; *Water International*, vol. 15, no. 4, 1990, p. 202. Kirmani was a member of Pakistan's negotiating team and later a WAPDA director in charge of irrigation projects under the IWT.

[787] The readiness of the U.S. and its main allies to put considerable funding behind the Bank's plan needs to be understood within the Cold War context. The 1950s were a particularly crisis-laden period (Berlin, Korea, China/Taiwan, Egypt, Iran, Vietnam/Laos) and the prospect of keeping Pakistan and India out of the sphere of Soviet influence was a strategic objective of the Bank's effort.

[788] … in the words of Gulhati, *op. cit*., p. 271 – 272. The spectre of India blocking the river for more than a brief span of time was discarded as technically unrealistic by Bank officials in 1951, when the issue came up for the first time, according to Gulhati, *op. cit*., 313.

legal provision was also not at hand, and thus the UN would not be able to play the role of an effective supervisor of any bilateral agreement. Faced with the inability to guarantee Indian non-interference, the Bank instead shifted the focus on irrigation and storage schemes that would enable the lower riparian stakeholder (Pakistan) to operate its agricultural economy at a level of minimal physical dependence on the upper riparian neighbour.

The situation of the provinces in Pakistan did not change much until 1955. Water management was conducted on the basis of the 1948 supplies and the provisional agreements that followed. The legal framework continued to be the Government of India Act of 1935 which had effectively turned the provinces into competing stakeholders. In the absence of a national water policy or any binding mechanism, the provinces – particularly Sindh and Punjab – pursued their own water development programmes, more or less without coordination among themselves.[789] One important factor in this uncoordinated development was the political instability not only of the federal government, but also those of the provinces which saw a row of governments come and go.[790]

This development which ran parallel to the bilateral negotiations between India and Pakistan came to a halt with the suspension of the federal system, by the introduction of the so-called One Unit rule and the suspension of the provincial set-up, in 1955. This initiative by the Governor General was at least partly motivated by the lack of political coherence among the provinces of (West) Pakistan, between East and West Pakistan and on the national level. **Stability** was still a major concern in a country which had experienced a massive influx of migrants as a result of the Partition, a dearth of economic opportunities and jobs, a lack of legal and administrative provisions, and an unclear water management mechanism which put the economic future of the whole nation in jeopardy.[791]

As the central government led the negotiations with India and the Bank, the provinces were by and large left to accept the outcome or oppose it with whatever means possible. Internal pressure on the government apparently did have some effect, as Alam observes.[792] The provinces, rivals from pre-independence days, had since pursued their individual water management schemes without coordination. When the Bank proposal emerged as the likely foundation of future irrigation development, Sindh pressed its case regarding the barrages at Sukkur and Gudu which both relied on water supplies from the Indus and its tributaries, aggressively opposing the replacement schemes for their potential threat to downstream irrigation.[793] Sindh's position thus also gained recognition in terms of financial commitments.[794]

Sindh's stance on the one hand would delay the negotiating progress, yet on the other hand it turned out to be essential to protect the interests of this province

[789] Michel, *op. cit.*, p. 218.
[790] Alam: Water rationality, *op. cit*., p. 90, referring to A. Tayyeb: Pakistan: a political geography; London: OUP, 1966, p. 179.
[791] The country's first constitution, passed nine years after independence, did not address any aspect of water management.
[792] The inter-provincial rivalry is described by Alam as the *fifth layer* of the Pakistan Government's position in the negotiating process; Alam, *op. cit*., p. 110.
[793] Michel, *op. cit*., p. 245.
[794] Michel, *op. cit.*, p. 243.

because since the start of the One Unit system, provincial representation in the negotiations was non-existent. Needless to say, the perceived neglect of Sindh's interests by the central government obviously did not serve the stated aim of national unity, but rather reinforced the province's suspicion.

The political and legal position of the provinces remained weakened throughout the One Unit rule. The newly established Water and Power Development Authority (WAPDA) and the West Pakistan Irrigation Department obtained full control over all water schemes – including water distribution – in the western half of Pakistan, encompassing the territories of the former provinces Balochistan, NWFP, Punjab and Sindh. WAPDA is essentially a central government institution; its chairman and leading officers (Member of Water Wing and Member of Power Wing) are appointed by the government; institutional oversight is by the Ministry of Water and Power.[795] Provincial representation on any level is not provided in its main statute, the WAPDA Act of 1958, neither is coordination with the provinces or other administrative units relating to provinces or districts.

The Authority's *general powers and duties* range from *irrigation, water supply and drainage* to flood control and the *prevention of water-logging and reclamation of water-logged and salted lands*.[796] A wide range indeed, and there is no mention of provincial prerogatives as established by the Government of India Act (1935) or the Canal and Drainage Act (1873) – both of which were still considered valid in the post-independence years.[797] Only in 1959, through an amendment act, WAPDA was required to seek the approval of provincial institutions in the case the Authority would take over the execution of a provincial water project.[798]

The execution of the new projects envisioned in the Bank plan would be WAPDA's first task. For that purpose, the Indus Basin Advisory Board (IBAB) was created in 1959. Its task, according to Michel, was *to coordinate planning among WAPDA, the Irrigation Department, other agencies concerned, and the treaty delegation with its consultants*.[799] WAPDA and the IBAB were also tasked with estimating the cost of the planned projects – a matter of further dispute – which again raised the Authority's status.[800] What must have seemed a pragmatic step from the Bank's perspective – to have one institution in charge of implementing the plan where there wasn't any at all until 1958 – amounted to a factual **elimination of the actual stakeholders**, the provinces, from the biggest development programme in the history of the subcontinent. In the words of Palijo, *the IBAB plans, decisions and the international negotiations … were purely a Punjab affair*.[801]

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[795] WAPDA Act, Art. 4; document text: www.punjablaws.gov.pk/laws/86.html (April 2013).
[796] WAPDA Act, Art. 8.
[797] It was not until 1975, following the 1973 constitution which formally restored the original status of the provinces, that the WAPDA Act was revised through the Federal Adaptation of Laws Order (No. 4, 1975). WAPDA, by Art. 16, was required to address provincial authorities after the completion (!) of water works in order to facilitate future maintenance of the said works.
[798] WAPDA (Amendment) Ordinance (XIII, 1959), Art. 9-A.
[799] Michel, *op. cit.*, p. 249. Palijo notes that the then Chief Engineer of WAPDA, A. R. Kazi from Sindh, was not included in IBAB; cf. Rasool Bux Palijo: Sindh – Punjab water dispute, *op. cit.,* p. 90.
[800] WAPDA's cost estimates were a full 50 per cent above the Bank's projections, indicating WAPDA's political role in the growing dispute between the GoP and the Bank; cf. Michel., *op. cit.*, p. 252.
[801] Palijo, *op. cit.*, p. 90.

The lack of institutional mechanisms for the articulation and communication of stakeholder interests in Pakistan effectively prevented the participation of the provinces in the development and management of the Indus River system – including water distribution – until 1973 when the new (and final) Constitution was established. Compared to the pre-1947 situation, the *de facto* status of the provinces as such, with the practical exception of Punjab, was lower than after independence when it came to joint water management. As a result the relationship between the provinces, particularly Sindh and Punjab, was bound to deteriorate, dampening hopes of the central government to strengthen the unity of the country. The failure, early in the establishment of Pakistan as a culturally heterogeneous nation, to give the provinces a say in the development of their economies would be a major factor in the drawn-out process to reach an inter-provincial water sharing agreement. As will be seen in the next chapter, this process would take even longer than the bilateral agreement with India.

In sum, the water dispute of the early post-independence period (1947 – 1960) was resolved on the level of the central governments of India and Pakistan, both with only marginal representation from their respective provinces. The interests of the stakeholders – the provinces and states – were nevertheless taken into account, yet only because of their **direct intervention** with the governments and the third party, the World Bank. The Bank's effort represents both a strategically motivated effort to defuse the ideological and political tensions between India and Pakistan and the pragmatic introduction of a comprehensive, basin-oriented water management and distribution scheme to a region that was dominated by territorial rivalries. Cooperation, in Michel's words, was *purchased* by the Bank and the supporting nations, offering funding in return for signatures under the document.[802]

Though the Treaty as such may be seen as a proof of cooperation, the interaction between central and provincial governments in Pakistan and among the provinces was not. **Rivalry**, not just competition, and egotistic behaviour, rather than coordination, characterized inter-provincial relations. **Suspicion** towards the centre, at least on the part of Sindh, was the main obstacle to constructive centre – province relations. The centre did not exhibit any awareness of provincial concerns and consequently failed to represent them in the negotiations. The provinces as such were blocked from becoming active stakeholders by their own inability to form stable governments that could state and defend their interests. Punjab was in a better position, even though it was also plagued by political instability (not to mention the social problems due to the mass immigration), because most of the projects were situated on its territory. There wasn't any need to articulate its interests as they were by and large represented by the centre. Its proximity to the centre was further underlined by the location of the new water authority: WAPDA is headquartered in Lahore.

Finally, after another round of consultations with the concerned governments in 1959, a draft based in essence on the 1954 Bank proposal was developed. The central ingredient was the **separation of the basin** into a western half, consisting of the Indus, Jhelum and Chenab, to be under Pakistan's control, and an eastern half, consisting of Beas, Ravi and Sutlej, to be under Indian control. Both countries would enjoy more or less exclusive use of their allotted rivers – at least once the

[802] Michel, *op. cit.,* p. 254.

replacement works were completed. For that task a ten-year transition period was written into the treaty. Construction of the replacement works in Pakistan was backed by a detailed financial support scheme, to be funded mostly by a consortium of leading World Bank member countries.[803] The IWT solved the core issues of the dispute, as it guaranteed sufficient water supplies to Pakistan to enable both the upstream and downstream provinces to pursue their water projects; India would contribute only a limited amount to these projects as the bulk would be financed by the third parties.

Thus the IWT provided a solution to the 13 year-old conflict which had not seemed possible when the Bank entered the process. Interestingly, despite the lack of a cooperative spirit in both India and Pakistan, progress on the water issue culminating in the Indus Waters Treaty might have had a positive effect on another area of bilateral relations. By early 1960 a long-standing territorial dispute – over a number of minor **border issues** – was partly resolved, a step that had seemed unrealistic only a few years ago.[804] Though the main issue, Kashmir, would remain a divisive factor for decades to come, the 1960 border agreement signalled that cooperation was possible – even without outside intervention and material incentives.

Conclusion

This overview of water sharing in the Indus Basin has demonstrated the multi-dimensional nature of the water conflict in the Indus Basin. While it is difficult to pinpoint the exact beginning of the evolving dispute between the provinces, there are several key factors that dominate this period and are likely to overshadow future approaches to reach an agreement on water sharing.

First, the **colonial legacy of troubled inter-provincial relationships**, particularly between Sindh and Punjab, stands out as unfinished business. The perceived uneven distribution of water from the Indus Basin proved to be a major stumbling bloc on the path to reach a settlement with India and consolidate the troubled political, social and economic system of Pakistan. The hydrological **asymmetry** between both provinces was compounded by an increasing economic and political asymmetry favouring Punjab. The independence which – thanks to neglect of the imminent water issue by both the British and the South Asian parties – gave priority to territorial and ideological interests, cemented this status quo without offering any hope for a constructive settlement.

Second, the establishment of the One-Unit rule (1955 – 70) effectively prevented provincial participation in finding a solution to the problem of water sharing. The **centralization of politics** in Pakistan covered the critical period between the conclusion of the 1960 treaty and the post-treaty years when a number of major water works were planned and implemented. From this process the provinces were excluded, as the new central water authority – WAPDA – was in complete charge of the execution of the projects. The central government did little to address the growing

[803] Michel, *op. cit.*, p. 254 – 265.
[804] Agreement between Pakistan and India on West-Pakistan – India Border Disputes; New Delhi, 11 Jan. 1960; document text: http://mgd.nacse.org/watertreaty/textdocs/international/21.htm (Transboundary Freshwater Dispute Database, TFDD, May 2001).

division among the former provinces. None of the more promising pre-independence steps, like the 1945 draft or the Rau Commission's report, was picked up.

Third, the conflict over Kashmir has since 1948 led to a steadily increasing militarization of Pakistan. The constant focus on potential threats from India has not only resulted in a politicization of the armed forces but also in neglecting important tasks of nation-building – most notably water management, federalism, and institutional reform – in favour of an excessive security fixation. Issues like water distribution have since become the object of **political manipulation**, rather than professional water management. The drawn-out process to agree the Indus Waters Treaty shows how an obsession with security – not only, but particularly in Pakistan – has routinely overshadowed water sharing.

Fourth, the **hydrological dynamics** of a large river basin like the Indus make exact water allocation difficult. This means that any quantitative method of water distribution – and along with it, issues of financial compensation *etc*. – are prone to dispute. This aspect, from a game theoretical perspective, represents an obstacle to bargaining, as the fate of the draft agreement of 1945 has demonstrated.

Fifth, the **insufficient readiness of the provinces** to engage in a constructive process to find a long-term solution to the water dispute is indicated by the failure to reach a compromise. As early as 1945, finding a common ground apparently was not considered a worthy objective by either province. It seems that the desire to demonstrate to the other side as well to its own citizens the ability to hold on to a position in the face of opposition was a motive superior to solving the actual problem of water sharing. This manifestation of autonomy – first, against the background of fading colonial control, then *vis-à-vis* the new central government – appears to have been an important factor. As such, this phenomenon is mirrored on the level of India – Pakistan negotiations. Little was done to counter the widespread suspicion on both the international and inter-provincial levels; confidence-building measures have since played a marginal role.

Finally, the failure to return to the **river basin concept** and the adherence to a territorial concept of river management inhibited participatory water management by riparian stakeholders, i.e. the provinces of Pakistan. It seems that this aspect was not fully realized by decision-makers. Cooperation thus faced structural and political obstacles that would only partly be overcome 13 years after independence, with the conclusion of the Indus Waters Treaty. The Treaty cemented the territorial separation, yet by allowing both nations, India and Pakistan, to utilize its resources by and large independently, requiring coordination only in the case of major water works. Cooperation was, in a sense, rendered obsolete.

The theoretical models discussed earlier help explain the problems of water sharing in this early phase. **Water scarcity**, as feared by Sindh, was indeed a motive in the dispute with Punjab. Though the dispute did not turn violent, the rhetoric became more aggressive. Even more so, an expected shortage of water supplies as a result of water withdrawals in upstream India has been a concern of downstream Pakistan ever since and has often been cited as a potential cause of conflict.[805] On the Indian side, the realization that most canals were on Pakistani soil was a factor in Delhi's

[805] For an overview of the ongoing row between both countries over upstream water projects see the next chapter.

reluctance to accede to Pakistan demands. **Water law**, instead, played only a marginal role. The work of the early commissions was guided in part by the norms of international water law of that time, meagre as they were.

Their findings and recommendations, however, did not always receive a positive response from the stakeholders. Their arguments put forward were based less on legal regulations than on perceptions of historical **entitlements**. Of course, there was no basin-wide legal framework, and the concept of a legal framework of a national dimension had not evolved yet – in fact the very idea of a Pakistani nation seems not yet to have taken root in many parts of the country. Local or regional concepts were not in place when the need to cooperate arose, yet the idea of being a riparian stakeholder with established entitlements pervades the whole dispute. It is particularly evident in the statements emanating from Sindh.

Adequate institutions could have enabled the stakeholders to interact directly and seek a solution beneficial to all sides. The 1960 treaty between India and Pakistan, with its detailed provisions for a bilateral commission, provides a case in point of the importance of a transparent institutional mechanism. **Rational choice** helps explain the positions of Sindh and Punjab as determined by individual benefits to be realized on a short-term basis, even at the expense of potential or even likely long-term losses. Both sides, much like their national counterparts (the governments of India and Pakistan), basically acted out of self-interest as there did not seem to be any benefit from cooperation – certainly not after the provinces realized that their voices would not be heard. A more cooperative attitude of the main negotiating parties, the central governments, might have triggered a readiness to cooperate from the provinces. The One Unit system, of course, killed that hope. In other words, the conditions of interaction in effect rewarded egotistic behaviour, rather than coordination or cooperation.

The following chapter will discuss the detailed provisions and the impact of the Indus Waters Treaty on water sharing in Pakistan. As a practical measure, the Treaty has established a new mode of regulating water distribution: detailed water shares over time and space that cover the whole basin and all surface waterways within it. As an institutional measure, it could serve as a precedent for similar cases. It will be seen whether the Indus Treaty holds lessons for an agreement on inter-provincial water sharing. Can it even be a general model for hydro-cooperation?

IV.2 The Indus Waters Treaty and beyond: Cooperation as a last resort

The Indus Waters Treaty process reflects a long struggle between two neighbours which had turned into enemies over unresolved territorial and ideological disputes. The Treaty, often hailed as a milestone in international river management and conflict resolution, marks the divide between the political sphere of water and the hydrological sphere in the Indus Basin.

The effect and importance of the Treaty in both respects – water management and water politics – deserve a closer look in order to find out whether the Treaty, brokered by the World Bank, made two antagonists partners in water sharing or whether it simply provided a minimal consensus over a limited issue.

The Indus Treaty: making water a priority

The Indus Waters Treaty, unlike previous *formulae* for water sharing in the Indus Basin, is not limited by duration or by thematical scope. It effectively covers almost all relevant aspects of water management that relate to the river basin, preparing the ground for long-term water sharing and river use. The fact that its conclusion depended on outside mediation and incentives, though, suggests that the readiness of both principal stakeholders, India and Pakistan, to cooperate over such a vital matter as water was surprisingly limited.[806]

In the light of the all-encompassing security and status fixation that has pervaded both countries, water seems to have become a secondary issue from the start or just a means to achieve other objectives – which is even more surprising, particularly in the case of Pakistan, given the huge material benefits from the Treaty and the economic and security-related potential of the large-scale development project that was to be initiated soon after the signing of the Treaty.

Together with the **Indus Basin Development Fund Agreement** concluded on the same date, the Indus Waters Treaty provides a detailed plan to develop the Indus Basin.[807] In a sense, as Michel points out, the Development Fund Agreement was the actual treaty, to which the IWT was annexed.[808] The Agreement lists the works to be executed in Pakistan, particularly in Punjab, and their financing. Thus the Treaty *cum* Agreement opened the door for both stakeholders to substantial financial assistance within and beyond the scope of the Treaty, allowing for an economic development crucial to securing vital food production and political stability.

[806] David Lilienthal, the World Bank counsel, had originally advised against Bank mediation, recommending a neutral engineer (not from the U. S. or UK); cf. Michel: Indus Rivers, *op. cit.*, p. 225.
[807] Document text: www.austlii.edu.au/au/other/dfat/treaties/1961/2.html (May 2001). The IWT was originally reproduced in Michel, *op. cit.*, p. 559 ff. Agreement and Treaty are retroactive from 1 April 1960. The full text, including annexes, is also available on the Government of India's Ministry of Water Resources website: http://wrmin.nic.in/index3.asp?subsublinkid=287&langid=1&sslid=443 (Oct. 2013).
[808] Michel, *op. cit.*, p. 254.

The provisions regarding water sharing in the Treaty are:

- The *unrestricted use* of the three Eastern Rivers (Ravi, Beas, Sutlej) by India;
- the use of their waters by Pakistan as far as Indian entitlement is not affected;
- the limited utilization of these rivers by India and the supply of water to Pakistan from these rivers within a transition period of ten years;
- the unrestricted use of the Western Rivers (Indus, Chenab, Jhelum) by Pakistan;
- the limited use of these waters by India for non-consumptive uses and consumptive uses up to fixed amounts per season and canal.[809]

Water sharing is qualified here not simply by the delivery of agreed supplies from fixed sources but also by the avoidance of any undue effects on the other stakeholder.[810] In particular, the potential interference of the water works of either country with the supplies to the other are qualified in minute detail. Following the legal principle of avoiding significant harm, for all future works a storage ceiling is established.[811] Many, if not most of the negative effects to be expected by Pakistan from the asymmetric conditions vis-à-vis India would thus be averted. The integration of precisely established water rights and stakeholder entitlements may not by itself have guaranteed effective cooperation by both sides, but has provided a reliable foundation for constructive interaction where suspicion had undermined bilateral relations before.

The Indus Basin Project which is at the heart of the Agreement includes a whole set of projects:

- two large storage dams on the Jhelum and Indus with a given minimum capacity;
- eight link canals;
- three barrages and
- about 2,500 tubewells and a system of open drains, all designed to lower the water table and prevent further water-logging.[812]

Thus the ground was prepared for the development of the replacement works – and the extension of the Indus Basin irrigation system into the biggest network of its kind. Without it, Pakistan's economic future would have looked bleak – particularly in the light of the dramatically rising population – because the Project eventually made much more water available than what Pakistan had at the start of independence.

From a water management perspective, the inability of both sides, India and Pakistan, to agree on a joint mechanism to share the basin's resources made the physical and administrative separation of the basin seem the only choice. Both sides, however, did not exhibit much enthusiasm towards that solution either, nor did they present a feasible alternative to the Bank's plan of 1954, rendering the impression that a solution of the dispute was not worth much effort. For the World Bank, the interest in reaching a solution acceptable to both stakeholders, by contrast, was an overriding concern reflecting higher objectives of major powers like the United States

[809] Art. II and III and Annexure C, D, E.
[810] Art. IV of the Treaty.
[811] Annex. E.
[812] Annexure D of the Agreement. I am grateful to Chaudhry Mazhar Ali, of the Punjab Irrigation and Power Dept., for providing me a copy of the annexure.

and its European allies. Based on the said plan, the treaty that finally came out of this proposal was a *commitment to development* and an *investment in peace*.[813]

Though the Treaty represents a practical solution to the long-standing issue of sharing waters from the Indus in the most comprehensive and detailed manner, the **expectations** especially of the Pakistani side – the one which would benefit the most – were not entirely met. Having realized that the Bank and the international donor community would not risk seeing the negotiations fail, the Pakistani government had hoped to reverse its weak hydrological position for political gains by maximizing financial demands far beyond established project needs. This move appears to have been motivated by a desire to gain international status *vis-à-vis* India. As it obviously had little to do with water realities on the ground, it is another indication of the political dimension of water in Pakistan. Ironically, this very motivation of Pakistan would tie its government to the Treaty because abandoning it would mean to sacrifice the status and other potential gains – not to mention the economic and social repercussions in terms of development aid which might be discontinued.

Pakistan's ambivalent position towards the Treaty brought to light a strange mixture of political interests and water-related interests. The official comment of President Ayub, on the signing of the Treaty on September 1960, renders a vivid impression of this double-faced attitude towards the settlement of the water dispute:

> *We had no alternative but to make a genuine and determined effort to assist the International Bank to find an engineering solution of this grave problem. … The solution that we have now got is not the ideal one … but this is the best that we could get under the circumstances many of which, irrespective of merits and legality of the case, are against us. So, whereas there is no cause for rejoicing at this juncture, there is certainly a cause for satisfaction and thanksgiving, that a very ugly situation which might have arisen in the absence of such an agreement has been averted…*[814]

Downplaying the political dimension of the struggle and suggesting that Pakistan more or less single-handedly salvaged the effort by coming to the Bank's help, Ayub Khan, apparently trying to win over nationalist, anti-India sentiment, implied that Pakistan deserved a better deal. Inviting the perception that Pakistan was a natural victim of India's bullying and the machinations of foreign powers aligned with India, the country could not realistically expect a fair solution but would have to fight in order get its due. In other words, cooperation did not seem a goal worth struggling for.[815]

The implementation of the Indus Basin Project faced a number of technical and political obstacles, challenging both sides' readiness to cooperate. First, the discussion over promising dam sites in Pakistan did not yield unanimous results. The geological, logistical and hydrological difficulties in fact continue to stand in the way

[813] Syed Kirmani & Guy LeMoigne: Fostering riparian cooperation in international rivers. The World Bank at its best in development diplomacy; *World Bank Technical Paper* no. 335, 1997, p. 5. Kirmani, formerly with WAPDA, was later to become a Bank consultant.
[814] Ayub Khan: Speeches and Statements, vol. III, p. 17 – 21, quoted in Gulhati, *op. cit.*, p. 340.
[815] Nehru's comments on the signing of the Treaty, by contrast, highlight cooperation as a major accomplishment; quoted in Gulhati, *op. cit.*, p. 341 – 342 (without reference).

of making more water available.[816] Among many potential sites, only the Tarbela and Mangla projects have so far been concluded.

Second, the **budget** for the dams proved to be beyond the finance secured by the Treaty and Agreement. Pakistan was in effect left to make a substantial contribution from its own sources. Though the Fund Agreement carried a further incentive for Pakistan to complete the replacement works within the 10-year transition period, by making available a Special Reserve, it was yet unclear whether Pakistan would meet that target and reap these benefits.[817] A sign of relief came in the form of the Indus Basin Development Fund Supplemental Agreement of 1964 which secured additional finance for Pakistan.[818] This supplement was intended to secure the implementation of all projects envisioned in the IWT, as it was realized that the originally allocated funds would not suffice.[819] Further funding, the government hoped, would be available from the U.S. Government as part of its Food for Peace programme. That, however, was tied to certain political and economic expectations. The second war with India – again over Kashmir, in September 1965 – killed these hopes. At a time when both countries were massively dependent on foreign aid and desperate to consolidate their political systems and strengthen their economies, the two antagonists devoted much-needed resources to a hopeless fight over a disputed region, inevitably alienating the community of nations that had pledged support.[820]

Political or status-related and territorial challenges once more appeared to be of greater importance to the Governments of India and Pakistan than more elemental problems such as food production, the prevention of famines and the raising of agricultural efficiency – issues that determined the lives of hundreds of millions of people in South Asia.[821] With regard to Pakistan at least, this conclusion is all the more compelling as the same government (Ayub Khan) that had signed the Indus Treaty in 1960 and had secured additional funding for the main water projects launched a military attack in Kashmir only a year later.[822] Kashmir once again proved to be a bone of contention irresistible to both governments.

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[816] The on-going dams debate will be discussed in detail at the end of this section, within the context of the implementation of the Water Accord.
[817] Art. IV of the Agreement; cf. Michel, *op. cit.*, p. 302.
[818] Document text: www.austlii.edu.au/au/other/dfat/treaties/1964/14.html (May 2001).
[819] Michel, *op. cit*., p. 311.
[820] The September War was preceded by a military confrontation in the Rann of Kutch region on the coast of the Arabian Sea in early 1965. The Food for Peace programme was halted, and only resumed in mid-1966 following Pakistani and Indian consent to a UN peace plan and an Indian commitment to a number of economic measures and steps to improve birth control; cf. Michel, *op. cit*., p. 522.
[821] Territorial and status issues often appear to display the irrationality of political leaders. Pakistan and India are by no means the only examples of costly power politics lacking any prospect of material gains, but risk deterioration, even catastrophe on all fronts. Maoist China, with three wars (Tibet, Korea, India) within the first thirteen years of its existence, faced economic collapse and social unrest during and after these campaigns over territory and regional status. Defeat of the proud yet impoverished nation was averted thanks to massive outside help (from the USSR). France, its economy having barely survived the Second World War, lost no time by initiating two wars over colonies (Vietnam, Algeria) spanning 17 years, carefully concealing the fact that only external support (from the U.S.) saved it from collapse. For a discussion of Chinese intervention in Korea, *e.g.*, see Chen Jian: Mao's China and the Cold War; Chapel Hill: University of North Carolina, 2001, ch. 4; for a discussion of France's position in Vietnam see John Prados: Operation Vulture; New York: Simon & Schuster / ibooks, 2002.
[822] A commonly cited motivation of Pakistan's military was to exploit a potential Indian weakness, resulting from the 1962 Chinese attack. The war, though lasting only six weeks, proved very costly in military, political and economic terms. Its conclusion was reached through UN mediation.

The situation of the provinces was an implicit concern of the Treaty, but remained a minor issue when it came to implementing the Treaty. The dams conceived under the Indus Basin Project were vital to their respective irrigation systems. For Sindh, it was Tarbela, on the Indus River, whereas Punjab would exclusively benefit from the Mangla Dam. With Punjab receiving all of the link canals, that province's irrigation system would experience a strong boost. Water supplies to Pakistan as a whole were secured through the Treaty, yet without any provision regarding the internal distribution of the resource.[823]

During the One Unit rule, no mechanism was established to regulate water-sharing within the country.[824] The new water authority, WAPDA, was free to operate without the need to coordinate with provincial stakeholders. Thus, in a sense, the Indus Treaty did little to eliminate the chronic defect of water management inside Pakistan, the hydrological asymmetry between the upstream and downstream areas.

The Indus Treaty as a precedent: regulating cooperation

Against the background of a growing antagonism between India and Pakistan, it was recognized early that tight provisions which left little room for interpretation would be required in order to prevent the Treaty from being hijacked for political purposes or otherwise being manipulated for one-sided gains. Cooperation was made an explicit part of the Treaty, with Article VII stating the *common interest* of both sides *in the optimum development of the river*. Several **institutional features** that characterize the Treaty are worth assessing with regard to the central question: did the Treaty further cooperation, and if so, how?

Transparency was identified as a crucial means to counter the mistrust pervading the relations between both sides. The exchange of data on river flow, water withdrawals, water escapage (water system losses) and deliveries from canals were detailed as duties to be fulfilled by the stakeholders (Art. VI). The newly established Permanent Indus Commission (PIC) would obtain data, forward it from one side to the other and issue annual reports to be made available to both governments (Art. VIII). The PIC would also conduct regular inspections of the Basin thus ensuring both governments (and the respective provincial authorities) that the Treaty and Agreement were implemented in a due manner.

Precision played an obvious role where all water withdrawals were detailed according to time and location.[825] As the negotiations had frequently revolved around seemingly negligible aspects of water allocation, accurate provisions were desired by both parties. Consequently, exact dates, locations and figures regarding water withdrawals and replacement works were established – the only exception being water quantities. As the Treaty had effectively separated the basin into two systems – western and eastern – whose resources would basically be allocated for the sole use

[823] The distribution mode after 1960 will be discussed in the following chapter.
[824] A rare reference is Kazi who states that *the recommendations of the Rao Commission … have been acted upon till as late as 1990*, yet without giving any details; cf. Abrar Kazi: Kalabagh dam. The Sindh case; Hyderabad: Creative Communications, 1998, p. 25. The important element of the Rau Commission's report, as described in the previous chapter, was the principle of equitable apportionment and the prevention of significant harm (to the downstream province).
[825] Art. II, III, IV.

by one or the other side, water sharing automatically obtained a new meaning: rather than obtaining fixed allotments from the same source, both stakeholders would each utilize its **own source**.

The only rule to observe was to abstain from actions that could cause harm to the other side. In this regard, the IWT goes beyond the 1945 draft agreement which in itself was a comprehensive and precise document. In addition, all important terms used in the Treaty have been defined in exceptional detail in the document (Art. I).

Coordination is an important element of both the Treaty provisions dealing with water distribution and the provisions regarding the planned works. While each party is – within the scope of the Treaty – autonomous with regard to the planning and execution of water utilization and development (Art. V), no project or action should damage the other side's established rights.

Communication through a direct channel is the objective of the Permanent Indus Commission, consisting of one senior irrigation official from each side.[826] The PIC, expected to meet at least once year or whenever one side calls it in on a particular issue of concern, was tasked to *establish and maintain co-operative arrangements for the implementation of this Treaty* by examining potential problems regarding the Indus Basin Project and providing practical solutions (Art. VIII). Its main duty being the oversight of the Project, the PIC would also address concerns in this regard issued by one side or the other, thus acting as a mediator of sorts in the case of a dispute.

Compensation schemes would prevent one-sided gains or losses.[827] This provision effectively helped overcome some of the consequences of hydrological asymmetry. Without it, Pakistan would have been left to finance the replacement works alone – a task well beyond its capacities. Given such a prospect, the readiness of its government to agree to the Treaty would have been doubtful.

The same applies to India which was expected to let water flow downstream in order not to strangle the Pakistan economy. With no binding legal provisions in place that would have guided water sharing across the new boundary, there would have been little motivation for India to let precious resources flow to Pakistan without any returns.

Dispute settlement is another important institutional feature of the Treaty. Article IX proscribes the steps to be taken in the case of *differences and disputes* similar to the draft agreement of 1945. The *interpretation and implementation* of the Treaty is the task of the PIC which aims to *resolve the question by agreement* between both parties. If an agreement cannot be reached, the next step – depending on the issue at stake – would be to refer the matter to a neutral expert whose *decision shall be final and binding*.[828]

[826] The Commissioner, usually a *high-ranking engineer competent in the field of hydrology and water use*, enjoys a diplomatic status equal to that of a representative to the UN (Art. VIII, 6).
[827] Art. V details the payments to be made to India by Pakistan and the World Bank regarding the replacement works.
[828] According to Annexure F, Part 2 of the IWT, *the neutral expert shall be a highly qualified engineer*.

The issues to be forwarded to the neutral expert are

- claims for financial compensation,
- costs associated with drainage works in Pakistan according to Art. IV, 5,
- charges for the floating of property down the rivers according to Art. IV, 11,
- costs for the installation of hydrological observation posts (Art. VII, 1a) and
- costs associated with necessary drainage works related to the other side's projects (Art. VII, 1b).[829]

Other issues in dispute are to be dealt with by the Commission (PIC) and may be referred to the governments of both sides to seek a solution. If both sides fail to reach an agreement or if one side takes the initiative, a Court of Arbitration is to be set up in order to issue a final and binding award to both sides.[830]

In sum, the Treaty's significance is that is has become an **institution** in its own right. With its scope, its detailed provisions and safeguards, the IWT is not only very comprehensive but serves as an effective instrument to regulate water utilization of a vast network of rivers and canals. The IWT has initiated a mechanism of river use that relies on procedures and facilities established by the Treaty. Its implementation does not depend on outside or third party involvement but only on the willingness of the stakeholders themselves, India and Pakistan including the concerned provinces. Unlike previous schemes, the IWT defused the tension over long-term water security. Last but not least, the Treaty effectively established the principle of equitable river use as a legal norm, displacing the previously circulated principle of territorial sovereignty.[831]

With thorough and precise regulations the Treaty effectively reduced **the need to cooperate to a minimum**, reflecting the Bank's experience with the limited readiness of both sides to develop a constructive relationship. In retrospect, the Treaty, such as it is, seemed the only solution that two antagonists would agree to and adhere to – if only because in the event of non-compliance, the respective stakeholder would lose the benefits promised by third parties. By taking into account the critical dimension of territory which was essential in the light of the unresolved Kashmir dispute, little room was left for political manoeuvring. The strict focus on water management and engineering, in particular the long-term irrigation needs, served to keep non-professionals, like politicians, away from the negotiations over technical and

[829] Annexure F, Part 1, para. 3.

[830] Art. IX, 5 and Annexure G. The court would be made up of seven arbitrators, four of which are to be nominated by both sides and three to serve as umpires.

[831] Curiously, both countries, India and Pakistan, have abstained from the 1997 UN General Assembly vote on the Convention on the Law of Non-navigational Uses of International Watercourses – a document which builds on that very principle; cf. Waltina Scheumann & Axel Klaphake: The Convention on the Law of Non-navigational Uses of International Watercourses; paper presented at the Water 2001 international conference, Bonn, Germany, 3 to 7 Dec. 2001; www.water-2001.de/supporting/WaterConvention.pdf (Feb. 2002), p. 5. The Pakistani position had preferred a stronger wording as to the prevention of *significant harm*; cf. UNGA press release of the 99th meeting, 21 May 1997; www.un.org/News/Press/docs/1997/19970521.ga.9248.html (Dec. 2009). India, in turn, was concerned about the threat to a nation's *autonomy to conclude agreements without being fettered by the Convention*; *ibidem*. Regarding dispute settlement, India objected to the third-party intervention to mediate a dispute – once more reiterating a chronic Indian concern over any outside attempt to mediate in its external disputes. As such, both positions reflect the intransigent, sometimes aggressively defensive stance of both sides regarding their autonomy as independent states. This stance does not necessarily reflect actual threats to their respective autonomy, but often serves to nourish populist policies, as will be seen later in this chapter.

hydrological details. That as such should be considered a success given the dominating bellicose atmosphere that has characterized India – Pakistan relations ever since 1947, with only few and brief interludes as will be seen.

From an institutional perspective, the Treaty, can serve as a model. A number of important lessons are to be learned, particularly *vis-à-vis* the inter-provincial dispute:

- Its **institutional ramifications** have limited the chance of a future conflict over water by prescribing a clear and precise *modus operandi* in the event of dispute.
- Its strict **limitation to river management** by and large insulated water sharing against being enmeshed in other political issues, particularly the conflict over Kashmir.
- Though no treaty alone could possibly manage to keep water entirely free from being politicized (especially in the Indus Basin), the IWT's **comprehensive regulations** left little room for political manipulation.
- The IWT's success as an institutional mechanism has to be read within the **context of time and place**. Against the threat of major war between two large nations, major international actors felt compelled to promote a settlement satisfactory to both sides. This intervention, based on the Cold War-era conviction that stable political conditions are to be flanked by sound economic development, resulted in major financial support – without which neither the IWT nor the ensuing river development, with substantial benefits for both sides, seemed realistic. It was this intervention, with **strong incentives** to both sides, which ended a dispute that had lasted more than a decade.
- The India – Pakistan dispute has exhibited the principal dangers involved with upstream – downstream asymmetry, particularly under the conditions of less than fruitful bilateral relations in general. In this case, an elaborate **compensation scheme** was the key to balancing the otherwise one-sided effects of this hydro-geographical asymmetry. Thus the dispute ended in a win – win situation for both sides.

For the provinces the success of the Treaty hinged on the implementation of the Indus Basin Project. Without this complex, long-term development project the upstream – downstream asymmetry within Pakistan would almost certainly have been exacerbated as the demand for water and food kept rising steadily due to growing populations in both provinces, Sindh and Punjab. Both provinces, however, had no institutional mechanism at their disposal for settling their dispute.

The situation would have been most dramatic for Sindh because the regulation of the Indus was especially vital, as Michel stresses.[832] If a dam was not constructed, its three major barrages would not work effectively to channel water from the Indus into the downstream irrigation area. With the Indus being the only river to supply water to Sindh, this part of the project was the most important. Finding a suitable site, however, would prove difficult due to the sedimentation to be encountered at most sites. Tarbela finally turned out to be *less unattractive* than the other major site under consideration, Kalabagh.[833]

[832] Michel, *op. cit.*, p. 292.
[833] Michel, *op. cit.*, p. 295. The seemingly unending row over dam sites will be discussed in depth in the last chapter of this section.

From an institutional perspective, the outcome of the IWT process could have been expected to affect the **relations between the provinces** of Pakistan positively and make water sharing between them easier. The implementation of the Indus Basin Project over the coming years consolidated pre-Treaty water plans and provided a strong basis for future agricultural development in Sindh and Punjab.

Several obstacles, though, stood in the way of ending the original dispute:

- The IWT brought disproportionate benefits for Punjab, while leaving the other provinces with much smaller benefits, thus strengthening the Punjab's dominance and widening the **gap between the provinces**. In this case, too, the upstream – downstream dilemma proved to be a major challenge calling for a comprehensive political and economic solution within Pakistan.
- The failure to augment the IWT by a comprehensive agreement on river utilization and water sharing within Pakistan, comparable in scope and detail to the IWT provisions, allowed the inter-provincial dispute to grow. The **protracted nature** of the dispute, with demands for water growing over time, made a solution increasingly difficult. Outspoken mistrust of stakeholders signalled a very limited readiness of both sides, Punjab and Sindh, to engage in a cooperative process to end this dispute.
- Over time, this dispute has inevitably become enmeshed in other disputes. This **linkage** further inhibits efforts to solve the problem.
- In the absence of any outside mediation it would have been on the central government to act as a **broker**. This has not happened.

At last, a treaty – but a lasting treaty?

The Indus Waters Treaty, since its ratification by India and Pakistan, has been accompanied by considerable **scepticism**, stemming largely from both countries' history of violent conflict and unresolved disputes. Both outside and inside observers had plenty of reason to fear that the Treaty would at one point or the other become a victim of the intractable conflict between the two neighbours. The fact that the Treaty has survived unchanged to this day prompts a number of questions as to the quality of the Treaty and the water-relations of both sides as well as the nature of the seemingly intractable bilateral problems:

1. Did Treaty regulations prevent the water issue from being drawn into the quagmire of bilateral conflict?
2. Has water really been a secondary issue, as it seems by now, subordinated to national security or power politics?
3. Or did policymakers simply trust that in spite of the conflict the Treaty would not be affected?

The Treaty regulations, agreed upon after seemingly endless deliberations between India and Pakistan over almost any conceivable technical aspect, reflect the desire of the stakeholders and the World Bank to avoid the major political and territorial problems. Comprehensive as they are, the provisions of the IWT have proved solid since the ratification of the Treaty. The IWT which represents a major political and economic investment of the two stakeholders as well as the donor community and the World Bank has stood the test of time at least in part because its precision and transparency leaves little room for misinterpretation or manipulation.

The status, or rather stature, of the Treaty which has often been cited as a precedent is significant. It symbolizes the high expectations not only of the people in both countries depending on reliable water supplies but also the third parties. The daily reality of water sharing was determined by the political will of the governments involved. In spite of the ongoing conflict over Kashmir, both sides have stuck to their commitment to implement the IWT. Water sharing between both sides, it seems, has developed in a somewhat isolated arena of bilateral relations.

The determination of both sides to uphold the Treaty can – at least on the surface – be explained by a realization that each side would need the other in order to realize the benefits from the Treaty and Agreement. This state of interdependence has required India and Pakistan to practise cooperation for the sake of stable water management and continued international support even when confrontation ruled the day in most other areas of bilateral relations.

The crisis of 1965 took this arrangement to the test. Pakistan's decision to wage war against India came at a time when the transition period of water sharing and the Indus Basin Project were still underway. It exposed a rationality that seems to run counter to the country's commitment to the IWT. The aim of the military campaign was to force a favourable solution of the Kashmir conflict. Water did not play any role, as far as is known. However, the failure to consider water issues did carry several major risks:

- first, the termination of the Treaty by India and an internal uprising with unforeseeable consequences in response to the disruption of water supplies by India;
- second, the withdrawal of the Bank and the donor community from the Indus Basin Project that would throw the country's irrigation programme back by many years and leave the government unable to meet its five-year-plan targets;
- third, international isolation and denied access to much needed development support which would further exacerbate the strained economic and financial situation of Pakistan;
- fourth, a further exacerbation of the existing divide between East and West Pakistan;
- fifth, the termination of military support by the major suppliers of military hardware, further increasing the country's vulnerability.

Maybe most surprisingly, the threat to Pakistan's internal security from a starving people – a concern that had at least partly determined colonial-era politics just a few decades ago – did not appear to figure prominently in the decision to go to war over a piece of territory the control of which would have little or no impact on the society and economy of Pakistan. Water management was clearly subjugated to a rationality dominated by interests relating to status, power and a narrow concept of security rather than tangible benefits.

The consequences of the war, though sobering in military terms, were not as harsh as expected in economic terms. The first and second risks (the termination of the Indus Treaty) were avoided, as was the third. The fourth and fifth, however, did materialize: The U.S. discontinued the shipment of arms to both sides. More importantly, the war furthered the internal friction that would finally lead to the

separation of East Pakistan, as Cohen notes.[834] The loss of territory in the heartland of the Punjab (the Lahore district) signalled that further military confrontations with India carried the risk of even greater losses, a severe economic downturn and subsequent internal unrest.

Fortunately, there was no fall-out from the war on the water issue. The Indus Basin Project was kept running against all odds, again due to the World Bank's initiative, clearing the road for the Tarbela water supply and hydropower project.[835] The Bank's initiative, it seems, was factored into the war decision by the Government of Pakistan which apparently did not expect any negative response on the water front in the first place. The Bank's strong commitment during and after the IWT negotiations seems to have been interpreted as a wider commitment to the welfare of Pakistan as a nation and as a virtual blank-cheque to the government.[836]

The divisive factors, particularly Kashmir and other open territorial issues, would continue to overshadow bilateral hydro-politics even after the 1965 war. While Kashmir in particular came to symbolize the ideological and political antagonism between the two neighbouring countries, other territorial disputes would over time be approached with more pragmatism. The IWT negotiations had carefully circumnavigated the shallow waters of unresolved boundary disputes. Scholz notes that two of the main western rivers, Jhelum and Chenab, originate in this disputed region, parts of which continued to be claimed by India, Pakistan and China.[837]

The Indus Waters negotiations were conducted with the explicit understanding that this dispute would not be addressed as it had proven very controversial ever since independence. Scholz's assumption, however, that *the Treaty shifted the water dispute northward*, to Kashmir, arguing that the dispute over Kashmir was effectively *extended to another level of conflict* (water), would only be convincing if the Kashmir question was in fact linked to the Water Treaty, or if the Treaty was made contingent by one side or the other on a particular action regarding the Kashmir issue, or if indeed there was a threat that upstream waters could be blocked from entering water in Pakistan.

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[834] Stephen Cohen: Shooting for a century; Washington: Brookings, 2013, p. 10.

[835] Michel, *op. cit*., p. 533. The 1964 Supplemental Agreement provided for a feasibility study of the Tarbela scheme, to be made available before the end of the year (Art. V).

[836] Details of the decision-making process that led to the war are not known. Klaff who seeks to present the IWT as a milestone in water cooperation between two antagonists finds that the 1948 war had promoted both sides' realism; cf. René Klaff: Der Induswasserkonflikt – Ansätze einer pragmatischen Wasserpolitik in der Konfliktregion Südasien (The Indus water conflict – towards a pragmatic water policy in the troubled region of South Asia; in German), in: Jörg Barandat, ed.: *Wasser – Konfrontation oder Kooperation?* Baden-Baden: Nomos, 1997, p.259. The 1965 war seems to reject that notion. It is hard to see how the IWT would have kept both sides from waging war. While it may seem surprising to a degree that the Treaty survived all those clashes and crises, one cannot fail to observe that since 1945 no other two nations (with the possible exception of Israel and the Palestinians) have shared more violent confrontations than India and Pakistan. Ironically, the Kashmir issue has proved just as durable, in a sense, as the Indus Treaty.

[837] Jorge Scholz: Bilaterale Konflikte um Wasser zwischen Indien und Pakistan (Bilateral conflicts over water between India and Pakistan; in German); in: Thomas Hoffmann, ed.: *Wasser in Asien. Elementare Konflikte*; Essen: Asienhaus, 1997, p. 250. As of October 2013, the Kashmir border problem between India and Pakistan remains unresolved, whereas India has reached a tentative agreement on border cooperation – though no settlement on the actual border demarcation – with China; cf. *BBC World Service* (radio broadcast), 22 Oct. 2013.

The following years, however, have shown that

- the Kashmir problem has been developing its own dynamics due to the situation on the ground;
- Kashmir has proved increasingly susceptible to the influence of terrorist organizations with an ideological agenda directed against non-Muslim religions and countries, particularly India and Western countries;
- Water-related problems have been addressed and dealt with independent of the Kashmir issue, within the framework of the Treaty which bars one side from blocking natural flow regimes.

Terrorism, partly motivated by the Kashmir problem, has been overshadowing bilateral relations in recent years, challenging both sides' ability and readiness to interact peacefully on any issue, including water. The 2001 bombing of the Indian Parliament House in Delhi – blamed on Pakistan-funded terrorists – strained the already heated relations between the nationalist BJP-led government in Delhi and the military government of Pervaiz Musharraf in Islamabad and brought to the fore once again the issue of Kashmir. What followed was a series of aggressive exchanges, with calls to *scrap the treaty* being uttered by groups on both sides of the border. Invoking Pakistani fears of being *strangled*, Indian Foreign Ministry secretary S. K. Singh noted that *ending the Indus Valley Water Treaty and starving Sindh and Punjab* was among the options contemplated by the Indian Government.[838] Not surprisingly, the bare mention of such a scenario – no matter how realistic – triggered strong reactions from Pakistan, some defensive and cautious, others aggressive and confrontational.[839]

On the diplomatic front, the crisis of 2001/2002 escalated up to a point just below the termination of diplomatic relations. The High Commissioners of both countries were subsequently expelled from the respective host country under the classic charge of espionage.[840] On the military front, Delhi announced that it would step up manoeuvres. On the water front, the Indian Government apparently suspended its participation in the Permanent Indus Commission for some time and discontinued the transfer of water flow data.[841] After a few weeks, the Pakistani Government, downplaying the incident that had caused the crisis, publicly announced that the

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[838] Quoted in: New Delhi planning tougher sanctions: scrapping of Indus Treaty, suspension of overflights; *Dawn*, 23 Dec. 2001. A former High Commissioner of India was quoted suggesting: *Should we not consider measures to deprive the Pakistanis of the water they need to quench their thirst and feed their crops?* Cf. A. G. Noorani: A treaty to keep; *Frontline*, no. 8, 2002.

[839] See: India can't scrap the Indus Water Treaty: experts; *Dawn*, 24 Dec. 2001; ECC meets today to weigh consequences: India's threat to abrogate water treaty*; Dawn*, 5.1.2002. Pakistan asks India to explain its position: Indus Basin Treaty violation; *Dawn,* 27 Feb. 2002. For an overview of media reactions see also Medha Bisht: Water sector in Pakistan. Policy, politics, management; New Delhi: Institute for Defence Studies and Analyses, 2013, p. 80 – 81.

[840] *Dawn*, 17 and 20 April, 2002.

[841] See: Cold Indian attitude threatens Indus Treaty*; Dawn*, 17 Feb. 2002. Unnamed *sources in the office of Pakistan's Permanent Commissioner* allegedly stated that the Treaty would *automatically be suspended* if the Indian Government failed to rejoin the PIC: Indus Treaty may be scrapped*; Dawn,* 22 April, 2002. This assumption, dramatic as it may sound, conflicts with reality. The Treaty does not specify any factor or action that would cause it to expire. The Commission's role is limited to the handling of water disputes, and does not include the oversight of the implementation of the Treaty as such, nor does it have decision-making authority. Though the PIC's function is important, it is on the governments to decide whether or not to terminate the Treaty. Research for this study has not found any indication that such a move had ever been contemplated seriously.

Treaty had so far been implemented duly and the resumption of the Commission was to be expected.[842]

In Kashmir, however, the tensions on the ground reached a highpoint prompting the state government of the Indian-controlled part of the region to push Delhi towards a more provocative path, calling for a review of the Treaty or even its annulment.[843] The Indian Government, increasingly challenged internally over its stance towards Pakistan, on the one hand stressed its determination to counter alleged Pakistani-sponsored terrorism, on the other hand declared that the *decision* to *recall the Indian High Commissioner* was *necessary to highlight the need for Pakistan to end support to cross-border terrorism and infiltration*.[844] With the Kashmir conflict threatening to cause another war between both countries, the Musharraf government felt compelled to *assure the world community that Pakistan does not want war*.[845] Five months after the incident in Delhi, the Permanent Indus Commission announced its next meeting, termed by both sides a *routine one*.[846]

Water-related cooperation has since been continuing – even in the face of numerous violent clashes. It remained, however, strictly limited to the scope and terms of the IWT. Wolf observes that Future Cooperation, as outlined in Art. VII of the Treaty, has played little role so far because no further projects have been submitted under these provisions.[847] Given the slow progress even on simple issues like the

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[842] See: Pakistan sees no threat to Indus Water Treaty*; Dawn*, 23 April 2002. Matthias Paukert: Kooperation versus Konfontation (in German); *Südasien* 2/2002, p. 46 – 47; M. Paukert: All quiet on the water front? SAI-Report 2001, p. 9.

[843] See: J&K wants centre to annul Indus Treaty*; The Asian Age*, 14 April 2002; www.jammu-kashmir.com/archives/archives2002/kashmir20020414c.html (June 2002). Behind these claims, it seems, are both political and financial motives, pointing at alleged losses of Jammu and Kashmir in terms of abandoned hydropower plans as a result of the Treaty, as Praveen Swami assumes: *A treaty questioned; Frontline*, no. 9, 2002. B. G. Verghese notes that Kashmir has *much unutilised irrigation and hydro potential to exploit within the ambit of the Indus Treaty*: Misconceived facts, fallacious arguments; *The Tribune,* 29 April 2002. Matthias Paukert: The Indus umbilical; *Himal*, July 2002, p. 29.

[844] Quoted from a statement by the Ministry for External Affairs in reply to questions by Members of Parliament whether the abrogation of the Treaty was in fact contemplated; the Indus issue, including the suspension of the PIC; was not mentioned at all; Rajya Sabha and Lok Sabha press releases, 7 and 20 March 2002; http://meadev.nic.in:80/govt/parl-qa/rajyasabha/mar7-02-841.htm; http://meadev.nic.in:80/govt/parl-qa/loksabha/marmar20-2783.htm (May 2002).

[845] See: India creating war hysteria, Pakistan not to initiate war: Gen. Musharraf; *Associated Press of Pakistan*; News Summary, 28 May 2002. The statement of the self-appointed Chief Executive, with its bold assertions towards India, was as much directed at India as it was at the home audience, particularly in light of Pakistan's international isolation following his *coup d'état* in 1999. In an interview with the Landau Network, an Italian arms control organization associated with the international Pugwash movement, General Khalid Kidwai, director of the Strategic Plan Division of the Pakistan Army, said that *the stopping of the waters of the Indus River* would be considered a case of *economic strangling* tantamount to an existential threat to Pakistan which would be answered with the use of nuclear weapons; cf. Maurizio Martinelli & Paolo Cotta-Remusino: Nuclear safety, nuclear stability and nuclear strategy in Pakistan. A concise report of a visit of the Landau Network; www.pugwash.org/september11/pakistan-nuclear.htm (June 2002). For a comprehensive discussion of international repercussions see Christian Wagner: Brennpunkt Pakistan. Islamische Atommacht im 21. Jahrhundert (Pakistan in focus. An Islamic nuclear power in the 21st century; in German); Bonn: Dietz, 2012.

[846] Indian Minister of State for Water Resources Bijoya Chakraborty, quoted in *Indus Treaty will not be affected: Centre; Times of India*, 28 May 2002. *Indus Basin to "continue smoothly"; Dawn*, 4 June 2002. An annual charge of $1.8m to be paid to India by Pakistan for river data according to the IWT was established by the PIC; cf. *Südasien* no.2, 2002, p. 44; *Dawn*, 30 May 2002.

[847] Aaron T. Wolf: Transboundary waters: sharing benefits, lessons learned; thematic background paper presented at the International Conference on Freshwater, Bonn, 3 to 7 Dec. 2001, p. 23;

easing of cross-border travel restrictions, this can by no means be a negative assessment, as the quality and dimension of bilateral relations in other areas will show. In other words, the IWT has proved its durability once again.

Internal perceptions from within Pakistan have signalled that in spite of the overall benefits, satisfaction with the Treaty has not been ubiquitous. In downstream Sindh, the demand that all rivers, i.e. not only the western but also the eastern rivers, should have been allotted to Pakistan for exclusive use, has been directed at the rivalling province of Punjab. Palijo, citing the set-up of the Pakistan negotiating team, internal communication during the IWT negotiations and the provisions to share the rivers, views the IWT as a systematic plan for the *virtual exclusion of Sindh*.[848] The claim that the three eastern rivers were given to India *just for peanuts* is part of a more fundamental criticism of inter-provincial relations which are seen to disproportionately benefit Punjab.[849] Pointing at the Indus Basin Project, Sindh is seen as being left out of a programme that was supposed to benefit all provinces.

The Indus Basin Project as such could not realistically have been expected to help overcome the hydrological disadvantages, or **asymmetry,** of the downstream region of the Indus Basin. The bulk of the Indus Basin Project, like most of the earlier projects, was indeed concentrated in the Punjab – for well-known hydrological, geographical and agricultural reasons: The potential in the upstream region of the basin was far greater than that of the lower region, Sindh, and easier to exploit. The need to expand irrigation and increase output significantly could only be met where hydrological conditions were favourable.

The sharing of (other) benefits, however, could have helped reducing the economic asymmetry that resulted from the hydrological asymmetry. A mechanism to transfer some of the one-sided gains of one province to other provinces was not given consideration – neither during the negotiating process, nor in the post-Treaty period. The distribution of water within Pakistan has not been an issue on the IWT negotiating agenda. It has always been a responsibility of the respective government and provincial representations.

What would have happened if Pakistan had received control over and the resources of all rivers? While it is hard to conceive circumstances in which such a scenario might have become reality, given the way the Partition took place and the explosion of the Kashmir dispute, Pakistan would have faced the challenge to develop the whole basin from its own financial, technical and administrative resources, without the substantial support from third parties guaranteed in the IWT. In order to actually benefit from the rivers would have meant to effectively control the upstream regions – either in the form of territorial control or in the form of a contractual regulation requiring India to abstain from withdrawing water from the rivers within its boundaries. Whether such a regulation was desirable or not, it was far beyond the narrow scope of hostile relations between the two stakeholders.

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www.water-2001.de/co_doc/transboundary_waters.pdf (Feb. 2002). Cf. Mohammad Yunus Khan: Boundary water conflict between India and Pakistan; *Water International*, vol. 15, 1990, p. 199.

[848] Palijo's book, *op. cit.*, which is *dedicated to the stolen mighty river Indus,* describes in some detail how the Punjab dominated the negotiations and treated the issue at hand as *an exclusively internal family affair of the inhabitants of the old province of pre-partition, undivided Punjab*; p. 46 (referring to the early 1948 situation).

[849] Palijo, *supra*, p. 47.

Whether the IWT has affected overall relations between India and Pakistan is a matter of debate.[850] Some authors view the IWT as a confidence-building measure.[851] The IWT, as is widely acknowledged, has been successful as it has provided a reliable basis for water management in the upstream and downstream regions of the Indus Basin. Both sides have by and large adhered to its provisions and no party has attempted to withdraw from the Treaty obligations or boycott the Treaty. But has the IWT instilled a lasting confidence in the willingness to cooperate in decision-makers on either side of the negotiating table? Cooperation, as will be seen soon, has been confined to the Treaty obligations and some small initiatives beyond the Treaty.

There is no indication that the IWT, a 1960 treaty that was specifically targeted to regulate river management from an engineering perspective, has had any political effect. It obviously did not prevent both sides from pointing their nuclear assets against each other in the acute crisis of 1990 which required third-party intervention to prevent further escalation.[852] Almost seven decades after independence, bilateral relations remain peripheral in many areas. This state of affairs is deplorable, even when measured by Cold War standards.

Whether the IWT has nurtured mistrust between both sides, as Mirza claims, is doubtful.[853] The separation of the basin was agreed upon by both parties following a series of disputes due to India's decision to discontinue the sharing of water on pre-independence terms. Mistrust has characterized the relations of both nations not only since the sudden halt of water supplies in 1948 and throughout the whole IWT process but even before independence. The large-scale violence that preceded and accompanied the Partition owes its vehemence in part to the mistrust nourished among ethnic communities by activists on both sides over many years.

The IWT, by establishing a precise, transparent mode of water management, effectively countered apprehensions by many people in both countries about their respective neighbour. Had there not been a mechanism to regulate transboundary water management, the same activists who had demonized their respective neighbour in the run-up to the Partition could have used water as a political weapon. Whether the IWT has furthered trust between the two stakeholders may be debated, but it certainly did not fuel mistrust.

A potential renegotiation of the Treaty has been raised as a way towards more efficient water management or in order to simply get more water from India.[854] In

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[850] Saleem H. Ali: Water politics in South Asia: Technocratic cooperation and lasting security in the Indus Basin and beyond; *Journal of International Affairs*, vol. 61, no. 2, 2008, p. 171, 173. Jürgen Clemens: The Indus Waters Treaty between India and Pakistan; *Agriculture and Rural Development*, no. 1, 2005, p. 60 – 63.

[851] P. R. Chari: Indus Waters Treaty II; *The Hindu*, 10 March 1999.

[852] For an assessment of the most serious bilateral crisis so far see Seymour Hersh: On the nuclear edge; *The New Yorker*, 29 March 1993, p. 56.

[853] Nasrullah M. Mirza: Water, war, and peace: linkages and scenarios in India – Pakistan relations; *Heidelberg Papers in South Asian and Comparative Politics,* no. 37, 2008, p. 12 – 13; www.sai-uni-heidelberg.de/SAPOL/HPSACP.htm (March 2010). The author's assumption that the IWT *has delayed the resolution of the Kashmir dispute* lacks evidence. It is difficult to see how the water issue stood in the way of the proposed referendum, or any legal solution.

[854] Daanish Mustafa: Hydropolitics in Pakistan's Indus Basin; *Special Report* no. 261; Washington, D.C.: United States Institute of Peace, 2010, p. 2, 12; www.usip.org (March 2011); Nausheen Wasi: Harnessing the Indus waters. Perspectives from Pakistan; *IPCS Issue Brief* no. 128, Sept. 2009; New

theory, the potential for greater water productivity does exist, though the realization of it depends on specific local conditions and a corresponding water policy framework. Coordinated transboundary water management could make more water available downstream and upstream – within or without the context of the IWT. At look at some attempts in this direction brings to light the practical challenges of the IWT.

To dam or not to dam: implementing the Indus Treaty

Practical problems of water management have emerged in the wake of the IWT over projects in the upper reaches of the river system, putting the treaty provisions to the test and challenging both sides' readiness to cooperate. The first case concerned the Salal Dam, and Indian project in Jammu and Kashmir. After objections from Pakistan, a bilateral solution was reached within the framework of the Treaty, through the Permanent Indus Commission.[855] The second case proved to be more contentious: The Tulbul navigation project, initiated by India in 1984, represented a first real challenge because it included a barrage at the mouth of the Wular Lake, apparently designed to store water from the Jhelum River in Jammu and Kashmir. The barrage which would allow commercially viable navigation in the Wular region was rejected by Pakistan in 1987, after both sides failed to reach an agreement through the Permanent Indus Commission. The stated concern of Pakistan was that Tulbul/Wular involved the permanent storing of water beyond a permissible level which would inevitably reduce the water available downstream, in Pakistan.[856]

A series of negotiations led to a draft agreement in 1991, allowing India to proceed, yet with restrictions which would secure downstream water supplies in line with the IWT.[857] Before the draft could be signed by decision-makers on both sides, however, two other projects, one by Pakistan, one by India, were brought to the fore. Pakistan's own project, the Neelum – Jhelum hydropower project, initiated in 1988, would rely on undiminished water supplies from the Jhelum River. India's Kishenganga Project on the Jhelum, conceived in 1994, would divert water from the

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Delhi: Institute of Peace and Conflict Studies, 2009, p. 4; www.ipcs.org. Both contributions, much like other critical voices in the wider water debate, lack precision as to which elements of the existing treaty should be revised or augmented. In 2004 the National Assembly discussed a motion to *renegotiate the IWT to get more water from the Sutlej River*, according to Nasrullah M. Mirza: Water, war, and peace: Linkages and scenarios in India – Pakistan relations; *Heidelberg Papers in South Asian and Comparative Politics,* no. 37, 2008, p. 4.

[855] The settlement was reached in 1978 after India agreed to design changes in order to minimize river flow reductions; cf. *Keesing's Contemporary Archives*, 1978, p. 29019.

[856] Pakistan's position refers to Art. III of the Indus Waters Treaty, requiring India *to let flow all waters of the Western Rivers, and shall not permit any interference, except for (…) domestic use, non-consumptive use, agricultural use, as set out in Annexure C, and generation of hydro-electric power, as set out in Annexure D*. The potential effects of the barrage have provided rich grounds for heated discussions in Pakistan, ranging from the standard ideological position perceiving it *a matter of life and death* for Punjab, due to *the ruling parties of India … ready to jump on our throat* (*Pakistan and Gulf Economist*, 11 – 17 Nov. 1989, p. 20) to the classic security-centred perception citing Indian schemes to inundate the area in order to stave off Pakistan Army advances in a war situation (Mirza N. Nasrullah: Wular Barrage; *Pakistan Horizon*, vol. 47, no. 1, Jan. 1994, p. 49; Farzana Noshab & Nadia Mushtaq: Water disputes in South Asia; *Strategic Studies*, no. 3, 2001, Islamabad: Institute of Strategic Studies Islamabad; www.issi.org.pk/strategic_studies_htm/2001/no_3/article/4a.htm); cf. also Salamat Ali: Propaganda barrage; *Far Eastern Economic Review,* 21 Dec. 1989, for a balanced review.

[857] For a brief overview: Narottan Gaan: Environment and security: the South Asian experience; Denver: Academic Books, 2000, p. 169 - 170.

main river in order to allow power generation in the Baramullah District in Jammu and Kashmir.[858] If implemented, this project is expected to lead to a reduction of downstream water supplies in the Jhelum – Neelum area. Bilateral discussions on project designs led to Indian concessions regarding the storage volume of Wular/Tulbul, putting the project in line with the IWT provisions.[859] Pakistan, in 1992, made its consent with the draft agreement contingent on India reviewing the Kishenganga project – a condition that Delhi rejected.

The resulting situation means a **hydrological and political interdependence** between both stakeholders as either side can only achieve its target with some form of consent or compromise from the other. In theory, this situation where IWT regulations alone don't allow a clear decision pro or contra a particular project would call for a trade-off. This perspective, though, did not trigger any cooperation. Pakistan, apparently fearing that it could not expect any concessions or guarantees from upstream India for its Neelum – Jhelum project, avoided the bargaining table by resorting to a linkage strategy. India in turn, expecting economic benefits from its Wular project plus some form of reward for the concessions already made in the Wular case, rejected the Pakistani move. More than two decades have since passed, with no solution in sight and no benefits realized on either side.[860]

The Baglihar Dam project, conceived by India in 1992 and started in 1999, provided for another controversial case. Designed as a run-of-the-river system without a reservoir attached to it, this dam on the Chenab River would generate up to 450 MW of hydroelectric power.[861] Alterations in order to check sedimentation (through gated spillways) and counter floods (through gates capable of releasing excess water), some of which were not communicated to Pakistan, caused the lower riparian to raise objections, mainly because it had not been informed ahead of construction.[862] Lack of transparency was one factor in Pakistan's opposition to the project, a reduction in water supplies the other. Further enhancement of the dam's capacity led to an escalation of the dispute which the Permanent Indus Commission was unable to solve. After an on-site inspection by Pakistan and another round of unsuccessful talks, Pakistan turned to the World Bank for a neutral assessment in line with the Treaty regulations.[863] The Neutral Expert, in 2007, submitted its approval of the dam, with only minor alterations; most of Pakistan's objections were refuted.[864]

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[858] The Kashmir issue surfaced from time to time, yet apparently without much effect on the dams problem. The Wular area had witnessed militant activities supposedly relating to Kashmir, prompting Indian Army intervention: Naval commandos guard Wular; *Tribune News Service*, 18 Oct. 1998; www.tribuneindia.com/1998/98oct19/j&k.htm#2.

[859] For an overview see: Gitanjali Bakshi & Sahib Trivedi: Indus equation; Mumbai: Strategic Foresight Group, 2001, p.23 - 24; www.strategicforesight.com/110617.pdf (May 2012).

[860] See: Water talks end without accord; *The News* (Islamabad), 31 July 2004; Pakistan and India begin talks on Wullar Barrage project; distribution of water; *Dawn*, 28 March 2012. The issue has also been addressed sporadically as part of the so-called Composite Dialogue between both sides; cf. Joint Press Statement, 23 June 2006; www.pakistan.gov.pk.

[861] For an overview: Tapan R. Mohanty & Adil Hasan Khan: Dam of division: understanding the Baglihar dispute; *Economic and Political Weekly*, 16 July 2005

[862] Bakshi & Trivedi: Indus equation, *op. cit.*, p. 19 – 21; Pakistan to seek legal help against Indus Treaty violation; *Dawn,* 11 June 2002; Pakistan demands inspection of Baglihar power project; *Dawn*, 5 February 2003.

[863] With dam construction going on, internal pressure on the Pakistan Government, criticized for *being too soft* (PK Foreign Minister Kasuri), kept heating up. See: Pakistan may seek WB's help if issues not taken up: Baglihar project; *Dawn*, 4 June 2004; Don't make Baglihar another dispute, Kasuri tells India; *The News*, 14 January 2005; WB appoints neutral expert on Baglihar dam; *The News*, 12 May

The role of power and status politics in both Pakistan and India may have been demonstrated by Baglihar even more so than by previous projects.[865] The rationality behind the Baglihar brawl is only partly about water (on the Indian side, which expects material gains), but partly political (especially on the Pakistani side which did not expect any material benefits). After the binding verdict, the dam project was pushed forward yet without both sides putting to rest their differences over the issue.[866] The dam, now in operation, continues to fuel claims that water scarcity in Pakistan is largely the result of destructive Indian schemes.[867] While this interpretation, as delivered to the Pakistani public, may help to build up internal support for the Pakistan Government over other issues (especially security-related), it undermines future efforts towards cooperation in the water sector.[868] A strategy that simply seeks to deny the other side any gains, by raising objections of all sorts – legal, technical, ethical, and of course security-related – risks not being taken serious any more, even if some of the claims could in fact be substantiated, thus spoiling hopes for cooperative solutions altogether.

From an institutional perspective, both sides have so far sought to advance their respective causes by and large within the framework of the Treaty. The recent projects, however, have also exhibited the limitations of the Treaty simply because projects of such scope and quality had not been envisioned in 1960. Their complexity requires comprehensive technical assessments which in turn rely on coordination of both sides, chiefly by providing accurate data. A step in this direction is the agreement (within the Commission) to install a telemetry system for the monitoring of river flows.[869] This move may indicate that both sides are willing to share more relevant data, including that on complex water projects.

The PIC has been invoked over bilateral problems several times, and both sides have also held direct talks outside the PIC. The reason why some issues remain unsolved is related not so much to a lack of coordination and transparency but to the

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2005; World Bank receives request from Pakistan under Indus Waters Treaty; *World Bank News Release* no. 2005/287/SAR, 18 January 2005.

[864] Cf. the assessment of the Neutral Expert: Baglihar Hydroelectric Plant. Expert Determination by Raymond Lafitte. Executive Summary, 12 February 2007; www.pakistan.gov.pk/ministries/water-power-ministry/media/SUBMISSION-BHP/10/6Summary.pdf (Jan. 2010). See also Government of Pakistan, Ministry of Water and Power: Baglihar hydroelectric plant; press release, 12 February 2007.

[865] At the height of the controversy, the Government of Pakistan tried to control the flow of information, apparently in anticipation of negative reporting in the media: Water ministry barred from comment; *Dawn*, 20 May 2003.

[866] For a review of the World Bank role and the meaning of the neutral assessment: Salman M. A. Salman: The Baglihar difference and its resolution – a triumph for the Indus Waters Treaty? *Water Policy*, vol. 10, 2008, p. 114 – 116.

[867] See: IPRI: Pakistan's water concerns, *op. cit.* Water scarcity reigniting anti-India sentiment in Pakistan; *Dawn*, 2 July 2011; Crisis deepens as India blocks Chenab flow; *Dawn*, 19 Sept. 2008; India stealing water causing $12bn loss to Pakistan; *Associated Press of Pakistan*, 7 Feb. 2013. On the Indian side, Pakistan's tendency to automatically object to Indian water projects is often seen as politically motivated and intended *to delay if not deny progress that primarily benefits J&K*; cf. B. G. Verghese: Political fuss over the Indus; *The Tribune*, 25 May 2005.

[868] Former ISI director general Qazi Javed Ashraf, terming pervious Indian projects violations of the Indus Treaty, told the Pakistan Senate that *war is the only option* if the World Bank won't solve the dispute: War an option on Baglihar: Pak minister; *The Indian Express*, 17 February 2005. This is by no means the exotic opinion of an irresponsible former head of the Pakistan secret service whose main task is to keep the India threat alive. For a collection of similar attitudes excerpted in 2010 from all major newspapers see: Islamabad Policy Research Institute (IPRI), ed.: Pakistan's water concerns, 2011; www.ipri-pak.org (May 2011).

[869] See: Pakistan and India agree to install telemetry system; *Dawn*, 23 July 2010.

perceived benefits and losses (material and immaterial) from either agreeing on the project at hand or not. Both sides could have underlined their willingness to seek a joint solution more convincingly by improved coordination and the smoother exchange of relevant information. In most cases, however, it was the lack of a trade-off in order to share benefits in one form or another that prevented a solution. Pakistan's strategy to demand significant changes in Indian projects in return for its formal consent could only expect some success where such changes were in fact necessitated by the Treaty.

This was not always the case. The threat to call in a third party for a judgment did not deter the Indian side from maintaining its course. The psychological problem of the Pakistani strategy became apparent where such technical deficiencies could not be substantiated; then Pakistan would have to accept the Indian project without getting anything in return from India, plus having to communicate this unfavourable outcome to a Pakistani public previously told that a solution depended on Indian compromises and corrections. The Baglihar case served to demonstrate how the strategy of blaming India can backfire internally when faced with reality.[870]

The recent Track II initiative has opened a **parallel road** towards a potential solution of bilateral water problems. Whether the decision to augment the existing Commission by an *independent office*, consisting of *neutral experts* from other countries, will depoliticize the water dialogue remains to be seen.[871]

From a water management perspective, the main challenge was hardly ever addressed during these disputes: the widening gap between water supply and demand in Pakistan as well as in India. The assessment of a World Bank water expert that the water problems of both countries were mostly caused by bad management, not by the respective other side, was not received well.[872] The plain facts, though, are well-known and have not come as a surprise.[873] Similarly, the potential effects of a series of upstream projects on water quality and quantity in the basin deserve a thorough long-term assessment which would inevitably rely on a

[870] The refusal of the Pakistani Commissioner to the PIC, Syed Jammat Ali Shah, to object to the recent Indian Uri – II project on the Chutak River led to his dismissal, interpreted as a government gesture towards right-wing groups; see: Pakistan fires Indus Commissioner; *Kashmir Life*, vol. 2, issue 41, 27 Dec. 2010; www.kashmirlife.net (May 2011).

[871] Cf.: Track II: Pakistan, India move to avert water war; *The News*, 6 April 2012. The spectre of an imminent water war keeps occurring from time, hitting even the more serious newspapers.

[872] John Briscoe: War and peace on the Indus; *South Asia Global Affairs*, Sept. 2010; www.saglobalaffairs.com/back-issues/623-war-and-peace-on-the-indus.html (March 2011). According to Briscoe, formerly a senior water advisor for the World Bank and co-author of a major WB study (Pakistan's water economy: running dry), *India could tap virtually all of the available power without negatively affecting the timing of flows to which Pakistan is entitled*; see: WB expert warns India of severe water crisis; *The News*, 6 Oct. 2005. According to Briscoe, formerly a senior water advisor for the World Bank, *India could tap virtually all of the available power without negatively affecting the timing of flows to which Pakistan is entitled*. See also: B.G. Verghese: The inconvenient truth; www.bgverghese.com/PakistanWater.htm (May 2011).

[873] This is true not only for India but also for Pakistan; see e.g. Sardar Muhammad Tariq (former managing director of WAPDA's Water Wing): The Indus Waters Treaty and emerging water management issues of Pakistan; in: Pervaiz Cheema, R. Khan & A. Malik, eds.: *Problems and politics of water sharing and management in Pakistan*; Islamabad: IRPI, 2007, p. 90 - 92.

coordinated effort of both sides. Here the *way forward* is through cooperation, as Akhtar points out.[874]

In sum, the picture of water-related cooperation between India and Pakistan is ambivalent. Both sides adhere to the institutional framework of the IWT, yet seek to use it for political gains wherever possible. This is particularly true for Pakistan. India, being the upper riparian, could expect material benefits from upstream projects by observing IWT provisions – some of which, however, require interpretation and negotiations with the lower riparian, Pakistan. Pakistan could – hypothetically – convert its inferior hydrological position into a more favourable political position by demanding a price for its consent from India, rather than focussing on design changes where they are not warranted. Given the long and costly delays of water projects, a swift benefit-sharing agreement could include some form of reward (economic, financial, political or else) for Pakistan. Such a trade-off would in principle depend on the willingness of the decision-makers on both sides.

Testing the waters: regional prospects for cooperation

The political willingness of stakeholders to cooperate, as the IWT process has amply shown, has been a critical factor. A look at similar cases from the wider South Asian region puts the India – Pakistan dilemma over water into perspective. As will be seen, cooperation – on bilateral as well as multilateral levels – does take place, but faces some well-known obstacles.

One example of **multilateral cooperation** over water is an initiative by the UN's World Meteorological Organization (WMO). The concept for the Hydrological Cycle Observation System (**HYCOS**) for the Himalaya-Karakorum-Hindukush (HKH) region is the result of a series of meetings since 2002. This early-warning facility would help flood management through an automatic exchange of meteorological data collected in the glacial regions of the HKH. Pakistan, one of the potential beneficiaries of this facility, has so far had to request the respective data from the Indian government on a case-by-case basis.[875] Though cooperation in this field would bring substantial benefits to most, if not all, countries of this region, progress on HYCOS has been slow – slower in fact than in other world regions. By 2010, the project had not moved beyond the pilot phase.[876] Apparently, at least one stakeholder did not consider the

[874] Shaheen Akhtar: Emerging challenges to Indus Waters Treaty. Issues of compliance and transboundary impacts of Indian hydroprojects on the Western Rivers; Islamabad: Institute of Regional Studies, 2010, p. 60 - 61; www.irs.org.pk (March 2013)

[875] The communication of river flow information has been agreed upon during meetings of the Permanent Indus Commission, following Art. VIII of the Treaty. India delivers river data from selected sources to Pakistan for an agreed fee. The fact that some rivers of the wider basin, Chenab and Ravi, are excluded, and the substantial amount charged by India ($1.8 m per season) are another indication of the limited willingness to cooperate; Pakistan to pay $ 1.8 m to India: provision of water data; *Dawn*, 4 June 2002. Data on glaciers is part of the mandatory communication: Glacial lake spill not to affect Pakistan; *Dawn*, 20 August 2004, citing *minute-to-minute reports from the Indian Commissioner* on a glacial lake spill into the Sutlej River that could have resulted in flash floods in Pakistan.

[876] See: Five states to discuss sharing of weather data; *Dawn*, 17 May 2002. HYCOS, with funding from the UN and USAID (United States Agency of International Development, a State Department institution) has already been established in a number of other world regions; see: Executive Council of the WMO: Enhanced capabilities of members to provide better hydrological forecasts and assessments; summary report of the WMO's 62nd session, Geneva, 8 – 18 June 2010; http://www.hydrometeoindustry.org/Reports2010/ECDocs2010/d03-3.pdf (Feb. 2011). The original

issue urgent or important enough to push the process, if one assumes that the price of cooperation, or sacrifice, was negligible.

The South Asian Association for Regional Cooperation (**SAARC**), founded in 1985, represents an effort by the governments of the region to promote peaceful relations. SAARC has recently, after decades of marginal relevance, broadened its scope to include economic and other non-military aspects. Water management has been assigned to the Technical Committee on Agriculture and Rural Development, yet without much specification. Progress on this issue is still at a very basic stage.[877] Its 1996 initiative to boost regional trade, SAFTA (SAARC Free Trade Agreement), has suffered from national restrictions and thus remained marginal.[878] This applies even to SAARC's core issue, regional security. In this case, it seems that this body was not meant to play an active role in policies that might affect national decision-making. So far, instead of becoming a normative or even decision-making body, SAARC has acted as a discussion forum rather than a body to facilitate collective solutions.

A more hopeful example of regional cooperation is the International Centre for Integrated Mountain Development (**ICIMOD**), a Nepal-based non-governmental research organization that is renowned for launching important development initiatives such as FRIEND, a project *intended to develop, through the mutual exchange of data, knowledge and techniques at a regional level and a better understanding of hydrological variability and similarity across time and space* with a view to support sustainable water management in all participating countries and the nations of Central Asia.[879] ICIMOD's Regional Working Group includes members from all mainland nations of South Asia, including India and Pakistan, plus China. ICIMOD's purpose is primarily scientific, yet with a clear orientation towards making research work in favour of development. This indirect path to regional cooperation, avoiding the political track, escapes the challenge to overcome deep-rooted disputes between its member countries.

Prospects for bilateral cooperation between South Asian nations appear to have a greater chance of success in the light of dominant national authorities. Geographically, the unique composition of this world region that houses over a fourth of the human population makes all countries a neighbour of India, yet none (except India) is a neighbour of another regional nation.[880] A look at several bilateral river

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project proposal of 2002 includes a 3-phase plan for an 8-year region-wide implementation period: www.whycos.org/IMG/pdf/HKH-HYCOS.pdf (Feb. 2011).

[877] http://www.saarc-sec.org/areaofcooperation/detail.php?activity_id=3 (Feb. 2011). SAARC's role has to be judged against the region's unique shape – with India located in the geographical centre, sharing borders with all other nations, except Afghanistan – which furthers bilateral, rather than regional relations. Consequently, SAARC has excluded *bilateral and contentious issues* from its charter (Art. X); www.saarc.com/scharter.html (July 2001). The dominance of India as by far the largest and most prosperous nation is geographically underlined by the ring of smaller nations on its borders. Crow and Singh refer to *bilateralism as a main principle of Indian government policy towards its neighbours* since independence: Ben Crow & Nirvikar Singh: Impediments and innovation in international rivers: the waters of South Asia; research paper, Univ. of California, Santa Cruz, Dept. of Economics, 1999, http://econ.ucsc.edu/~boxjenk/wd_rev.pdf (April 2001), p. 8, quoting L. Rose: India's regional policy: non-military dimensions; in: Stephen Cohen, ed.: *The security of South Asia: American and Asian perspectives*; Urbana: Univ. of Illinois Press, 1987.

[878] Christian Wagner: Indien als Regionalmacht, *op. cit.*, p.14.

[879] Project description quoted from: www.icimod.org/?page=585 (Feb. 2011).

[880] For the purpose of this study which focuses on the Indus Basin, of which Afghanistan is a part, this country is taken as a South Asian state. Due to its cultural and ethnic affiliations, some authors

disputes exhibits the relationship between politics and the settlement of water-related problems.[881]

The dispute over the Ganges River between Bangladesh and India is a classic dispute over water sharing, similar to the Indus dispute. The Farakka Barrage project, designed by India to improve navigation and protect the freshwater supply of Calcutta, raised concerns over reduced water supplies in downstream East Pakistan.[882] Discussions, planned since 1951, did not take place until 1960 (two months before the conclusion of the Indus Treaty) due to disagreement on the procedure. Ten years later, the Farakka Barrage was built while negotiations were still underway. After the independence of Bangladesh, a **Joint River Commission** (JRC) was established to determine the water shares (1972).[883] A formal Ganges Waters Agreement was reached in 1977, to be valid for 30 years. In 1996, both sides concluded another treaty (for another 30 years).[884] Crow *et al.* conclude that *the Ganges conflict was a subsidiary issue, the conduct of which was generally tied to the state of diplomatic relations – either unfriendly, overtly hostile, or even characterized by war*.[885] Verghese likewise finds that *the problem is … not that of finding engineering or technical solutions (which are available and capable of being costed* [sic] *and prioritized) as much as of establishing a framework of long-term political relationships in the region. Progress has been impeded by mistrust, fears, misperceptions and myths …*[886]

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consider Afghanistan a Central Asian country. Pakistan shares a border with both India and Afghanistan, whose only South Asian frontier is with Pakistan.

[881] For an overview of South Asian river disputes and attempts at solving them see B.G. Verghese: Waters of hope. From vision to reality; Delhi: Oxford U.P., 1999 (2nd ed.), p. 359 – 383. Maniruzzaman Miah, K. Rahman, S. Hamid, S. Mukherjee and G. Verghese: Water sharing conflicts between countries, and approaches to solving them; project on Water and Security in South Asia, vol. 3; Washington: Johns Hopkins Univ. / Honolulu: Global Environment and Energy in the 21st Century, 2004; www.waterconflictforum.org/pdf/resources/article/conflictsbetweencountriesvol3Jan2004.pdf (March 2010); John E. Priest: International competition for water and motivations for dispute resolution; *Agricultural Water Management*, vol. 21, 1992, p. 3 – 11.

[882] For a comprehensive account of the dispute see Ben Crow, A. Lindquist & D. Wilson: Sharing the Ganges. The politics and technology of river development; Delhi/London: Sage, 1995, especially p. 26 ff. Early plans to divert the heavy silt load of the Hooghly River, a Ganges tributary, date back to 1853. The problems addressed in this dispute concern ways to counter the salt influx, to limit the silting of the river, and to balance the long dry season in the delta (Nov. – May); p. 20 – 21. Cf. also Ashok Swain: The environmental trap. The Ganges River diversion, Bangladeshi migration and conflicts in India; Uppsala: Dept. of Peace and Conflict Research, 1996, p. 38 – 57.

[883] The statute text is brief and vague, the task of the JRC being mainly to *formulate proposals*; document text: www.internationalwaterlaw.com (July 2005). It did not prevent India from extending the agreed trial run of the Farakka feeder canal without notice, causing significant economic damage to Bangladesh; Aaron Wolf & J. Newton: Case study of transboundary dispute resolution: the Ganges River controversy; www.transboundarywaters.orst.edu/research/case_studies/Documents/ganges.pdf, p. 5 (Feb. 2011).

[884] Official title: *Treaty between the Government of the Republic of India and the Government of the People's Republic of Bangladesh on Sharing of the Ganga/Ganges Waters at Farakka*; document text: www.worldwater.org/ganges.htm (Sept. 2000). Sands notes that the new Ganges treaty defines cooperation as being guided by *equity, fair play and no harm to either party* (Art. IX), but does not provide for dispute settlement; Philippe Sands: Bangladesh – India: Treaty on sharing of the Ganges waters at Farakka; introductory note, *International Legal Materials*, 36 ILM 519, 1997; wysiwyg://4/http://www.asil.org/ilm/india.htm (June 2002).

[885] Crow *et al*.: Sharing, *op. cit.*, p. 23.

[886] B.G. Verghese: Waters of hope. Integrated water resource development and regional cooperation within the Himalayan-Ganga-Brahmaputra-Barak-Basin; Delhi: Oxford, 1990, p. VIII, quoted in Crow *et al., supra*, p. 25. For a Bangladeshi view which points in a similar direction see Syed Muhammad Hussain: The Ganges Basin development: an actionable proposal; *Daily Star* (Dhaka), 6 Oct. 2000.

With the current treaty, cooperation over water has become regular and even developed beyond the scope of the 1996 treaty, mainly on the initiative of Bangladesh.[887] Whether similar agreements on other rivers can be reached will depend on the political will of both stakeholders.[888] Several years of negotiations facilitated by the JRC have recently resulted in an agreement covering 14 irrigation projects in the Indian state of Tripura.[889] This state is the only part of India which is in a downstream position vis-à-vis Bangladesh. Using its favourable hydrological position as leverage, the Bangladeshi Government, which had originally objected to the Indian projects on security grounds, signalled its consent with Indian projects in Tripura in return for an Indian readiness to negotiate water sharing in the Teesta River Basin. If an agreement on the Teesta will be reached, as observers expect, it would be a rare case of sharing, or rather swapping, benefits: Bangladesh's consent on one water issue for the Indian consent on another.

Asymmetry remains a major challenge: The fact that downstream Bangladesh generally has much more to gain from cooperation than its upstream neighbour India makes it difficult to engage in cooperation – at least theoretically – because water-related benefits can not easily be balanced. A lack of incentives and potential gains (water-related or else) on the Indian side makes effective cooperation based on a benefit-oriented rationality difficult. Though the Ganges Treaty has been successful in so far as both parties adhere to it, it does not *per se* remove the obstacles to further cooperation.[890] Bangladesh has thus turned to normative arguments, particularly the no-harm-rule, to underline its position.[891] This path will, however, depend on India's accepting this norm as a guiding principle of interaction to be successful.

The Mahakali River, shared by Nepal and India, is a somewhat more positive example of water-related cooperation. Based on a successor treaty on the Tanakpur Barrage on the Indian side of the river basin, the current agreement, reached in 1996, gives Nepal, the upstream riparian neighbour, a greater share of benefits from

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[887] One example is the protocol on inland water transport and commerce renewed in 1999; *Xinhua*, 28 Oct. 1999 (*Bangladesh, India renew water transport protocol*; accessed through Countrywatch.com, Nov. 2000).

[888] Bangladesh hopes to negotiate the remaining 53 rivers shared with India: *India and Bangladesh to consider more water sharing*; *BBC News* (online), 8 April 1999. The Sundarbans mangrove forest, an elemental part of the river delta ecosystem, may face a more promising future as it covers both Indian and Bangladeshi territories: Pledge to save the Sundarbans; *BBC News* (online), 12 May 2002; and: Bangladesh seeks India's cooperation on water resource issue; *Xinhua*: 26 Sept. 2000 (accessed through Countrywatch.com, Nov. 2000).

[889] See: Bangladesh accord pushes 14 irrigation schemes in Tripura; *Manipur Online*, 13 Jan. 2011; www.manipuronline.com (Feb. 2011).

[890] This logic seems to be particularly fit to describe the dispute over the inter-basin water transfer projects of India. To extend its irrigation and power generating capacities, the Indian government plans to build link canals to transfer large quantities of water from one basin to another. The project, as outlined by the Director General of the National Water Development Agency, fails to mention any potential effects on downstream Bangladesh: Rama Kant Parashar: Interbasin water transfer: Indian scenario; in: Proceedings of the International Workshop *Interbasin Water Transfer*, Paris, 25 – 27 April 1999, hosted by UNESCO, p. 75 – 80. Bangladesh's concerns, as expressed by Khalilur Rahman, JRC member, are the loss of agricultural output, the drying of inland ports, widespread disruption of riverain communities and loss of fishing grounds: Interbasin water transfer: Bangladesh perspective; in: UNESCO, *ibidem*, p. 82 – 92. In the words of Bangladesh's then foreign minister Muhammad Morshed Khan, the project *spells disaster of unforeseeable proportions* for the entire region; *Daily Star* (Dhaka): *FM slams Indian river-link plan*; 26 Oct. 2003.

[891] This position is outlined in principle by Nahid Islam: Indo-Bangladesh common rivers: the impact on Bangladesh*; Contemporary South Asia*, vol. 1, no. 2, 1992, p. 213 – 223.

power generation and irrigation.[892] The obstacles in this case were not so much a lack of consensus on how to share benefits, but a lack of continuity in policy-making on the Nepali side and an atmosphere of suspicion. In the end, a *package deal*, which in fact represented a more integrated approach to river management than the previous agreement, was reached. Similar bilateral agreements on hydropower have been reached between India and Nepal, and Bhutan and India respectively.[893]

The politicized nature of water issues has been overshadowing India – Nepali relations ever since the first agreement on the Kosi and Gandak projects (of 1954 and 1959 respectively), reflected in internal disputes in Nepal over potential negative implications of the agreements.[894] Conversely, Indian policymakers have expressed concerns that Nepal (as the upstream neighbour on the Bagmati River) might exacerbate the floods in Uttar Pradesh. [895] Such fears echo Pakistani claims against India (the alleged manipulation of the Indus River to the detriment of Pakistani agriculture). The claim that downstream riparian states live at the will of a hostile upstream state intent on misusing its geographical position is frequently used as political ammunition – regardless of many clarifications that such schemes are by and large impracticable.

The case of the Kabul River dam at Sarobi has negatively affected the already strained relations between Afghanistan and Pakistan. For Afghanistan, a country with an agricultural sector that cannot nearly meet the demands of a massively increasing population, the need to generate more water has become acute. For Pakistan, the fear of reduced water flows to the Indus Basin has been compounded by the perspective of being at the downstream end of two neighbouring countries (Afghanistan and India) with less than positive overall relations.[896] Though it is not

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[892] Official treaty title: His Majesty's Government of Nepal and the Government of India concerning the integrated development of the Mahakali River including Sarada Barrage, Tanakpur Barrage and Pancheshwar Project; document text: www.nepalicongress.org.np/nepal/mahakali.html (June 2002). For a critical assessment of the process see Dipak Gyawali & Ajaya Dixit: How not to do a South Asian treaty; *Himal*, April 2001, p. 8 – 19. For a concise overview of the history of bilateral relations regarding water see Ingrid Decker: David und Goliath – Wasser als politischer Konfliktherd zwischen Nepal und Indien (David versus Goliath – water as a source of political conflict between Nepal and India; in German); in: Thomas Hoffmann, ed.: *Wasser in Asien. Elementare Konflikte*; Essen: Asienhaus, 1997, p. 229 – 233.

[893] Official title: Agreement between His Majesty's Government of Nepal and the Government of India concerning the Electric Power Trade, 1996.

[894] Official titles: Agreement between the Government of India and the Government of Nepal on the Kosi Project, 1954; Agreement between His Majesty's Government of Nepal and the Government of India on the Gandak Irrigation and Power project, 1959. Document texts: www.internationalwaterlaw.com (July 2005). Agreement on hydropower projects has been overshadowed by mistrust, as Lincoln Kaye notes: Buyer's market; *Far Eastern Economic Review*, 2 Feb. 1989, p. 22.

[895] Ajaya Dixit: Damning Nepal. Nepal is not responsible for the floods in Bihar and Uttar Pradesh; *Nepali Times*, 16 August 2000, pointing at a long history of *blaming Nepal*, dating back to the colonial era. As a whole, India – Nepal relations appear to be on the road to greater cooperation as measures that are not a part of any wider agreement, like the Indian support of a flood protection embankment for Nepali villages, show. These villages on the Rapti River face a greater threat of flooding due to the Indian barrage at Laxmanpur; see: India to assist Nepal in embankment construction; *Xinhua*, 5 Oct. 2000 (accessed through *Countrywatch.com*, Nov. 2000).

[896] The dam has aroused speculation in Pakistan that it will be used in a destructive manner – to exacerbate flooding in downstream Pakistan – as a number of internet discussion *fora* indicate; see for example:http://www.siasat.pk/forum/showthread.php?41589-Indian-and-Afghan-Dams-Caused-Devastating-Flood-in-Pakistan;http://www.daily.pk/india-used-sarobi-dam-on-the-river-kabul-to-flood-pakistan-20671/ ; http://www.kmsnews.org/articles/indian-water-belligerence (Feb. 2011).

clear yet to which degree Pakistan might actually have to face reductions at all.[897] If so, it will depend on the number of dams and their respective storage capacity.[898] Politically, the fact that this dam was realized with financial support from India has added to deep-seated apprehensions in Pakistan.[899]

Third-party mediation has followed unsuccessful attempts of both sides at reaching a bilateral agreement on Kabul waters in 2003 and 2006. The World Bank has suggested the establishment of a joint river management body modelled on the Permanent Indus Commission.[900] Unfortunately, long-standing grievances between Afghanistan and Pakistan – security, border demarcation and the refugee problem – have been standing in the way of a practical solution to water-related problems.[901] Pakistan's involvement in the Afghan civil war – as a sideshow of its rivalry over regional influence with India – has proved to be a major stumbling block in bilateral relations.[902] Again, it is power and status-oriented interests that effectively preclude any constructive effort towards a solution of seemingly secondary problems like water sharing.

The regional geography remains a significant obstacle that effectively undermines potential cooperation – not only within the region but also beyond its borders.[903] India has put its political, economic, demographic and military dominance to use to achieve the desired outcome of water disputes. Nepal and Bhutan, the only other upstream neighbours of India, have not been able to bring their geographical advantage to bear due to their comparatively minor economic and political position. Being landlocked and lacking alternative infrastructure, both nations effectively depend on their downstream neighbour, India, for many economic activities.

In sum, water-related issues have proved particularly complex and prone to attract **political concerns**, as in the case of the Ganges and the Kabul River. Regional efforts to solve such problems have been almost non-existent, international mediation has not played a significant role.[904] Bilateral, direct government – to – government

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[897] Aamir Kabir: Damming Kabul River; *Dawn*, 20 Oct. 2003.

[898] India has been approached by the Afghan Government: Afghanistan seeks Indian help in water infrastructure; *Pak Tribune*, 25 April 2012.

[899] See: Sharing water resources with Afghanistan*; Dawn*, 14 November 2011. The conclusion of a water agreement with Afghanistan was among the recommendations of the Technical Committee on Water Resources, appointed by President Musharraf, to explore perspectives of water management in the Indus Basin; cf.: Need stressed for water treaty with Afghanistan; *Dawn*, 28 September 2004.

[900] See: Joint management of water proposed with Afghanistan; *Dawn*, 14 June 2011. See also Michael Klugman, Ahmad Rafay Alam & Gitanjali Bakshi: Peace through water; *Foreign Policy AFPAK* news service, 2 December 2011; www.foreignpolicy.com (May 2012).

[901] Bilateral relations have progressed slowly. An agreement on trade and transit, though in preparation for a long time, could not be reached yet, as Yusufzai explains, pointing at several unsolved issues overshadowing relations, like the situation of Afghan migrants, the presence of Afghan militants in Pakistan, Pakistan involvement in Afghan politics, among else; see Rahimullah Yusufzai: Pakistan – Afghanistan relations. A Pakistani narrative; *Background Paper* series; Islamabad: PILDAT, 2011, p. 11 – 16; www.pildat.org (April 2011).

[902] For an authoritative account see Ahmed Rashid: Taliban. The story of the Afghan warlords; London: Pan, 2000, p. 183 ff.

[903] The energy sector in South Asia, the subject of many discussions in recent years, is another typical example. For an overview see Aurangzeb Khan: India and Pakistan: Bilateral cooperation in the energy sector; Washington, D.C.: Henry L. Stimson Center, *Occasional Monograph* no. 32, 1997, p. 75 – 96.

[904] … the Indus case being the notable exception. In the Ganges case, Pakistan's proposal of UN-assisted negotiations was promptly turned down by India (1957). All the more interesting are joint

communication has been the preferred mode of interaction.[905] Consequently, institutional mechanisms for regional cooperation have not evolved. Though models for cooperation do exist, practical development has often become a victim of power politics and the widespread hysteria for security. Where an over-riding conflict (like the Kashmir issue) does not exist and benefits to both sides are being realized, cooperation is possible, as Crow and Singh point out.[906]

The India – Pakistan case is special because it suffers from a long history of conflict over territorial issues and – underneath the surface of practical questions and ideological antagonism – matters of identity. The fact that the largest nations of South Asia have faced each other in four violent confrontations since 1947 and point nuclear weapons at each other is an enormous road block for any cooperative move. Possible benefits, economic and otherwise, to be realized from cooperation have provided ample ground for academic discussion, but have so far failed to render an incentive big enough to overcome ideologically motivated political positions – some of which are tied to manifest material benefits, too.[907] This is particularly true for the military establishments of both countries.

By contrast, **the non-governmental arena** of bilateral and regional relations renders a different picture of cooperation, by and large unimpressed by the political disputes. The Global Water Partnership (GWP) regularly brings together scientists, bureaucrats and politicians from all South Asian countries at its South Asia Water Forum.[908] The International Water Management Institute (IWMI), a renowned water research institution with offices in many cities in the region, has institutionalized strong academic links within the region.[909] The Regional Workshop for Journalists on Climate Change saw the participation of media representatives from several regional

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academic efforts on a regional scale that call on policy-makers to overcome political divisions in favour of sustainable utilization of water resources: Ashis Nandy, Imtiaz Ahmad & Ajaya Dixit: Water, power and people. A South Asian manifesto on the politics and knowledge of water; Colombo: Regional Centre for Strategic Studies, 1997. This *networking initiative* brings together research institutions from Bangladesh, India, Nepal, Pakistan and Sri Lanka.

[905] Crow and Singh: Impediments, *op. cit.*, p. 11: In one case, a third party was involved: A discussion of flood management in the Ganges Basin, initiated by Bangladesh and India in 1986, was held with the participation of Nepal, yet without taking into account Nepal's concerns, as the authors note. Dixit: Damning Nepal, *op. cit*. The author remarks that other upstream nations such as Bhutan and China have not been blamed by India in the said case, indicating that Nepal has been singled out for criticism for political reasons.

[906] Ben Crow & N. Singh: Impediments, *op. cit*., p. 13 – 14. The assumption that environmental issues in general are considered *low politics* by decision-makers, following a realist terminology of international relations theory, may be true in some cases. Water, as Ali rightly remarks, is but a particular case, not simply any other environmental issue. Whether the heightened awareness of the manifold importance of water leads to water *being used instrumentally in conflict resolution* is debatable and does sound overly optimistic especially in the case of South Asia. Cf. Saleem H. Ali: Water politics in South Asia: Technocratic cooperation and lasting security in the Indus Basin and beyond; *Journal of International Affairs*, vol. 61, no. 2, 2008, p. 176, 179.

[907] Benefits to be realized from continued confrontation manifest themselves in the status and very identity of the military in both countries. For this reason, initiatives like *the K-2-Siachen Peace Park*, targeted at joint natural resource utilization and environmental protection, have not moved beyond theory; cf. Jürgen Clemens: K-2-Siachen-Peace-Park: Internationale Initiative für grenzüberschreitenden Naturpark (Initiative for a cross-border national park; in German); *Südasien,* 1/2004, p. 52; Askok Swain: Indus II and Siachen Peace Park: Pushing the India-Pakistan peace process forward; *The Round Table*, vol. 98, no. 404, 2009, p. 569 ff.

[908] See: www.gwp.org.

[909] See: www.iwmi.cgiar.org .

nations, including Pakistan and India.[910] The South Asia Consortium for Interdisciplinary Water Resources Studies, a research group linking scholars from the region, is a development-oriented forum.[911] These and other initiatives show that cooperation is not an alien concept in the region.

Conclusion

Among the cases discussed here, the Indus Waters Treaty (IWT), together with its accompanying provisions on river development (Indus Basin Development Fund Agreement) and the Permanent Indus Commission, stands out as a remarkable institutional arrangement and a **symbol of cooperation** between two neighbours that have become notorious for their deep-seated antagonisms. Though it took considerable pressure from third parties, the IWT has succeeded in its primary functions: to end the main water dispute, prevent water from becoming a vehicle in the wider India-Pakistan conflict, and to enable economic development in both countries with a view to promoting long-term peaceful co-existence.

The focus on water management, manifested by the pre-eminence of water engineers from the negotiating parties and from the third-party team, helped to preclude political or ideological aspects. Still the Treaty symbolizes the intricate nature of water sharing – and in fact cooperation as such – in South Asia: water management is closely linked to politics. It is this **linkage** that has made river development difficult – both before and after 1960.

A clear institutional framework provided precise, enforceable and verifiable regulations which were important given the climate of mistrust that has pervaded bilateral relations ever since the Partition had surfaced as a likely outcome of negotiations with the then colonial rulers. Without this mechanism, both sides might have sought ways to seek individual gains by sidetracking agreements. Even more important, the institutional arrangement has effectively decoupled water management from water politics and politics as such, as the Kashmir issue has shown.

The need to cooperate was realized early, yet it took years to agree on a formal procedure of managing the Indus Basin. Economic incentives played a critical role at a time when both sides were in acute need of outside development assistance. To deny cooperation on river management would have proved too costly for either side – both financially and politically. The decision of the governments of India and Pakistan to sign the Treaty was a calculated move: the expected material and immaterial gains from agreeing on the IWT would strongly support the wider social, economic and political development of the respective countries over a longer period.

In effect, the IWT has in a sense enabled cooperation where there was confrontation before. Given the course that the Kashmir conflict has taken, it is doubtful that both sides would have reached an agreement without this intervention, particularly not after the 1965 war. Curiously, the IWT, by confining cooperation to tightly set limits, has allowed both sides to pursue their political interests without much concern for any potential harm to water management. Even the 1965 war did not threaten the status

[910] Islamabad, 28 – 30 March 2010; see: http://www.lead.org.pk/attachments/updates/update_254.pdf (March 2011). Support was provided by UNDP, UKAID and the Commonwealth Foundation.
[911] See: http://www.saciwaters.org/.

quo of water management that was established through the IWT. Thus the water treaty may be read as a strange example of “eat the cake and have it”.

The realization that the **antagonism** between both sides and their asymmetric, confrontational relationship would remain the same whatever the outcome of the water negotiations, while the patience of foreign donors might expire seems to have pushed both sides to agree to the formula laid out in front of them. The external intervention by the World Bank thus came at a crucial time, offering India an incentive that Pakistan could not have provided (funding of irrigation projects *etc*.). The Kashmir problem had not yet assumed the hardened shape of an ideologically charged elemental antagonism on which the vested political interests were built. A few years later, the prospects for an Indus agreement would have faced much greater obstacles. The confrontation, symbolized by Kashmir, has since become institutionalized in military and political terms as leaders on both sides continue to perceive each other predominantly in terms of security and physical threat, rather than in terms of constructive opportunities. Considering how long it took to reach a solution in a case that did not suffer from a heavy burden of armed conflict, like the Ganges, an agreement on the Indus after the 1965 war would probably have taken much longer.

The problem of asymmetry that has proved to be an almost insurmountable challenge in many river basins, particularly in South Asia, was by and large defused by the separation of the basin. This solution still appears to be underestimated by activists on both sides, particularly in Pakistan. Without this solution, Pakistan would have been subjected to a downstream riparian position with all the inevitable consequences, yet minus the finance that came with the Treaty. The idea to let Pakistan have control over all six rivers was as unrealistic in 1960 as it would have been at any time before or after the signing of the Treaty. It not only lacked a legal foundation but would have stood no chance of outside support. From a political-economic perspective, Pakistan would have had to offer something to India significant enough to make it agree to water sharing. It is not easy to see what that could have been. The sharing of the basin, through its separation, may appear overly pragmatic, yet it is hard to imagine any other potential solution to the problem at hand, particularly under the given circumstances.

While the **rationality of Indian and Pakistani politics** appears to be very similar, their respective positions are different. India clearly benefits from a position of natural superiority due to population, resources and geography. Its relations with all neighbouring countries – except China – are marked by a favourable asymmetry, very much unlike that of Pakistan. Politically and economically, India can afford not to cooperate; Pakistan, on the other hand – much like other neighbours of India – has a lot to lose from non-cooperation on vital issues like water.

The apparent irrationality of the notorious war talk has developed its own rationale. It has become a standard appendix to India – Pakistan relations over the decades, with hundreds of millions of people on both sides now used to it. This antagonism, bizarre as it is in the face of truly elemental problems such as water and power shortage, has often been described as part of the national identity or culture of both sides, particularly Pakistan. This rationale has become firmly institutionalized, as the position of the military in Pakistan shows. Pakistan’s *obsession* with security – or rather the leadership’s fixation on the India threat as a convenient instrument to divert

public attention away from much more acute and (for most of its nearly 200 million people) much more existential issues like water, electricity, jobs and affordable food and education – has remained a major obstacle to cooperation.[912] India's insisting on bilateral solutions, without any third-party involvement, has served to harden the positions on both sides.

For the provinces of Pakistan, the IWT has an ambivalent meaning. On the one hand, its clear and reliable regulations, its enforcement and dispute settlement mechanism would provide a degree of stability. On the other hand, Sindh's disadvantageous downstream position suddenly became more pronounced, as Punjab's favourable position rose even further. The dispute between Sindh and Punjab may not have the existential quality of the confrontation between India and Pakistan. It nevertheless is of fundamental importance to Sindh and to the cohesion of the nation. The resorting to politics in the dispute over water shares can be read as a reaction of the weaker side to the inescapable reality of being at the lower end of the river and all its wealth. This wealth, envisioned by the IWT, would increase dramatically over the following decades, widening the gap between the upstream and downstream provinces. It will be seen in the following chapter how the provincial stakeholders have approached this problem.

[912] U.S. President Barack Obama, referring to Pakistan's preoccupation with perceived threats from India (rather than internal problems of a possibly more serious and acute nature), in an interview with the BBC on the assassination of Osama bin Laden in Pakistan, April 2011; see: US would repeat Bin Laden raid; *BBC World Service* radio broadcast, 22 May 2011. Public protest against the U.S incursion (rather than against the ISI's inability – or unwillingness – to detect and expose the terrorist group) can be read to support the assumption that Pakistan cherishes confrontational status-related issues, rather than facing its home-grown problems and dilemmas, many of which pose a very real security threat.

IV.3 From *ad hoc* to accord: Towards inter-provincial water sharing

The Indus Waters Treaty established a new *status quo* of water management in the Indus Basin. For Pakistan, it determined how much water this country would be entitled to get. Through the Indus Basin Project, the existing network of canals, barrages and reservoirs would grow further, making ever more water available for irrigation and other uses. This large project would not only satisfy the needs of a fast growing population and economy. Through reservoirs and link canals it would bolster the water autonomy guaranteed by the Treaty itself.

The problem of hydrological asymmetry between India and Pakistan was effectively defused through precise and clear entitlements, a strict focus on water management, third-party invention, and substantial financial incentives to compensate for a lack of political willingness. An institutional framework that provided enough transparency, participation and verification would stem virulent mistrust among the stakeholders. In a sense, cooperation, beyond the actual consensus on the Treaty, was not even required, thanks to a comprehensive set of regulations that both sides had to adhere to.

For the provinces of Pakistan, the effects of the new system of water management were less dramatic, simply because water use and distribution within Pakistan were not part of the Treaty. The main benefit from the Treaty was water security, i.e. reliable water supplies. But the most important question was left to be answered: who would get how much? The IWT had demonstrated that an agreement over water distribution was possible even under adverse circumstances. For the Pakistani provinces, the challenge to divide the waters from three rivers would be much smaller, thanks to the absence of an overriding territorial and ideological dispute like Kashmir. In part at least the IWT could serve as a model for an inter-provincial water sharing agreement.

Water centralism: WAPDA and One-Unit

Water management in Pakistan at the time of the signing of the Treaty was determined by the political transformation initiated by the military government of Ayub Khan. Within the so-called **One-Unit framework** the former provinces were merged into one administrative unit (West Pakistan); consequently, the interests of the original provinces were not given representation in the process to reach the IWT. Instead, the central government had acted as a riparian stakeholder in the talks with India.

The task of overseeing the implementation of the Treaty was assigned to a newly created central government institution, the Water and Power Development Authority. Headquartered in Lahore, Punjab, WAPDA's authority extended to all the former provinces, its primary mission was *to combat the twin menace of water logging and salinity* and to extend the power supply throughout the nation, especially the countryside where many villages were yet to be electrified. The provinces neither had

a formal role in the staffing of this important new water institution nor in its decision-making process. Instead, *governments both at the national and provincial levels looked towards WAPDA for taking over new challenges in water and power sectors*.[913]

The mode of water distribution, under the given circumstances, had formally become a central government responsibility. While the basic problem of upstream – downstream asymmetry in the Indus Basin remained, the question of inter-provincial water sharing had fallen victim to the overriding concern of internal stability and outward security. With the India – Pakistan water dispute settled and the One Unit established, WAPDA, the dominant institution in the water sector, was free to regulate water supplies within Pakistan.

The WAPDA Act of 1958 determined that the Authority would manage *the water and power resources of Pakistan on a unified and multi-purpose basis*, including *irrigation, water supply and drainage*, according to *a scheme or schemes for a Province or any part thereof*.[914] The Act, though passed two years after the Constitution of 1956 which instituted the One Unit, remains surprisingly vague about water distribution, given the Authority's total control of all water sources, surface and underground. It is unclear as to whether any such *scheme* has actually taken shape. The Act which states that WAPDA *make take such measures and exercise such power as it considers necessary or expedient* resembles a blank cheque, rather than a clear and precise institutional guideline, and no reference is made to any other water law.[915] Though the Authority would retain full control over all water sources in the country, the allocation of these very resources is not mentioned in this Act.

The original Sindh – Punjab dispute apparently was not on the agenda of either the government or WAPDA, as there was no traceable political action in this direction.[916] According to the few secondary sources available, the distribution of water from the Indus network of rivers, tributaries and canals, including those which were to be built as a result of the Indus Waters Treaty, was guided by the Draft Agreement of 1945 – a document which, in spite of its detail, had failed to win the approval of decision-makers. The Draft which embodied the recommendations of the Rau Commission of 1942, in particular the prevention of significant harm to the downstream province, in fact was the only source to provide norms of water sharing in the absence of clear entitlements.

The Draft Agreement of 1945, without any further formalization, has developed into a shadow norm that guided water sharing through the decades to come.[917] The same

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[913] Cf. Sardar Muhammad Tariq & Shams ul Mulk: Sustainable, accountable institutions; in: John Briscoe & Qamar Hasan, eds.: *Pakistan's water economy: running dry*; *World Bank Background Paper*; Washington: WB, 2005, p. 5.

[914] WAPDA Act, XXI, 24 April 1958, Ch. III, Art. 8.

[915] WAPDA Act, Art. 13.

[916] Very few publications on the inter-provincial water dispute mention the early period at all.

[917] There are very few notions on the role of the Draft after independence. According to the then chairman of the Indus River System Authority, Nasar Ali Rajput, the Draft Agreement did determine water sharing until 1990; cf. personal discussion at IRSA office, Islamabad, 12 December 2002. Cf. Abdul Majid Kazi: Overview of water resources in Pakistan; www.pakissan.com/english/watercrisis/overview.of.water.resources.in.pakistan.shtml (August 2008). Hasan Mansoor: Water wars. Sindh's struggle for control of the Indus; *Himal*, July 2002, p. 32. Abrar Kazi: Kalabagh dam. The Sindh case; Hyderabad: Creative Communications, 1998, p. 25. I am grateful to Mohsin Babbar, an Islamabad-based journalist, for making a copy available to me.

might be said of the Canal and Drainage Act of 1873, the colonial-era law which established the provincial authority over irrigation and canal maintenance. From a political point of view, the failure to tie the WAPDA Act to any other formalized water norm – or to establish a new one – is understandable in the light of the stated desire to unify the country.

Whether the hope that the merging of all provinces into one would automatically put to rest previous grievances stood much chance is a different matter. By quietly sticking to a rule that represented a degree of consensus on at least some disputed issues, a semblance of continuity would be achieved. This might have been a primary factor in view of the mounting criticism of the One Unit. In other words, the fragile social, economic and political cohesion of the newly independent nation appears to be a dominant political factor in the water management of the early years.

From an institutional perspective, the implicit understanding that the Draft Agreement and the Canal Act would remain *de facto* rules represents an informal arrangement.[918] Such an arrangement, lacking legal status and institutional structure, would be less dependable as a formal, officially sanctioned document. For the main beneficiaries, the former provinces, it would mean that

- in terms of water distribution, their status as stakeholders was preserved in spite of centralist water governance, and that
- there would be a point of reference for future negotiations over water distribution in the post-One Unit era.

For the government and WAPDA, it would mean that

- the objective of internal stability could be reached while keeping the former provinces on hold by assuring them that the previous entitlements would remain valid, and that
- the new water management approach, namely WAPDA, would have time to consolidate its authority in the water sector.

The lack of documentation prevents further conclusions. Therefore the importance of this informal arrangement – especially the details of the Draft Agreement – cannot be assessed in detail. Whether the informal nature of water distribution in this period corresponded to the interests and expectations of the stakeholders is unclear. The absence of protest against this form of water management and the existence of very vocal protest against other issues during that period suggests that at least the basic demands have been met. It will be seen whether and how the stakeholders took a more active part in defining their water entitlements in the 1970s when the One Unit came to an end.

[918] The Canal and Drainage Act, firmly established since 1873, informally survived the One Unit era, as it was not officially revoked. With the reinstitution of the provinces it somewhat automatically became valid again and was amended in the decades to come. Cf. Sardar Muhammad Tariq & Shams ul Mulk: Sustainable, accountable institutions; *op. cit.*, p. 3. Abrar Kazi stresses that the Draft Agreement was explicitly referred to by the Fazl-e-Akbar and Haleem Commissions of 1970 and 1973 respectively; cf. Abrar Kazi: Analysis of water accords, 1935 – 1991; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi: OUP, 2003, p. 167.

Committees, commissions, and the new Constitution

The post-One Unit era is marked by two developments. First, the Indus Basin Project had by then transformed the water economy of Pakistan. The fact that more water was made available meant that significant economic potentials could be realized, namely the extension of irrigated agriculture in the Indus Basin and the generation of hydropower on a nation-wide scale. The main hydrological problem – the asymmetric relationship between the upstream province of Punjab and the downstream province of Sindh – remained in principle, yet it was defused simply because more water was available than before the IWT. Second, the new Constitution opened the road for political participation of the newly re-established provinces.

Punjab's position was most markedly elevated by the IWT. Whereas for the other provinces the IWT had simply secured dependable water availability and the promise of growing supplies, for the Punjab the impact was more profound and more comprehensive. The biggest province in terms of population had already become the economic powerhouse of Pakistan thanks to colonial-era irrigation development. As most of the new water projects were located in Punjab, irrigation and power generation were to receive a strong boost, pushing not only economic growth but also the political status of this province. Punjab's upstream position would allow the exclusive control of the three western rivers which supplied water for most of the country's agriculture.

Sindh's position also improved due to increasing water supplies from upstream Punjab. However, the principal problem of this downstream riparian province remained. Its supplies would depend on the upstream neighbour. In the absence of a formal mechanism to regulate water allocation, the water supplies of this province would not be based on a formalized entitlement but rather on an implicit arrangement.

The Constitution of 1973 reinstituted the provinces within a newly created system of federal administration and division of powers that would change the legal and political conditions of water distribution. The provinces were granted shares in all federal services, i.e. institutions, and a say in national politics, through the Senate.[919] Water management as a provincial prerogative, though, was not part of the Constitution. It did not as such establish provincial water entitlements. But it opened the door to active participation in decision-making by the provinces.

Provincial participation in water management was enabled through a new institution, promisingly termed the Council of Common Interests (CCI). This body, a forum designed for the discussion and settlement of water disputes arising among the provinces, was the first of its kind in the history of post-independence water management in Pakistan.[920] Constitutionally sanctioned, its legal status was and still is unique. Similar to the Permanent Indus Commission (PIC) established as a part of the Indus Waters Treaty, the CCI would convene upon request by one or more

[919] Constitution of Pakistan, Art. 38.

[920] Constitution, Art. 153 – 155. The CCI, unlike WAPDA which is under the authority of the Ministry of Water and Power, has since been the only official body in the water sector instituted through the Constitution. The National Economic Council (NEC, §156 of the Constitution) and the National Finance Commission (NFC, §160) are the only other institutions with equal provincial representation.

stakeholders, that is, provinces.[921] Unlike the PIC, however, the CCI did not have a water treaty or any other legal basis to refer to. Thus the CCI would address practically any water-related complaint of one or more provinces and reach a solution based entirely on negotiation.

The need for a mechanism of water distribution was realized even before the establishment of the federal system. The process to reach a formal mechanism began under the One Unit rule with a series of committees and commissions.[922] This process would span more than two decades, a period which saw shifts from military to civilian rule, back to military rule, and again to civilian rule. Interestingly, throughout this period it was the federal government that took the initiative to form these committees. In a sense it is the rulers of the One Unit system which can be credited with making the first step towards a water sharing formula, in 1968.

According to an official Government of Pakistan publication, the then One Unit government had, at the start of this process, signalled to the former provinces that *any points of dispute between the units in Pakistan will be resolved in a fair and equitable manner, if necessary, by the appointment of an impartial commission by the Central Government*.[923] This declaration, of course, would depend on some form of mechanism. It would be the objective of the first government-appointed committee to formulate the basic framework for such a mechanism.

The Akhtar Hussain Committee, also termed the Water Allocation and Rates Committee, was initiated by the Central Government in 1968. Tasked with water allocations at barrage-level, water releases from reservoirs, and groundwater supplies, it should prepare the basis for future water distribution.[924] The committee issued a report, in June 1970, yet failed to establish a new system of water allocation because the governors-designate of the soon-to-be re-established provinces refused to sign it but rather sought the ruling of a commission.[925]

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[921] The 18th Amendment to the Constitution (2010) introduced important changes to the procedure of the CCI, among them regular meetings, which will be discussed in the following chapter.

[922] For a brief overview of the committees and commissions: D. J. Bandaragoda: The role of research-supported irrigation policy in sustainable irrigated agriculture; *IIMI Country Paper* (Pakistan) no. 6, 1993; Lahore/Colombo: International Irrigation Management Institute, 1993, p. 68; Iram Khalid & Ishrat Begum: Hydro politics in Pakistan: Perceptions and misperceptions; *South Asian Studies*, vol. 28, no. 1; Lahore: Punjab University, 2013, p. 13.

[923] Government of Pakistan (GoP): Apportionment of the Indus waters (promise and prospects). An historic accord: 21 March 1991; Islamabad: Ministry of Information and Broadcasting, 1991, p. 6 – 7. I am grateful to Chaudhry Mazhar Ali, adviser to the Punjab Irrigation and Power Department, for providing me a copy of this publication. An online version of this document was later published by the Musharraf Government at www.presidentofpakistan.gov.pk (July 2006) on a special site covering the water issue. After the demise of that government, the site was closed. Unfortunately, this brief overview represents the only official document on this process. Even the quasi-official account of a former IRSA chairman barely mentions the various initiatives towards a water agreement; cf. Shafat Masood: Water Apportionment Accord of 1991; in: Pervaiz Cheema, R. A. Khan, A. R. Malik, eds.: *Problems and politics of water sharing and management in Pakistan*; Islamabad: IPRI, 2007, p. 95.

[924] For a brief description of this committee and its successors: Iram Khalid & Ishrat Begum: Hydro politics in Pakistan: Perceptions and misperceptions; *South Asian Studies*, vol. 28, no. 1; Lahore: Punjab University, 2013, p. 13; Amit Ranjan: Inter-provincial water sharing conflicts in Pakistan; *Pakistaniaat: A journal of Pakistan Studies*, vol. 4, no. 2, 2012, p. 111. Arif Nadeem: Water sector challenges: the Punjab perspective; in: P. Cheema, R. A. Khan & A. R. Malik, eds.: *Problems and politics of water sharing and management in Pakistan;* Islamabad: IPRI, 2007, p. 113.

[925] GoP: Apportionment, *op. cit.*, p. 7. Details of this committee and the fate of its report are unclear for lack of documentation. Extensive research into these committees and commissions has resulted in only a few vague descriptions in secondary material, typically without any reference to primary

The Fazl-e-Akbar Committee, or Indus Waters Committee, was initiated by the Central Government in October 1970, just three months after the dissolution of the One Unit. It was led by a former Supreme Court Judge and constituted mainly of technical experts. As the committee was *not able to work out a consensus either on apportionment of water or even on technical issues*, Justice Fazl-e-Akbar – for lack of a report – forwarded his own recommendations to the Government in November 1971, at a time when the civil war in East Pakistan reached a climax.[926] The newly appointed provincial governors met in October 1972 to discuss these recommendations. At the same time a draft of the new Constitution that would re-establish the rights of the provinces was already being debated. Perhaps not surprisingly, the conference that took place in a period of major political revulsions failed to reach a decision on the Committee's report.

The first direct talks over water allocation between the major stakeholders Sindh and Punjab took place shortly after the new Constitution had won approval in the National Assembly. Convened under the auspices of the newly established Inter-Provincial Coordination Committee, the meeting of both sides on 3 July 1973 concluded an Interim Accord on the opening of the Chashma – Jhelum link *on an ad hoc – basis*, allowing Punjab to transfer excess water to areas in need of water.[927]

This agreement, covering only a tier of the Indus network and a small aspect of river management, was not meant to pre-empt a basin-wide regulation. Yet it represents the first bilateral arrangement between two major stakeholders in Pakistan's Indus Basin. As such it is noteworthy; it did, however, not render any direct benefits for Sindh, as it barely enabled Punjab to operate the link canal with greater flexibility. The hope of Sindh must have been to reap some long-term benefits from meeting Punjab's expectations once the Tarbela Dam was completed – a large reservoir to be filled up with water from this very link canal.[928] Sindh's consent would thus have been a political investment in future cooperation over water with its upstream neighbour Punjab.

The Anwar-ul-Haq Commission, sometimes referred to as the Indus Waters Commission or the Chief Justices' Commission, marks the resumption of efforts to reach a formula for water distribution after the passing of the new Constitution.[929] From an institutional perspective this commission is a step forward as it represents the first practical implementation of the new Constitution in terms of water management: It is the direct outcome of the first meeting of the Council of Common Interests (31 December 1976) which was aimed at a comprehensive water sharing mechanism. The Commission, summoned by the President in 1977 upon the recommendations of the CCI, again took a legal approach to the problem of water sharing. It comprised of legal experts only, i.e. the Chief Justices of all four provincial High Courts, with the Chief Justice of the federal Supreme Court as its chairman. As such, it was the first institutionalized expression of the stakeholders' willingness to seek a water sharing formula.

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sources. This is true for the article quoted in the previous footnote as much as for all other articles referred to in this chapter which mention these committees and commissions.

[926] GoP: Apportionment, *op. cit.*, p. 7. The details of these recommendations are not mentioned.

[927] Rasul Bux Palijo: Sindh – Punjab water dispute; *op. cit.*, p. 119. The authenticity of the text reproduced there could not be verified as the author does not mention document sources.

[928] Palijo, *supra*, p. 121.

[929] GoP: Apportionment, p. 8; Bandaragoda: research-supported irrigation*, op. cit.*, p. 68; Khalid & Begum: Hydropolitics, *op. cit.*, p. 13.

The Commission, which for the first time approached the problem from an international law perspective rather than treating the Indus dispute as a particular problem of Pakistan, failed to deliver a report within the time frame given by the federal government (nine months). When the commission finally reached a conclusion, in June 1982, its new head, Chief Justice Mohammad Haleem, recommended to the Government that it should follow the line of Fazl-e-Akbar – a position, though, that had failed to win the provinces' support ten years ago.[930]

The Haleem Committee was convened shortly thereafter by the President in March 1983 as yet another effort to arrive at an agreement. Its report, delivered just a few weeks later, in April 1983, gained the support of Sindh, Balochistan and Punjab, yet failed to win the consent of NWFP which demanded a higher share of water. What followed was a period of *stalemate* lasting seven years, without further initiatives towards a comprehensive solution.[931] In the background, political unrest, with demonstrations against the military dictatorship of Zia ul-Haq, shook the country, prompting the government to send the armed forces into Sindh. In other words, the resolution of the water dispute once again became a victim of politics of stability and security.

An *ad hoc* pattern continued to determine water distribution in the absence of a formal regulation of water supplies throughout this period – according to Kazi, *without prejudice to the claims of the provinces*.[932] After the completion of the Mangla and Tarbela dams, water allocation for most of the year followed reservoir operation. The federal government allotted water to the provinces according to the forecasts of WAPDA's Water Resource and Management Directorate for water inflows at the level of the large dams.[933] Their ten-day operation sequences formed the basis of water allocation.

The provinces were *notified by the federal government* on the supplies to be expected on a seasonal basis.[934] Yet their role was not entirely passive. Though WAPDA was in charge of monitoring river levels and releasing water, the Irrigation and Power Departments (IPD) of the provinces communicated water requirements to WAPDA's operating unit in order to adjust water releases to seasonal crop requirements.[935] The heads of the IPDs were also members of the Water Distribution Committee that monitored water levels.[936] This committee, headed by WAPDA's

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[930] GoP: Apportionment, *op. cit.*, p. 8.

[931] GoP: Apportionment, *op. cit.*, p. 12. NWFP initially demanded 14 MAF, later 12 MAF. According to this official document, *only the political will to take the bull by the horns was lacking*.

[932] Abdul Majid Kazi: Overview of water resources in Pakistan; www.pakissan.com/english/watercrisis/overview.of.water.resources.in.pakistan.shtml (August 2008).

[933] Cf. World Commission on Dams (WCD): Tarbela case study; Islamabad / Cape Town: Asianics / WCD, 2000, p. 149 - 150; www.dams.org (May 2002). This report was prepared by Asianics Agro-Development International Ltd., one of the major contractors working in conjunction with WAPDA and the World Bank on the construction of the large dams. According to A. N. G. Abbasi, former Minister of Irrigation and Power of the Government of Sindh, water availability calculations were in part based on historical records of monthly river levels dating back to 1922; cf. personal communication, Karachi, 17 December 2002.

[934] GoP: Apportionment, *ibidem*. This document indicates that provincial representatives met regularly to discuss seasonal shares; concrete evidence, however, is not given.

[935] WCD: Tarbela; *ibidem*.

[936] WCD: Tarbela; *ibidem*. The authors note that the subcommittee attached to the Water Distribution Committee met at least once a month to review reservoir operations in the light of monitored water levels.

Chief Engineer, would deliver release data to the government for formal approval.[937] The provinces were in a position to state their demands; the potential for disputes over shares was reduced thanks to the transparency of the monitoring and reservoir operation.

The hydrological asymmetry between upstream and downstream riparian provinces which had originally been the major obstacle to a solution of the water dispute obviously did not play a major role in inter-provincial relations at that time.[938] A major reason must have been the relative water wealth resulting from the Indus Basin Project and the extensive utilization of groundwater sources in the 1970s and 1980s. The available institutions remained more or less dormant in this period as the provinces did not take on an active role in reaching a water sharing agreement. This is true for the CCI which did not focus on the water issue again until early 1991 as well as the Inter-Provincial Coordination Committee (IPC) which remained irrelevant until long after an agreement was finally reached in 1991.[939]

In sum, the water sector in the post-independence period is marked by a degree of continuity, as colonial-era regulations (Draft Agreement, Canal and Drainage Act) were upheld, as well as change, symbolized by the Indus Treaty, WAPDA and sporadic steps to regulate water sharing, some even with the participation of the actual stakeholders. Though a lack of documentation prevents a closer analysis of some of these early steps, existing evidence permits an assessment of a water management system in **transition**. Much like the country as a whole, Pakistan's early water management reflects the manifold challenges, water-related and else, that its decision-makers continued to face. Inevitably the political situation of Pakistan – with its frequent changes of government, with its states of emergency and external conflicts – overshadowed the development of a system of water management.

The political reforms following the One Unit rule have shown that **institutions** can positively affect stakeholder engagement and water management. The slow and sporadic development of water institutions, however, indicates that managing and allocating water had not been the first priority. The major focus – at least in the first three decades after independence – was external security and internal stability, and in this context the conclusion of a stable water agreement with India eliminated one potential external threat. Once that goal was reached and supplies secured, allocation of water within Pakistan may not have seemed to be of major importance – particularly not in the One Unit period. After the demise of the One Unit, and the military government along with it, provincial representation was formally established. But that did not mean that the provinces would take an active part in formulating water allocation rules. Instead throughout most of this period, it was the central

[937] According to M.H. Siddiqui, consultant to the Irrigation and Power Department of Punjab, the Water Distribution Committee met on a six-monthly basis to establish water allocations; cf. personal communication, IPD, Lahore, 24 April 2004.

[938] It is noteworthy that none of the secondary sources – including Palijo's widely quoted chronicle of the water dispute – mentions any form of protest against water distribution in this period. Public protest, though, did take place a number of times in this period – yet not over water distribution.

[939] According to official sources, the IPC was initially placed under the supervision of the Federal Ministry of Education, then under the Ministry of Finance. From 1977 – 1989 it was inactive due to Martial Law. Following several organizational shifts, it was finally revised and reconstituted under the Musharraf government; cf. Government of Pakistan: Yearbook 2009 - 2010 of the Ministry of Inter-Provincial Coordination; Islamabad, 2010, p. 11; www.pakistan.gov.pk (March 2013). Between 1973 and 2010, around 30 IPC meetings took place, averaging less than one per year.

government – not the provincial governments or their representatives in the Senate or the National Assembly – that took the initiative, substituting, in a sense, for the actual stakeholders.

The Council of Common Interests, the first constitutionally sanctioned institution tasked with inter-provincial water issues, gained importance in the process towards a water sharing mechanism soon after its establishment. Though the CCI is answerable to the Parliament, there is no indication that the National Assembly or the Senate played a similar role in regulating water distribution.[940] The stakeholders did not choose the legislative path to seek a regulation of water allocation, but rather a forum with direct stakeholder participation (through the provincial Chief Ministers) authorized to make majority-based decisions.[941] The CCI has since been the only institution – albeit operating on an occasional, non-permanent basis – that effectively represented stakeholder interests in the water sector.

The Constitution of 1973, though explicitly tasking the CCI with handling *complaints as to interference with water supplies*, fails to mention water distribution in its respective section.[942] Among the provincial prerogatives contained in the Concurrent Legislative List, water is not mentioned. The corresponding Federal Legislative List makes *inter-provincial matters and coordination* a federal government responsibility, without further details.[943] The CCI, in charge of practically all inter-provincial matters that are within the scope of the Federal List (Part II), would thus be the sole decision-making body in this field. This – at least hypothetically – includes the conclusion of an agreement to share water.

Provincial participation in this process, however, remained limited in spite of the existing institutional capacity. Seen through a rational choice lens, it means that the stakeholders perceived their situation to be satisfactory. With two exceptions – one initiative by the CCI, one move by Sindh and Punjab – the central or federal government was left to pursue its own strategy, meeting with limited enthusiasm from the provinces. On the other side, stakeholder participation was allowed but hardly encouraged by the centre. Though water had not yet become the hot issue it would be in a later period, the central government probably was afraid it might develop into a cause of further instability. It might be for this reason that the development of effective administrative and decision-making bodies was not on the agenda and that WAPDA remained a centralist authority without provincial representation. The prime concern and preoccupation especially of the military governments (Ayub Khan and Zia ul-Haq each ruled for about eleven years) were external conflicts (India/Kashmir, Bangladesh, Afghanistan) and perceived threats to Pakistan's security and territorial integrity.

Water availability as a result of the new reservoirs probably was the most important factor in the process to reach a water sharing formula. Total water use before the activation of the Tarbela Dam, in 1970, was 97.57 MAF. When the dam became operational, in 1974, water consumption rose to 105.35 MAF.[944] This means, on the

[940] Constitution § 153 (4). Extensive newspaper and literature searches did not yield any indication of initiatives by the legislature.
[941] Constitution § 154 (2).
[942] Constitution § 155.
[943] Constitution, Fourth Schedule, Part II, Art. 13.
[944] GoP: Apportionment, *op. cit.*, p. 11.

one hand, that the additional amount of water apparently was sufficient to satisfy current needs. On the other hand, however, this increase in water by just over seven per cent had to confront a corresponding population increase of over eleven per cent.[945] In other words, the new reservoirs alone were unlikely to meet demands at existing levels in the future. According to the federal government, more water could have been made available: *However, because the water allocation issue was not resolved, additional projects to extend the system could not be taken up*.[946]

The rise in demand did not trigger action on the part of the provinces nor on the part of the federal government.[947] For the provinces the growing reliance on groundwater must have rendered the impression that future water shortage in the river basin could be met by extending the use of underground sources; therefore there seemed to be no need for action, neither on an individual nor on a collective, let alone cooperative, basis. For the centre other priorities stood in the foreground; apart from occasional committees and commissions, no initiative was taken and no political objectives set.[948] An answer to the problem of water shortage would inevitably involve the whole Indus Basin and all provinces. Did the stakeholders choose to cooperate in order to reach a solution for this collective challenge, and if so, what did in entail?

Agreement at last: the Water Apportionment Accord

The *ad hoc* period of water sharing came to an end in 1991. Eight years after the fruitless last committee and three years after the end of the military dictatorship of Zia ul-Haq, the federal government took the initiative to address the water issue once again. The government of Prime Minister Nawaz Sharif, as one its first actions after assuming office in November 1990, appointed a sub-committee under the supervision of the cabinet to *explore different options under which the outstanding issues could be resolved on a final basis*.[949]

The Council of Common Interests, after 18 years of more or less passive existence, took up the cabinet's recommendations in January 1991 and – in its second meeting on water sharing so far – decided to set up an Inter-Provincial Committee on Apportionment of Indus Waters.[950] This Committee, starting on 30 January 1991, met several times throughout February to discuss technical aspects and presented its recommendations to the provincial governments. The provincial Chief Ministers met on 3 March 1991 and convened again – after two sessions of provincial representatives and experts under the umbrella of the Committee (4 and 16 March) – on 21 March 1991 to finally arrive at a *complete consensus*.[951]

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[945] World Bank: World Development Report 2000/2001; Washington, D.C.: World Bank, 2002, p. 288.
[946] GoP: Apportionment, *ibidem*.
[947] According to World Bank figures, the period of 1970 to 1990 saw the highest rates since 1960, ranging between 2.5 and 3.1; cf. World Bank: Pakistan data profile; www.worldbank.org (database download for Pakistan for 2006: Oct. 2007).
[948] The ongoing debate over water management in Pakistan has not led to a framework policy yet; the draft National Water Policy of 2003, to be discussed in the following chapter, has not evolved beyond the status of a theoretical concept.
[949] GoP: Apportionment, *op. cit.*, p. 13.
[950] This committee was also referred to as the Special Committee, cf.: Consensus to be worked out on water solution; *Dawn*, 14 March 1991, p. 5.
[951] GoP: Apportionment, *op. cit.*, p. 13. Cf. also: CCI decides on water apportionment; *Dawn*, 22 March 1991, p. 1. The Government of Pervez Musharraf even referred to the agreement as *sacrosanct*; cf.

On the surface at least, the newly elected federal government, headed by a former governor of the Punjab, had achieved within three months what a host of other governments over a period of three decades could not achieve. Consequently, Nawaz Sharif received most of the applause for this *pivotal breakthrough* which would smooth the start of his government.[952]

In the words of President Ghulam Ishaq Khan, the agreement marked a victory for the participatory system:

> *… this remarkable achievement will go down in history as one of the most significant, far-reaching, and courageous contributions to the strengthening of our federal bonds … This great event signifies the victory of the democratic process and testifies to the efficacy of our constitutional institutions for the amicable solution of national problems in ways that satisfy all and do injustice to none.*[953]

The signing of the agreement was initially greeted with almost unanimous fanfare.[954] The provinces, represented by their Chief Ministers, had indeed for the first time agreed on a major issue of common interest.[955]

The Water Apportionment Accord (WAA)**,** by its common short title, officially is a decision by the Council of Common Interests.[956] As such it reads like a meeting protocol, rather than a formal agreement of four provincial governments.[957] Under the caption *Apportionment of the Waters of the Indus River System between the Provinces of Pakistan*, it plainly states that *the participants agreed on the following points*:

- water shares (seasonal, per province, in MAF, based on a total water availability of 117.35 MAF);
- distribution of potential balance river supplies (percentage-wise, including flood supplies and future storage);
- water supplies for the Left Bank Outfall Drain (LBOD) to come from flood supplies *in accordance with the agreed sharing formula*;
- establishment of the Indus River System Authority *with representation from all the four provinces*.

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www.presidentofpakistan.gov.pk (July 2006; this website was closed after the demise of this government).

[952] Agreement, paragraph one; document text: www.pakirsa.gov.pk/wateraccord.html (March 2013).

[953] President quoted in: Ishaq felicitates PM, Chief Ministers; *Dawn*, 23 March 1991, p. 16.

[954] Cf.: Leaders hail water distribution accord; *Dawn*, 25 March 1991, p. 4; Accord termed historic; *Dawn*, 25 March 1991, p. 7; JI and JUI hail water settlement; *Dawn*, 25 March 1991, p. 7; NWFP to get more water than it had been urging: Afzal; *Dawn*, 25 March 1991, p. 7; Agriculture to gain: Jamali; *Dawn*, 25 March 1991, p. 7; Dam now possible, says Sartaj; *Dawn*, 25 March 1991, p. 16; All provinces happy with water accord; *Dawn*, 25 March 1991, p. 1; for an overview: M. Badruddin: Accord on sharing of the river waters in Pakistan and its implications; Lahore: IWMI, 1991, 6 – 8.

[955] For a collection of statements from the provincial heads of government, most of which point at expected gains from increased agricultural output, cf. GoP: Apportionment, *op. cit*., p. 14 – 18.

[956] Official document no. CCI-2/91, dated 21 March 1991. I am grateful to the staff at IRSA for providing me a copy. Document text of the WAA: www.pakirsa.gov.pk/wateraccord.html (March 2013).

[957] The original agreement was initialled on each page by the twelve signatories. I am grateful to Mazhar Ali of the Punjab Irrigation and Power Department, himself a signatory to the Accord, for a photocopy of this document.

Other aspects mentioned are:

- *the need for storages, wherever feasible on the Indus and other rivers*;
- *the need for certain minimum escapage to sea to check sea intrusion*;
- the provinces remain free to *undertake projects within their agreed shares*;
- no restrictions at all on projects in Balochistan;
- no restrictions on irrigation projects in the Kurram, Gomal and Kohat basins.

Water allocations, the central issue of the agreement, are detailed in the form of monthly water supplies (in million acre feet) for each province (§ 2). A certain overall amount of water of 117.35 MAF was expected to be available in the Indus Basin.[958] Apparently the expected increase in water availability from new reservoirs had already been factored in.[959] This distribution formula, unlike that of the Indus Treaty or the Draft Agreement, provides quantified shares for each province:

- Punjab: 55.94 MAF (equivalent to 48.92 %),
- Sindh: 48.76 MAF (42.64 %),
- NWFP: 5.78 MAF (5.05 %), plus 3 MAF from Kabul and Swat rivers,
- Balochistan: 3.87 MAF (3.38 %).

The basis for this allocation was *the existing uses of water supplies to the provinces which they have so far been getting as ad hoc allocations*.[960] The allotment of the 1977 – 82 period (102.7 MAF), commonly referred to as the historic uses, formed the basis of the Accord (§ 14b):

- Punjab: 54.51 MAF (equivalent to 53.06 %),
- Sindh: 43.53 MAF (42.37 %),
- NWFP: 3.06 MAF (2.98 %),
- Balochistan: 1.63 MAF (1.59 %).[961]

The allotted water shares, in an appendix to the Accord, were broken down to *ten-day seasonal system-wise allocations* specified by the respective source, i.e. barrage, and agricultural season, i.e. *Rabi* and *Kharif*.[962] This means that – overall water availability permitting – each province would get a fixed amount in each 10-day period calculated to correspond to the changing water needs of farmers in the respective areas. Sindh *e.g.,* entitled to a total of 48.76 MAF per year, would receive 14.82 MAF in *Rabi* and 33.94 MAF in *Kharif*.

Water shortage was defined as water availability below these existing uses. The so-called *balance water supplies* would determine how shortfalls or surpluses would have to be shared. For this a different ratio was established:

- Punjab: 37 %
- Sindh: 37 %
- NWFP: 14 %
- Balochistan: 12 %.[963]

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[958] Water shares are given in Million Acre Feet (MAF). One MAF is equivalent to 1233.5 million m³.
[959] GoP: Apportionment of Indus Waters Accord; www.presidentofpakistan.gov.pk (July 2006).
[960] GoP: Apportionment, *op. cit*., p. 13.
[961] Cf. Rao Irshad (former IRSA Chairman, 2010): Water Apportionment Accord 1991; presentation at University of Agriculture, Faisalabad, 10 January 2011, p. 12; www.uaf.edu.pk (May 2012).
[962] The seasonal allocations were arrived at during a CCI meeting in September 1991 and added to the Accord as an appendix. The full document is reproduced in the official version; www.pakirsa.gov.pk.
[963] For Balochistan and NWFP, this ratio would only be applied in times of surplus. In times of shortage, both provinces would be exempted, according to a decision by IRSA in 2003; cf.:

The Accord as an official document does not carry the names of its signatories; it only notes that *the participants* (of the 16 March meeting in Karachi) are listed in its attachment. It cannot therefore be mistaken for a legally binding treaty, and no paragraph makes any reference to an existing treaty, law or the Constitution. The signatures on the original document's three pages are merely bureaucratic symbols of acknowledgement. Strictly speaking, nothing in this document of 14 brief paragraphs can be read as an obligation or binding commitment. However, the Accord has been elevated to a quasi-law through the Indus River System Authority Act a year later, in 1992, which explicitly notes that the Accord is the basis for this new institution.

The text of the Accord is surprisingly vague and brief as to the details of water distribution and management. The first point states that *there was an agreement that the issue relating to Apportionment of the Waters of the Indus River System should be settled as quickly as possible*. It is followed by the actual apportionment (season-wise, per province), referring to *the accepted water distributional principles*, without any further details. The document neither states when the agreed schedule would start, nor when the Accord would actually become effective, nor when, and how, IRSA should be established. No further details are given on such important and controversial issues like reservoirs, basin delta conservation, and the operation and further development of the irrigation network.

This lack of precision has prepared the ground for further disputes. Among the issues rose to the fore in the aftermath of the signing of the Accord are the LBOD, the proposed Kalabagh Dam and other large reservoirs, and the conservation of the Indus delta region in lower Sindh.[964] Another issue that came under review was the system-wise allocation of water on a 10-day-basis, originally annexed to the Accord. Whether and to what extent these provisions were binding would become a contentious issue between the provinces.

Integrated river management can hardly be identified in the Accord. Important elements of comprehensive water management, like groundwater management and water quality preservation, are missing. Some of these issues have been addressed in the aftermath of the Accord and have later been entered in the draft of a National Water Policy.[965] As the WAA does not include a concrete plan or guideline for joint water management, the provinces retain their freedom to develop their respective sections of the river either in collaboration with other provinces or on an individual footing. The WAA can thus be read as a preference of maximum freedom of decision-making by the stakeholders. The oft-cited suspicion, particularly between Sindh and Punjab, might be one reason; another may be the fact that after many years of centralist rule, the provinces had yet to establish effective governments and administrations.

The only reference to comprehensive river management is the mention of the Kotri Barrage release and the need to establish a minimum water level in the lower reaches of the Indus to prevent the intrusion of salt water – a matter on which *further studies would be undertaken* (Art. 7). This danger, however, essentially threatens

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Muhammad Idrees Rajput: Background Paper: Inter-provincial water issues in Pakistan; Islamabad: PILDAT, 2011; www.pildat.org (March 2011).

[964] See the following chapter for an in-depth discussion.

[965] Developments surrounding the NWP will be discussed in the following chapter.

only Sindh's agriculture, not that of other provinces and had initially not been considered by the other stakeholders. It would later become a matter of wider discussion. Drainage, a critically important part of water management particularly in the flat downstream region, is not mentioned at all.[966]

Whether water law concepts played a role in the discussions that led to the Accord is unclear. The prevention of significant harm to the downstream province, a norm that marked the 1945 Draft Agreement as well as the 1960 Indus Waters Treaty as progressive arrangements, was not mentioned in the context of the WAA. Neither was the concept of equitable apportionment, as recommended by the Indus Commission of 1942.[967] The Accord of 1991 does not contain any reference to a legal norm of water management, nor does the official statement (*Apportionment of the Indus waters*) indicate that the solution that had been reached was based on any particular principle. By manifesting quantitative entitlements based on previous allocations, the Accord establishes its own legal basis, and that has been formally acknowledged by the IRSA Act.

In sum, the Water Apportionment Accord marks a departure from elaborate water distribution mechanisms like the Draft Agreement of 1945 or the Indus Waters Treaty. Much less detailed, precise and comprehensive, the WAA represents a statement of claims and expectations of the provinces. By mainly securing existing supplies, this agreement is stakeholder-oriented and not focused on collective objectives or benefits. Its main (and most precise) content is the allocation schedule. The fixed allocations represent a supply-oriented, not demand-oriented, understanding of water management. The WAA assumes a certain amount of available water which is to be distributed among the users of the basin. Measures to make more water available – either by more economic use or by increasing storage or recycling capacities – are not mentioned in the Accord even though this issue is among the most pressing problems of irrigated agriculture in Pakistan.[968] The Accord merely states that *all efforts would be made to avoid wastages* (Art. 14).

Reviewing the Accord

The Accord has over the years become an object of controversial debate as it contains several aspects that deserve a critical look:

- the assumed annual total availability,
- the fixed allocations,
- the sharing of shortages and surpluses, and
- future efforts towards greater water availability.

[966] Whether drainage has been on the discussion table prior to the Accord is not known. Cf. Jörg Zimmermann: Das Indus-Wasser soll neu verteilt werden (A new water distribution scheme for the Indus; in German); *Südasien*, no. 6 – 7/1991, p. 62, citing an interview with Abdul Hafeez Pirzada, former federal Minister for Inter-Provincial Coordination, on the conclusion of the Accord, in *Viewpoint*.

[967] According to Kazi, one of the very few authors to address legal aspects of the process to arrive at a water sharing agreement, states that the Draft Agreement of 1945 had been *the only uncontroversial agreement* and *the most painstaking exercise to date*; cf. Abrar Kazi: Analysis of water accords, 1935 – 1991; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi: OUP, 2003, p. 162.

[968] Badruddin suggests that groundwater resources might have been implicitly taken into account, yet this assumption is not supported by other sources; cf. M. Badruddin: Accord on sharing of the river waters in Pakistan and its implications; Lahore: IWMI, 1991, p. 5. I am grateful to Saiqa Kazmi, of the IWMI library, for providing me a copy.

The estimated water availability in the river system has been questioned by almost all sides. The Accord does not hint at how this figure was arrived at. In the years following the conclusion of the WAA, the stakeholders have been debating these estimates and the ways to make more water available. Even IRSA later admitted that the *quantity of 117 MAF of water availability over the year for irrigation uses of the canals is not available*.[969]

The assumption that a certain amount of water will be available is problematic, even more so if it includes expected gains from projects not completed or not even conceived yet. In addition, this calculation does not take into account the numerous structural changes that have affected the actual water availability. Similarly, the existing and prospective demands from a rising population are not taken into account. Environmental change due to climate dynamics is likely to affect future water availability, a factor that necessitates caution with regard to any prognosis on water supplies.

The fixed allocations create a quantified entitlement. The Accord which in essence established the previous allocation as a basis for future allocations obviously satisfied the demands of the provinces. NWFP even received more than before.[970] The implicit expectation of the stakeholders expressed in the agreement is that the allotted amounts will be delivered. Inevitably this will not always be the case, and if some of the less optimistic forecasts are factored in, this target is unlikely to be achieved in the future. By manifesting the claims of the stakeholders in terms of quantities, the Accord establishes a supply-centred practice of water management – one that has ever since dominated water management in the Indus Basin. The Accord of 1991 not only avoids the necessary shift towards demand management and the discussion of more efficient water use. It also provides little ground for collaborative action by the stakeholders.

The sharing of surpluses and shortages puts Sindh and Punjab on an equal footing. This seems surprising because Punjab's allotment is much higher. To cope with shortfalls in the system, Punjab is in a favourable position because it has more canals and rivers to draw water from. In case of shortage in one tributary or canal, the release from another can be increased in order to reach the target amount. Thanks to a network of link canals, this province's water supply system is better adapted to react to shortfalls than other provinces. Sindh, for example, has only three, and all of them are on the main river, the Indus, which means that this province lacks the flexibility of its neighbour's irrigation system.

Efforts to make more water available primarily meant large-scale dam projects. The vague mention of such efforts in the Accord hints at the lacking consensus on this issue. In fact the provinces would spend the following years bickering over

[969] Former IRSA Chairman Shafqat Masood (2005 – 2006): Water Apportionment Accord of 1991; in: P. Cheema, R. A. Khan & A. R. Malik, eds.: *Problems and politics of water sharing and management in Pakistan;* Islamabad: IPRI, 2007, p. 101. According to Shafiq, *this figure has been adopted based on statistical analysis of the last 77 years' river flows record from 1922- 1990*; Mohammad Shafiq: Water sharing: a conflict of gains; *Monthly Management Accountant*, vol. 13, no. 1, Karachi, 2004, p. 16. Daanish Mustafa: Hydropolilics in the Pakistan's Indus Basin; Special Report 261; Washington, D.C.: United States Institute of Peace, 2010, p. 9. Official sources neither support, nor deny this claim; cf. Government of Pakistan: Apportionment of Indus Waters Accord – 1991; www.presidentofpakistan.gov.pk (July 2006).

[970] Cf.: NWFP to get more water than it had been urging: Afzal; *Dawn*, 25 March 1991, p. 7.

projects like Kalabagh and blame each other for wasting water. The question of groundwater as a collective water source to augment surface supplies – particularly in the dry season, as suggested by Sindh – was not put on the table.

The Council of Common Interests convened again half a year after the conclusion of the WAA to discuss *follow-up actions on the Accord*.[971] On the agenda were several issues, among them the so-called 10-day system-wise allocations, a measure of water allocation that was in use in the *ad hoc*-period, before the Water Accord was agreed. It is basically a method of reservoir operation that would correspond to local water needs. It allows WAPDA to channel sufficient water to the relevant channels and to the places where particular crops require irrigation at a given time. The provinces did agree on a ten-day schedule for each month and each crop season. This schedule was then formally attached to the existing Accord.

Water availability proved to be a more thorny issue, and it raised the old Sindh – Punjab dispute to the surface again. Punjab's position was in favour of new large reservoirs, and its representatives held that the mere mention of such projects in the Accord meant that the whole agreement would effectively be null and void without them.[972] Sindh, by contrast, stuck to the water allocation as agreed, but saw no binding connection to the question of future dams and reservoirs. Its government formally opposed the inclusion of the planned Greater Thal Canal in the 10-day system-wise allocations.[973] The meeting did not result in an agreement on this issue.

Punjab's share in the *Rabi* season represented a problem directly relating to water allocation.[974] According to the meeting protocol, the largest province continued to receive 1 MAF of water more than its current share. The Accord had raised NWFP's share, which put Punjab at a loss. As Punjab had agreed to the new formula, it was now under pressure to use the allotted share more economically. The strategy to save that amount of water was the lining of canals – a major project to cut water losses in the canal system as a result of seepage. To fund this project, the federal government was approached in what was considered a compensation scheme.

The Kotri Barrage water release was identified as a problem within the framework of the Accord. The stakeholders agreed to task a neutral expert to calculate the amount of water at the barrage level required to prevent sea water intrusion. The quantity of water needed to save fields in low lying areas of Sindh from salt contamination would not be available for consumption. While the problem as such

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[971] Cf. Minutes and Decisions of the Meeting of the Council of Commons Interests held at 12:30 pm on Monday the 16th September 1991 in the Prime Minister's Secretariat, Islamabad; document text reproduced in: Report of the Technical Committee on Water Resources, Part II (Examination of TORs, Conclusions and Recommendations); Islamabad: TCWR, 2005, Annexure II – 14, p. 147; www.ppib.gov.pk/1.pdf (May 2006).

[972] Similar to the Punjab's view is the assessment of former IRSA chairman Shafqat Masood (2005 – 2006) that the expected water availability of 117 MAF can only be reached through implementing a number of dam projects; cf. S. Masood: Water Apportionment Accord; in: Cheema *et al*., eds.: *Problems and politics of water sharing and management in Pakistan; op. cit.,* p. 101.

[973] Cf. Letter by the Secretary for Irrigation and Power, Government of Sindh to Ministry of Water and Power, Islamabad, 21 Sept. 1991; document no.: A / WDC / I&P 5-91. I am grateful to the author of the letter, Muhammad Idrees Rajput, for providing me a copy of this letter during our conversation in Karachi on December 18, 2002.

[974] At the time of the meeting, water continued to be allocated on the basis of the *ad hoc* pattern. It would continue so until IRSA became operational in April 1993; cf. WCD: Tarbela, *op. cit*., p. 150.

was uncontested, the challenge facing the provinces would be how to treat this amount of water:

- Would it be treated as Sindh's responsibility and deducted from this province's share, or
- would it be considered a collective responsibility and duly divided among all stakeholders?

The CCI meeting of September 1991, the fourth session on water, revealed a number of critical aspects of the Water Accord relating to both current and future water distribution.[975] It also showed the limits of this forum as well as the readiness of the stakeholders, notably Sindh and Punjab, to actively seek a collaborative solution. As will be seen, important questions like the controversial Kalabagh Dam project have not been addressed in this forum.[976] In sum, most of the open questions remained untouched until the inauguration of the new water authority.

IRSA: facilitating cooperation

The Indus River System Authority is a direct result of the Water Accord. Within 20 months after the signing of the WAA, the Parliament passed the IRSA Act as a federal law (XXII, 6 December 1992).[977] As envisioned in the Accord, IRSA would oversee and direct the implementation of the agreement between the provinces and work towards *equitable* and *just* water distribution.[978]

The IRSA Act establishes the Authority tasked to

- *lay down the basis for the **regulation and distribution** of surface waters amongst the Provinces according to the allocations and policies spelt out in the Water Accord;*
- *review and specify **river and reservoir operation** patterns and periodically review the system of such operation;*
- *coordinate and regulate the activities of the Water and Power Development Authority in **exchange of data between the Provinces** in connection with the gauging and recording of surface water flows;*
- ***determine priorities** with reference to sub-clause (c) of clause 14 of the Water Accord for river and reservoir operations for irrigation and hydro-power requirements;*
- ***settle any question** that may arise between two or more Provinces in respect of distribution of river and reservoir waters;*

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[975] The Yearbook 2009 – 2010 of the Ministry of Inter-Provincial Coordination (IPC) lists 11 meetings between 1975 and 2006 and none until 2009; www.pakistan.gov.pk (April 2013). To enhance its role, the legislature has amended the Constitution to require the CCI to meet at least once each quarter (18th Amendment). Whether this intervention by the federal parliament will make the CCI more effective or whether it will degenerate to a mere discussion forum, remains to be seen.

[976] … according to NWFP Chief Minister Mir Afzal Khan, quoted in: Heated debate over Kalabagh Dam; *Dawn*, 10 March 1991, p. 1.

[977] Document text: www.pakirsa.gov.pk/act.html (March 2013).

[978] IRSA's motto seems to elevate water sharing to a religious level: *Be just. That is next to piety (Quran 5:8).*Together with a map of Pakistan that highlights the Indus Basin, it represents the official IRSA logo. Originally, the objective of IRSA, by its own statement of purpose, was *to promote harmony and good faith amongst provinces* through *equitable* water sharing, as noted on IRSA's previous official website; www.stormpages.com/i/irsaa/ (May 2008). This statement does not occur on the current website (as of July 2014).

- *consider and make recommendations on the **availability of water** against the allocated shares of the Provinces …;*
- ***any question** in respect of implementation of Water Accord shall be settled by the Authority by the votes of the majority of members …*[979]

Water distribution, IRSA's main task, is based on the Accord of 1991, and the Act does not make any additions or specifications to this formula. The highly dynamic nature of water supplies from the Indus Basin requires the new authority to be very active. This means that

- in order to fulfil stakeholder expectations, regular meetings to work out allocation patterns beyond mere quantities are necessary to determine which source should be tapped at a specified moment and over a specified period, and that
- data on river flow situations in all relevant sectors of the system has to be collected and made available to IRSA and the stakeholders in order to assess the current water availability and to decide when to apply the shortage/surplus mode of water allocation.

For this purpose, IRSA is required to hold meetings of the stakeholders at least once a month. Two committees work to support the decision-making process of the Authority, especially with regard to planning the water supplies for the upcoming crop seasons. The Advisory Committee, made up of representatives of IRSA, the federal government, WAPDA and the provinces, represents the institutional link between IRSA and affiliated bodies.[980] The Technical Committee provides support on the operation of the irrigation system and the reservoirs.

The role of information on water levels at the various points in the basin has proved critical in order to determine when a shortage has to be faced and the respective allocation pattern be adjusted.[981] Given the less than favourable relations between the provinces, transparency regarding the collection and communication of water data to and among the stakeholders is essential. IRSA, at the start in 1992, did not have direct access to monitoring stations in the basin. The operation of the release stations (barrages) has always been the responsibility of WAPDA. IRSA would thus depend on this institution for all data needs in order to make informed decisions.

The lawmakers had in a sense recognized this necessity. The Act establishes that the compilation of data is a responsibility of the provinces and WAPDA and other institutions in the water sector.[982] IRSA's task is to *coordinate and regulate the activities of the Water and Power Development Authority in exchange of data between the provinces in connection with the gauging and recording of surface*

[979] IRSA Act, Ch. II, Art. 8. Majority means: simple majority of the four members and the chairman.
[980] The Advisory Committee's role is noted in Ch. III of the Act, yet without any details on its task. The Technical Committee which was established later is not included in the Act. The Advisory Committee typically meets once in each crop season.
[981] According to Khalid Rana, officer in charge of calculating seasonal water availability and releases at IRSA, water inflow levels at four rim stations (Nowshera/Kabul River, Mangla/Jhelum River, Merala/Chenab River, Tarbela/Indus River) are monitored; to calculate allotments for the upcoming season, water availability during the previous season is compared with historical data for the relevant season; cf. personal communication, IRSA, Islamabad, 14 April 2004. I am grateful to Mr Rana for providing me charts detailing reservoir operation patterns for Mangla and Tarbela, for Rabi 2002/2003 and Kharif 2003.
[982] IRSA Act, ch. III.

water-flows.[983] Unfortunately, this vague and confusing wording has hampered the flow of relevant information. Instead of sharpening the respective limits of authority of the various institutions, it puts IRSA somewhere in the middle of a network of institutions that have been in existence for decades without specifying how IRSA would exert its control over the collection and communication of water data. In this context it is noteworthy that none of the existing water regulations (like the WAPDA Act) has since been adjusted to allow IRSA a dominant role in the process of water distribution.

The monitoring of water levels at various stations in the basin has since been a problem that significantly impeded IRSA's decision-making. Without accurate measuring and recording of river flows, the Accord could not be implemented in a reliable manner. On the initiative of the federal government, in 2001, the stakeholders began discussing the installation of a telemetry system.[984] The move by the federal government, intended as a *confidence-building measure* targeted at Sindh and Punjab relations, effectively put IRSA in a position to seek a system according to its own purposes, rather than having to accept whatever would come from the provincial Irrigation Departments and WAPDA.[985] This initiative – nearly a decade after the establishment of IRSA – led to the actual implementation of a monitoring system that would link all recording stations with IRSA headquarters, providing the Authority with a state-of-the-art facility to assess water availability and evaluate water allocation patterns on a real-time basis.[986]

The significance of the telemetry system in the Indus Basin is manifold. The metering, now by electronic means only, provides accurate information that leaves little room for doubt because the previous margin of error (due to mechanical instruments) has been eliminated. That means the data as such would provide no grounds for dispute. Records of water levels and discharge amounts are stored electronically and serve as a reliable basis for prognostic assessments. Due to satellite-based data collection and internet-based communication, the relevant information is available on a real-time basis at any time.[987] Thus IRSA would be able to react swiftly to any unexpected changes in the river system. As all provincial irrigation authorities have access to the system, the risk of information being manipulated or misused is nil. In the words of the Federal Minister for Water and

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[983] *Ibidem*.

[984] The Musharraf government raised the issue with IRSA, WAPDA and the Federal Flood Commission in early 2001; see: CE for early installation of telemetric system at all dams, barrages; *Pakistan Link*, 7 January 2001; www.pakistanlink.com/headlines/Jan/07/15.html.

[985] See: Satellite technology to cost ISRA more; *Dawn*, 17 April 2001;

[986] On the federal government decision see: Telemetry system soon to monitor water flow; *Dawn*, 12 April 2002. WAPDA was authorized to prepare plans for the system's design. According to the manufacturer, the system receives data from 23 telemetric stations in the basin (including one each at Tarbela and Mangla), 2,400 electronic meters and 200 ultrasound sensors; cf. Siemens Industrial Solutions and Services press release: Transparente Wasserverteilung in Pakistan – Siemens liefert Telemetrie-System für Bewässerungsanlagen im Indus-Becken (Transparent water distribution in Pakistan – telemetry system for the Indus Basin irrigation system delivered by Siemens; in German); 12 February 2003; http://info.industry.siemens.com/data/presse/docs/I&S%201202.3103d.pdf .

[987] The telemetry system at Chashma Barrage, for example, delivers data from six metering points (upstream left, upstream middle and upstream right, downstream left, middle and right) on water levels in the river in feet, plus the total water discharge at the barrage. I am grateful to the on-site operators of Chashma Barrage for a first-hand impression on 23 June 2004 and especially to Mr Mohammad Nasir Naqvi of Mianwali who facilitated this visit as part of a tour of the region that also included the proposed Kalabagh Dam site.

Power: *The telemetry system will develop confidence amongst the provinces and the data will automatically be transmitted … without human interference*.[988]

Benefits from the new system, however, took some time to be realized. Aside from technical issues such as the calibration of the system, it was questions over finance and control that have haunted this hypothetical success story over several years.[989] Another problem proved to be technical expertise and infrastructure. Even before the completion of the basin-wide system, IRSA announced that it was not in a capacity yet to operate the system and requested WAPDA to do so *until IRSA is equipped to take over*.[990] After a row over maintenance, WAPDA and IRSA in 2006 agreed to jointly monitor the system for the time being.[991]

Technical questions continued to arouse the suspicion of some stakeholders, especially the downstream provinces of Sindh and Balochistan, regarding the accuracy and reliability of the installed water metering, prompting IRSA to suggest that an alternative be considered by the government.[992] To defuse the growing tension between the major water authorities, the Ministry of Water and Power convened a meeting of the stakeholders and representatives of WAPDA and IRSA.[993] In the absence of any solution from within IRSA or from amongst the provinces, this initiative of the federal government averted a deadlock both between the stakeholders as well as between the main water institutions. The neutral consultant charged with assessing the system finally, in 2008, concluded that the system worked as intended and needed only minor adjustments.[994]

The inability of IRSA to reach a conclusion of this important matter signalled that in the institutional landscape of Pakistan's water management, this new authority had not yet reached the level of effectiveness that other institutional players like WAPDA and the Ministry of Water and Power exhibited. Perhaps most significantly, IRSA failed to produce a solution that stemmed from an inter-provincial consensus. The

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[988] Liaqat Ali Jatoi quoted by *The News*, 2 December 2004.

[989] Initial complaints by the provinces over the accuracy of the data, at the start of the system, pointed at the necessary calibration of the meters. This problem was solved by late 2003; cf.: Telemetry system begins operation; *Dawn*, 12 May 2003; Irrigation dept's telemetry system sealed; *Dawn*, 13 May 2003; Chashma's telemetry system starts functioning; *Dawn*, 27 May 2003; IRSA to take over telemetry system in September; *Dawn*, 17 July 2003; Telemetry system to be fine-tuned*; Dawn*, 10 Nov. 2003.

[990] See: Fears and doubts about telemetry system; *Dawn*, 24 November 2003; IRSA lacks trained manpower to monitor telemetry system; *Business Recorder*, 19 March 2005. Poor maintenance appears to have been another factor in the system's initial deficits because of a lack of budget; cf. Zafar Samdani: Telemetry system – a source of controversy; *Dawn*, 5 Sept. 2005. Sardar M. Tariq and Shams ul-Mulk point at IRSA's lack of *technical competence and appropriate staff;* Tariq & ul-Mulk: Sustainable, accountable institutions, *op. cit.*, p. 6

[991] Cf.: WAPDA, IRSA to monitor the telemetry system; *Dawn*, 27 March 2006. The lack of maintenance had caused a highly publicized rift between the two authorities; cf.: IRSA blamed for ruining the telemetry system; *Business Recorder*, 5 August 2005; Time to ensure protection of telemetry system; *Business Recorder*, 11 June 2006. According to Khalid Rana of IRSA, electronic metering initially suffered from problems of calibration particularly at the barrages and from occasional theft of sensors prompting IRSA to return to manual metering; cf. personal communication, IRSA, Islamabad, 14 April 2004.

[992] Cf.: IRSA seeks to scrap telemetry system: water loss audit planned; *Dawn*, 8 November 2006.

[993] Cf.: Consultant to be engaged to report on telemetry system working: panel set up to spell TORs; *Business Recorder*, 29 November 2006.

[994] Cf.: Indus Basin irrigation telemetry system: World Bank consultant presents appraisal report; *Business Recorder*, 31 March 2008.

stakeholders were thus left to wait for the federal government to show a way forward.[995] The Ministry of Water in Power, by its own mission statement designed to *coordinate inter-provincial water sharing issues*, did so by assembling the relevant actors and lead them towards a pragmatic solution.[996]

In essence a technical problem, this issue highlighted the many difficulties attached to water sharing even 15 years after the conclusion of the Water Accord and the establishment of a specialized institution, IRSA. The long sought trust among the stakeholders apparently was not solid enough yet, the desire to approach a cooperative path not very strong. The federal government's move to augment the existing mechanism of inter-provincial relations with another tier might have been an indirect outcome of the telemetry row. In 2007, the Inter-provincial Coordination Division (IPC) became a new section of the Cabinet Division, designed to add a structural component to the meetings of the Inter-provincial Coordination Committee, a so far rather peripheral forum. Through the IPC which was flanked by Inter-provincial Coordination Departments in the governments of the provinces, Islamabad signalled that it would from now on take a direct and active role.

Several attempts to change IRSA were made by the federal government. The first came in the form of a presidential ordinance, in 1998.[997] This move by the government of Nawaz Sharif targeted the set-up of the Authority: The provincial representatives were to be the Irrigation Secretaries, not delegates chosen by their respective governments. The chairman's position would not be a rotating one any more, but automatically filled with the chief engineering adviser of the Ministry of Water and Power, giving the federal government a permanent command of IRSA. This high-ranking member of the Ministry of Water and Power had originally been assigned a secondary position, as an *ex officio* – member and part of the Advisory Committee, without a right to vote, just as the two representatives of WAPDA. This attempt was seen as a step by the federal government to curtail the role of the provinces and was met with opposition from the provinces. As a result, the ordinance was formally withdrawn by the Ministry of Law three months later.[998]

IRSA's set-up was again discussed during the Musharraf presidency. This time the provinces themselves took the initiative. The federal government in 2000 – in a move to quell fears of Sindh that the chairman tended to side with Punjab – had named a Sindhi as chairman for two years in a row, thus interfering with the IRSA Act for the sake of inter-provincial relations, an initiative that alienated Punjab because Sindh would then have two votes.[999] In response to this row the federal Ministry of Water and Power proposed to replace the rotating position of chairman with a permanent,

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[995] The failed start of IRSA and the telemetry system rendered the impression that IRSA *only created controversy*, in the words of Chaudhry Mazhar Ali, senior adviser to the Irrigation and Power Department of the Punjab; personal discussion at IPD, Lahore, 24 December 2002. Javed Majid, the then Secretary of Irrigation and Power and himself a former IRSA chairman (2000) saw IRSA as *more of an operation forum*, tasked with the surveillance and implementation of agreed water sharing; personal communication, IPD, Lahore, 24 December 2002.

[996] See official homepage: The role of the Ministry; www.mowp.gov.pk (March 2008). Mirza Hamid Hassan, the then Secretary of Water and Power, stated that the role of the Ministry is *to supervise and make water policy decisions*. While the *final authority* rests with the Planning Commission, *all water projects are coordinated by us*; cf. personal communication, MWP, Islamabad, 28 December 2002.

[997] Ordinance No. VIII, 1998, 16 July 1998. Document text: www.pakirsa.pk/act.html (March 2013).

[998] The withdrawal was executed through a Ministry of Law Order on 6 October 1998; www.pakirsa.gov.pk/act.html (December 2012).

[999] See: Centre asked to forego right to vote in IRSA; *Dawn*, 5 July 2001.

neutral expert to be appointed by the federal government.[1000] The Musharraf Government instead opted to keep the existing rotation. Maybe more importantly, it introduced a Technical Committee to the IRSA staff in order to shift the focus of the Authority from the political to the practical aspects of water sharing.

The first amendment of the IRSA Act that actually came into force has so far remained the only one. It brought a symbolic, yet important change: It shifted IRSA's offices from Lahore to Islamabad, the federal capital.[1001] This meant that, unlike WAPDA which retained its Lahore headquarters, IRSA would now be in the vicinity of other federal institutions. It would signal to the stakeholders that IRSA was not meant to be associated with pro-Punjab favouritism or a position junior to that of WAPDA. Passed as a presidential ordinance in 2000, in the first year of the Musharraf Government, this law – as expected – did not receive any opposition from the stakeholders even though the legitimacy of this self-appointed ruler derived mainly from claims that the previous, elected government had failed in its duties.[1002] Since then, the Act has been in effect without further changes.

In sum, through the IRSA Act the Water Apportionment Accord has been cemented as the guiding principle for water distribution and has obtained a legal status. Without this new institution, IRSA, the agreement between the provinces would have been a mere declaration of intentions. IRSA, in charge with basically all aspects of water sharing, is the actual decision-making forum for the stakeholders. Through IRSA, the provinces can obtain relevant river data from WAPDA which this Authority is required to provide. In case of dispute, the provinces can – without referring to a higher institution – reach a settlement among themselves. The provincial governments are also in a capacity to choose their own representatives (Members).

The IRSA Act reflects the intentions of the signatories of the Water Accord. It does not go beyond this scope nor does it broaden the authority of IRSA beyond the issue of water distribution. This means that important long-term concerns like future water availability are not necessarily on IRSA's agenda. In other words, the IRSA Act in a sense turns responsibility for water management over to the actual stakeholders, the provinces. If they consider issues like future water supplies relevant, it would be up to them to put the issue on IRSA's agenda.

Challenging the Accord: how to share water shortages

The Water Accord of 1991 came under fire for the first time in 1994 when the seasonal water availability fell below the so-called historic uses of the 1977 – 1982 period which had formed the basis of the WAA. A year after Nawaz Sharif's demise over charges of corruption and mismanagement, his rival Benazir Bhutto, now in her second term of office, found herself in a position to reverse the water distribution formula to favour her home province Sindh.[1003]

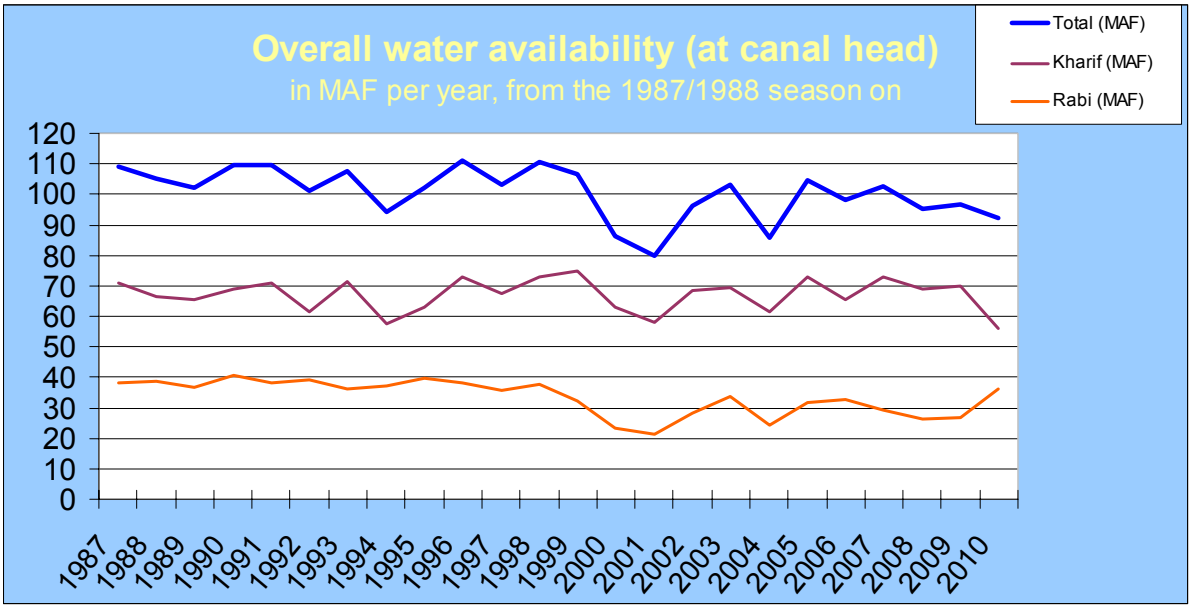
[1000] See: IRSA setup to be changed; *Dawn*, 6 September 2002.

[1001] Ordinance XLI, 4 Sept. 2000, issued under the provisions of the Emergency and the Provisional Constitution Order of 1999. Thus effectively both the IRSA Act of 1992 and the Water Accord of 1991 were altered.

[1002] See *Dawn*, 5 and 12 Sept. 2000, *The News*, 5 Sept. 2000. This matter has not been raised within the context of the wider dispute in any of the available publications.

[1003] Bhutto's effort to suspend the Accord reported in *Südasien*, no. 6, 1994, p. 65.

The water shortage that occurred during the late Rabi / early Kharif 1994 season meant that Sindh would not receive supplies according to the WAA.[1004] Sindh approached the federal government which set up an Inter-Ministerial Committee made up of the Minister of Water and Power plus the Ministers of the Irrigation and Power Departments of Sindh, Punjab and Balochistan and leading representatives of WAPDA.[1005] The Committee met on 2 May 1994 *to review matters relating to the water situation prevailing in the country*.[1006]



The Committee, intended to contain the dispute and prevent it from *snowballing into larger controversies that endanger our national interest*, noted the claim of Sindh that its water supplies were delayed, causing extensive damage to farmers.[1007] To reduce delays, Sindh's supplies should be delivered from Taunsa Barrage near the border of Sindh, not Chashma on the upper reaches of the Indus. Punjab demanded that in times of shortage, cuts should be shared on the basis of the so-called historic uses. The federal government referred to IRSA and the CCI for the settlement of disputes over water sharing, stressing that *the Ministry of Water and Power has no role in the water distribution* and deploring that *IRSA has turned into a debating society*.[1008] The Minister proposed the amend the IRSA Act to allow the federal government to appoint IRSA members and choose its chairman from among retired Supreme Court judges.

[1004] Surface water availability, measured at canal head, was 36.16 MAF in *Rabi* 1994 and 57.31 MAF in *Kharif* 1994. The *Kharif* figure was the lowest since at least 1987; cf. Government of Pakistan, Ministry of Agriculture: Agriculture report 2006 – 2007; Islamabad: GoP, 2008, p.139 (table 86-A).

[1005] Arif Nadeem: Water sector challenges: The Punjab perspective; in: Pervaiz Cheema, R. A. Khan, A. R. Malik, eds.: *Problems and politics of water sharing and management in Pakistan*; Islamabad: IPRI, 2007, p. 115. Hasan Mansoor: Water wars. Sindh's struggle for control of the Indus; *Himal*, July 2002, p. 33.

[1006] The meeting protocol was published on the official website of the then President Pervez Musharraf; www.presidentofpakistan.gov.pk (Dec. 2005). Water data taken from various issues of the Agricultural Statistics, *op. cit*.

[1007] Quote by Malik Ghulam Mustafa Khar, Minister of Water and Power; cf. meeting protocol, *supra*.

[1008] Quotes by Salman Faruqui, Secretary of Water and Power; cf. meeting protocol, *supra*.

The decisions made by the Committee effectively altered the existing mode of water sharing during periods of shortage, yet without any formalization. Though both Sindh and Punjab rejected the federal government's idea to amend the IRSA Act, they agreed by *consensus* to share shortage according to the historic uses.[1009] As a concession to Sindh, water supplies for May 1994 would be determined at Taunsa Barrage. To compensate for losses in Sindh, the reservoir at Mangla Dam would be operated to allow higher releases. Balochistan, dependent on Sindh for its water shares from the Indus, would get its full share, i.e. this province would not have to bear any shortages.

As a result of the Committee, the problem of shortage seemed to have been settled outside the existing institutional arrangement. The CCI was not called upon, as would have been the standard procedure according to the agreement signed just three years ago. Instead the stakeholders apparently had opted to involve the federal government. Thus the Committee's decision represented the will of the stakeholders, at least that of Sindh, Punjab and Balochistan.[1010]

The following weeks, however, saw growing dissatisfaction with the *consensus* decision reached by the Committee. Sindh's representative at IRSA, who had not been part of the Committee, rejected its decision outright immediately after receiving the meeting protocol, stressing that *there was no consensus that shortages between Sindh and Punjab would be shared according to historic uses* and such a decision would be *in violation of the Accord*.[1011] This position was supported by Sindh's Irrigation and Power Department (whose Secretary had participated in the May 5 meeting), claiming that the historic use-formula was merely a proposal by the Punjab side which Sindh did not support.[1012]

The federal Ministry of Water and Power, apparently fearing a wider rift, had to distance itself from the Committee, asserting IRSA's *full authority for resolving inter-provincial water issues* and stressing that the Committee was *of an advisory nature and without any legal mandate*.[1013] It did not, however, formally withdraw or refute the Committee's resolution. The open issue, from the perspective of Sindh, added to the suspicion that the federal government tended to side with Punjab. Its effect on the existing institutional arrangement in the water sector was negative as it undermined IRSA's authority. The Authority, however, stuck to the meeting's decisions. Water sharing in the following years was based on the historic use-formula.

The controversy over the 1994 decision seemed to come to end in 2000, when IRSA sought a legal clarification from the federal government. The Law Division delivered its assessment on 16 October 2000. It concluded that the established distribution formula detailed in the Water Apportionment Accord remained the only

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[1009] Cf. meeting protocol, *supra*. The concluding paragraph reads: *After further discussions, the following decisions were taken through consensus*.

[1010] NWFP, the uppermost riparian province, was not represented at the meeting. The outcome – which brought changes relevant only to the larger provinces – did not affect the two smaller stakeholders.

[1011] Letter from Abdul Rasul Memon to Salman Faruqui, Ministry of Water and Power, 12 May 1994; doc. no.: IRSA / 1692 – 93. A.R. Memon reiterated this position in a second letter to Faruqui, 16 July 1994; doc. no.: IRSA/M (Sindh)/2304-6. I am grateful to the staff of IRSA for photocopies of the correspondence following the inter-ministerial meeting.

[1012] Letter from Syed Ali Gohar Shah to Faruqui, 7 August 1994; doc. no.: A (WD)/I&P – 94/131.

[1013] Quoted in letter from A.R. Memon to S. Faruqui, 16 July 1994; *op. cit.*

legitimate regulation: *Any interpretation of sharing shortages on the basis of historic use shall be a violation of the concurrent accord*.[1014] The ministry asserted IRSA's responsibility to implement the Accord and noted that *any dispute on the subject should have been referred to the CCI*. IRSA thus suspended the 1994 formula.[1015]

The federal government's injunction, however, failed to settle the original problem. Punjab stuck to its position that

- water shortages would have to be shared on the basis of the so-called historic uses, and that
- the Accord of 1991 could only be implemented effectively if new storage reservoirs were built, because the amount envisioned in the Accord (114 MAF) would not be reached without further measures.

The Punjab Government, considering the Law Division's findings *erroneous* because they failed to determine that water shortage existed whenever total water availability fell below 114 MAF, thus requiring distribution on the historic use-principle, sought legal clarification from a private law firm.[1016]

The legal opinion obtained on 2 December 2000 stated that

- any clause (of the Accord) would have to be read within the context of the agreement, and not in isolation;
- *the figure of 114.35 MAF was notional* because *this amount had never been achieved historically even in the best water years*;
- the distribution formula of the Water Accord was founded in the *expectation of construction of further storages as envisioned in Clause 6 of the Accord*;
- the CCI, in its meeting on 16 September 1991 (when the detailed seasonal water distribution was agreed), had *considered the Kalabagh Dam sustainable*; and that
- *there is an acknowledgment and acceptance of the situation that until the target of 114 MAF is reached, the distribution will be regulated by the historic use*.

Thus the Punjab Government considered the Inter-Ministerial Committee decision to be a correct and binding interpretation of the Accord.[1017] The Law Division reiterated its stand on 25 April 2002, declaring the *ministerial award of 1994 annulled*.[1018]

IRSA, in response to the Law Division's finding, in 2003 adopted a new, *three-tier formula* that can be read as a combination of the historic-use formula and the Accord:

- in case of water availability <105 MAF: following historic uses,

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[1014] Quoted in: M. Idrees Rajput: Background Paper: Inter-provincial water issues; *op. cit.*, p. 15. The Law Division reiterated its stand on 25 April 2000; *ibidem*.
[1015] Cf.: Availability of water for Rabi reviewed; *Dawn*, 15 Nov. 2001.
[1016] M. H. Siddiqui: Apportionment of Indus Water Accord; Lahore: Government of Punjab, Irrigation and Power Department, 2001, p. 7, 10. I am grateful to the author, a consultant to this department, for providing me a copy of this report in the course of our discussion at the IPD, Lahore, June 2004.
[1017] Document reproduced in Siddiqui, *op. cit.*, Annex 4, p. 27.
[1018] Cf.: Availability of water for Rabi reviewed; *Dawn*, 15 Nov. 2001.The federal government issued corresponding directives to IRSA on 25 Oct. 2000 and 25 April 2002, respectively; doc. no. WA-5 (1) / 98 of 25 Oct. 2000; cf.: M. Idrees Rajput: Water problem: perspective from Sindh; in: Cheema *et al.*, eds.: *Problems and politics of water sharing; op. cit.*, p. 120; IRSA evaluating controversial water accord; *News Network International* (Islamabad), 23 Dec. 2000; www.nni-news.com.

- in case of water availability 105 – 117.35 MAF: historic use up to 105 MAF, from 106 MAF following Accord,
- in case of water availability >117.35 MAF: per Accord up to 117.35, from 117.36 on the basis of 37% each for Sindh and Punjab, 14% for NWFP/KPP and 12% for Balochistan.[1019]

This new formula, though not in line with the government's demand and the legal position, represents a pragmatic compromise. Actual water availability in the years since at least 1987 has never reached the amount envisioned in the Accord (see graph). In other words, water shortage, by the definition in the Accord, was regular, not an exception. The Accord, which – according to official sources – was based on dam projects that would make more water available, inevitably required not only interpretation and debate but also adjustment.[1020]

Repercussions in the public were mostly negative. The shifting from one rule to another and back again was widely perceived as an institutional deficit and symptom of political manipulation of the water issue.[1021] After the controversial 1994 formula, IRSA received the brunt of the blame for neglecting its main task, the implementation of the Accord of 1991. As a sign of *gross mismanagement,* according to Khan, IRSA let itself being used to *settle provincial scores rather than developing common ground*, thus compromising its *moral authority*.[1022] Instead of discussing technical solutions, *IRSA has allowed its members to aggressively express their provincial identities*.[1023]

Commenting the failure to adhere to the Law Division's ruling, Hashmi points out that *the authority (IRSA), on one pretext or the other, did not issue the notification until its chairman's office is assumed by a member from Sindh*.[1024] Ignoring the CCI, the legitimate body for solving such problems, *IRSA had adopted the decision of the 1994 inter-ministerial committee and it had no mandate to annul its own decisions*.[1025] This *violation of the 1991 accord,* according to Majid, has caused *great damage to national harmony* as it *pitched the provinces against each other*.[1026]

[1019] Cf. Rao Irshad: Water Apportionment Accord; *op. cit*., p. 16; Water distribution on historic-use basis; *Dawn*, 10 April 2003; I. Rajput: Water problem; *op. cit.*, p. 122. For a review of the controversial process: Abdul Majid Kazi: Water distribution among co-sharers; *Business Recorder*, 1 Nov. 2009.

[1020] This aspect has since been widely acknowledged. Cf. the semi-official Pakistan Water Gateway, co-sponsored by the Ministry of Water and Power and IUCN; www.waterinfo.net.pk/fstwr.html (April 2004). Government of Pakistan: Apportionment of Indus Waters Accord – 1991; www.presidentofpakistan.gov.pk (July 2006). Jorge Scholz: Innenpolitische Konflikte um Wasser: das Fallbeispiel Pakistan (internal conflicts over water: the case of Pakistan; in German); in: Thomas Hoffmann, ed.: *Wasser in Asien. Elementare Konflikte*; Essen: Asienhaus, 1997, p.255. For an overview: Matthias Paukert: The politics of water sharing: Pakistan's provinces and the struggle for hydrosolidarity; paper presented at the Second South Asia Water Forum, Islamabad, 14 – 16 Dec. 2002; proceedings, vol. 2, p. 688.

[1021] Aamir Kabir: Dry facts about water crisis; *Dawn*, 26 March 2001.

[1022] Ahmad Fraz Khan: Incompetence personified; *Herald*, July 2002, p. 52 - 53.

[1023] *Ibidem*.

[1024] Faraz Hashmi: 1994 water sharing decision annulled; *Dawn*, 13 Nov. 2001.

[1025] *Ibidem*.

[1026] Abdul Majid Kazi: IRSA's controversial role: violation of 1991 accord; *Business Recorder*, 20 Dec. 2009.

Highlighting the political nature of the dispute, Kabir notes that *there seems to be no end to the bickering among the provinces*.[1027]

Institutional weaknesses were a major factor in the dispute, as Husain states, noting that *the CCI has no powers to enforce its decisions*.[1028] Ahmad criticizes the Accord for its lack of enforcement provisions and the failure to include only the provinces, but not the special areas (FATA, Kashmir, Islamabad, Gilgit) in the agreement.[1029] Another negative aspect, according to Ahmad, is the lack of a market mechanism for unused shares, a point that would mainly benefit Balochistan which does not (yet) use all its water.[1030] Sharif points out that, while the CCI is the constitutionally sanctioned body to address water disputes, *the National Assembly is the most important and appropriate forum to debate national issues and develop consensus among the people and the provinces*.[1031]

The debate over IRSA even engulfed IRSA itself when two former chairmen exchanged conflicting statements over the Authority's responsibilities.[1032] Whether IRSA is in fact *fully competent to appraise projects* like Kalabagh Dam (as Khan contends) or not, is one question. The very conflict over the Authority's range of tasks points at the existing confusion over the role of this important institution. At the same time, it shows how this new institution quickly became entangled in a bitter row over future challenges and how they should be met.[1033] The federal government, which had stated that the Water Accord is *sacrosanct*, refrained from defending IRSA. The Ministry of Water and Power which had sponsored the fateful 1994 meeting continued to function as a *coordinator* on inter-provincial water issues, yet leaving the actual process to the stakeholders, the provinces.[1034]

The aftermath of this institutional chaos is significant. As will be seen in the following chapter, IRSA over time managed to implement water distribution by and large within the framework of the Accord. The major disputes – particularly between Sindh and Punjab over seasonal shares and large-scale projects – were circumnavigated, though IRSA hardly avoided further political entanglement. The federal government, especially during the Musharraf presidency after 2000, stepped

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[1027] Aamir Kabir: Settling historical water disputes; *Dawn*, 4 August 2003. For an overview: Matthias Paukert: Die Wasserkrise versinkt im Paragraphendschungel (Bureaucratizing the water crisis; in German); *Südasien*, 2/2001, p. 35 – 36.

[1028] Syed Shahid Husain: Is it time for a new water accord? www.watergenius.com/news/, 11 August 2003.

[1029] Shahid Ahmad: Water cooperation for inter-provincial trust building and sharing benefits of apportioned water – policy issues and options; Karachi: IUCN, 2013, p. 5.

[1030] Shahid Ahmad: Pakistan Water Apportionment Accord for resolving inter-provincial water conflicts – policy issues and options; Karachi: IUCN, 2010, paragraph 3.2 and 4.1.; http://cmsdata.iucn.org.pk/downloads/pk_ulr_d4.pdf (March 2011).

[1031] Humaira Sharif: Inter-provincial water distribution conflict in Pakistan; www.intermedia.org.pk (March 2009), p. 10.

[1032] Fateh Ullah Khan: IRSA's powers and duties; letter to the editor; reply to Shafqat Masood (Dam controversy; *Dawn*, 22 Dec. 2005); *Dawn*, 15 Jan. 2006; Shafqat Masood: IRSA's powers and duties; letter to the editor; reply to Fateh Ullah Khan (15 Jan. 2006); *Dawn*, 19 Jan. 2006. Khan, an outspoken critic of the Kalabagh Dam project, was IRSA Chairman 1994 – 1995, Masood 2005 – 2006.

[1033] Khan, in his letter, states that IRSA had rejected the controversial dam plan, but *interested persons* (within IRSA) *have stolen and destroyed the record*; *ibidem*.

[1034] Cf. Ministry website: www.mopw.gov.pk. According to its mission statement of 2008, it *coordinates inter-provincial water sharing issues*. The current homepage plainly lists *coordination with WAPDA, IRSA and Provincial Irrigation and Agriculture Departments* as responsibilities of its Water Wing (March 2014).

in from time to time to promote a consensus on water sharing and projects to make more water available, in other words to push cooperation between Sindh and Punjab. As the CCI continued to lead a *dormant* existence (Kabir) due to inactivity on the part of the stakeholders, the government activated the Inter-Provincial Coordination Committee (IPC).[1035] This *ad hoc* forum which had rarely been called up in the past, and usually without much effect, was initiated again in July 2003 and May 2004.[1036] Again, progress was not made. The controversial issues – water shares during times of short supply and the overall water availability – remained open.

Conclusion

Participation and representation have been important factors in water decision-making. From a theoretical perspective, the absence of a formal representation of the provinces during the One Unit period was an obstacle to cooperation. The central government was perceived to be more or less identical with the former province of Punjab. The failure of the provinces to participate in the IWT negotiations nourished apprehensions in the downstream region of the Indus Basin that participation, let alone cooperation or the sharing of resources, was not to be expected.

The reason was not only a lack of institutional access, but also a historically rooted suspicion fuelled by decades of water disputes and the long-standing perception of Punjab-centred political dominance. The head-start of the Punjab, as an unintended but inevitable consequence of the IWT, was reminiscent of colonial-era favouritism. Institutional access could have made cooperation easier. But its prospects for success would not have been much greater unless a measure of equitable sharing of executive and administrative positions – in the water sector and beyond – was implemented.

The provinces took long to define their roles as stakeholders and act accordingly. Three committees and two commissions, established between 1968 and 1983, were the meagre institutional result of attempts to solve the inter-provincial water dispute. These political initiatives – most of them by the federal government – did not achieve any significant result nor did they trigger any other reaction from the provinces, not even from those downstream riparian provinces which might have had the most to benefit from a settlement.

The one institutional change that – at least theoretically – could have propelled provincial participation to a level of active autonomy has since been playing a minor role in the process to arrive at an agreement on water sharing: The Council of Common Interests (CCI) – as a constitutionally sanctioned forum – met only twice in this period to address the water issue. Since its first meeting on this subject, 15 years had passed before a settlement was reached. During the crisis over the 1994 formula which lasted almost a decade, both sides, especially Sindh, threatened or announced that they would approach the CCI, yet neither of them actually did. It seems that the

[1035] Aamir Kabir: Settling historical water disputes; *Dawn*, 4 August 2003.
[1036] Cf.: Khaleeq Kiani: Inter-provincial body to tackle water dispute; *Dawn*, 22 July 2003; Committee to discuss water sharing on 25th; *Dawn*, 22 May 2004.

notion of the CCI was merely used in terms of public relations.[1037] There is an element of truth in what one commentator noted: *Therein lies one of the problems with institutionalized decision-making in the country: little to no attention is paid to the need to simply operationalize the many very good ideas already contained in the Constitution, such as the CCI*.[1038]

The agreement that was reached in 1991 in essence manifested the allocation practised in the years before, by adding a degree of formalization. This can be seen from two sides: On the one hand, progress was comparatively minor given the fact that the substantial elements of the Accord were already on the table. A *status quo* was cemented; prospects for future improvements were not part of the agreement. On the other hand, the conclusion of the Accord marks an important step forward because this time the provinces took part in the process. As such the Water Accord was – and still is – a positive example of collective provincial action. The stakeholders have regained the authority to make decisions on vital provincial matters. Since 1991 they have been actively determining water management within their territories and beyond. And, of course, in the event of dispute or failure to share water, they would only have themselves to blame – which translates into something of an incentive to seek a solution agreeable to all parties.

Cooperation, however, apparently has not been a major objective of either the provinces or the federal government. Instead, it was harmonious relations between the provinces – according to official statements. Simply manifesting the provinces' claims in terms of water allotments and prescribing a *modus operandi* for times of shortage (or surplus) does not provide a means for cooperation. Each stakeholder is likely to stick to its (now formalized) claim instead of seeking a cooperative solution that might benefit all stakeholders. The Accord barely notes the issue of efficient water use and the need to avoid waste, but it does not bind the signatories to concrete steps to use the available water more economically. The Accord's focus is on supply management, which means whatever amount is available is there to be consumed. Whether the respective targets could be met with less water does not seem to be relevant.

Integrated water resources management, as a result, is not envisioned in the Accord. IWRM could help refocus the country's way of resource use towards greater efficiency and demand-orientation but the stakeholders did not seem to consider this option when they met to agree on the Accord. Future water availability was no prime concern even though a strong rise in demand from a steadily growing population would have to be expected. This indicates that the political deliberations of the provincial representatives were by and large disconnected from some critical aspects of water management and planning. It seems that politics have once again dominated water management in Pakistan.

IRSA has exposed structural and procedural deficits. It lacked the technical foundation and the appropriate resources to adequately deal with the problems at hand. This deficit appears to have been underestimated both by decision-makers and the public. Its power to reach and enforce decisions is weak, political backing not

[1037] Cf. Sindh govt. to take up water issue with CCI; *Dawn*, 10 March 2003. In what seems to be a typical PR effort, Sindh's Minister for Law, Parliamentary Affairs and Human Rights spoke at a *reception hosted by the Sindh Chamber of Agriculture.*
[1038] Editorial (anonymous): Inter-provincial issues; *Dawn*, 6 March 2010.

sufficient. It has not taken the initiative to formulate a common water management framework that would include not only apportionment, but also drainage, reservoirs, groundwater and water saving. Not surprisingly, this authority has become an instrument in the political bickering between the provinces.

Asymmetry between upstream and downstream stakeholders, notably Punjab and Sindh, was hardly ever mentioned in the context of the Accord. This is surprising because the discrepancy between the two major provinces has grown – not least because of the dramatic development generated by the Indus Basin Project. IRSA's implicit task is to handle this asymmetry in a way that avoids an outright confrontation. It does so by basing its decision on a majority vote of the four members and the chairman. The role of the chairman – a position filled by rotation with members from all provinces – can be crucial when the members face a stalemate. An important vote might effectively be determined by whoever sits in the chairman's seat at a particular time. This mechanism brings shifting advantages to any one of the members, and the respective member, counting on an additional vote in its favour, might seek a decision be made to its benefit which would otherwise not reach a majority. But it can also lead to a stalemate when the other members opt to wait out the time until the shift is in their favour.

Any member can invoke the CCI in order to reach a solution when IRSA's vote threatens its interests. In rational choice terms, the members are free to seek alliances or to cooperate with other stakeholders in order to influence the outcome of a vote. The weakness of IRSA's voting mechanism – the rotating chairmanship – can be offset by recourse to a higher authority, the CCI, and even to the Legislature. To allow the provinces to do so may be one of the biggest achievements of the new institutional arrangement. It will be seen in the coming chapter whether the provinces make use of it.

Economic measures, especially incentives, crucial in the case of the IWT, have been non-existent in the case of the WAA. The federal government, which has taken the initiative to promote a water agreement a number of times, has not used incentives in order to trigger cooperation among the provinces. This suggests that either incentives were not expected to make the stakeholders agree to anything beyond the agreement, or that incentives were not necessary because the main demands of the provinces could be satisfied without much struggle. Thus a scheme to allow the sharing of benefits, like the IWT, did not reach the negotiating table even though it could have paved the way for likely future challenges like water waste in the irrigation system. In this sense, an important lesson of the IWT was missed.

Incentives or compensation schemes could have helped to alleviate the water shortage. When IRSA discussed a proposal by KPP to compensate the smaller provinces for unused water (which would then be available to the bigger provinces), it was Sindh – the province to complain most about short supplies – which opposed it on the grounds that KPP and Balochistan were already exempted from sharing shortages (in spite of the Accord) and could thus not expect another *undue favour*.[1039]

[1039] Cf. Sindh opposes changes in water law; *The News*, 21 April 2013.

The Accord as such is less comprehensive, less precise, and less verifiable than the Indus Treaty. Its legal position is weaker, as are its structural implications. Unlike the IWT, the agreement of 1991 was not preceded by heated negotiations over antagonistic positions, probably because the water supplies at that time were sufficient to satisfy demands. Many water-related problems were avoided, possibly for fear that a consensus over existing shares would be threatened. The lacking readiness to seek a more comprehensive agreement indicates that the willingness to actively cooperate, i.e. to identify common interests and objectives, was very limited. The sporadic use of available facilities, like the CCI, can only be interpreted in this sense.

Major deficits of the Accord are

- the lacking precision as to the sources that are to be factored in,
- the failure to match existing water availability with current demands instead of simply confirming demands,
- the failure to address future water demands and prospected water availability in order to avoid foreseeable disputes of the definition of shortage, and
- the failure to include related aspects such as drainage and water saving.

The Water Accord holds, in spite of criticism, and has been in force for more than two decades. The provinces, now in a position to actively pursue their own interests, have upheld the Accord rather than seek a new *modus operandi*. The next chapter will put the existing framework to the test:

- How far are the provinces willing to go in order to meet their targets?
- Will egotistic, non-compromising behaviour lead to a zero-sum result for the smaller provinces?
- Are there collective targets that all stakeholders share?
- Are the stakeholders willing to pay a price in order to reap benefits from cooperation?
- Does cooperation help to overcome the effects of asymmetry?
- Can the existing institutional arrangement cope with this challenge?

IV.4 Hydro-federalism: The provinces as stakeholders

Thanks to institutional developments since 1991, Pakistan's provinces find themselves in a position to actively pursue their interests – and even those of the nation as a whole. The challenges ahead call for action in the water sector. Per capita water availability has been declining steadily, economic activity has suffered from a lack of water and hydropower, and food prices have been on the rise as a result. While all provinces share at least some of this negative trend, this commonness does not automatically make them partners: Do the provinces pursue a common goal, or are they egotistic actors? Do they perceive themselves as stakeholders of this common resource or simply as consumers?

Cooperation has not been a prominent feature of the institutional process so far. Though federalism was firmly established in 1971, relations between the provinces have been overshadowed by a number of political problems, not least the issue of water shares. The institutions at hand – notably IRSA, CCI and the Parliament – can in theory at least promote cooperation. But do they? Questions remain as to the effectiveness of the existing mechanism:

- Does the existing institutional framework satisfy the interests of the provinces or do they seek changes in the framework?
- Do the provinces operate within this framework as partners or as antagonists, i.e. are they really stakeholders or simply actors seeking individual gains?
- How do they handle the problem of asymmetry?
- Which options do the stakeholders choose to address the problem of water availability?
- What benefits do the stakeholders expect from the federation?
- What are the consequences for the federation?

Hydro-politics: stakeholder positions

The positions stated by the provinces reflect both water-related and non-water interests. Water shares are not always the central concern, as one might have expected. For the two major provinces, Sindh and Punjab, agriculture is a major economic interest, and many political interests are connected to agriculture. The smaller provinces which depend less on irrigation water from the Indus have other interests attached to water distribution.

The position of NWFP/KPP as an upstream province is focused less on water shares but more on hydropower generation on the upper reaches of the Indus. For this northernmost province in the basin, revenues from this energy source are a major interest in the water debate.[1040] Due to the structure of its economy, NWFP/KPP has not been as vulnerable to seasonal water shortage as the bigger

[1040] Fateh Ullah Khan: Water problem, causes and solution: a view from North West Frontier Province; in: Cheema *et al.*, eds.: *Problems and politics of water sharing; op. cit.*, p. 133 ff. The author is a former IRSA chairman (1994 – 1995).

provinces have been. At the same time, it lacks the revenue base from the industry and large-scale agriculture that Sindh and Punjab enjoy.

The position of Punjab, the biggest upstream riparian stakeholder, reflects the interests of its vast agricultural sector and its status as the economic powerhouse of the country.[1041] From an official point of view, the Punjab made *major sacrifices in taking far less than its due share in additional supplies* in the course of the Water Accord and due to the Indus Treaty.[1042] It considers the Accord an agreement on protecting the existing water shares and to be tantamount to a wider agreement on future water availability, particularly through the construction of large dams – *the corner stone of the Accord*.[1043] Without such additional storage, the Accord cannot be fully implemented because the existing water availability is not sufficient.

Punjab's position is commonly underlined by a reference to the province's higher water productivity and greater share of the nation's agricultural output as compared to Sindh. Sindh is also accused of water waste.[1044] The official position is by and large supported by interest groups such as the Punjab Water Council which leads the call for large reservoirs to be built, starting with the Kalabagh Dam.[1045] Here again the WAA is seen in connection with the construction of large reservoirs and the dominant position of Punjab. Because of its stature, this province is also supposed to receive a higher share of federal resources and a greater say in water sector development.[1046] The Water Accord as such receives support, yet there is a perception that Punjab was *trapped into accepting the situation without new reservoirs*.[1047]

The position of Sindh, the major downstream riparian stakeholder, focuses on the supplies it receives from Punjab. Being dependent on just one source of surface water, the Indus River, this province's large irrigated fields are particularly vulnerable to shortages of water. Several aspects are of particular concern:

[1041] In a less than modest assessment, a former Secretary of Irrigation of the Punjab stated that *Punjab's irrigation system is one of the largest contiguous irrigation systems in the world*, suggesting that the Indus Basin (to which this term is commonly attributed) covers only one province; cf. Arif Nadeem: Water sector challenges: the Punjab perspective; in: Cheema *et al.*, eds.: *Problems and politics of water sharing; op. cit.*, p. 106.

[1042] Chaudhry Mazhar Ali: Water Accord 1991. A comparative study of Punjab and Sindh; Lahore: Government of Punjab, Irrigation and Power Department, 2001, p. I. I am grateful to the author, a senior advisor to this department, for providing me a copy of this paper in the course of our discussion at the IPD, Lahore, June 2004. Mazhar Ali stresses that *Punjab bore the brunt of the (Indus) Treaty to find alternative sources of supply for its canals, a situation which no other province faced*; cf. Ch. M. Ali: Sharing of water shortages between provinces; unpublished report for the IPD, Lahore, ca. 1999, p. 1; copy provided to me by the author in June 2004.

[1043] Ch. M. Ali: Water Accord, *op. cit.*, p. 5.

[1044] Ch. M. Ali: Water Accord, *op. cit.*, p. 2 – 3.

[1045] Cf. Hamid Malhi: Future reservoirs and water distribution; *The Nation*, 2 July 2003. This basic line – that the implementation of the WAA depends on yet to be built reservoirs – was reaffirmed by Malhi, coordinator of the Punjab Water Council, in a personal discussion at the PWC office, Lahore, 9 September 2003. The Accord is perceived as a manifestation of provincial water rights, whereas the federal government tends not to support the interests of the farming community.

[1046] According to the PWC's Hamid Malhi, Punjab *provides 70 per cent of WAPDA's revenues, but gets only 17 per cent of projects*. WAPDA is also being criticized for not involving the provinces in its decision-making: *there is no consultation*; cf. personal discussion, 9 September 2003. According to the PWC, *mismanagement* is to be blamed for water shortages in Sindh, not a failure of Punjab to release water through link canals; cf.: PWC wards off controversy over IRSA releases for C-J canal; *Dawn*, 11 July 2012.

[1047] H. Malhi, personal discussion, 9 September 2003.

- The handling of water shortages, particularly in the late *Rabi*, early *Kharif* seasons when irrigation in Sindh is critical, i.e. the release of stored water to compensate for shortfalls in the river;
- dam projects on the upper reaches of the river system that may affect downstream water supplies, if only temporary, thus undermining Sindh's crop calendar;
- the exemption of the smaller provinces from sharing shortages; has been criticized only by Sindh. This practice by IRSA is seen as unfair and in violation of the Water Accord.
- the minimum water level in the Kotri area which is important to save agriculture in lower Sindh, depending on sufficient flows from Punjab.[1048]

Water-related concerns as part of problems of federalism, particularly regarding Punjab's alleged dominance, are voiced by various interest groups. One line of argument sees the current projects as part of a century-old pattern of discrimination of Sindh, starting with early colonial-era irrigation projects that were implemented *without the consent of Sindh.*[1049] Another line of argument, somewhat more pragmatic and focussed on current water management, objects to the mode of decision-making and technical aspects of water distribution (*e. g.* the release of water from reservoirs for irrigation in Sindh) and projects (like Kalabagh).[1050] Most groups affirm the Water Accord and demand its due implementation, independent of any further projects, and call for a more independent IRSA.[1051] According to A.N.G.

[1048] Cf. Muhammad Idrees Rajput: Water problem: perspective from Sindh; in: Cheema *et al.*, eds.: *Problems and politics of water sharing; op. cit.*, p. 122. Personal discussion with the author, a former Secretary of Irrigation and Power, Government of Sindh, Karachi, 18 December 2002.

[1049] Cf. Ahmed Nawaz Hakro & Azhar Lashari: Greater Thal Canal. Another misadventure; Islamabad: Sungi Development Foundation, 2005, p. 74; the authors trace the history of the dispute between both provinces to 1873; www.sungi.org/publications/reports/GreaterThalCanalStudy.pdf (July 2008). Cf. also: Altaf A. Memon: An overview of the history and impacts of the water issue in Pakistan; paper presented at the international conference *Sindh, the water issue and the future of Pakistan*, hosted by the World Sindhi Institute, Washington, D.C., 9 November, 2002, p. 2 – 4, 13; www.waterinfo.net.pk/pdf/sindhpaperRev.pdf (March 2004). Muhammed Ali Shaikh: Keynote address, conference *Water shortage in Sindh: cause, consequence and cure*, hosted by Shaheed Zulfikar Ali Bhutto Institute of Science and Technology, Karachi, 9 April, 2001, reproduced in: The Indus irrigation issues; Karachi: SZABIST, 2001, p. 8 – 10.
Nazir Ahmed Memon, Secretary General of the Sindh Agricultural Forum (SAF), points out that the Indus Waters Treaty of 1960 was arrived at without the participation of Sindh and stresses that any decision on future reservoirs requires the consensus of all provinces; personal discussion, Hyderabad, 19 December 2002. The Center for Peace and Human Development similarly perceives projects like the Greater Thal Canal to be just another *anti-Sindh scheme* of the *unholy alliance of central government, Punjab and WAPDA* which makes *Sindh and its people to feel as if they are no longer part of the federation of Pakistan; cf. Jami Chandio, executive director*, CPHD; joint declaration, Hyderabad, 4 March 2002.

[1050] Cf. Zulfikar Halepoto: Water sharing for Kharif crops; *Dawn*, 20 April 2008. The author is Secretary of the Sindh Democratic Forum. Qamar-uz-Zaman Shah: Alarming situation of water availability in Sindh; statement by the Sindh Chamber of Agriculture to the Chief Executive's Secretariat, Government of Pakistan, 1 March 2002. Zulfikar Halepoto, ed.: Water. A security paradigm; Hyderabad: Forum for Conflict Resolution, 2003.

[1051] Cf. Nazir Ahmed Memon: Water shortage in Sindh; paper presented at conference Water Shortage in Sindh: Cause, Consequence and Cure, hosted by Shaheed Zulfikar Ali Bhutto Institute of Science and Technology, Karachi, 9 April, 2001; copy obtained from the author during personal discussion, Hyderabad, 19 December 2002. See also 5-point agenda of Jamiat-i-Islami quoted in: Musharraf's insistence on KBD deplored; *Dawn*, 2 January 2006. Abrar Kazi, Secretary General of the Sindh Democratic Party and prolific writer on water management, stresses that *the WAA is the only document we have* and in Sindh there is *no objection* to the Accord as such; it is the implementation

Abbasi, a former provincial Minister of Irrigation and Power, the WAA has *legal validity* as it was ratified by the CCI; *the dispute is why the Accord is not being implemented*.[1052] The need for storage reservoirs is seen with scepticism; it is the *regular supply of water* that must be given *top priority*. Instead, water is stored upstream even in times of shortage in Sindh.[1053]

Kazi, by contrast, notes that *Sindh has strong reservations to the 1991 Water Accord* because it does not apply the principle of equitable apportionment which has been honoured until 1991.[1054] Consequently, surpluses and shortfalls would have to be shared on an equal basis. The river basin should be seen as an integrated system, not as a combination of eastern and western river zones. Most importantly, link canals *should be operated only when historic allocations of the canals on the River Indus (*i.e. *in Sindh) have been met*.[1055]

More fundamental criticism is directed at the very concept of Pakistan as a nation. Calls for greater autonomy, even independence come from a number of organisations that perceive the water problem of Sindh as merely one of many symptoms of a denied sovereignty of a region that has a distinct cultural identity.[1056]

It is this form of a more far-reaching criticism that distinguishes Sindh from Punjab. Unlike in Punjab, not only the institutional mechanism of provincial participation and water distribution is questioned but also the status of the province and the nature of federalism in Pakistan. Similar calls for autonomy can be heard from Balochistan, particularly in the context of military action against terrorist groups, yet typically not connected to water-related issues.

The position of Balochistan, the only province that lacks direct access to the basin's resources, differs markedly from that of the other stakeholders. Unlike Sindh and Punjab, its agriculture is not dominated by extensive farming requiring large-scale irrigation. Only a very small area – the districts of Naseerabad and Jaffarabad,

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that is viewed critically because *WAPDA doesn't listen to IRSA*; personal discussion, Hyderbad, 26 August 2003.

[1052] Personal discussion, Karachi, 17 December 2002.

[1053] Abbasi, *ibidem*.

[1054] Abrar Kazi: Analysis of water accords, 1935 – 1991; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi: OUP, 2003, p. 168.

[1055] Kazi, *ibidem*.

[1056] A strong voice in this movement is the World Sindhi Congress. The Kalabagh Dam project is seen here as a more elemental case of *draconian actions by the military dictators*; cf. *The Sindh Perchar*, the WSC's official organ, January 2003, p. 1. See also Munawar Halepota, President of the WSC: press release on the World Sindhi Unity Forum, 2 January 2005, Woking, UK, 3 January 2005: *The meeting criticised the deliberate exclusion of Sindhis from the political process, institutional discrimination against Sindhis, violation of the mandate of the people of Sindh, sabotage of the agrarian economic structure of Sindh, misuse and exploitation of the natural resources of Sindh …* Under the umbrella of the Sindh Water Committee various groups have voiced their opposition to the disputed Kalabagh project, which *is considered by the people of Sindh as a deadly blow to the existence of Sindh and of Pakistan*; cf. Water committee opposes Kalabagh Dam; Sindh Website, 5 February 2005; http://sindh.ws (April 2008). Dodo Mehari, of the Sindh National Council, similarly sees *the political, social rights and civil liberties so far guaranteed by universal declaration* endangered in Sindh and links this state of affairs to a long history of hegemony by the Punjab; cf. personal discussion, Hyderabad, 25 August 2003. Qadr Magsi, President of Sindh Taraqi Passant Party, envisages a *break-up* of the federation because Sindh is treated as *a colony of Punjab*, likening Sindh's situation to that of East Pakistan in 1970/1971, the only viable long-term solution being *independence*; personal discussion, Hyderabad, 26 August 2003.

equivalent to about 5 per cent of the province's territory – receive water from canals originating in neighbouring Sindh.[1057] While most of the province's agriculture is fed by a number of smaller rivers, a lot of water goes unused due to *inadequate canal capacities and limited irrigation infrastructure*, according to Ahmad.[1058]

The harnessing of surface water from the smaller rivers remains a major challenge for the government of this province. Out of a total of 21.24 MAF of surface water, only 6.05 MAF is used, according to official figures.[1059] Water allocation per Accord does not represent a critical factor in the province's overall water management. Nevertheless, an occasional dispute between Balochistan and Sindh in times of shortage has occurred over inadequate water supplies, as will be seen in the analysis of the crop seasons between Rabi 1999 and Rabi 2004.

Hydro-rationality, episode one: seasonal water sharing

To promote harmony, water is distributed equally – this motto of the Indus River System Authority (IRSA) points at the connection between the political and the hydrological challenges of Pakistan. In other words, water sharing is understood to be a factor – if not the factor – in federal relations.[1060] IRSA has since 1992 evolved to an institution that distributes water from the Indus system on the basis of participatory decision-making. Being the only institution with equal representation of all provinces, it has effectively turned them into stakeholders.

The first decade of IRSA was characterized by disputes over the interpretation and implementation of the Water Accord and saw the provinces turning to the federal government rather than employing the due institutional means at their disposal. In the absence of a solution that carried the support of all provinces, IRSA operated on a compromise formula. Important decisions – especially regarding water reservoirs, drainage, and the Kotri question – were postponed. In the second decade IRSA and the provinces are faced with a more active federal government challenging the provinces' capacity and readiness to act as stakeholders as well as IRSA's ability to implement the WAA and satisfy stakeholder interests.

Seasonal operations at IRSA are marked by regular observations of water levels at selected metering stations and decisions on water releases from reservoirs according to water needs from the agriculture sectors of the provinces. The ten-daily season-wise allocations attached to the Water Apportionment Accord of 1991 are taken as a guideline; yet it is the actual water levels that determine how much each province gets in any ten-day period as the following overview of a number of crop seasons shows. The result, in many cases, is a conflict of interests between the provinces. A

[1057] The canals connecting Balochistan with Sindh are Pat Feeder Canal and Kirthar Canal. Cf. Abdul Raziq Khan: Water perspective from Balochistan; in: Cheema *et al.*, eds.: *Problems and politics of water sharing; op. cit.*, p. 146 - 147. The author is a former IRSA chairman (1998) and member of the Technical Committee on Water Resources (2004 – 2005; see below in this chapter).
[1058] *Ibidem*.
[1059] Cf. Nadir Ali: Rehabilitation of water sector in Balochistan; presentation to the Pakistan Development Forum 2005, Islamabad, 25 – 26 April 2005; www.worldbank.org (Sept. 2005). The author is a former Additional Chief Secretary of the Government of Balochistan.
[1060] This quote from the official IRSA website http://www.stormpages.com/i/irsaa/about_IRSA.html (old website - as of 18 Feb. 2010) has since been removed. The current website at www.pakirsa.gov.pk does not provide any information as to the role of this institution (December 2013).

look at IRSA operations over a five-year period of differing water availability presents the dynamics of water distribution and the interaction of the provincial stakeholders.

Rabi 1999 (Oct. 1999 – March 2000) brought lower than expected rainfall forcing IRSA to cut Sindh's share by 10 per cent even though stored water from Tarbela had been released earlier than usual.[1061] By the end of the season, IRSA announced that Punjab would get 40,000 cusecs (cubic feet per second) against 30,000 for Sindh, because of low levels at Mangla. Later the Technical Committee, upon the advice of WAPDA, further cut supplies – a move that caused Sindh to lodge a formal complaint because shortages were supposed to be shared equally, while Punjab complained that Sindh's wheat crop had already matured whereas Punjab crops would be in need of irrigation.[1062]

Kharif 2000 (April – Sept.) saw federal government intervention in favour of Sindh in order to provide extra water releases for the province's cotton fields, as it had earlier demanded.[1063] Sidelining IRSA, WAPDA received a direct order from the President, as a dispute with Punjab, which had rejected the demand, could not be solved within IRSA. Only when water levels finally rose did water sharing return to the WAA mode of equal sharing of shortages and, finally, in May, when water from the glaciers reached the basin, to the regular allocation.[1064]

Differences developed again before the Monsoon when WAPDA sought to divert water to fill up the reservoirs again rather than make it available for irrigation. After mediation by the Ministry of Water and Power, it was agreed that it would be left to IRSA, i.e. the stakeholders, to decide when and how much to divert to the reservoirs.[1065] In other words, the dispute this time was less over provincial shares but over priorities of use. Less water now meant that Punjab's rice fields would suffer; more water now meant that in the coming winter there might be a shortage for the winter crops. IRSA finally decided in favour of continued irrigation supplies.[1066]

While Sindh had fared well in this season, Balochistan claimed to have been left behind and sought compensation from the federal government for Sindh's failure to deliver due supplies.[1067] This claim was denied by Sindh, pointing at the disputed practice of IRSA to exempt the smaller provinces from sharing the shortage.[1068]

Rabi 2000 brought more shortage of water.[1069] Added to the existing dispute over water shares was the demand by Sindh that the water supply of Karachi to be covered outside of the province's share.[1070] The question of NWFP's and

[1061] Cf. Sindh to get 10% less water for Rabi crops; *Dawn*, 10 November 1999.
[1062] Cf. Indus River System Authority says enough water till 31st; *Dawn*, 3 March 2000; Punjab and Sindh to get less water from today; *Dawn*, 7 March 2000; Water shortage threatens wheat crop; *Dawn*, 9 March 2000.
[1063] Cf. Cotton sowing season: Sindh to get more water; *Dawn*, 9 April 2000.
[1064] Cf. Punjab, Sindh sharing burden of water sharing; *Dawn*, 28 April 2000.
[1065] Cf. Punjab, Sindh differ with WAPDA over release of irrigation water; *Dawn*, 17 July 2000; Tarbela reservoir level is fixed by IRSA, not WAPDA: spokesman; *The Nation*, 18 July 2000.
[1066] Cf. Water for Rabi crops assured; *Dawn*, 1 Sept. 2000.
[1067] Cf. Balochistan seeks Rs 357m compensation from Centre: reduced water for Kharif; *Dawn*, 14 Oct. 2000.
[1068] Cf. Sindh seeks more water for Rabi season; *Dawn*, 18 Oct. 2000.
[1069] Cf. Water crisis deeper than last year's; *Dawn*, 17 Oct. 2000.
[1070] Cf. Provinces asked to trim expenses: Cabinet wants Karachi problems solved; *Dawn*, 26 Oct. 2000.

Balochistan's supplies during periods of shortage was not reopened: both provinces continued to receive the full regular share, i.e. only the bigger provinces had to face cuts.[1071] To alleviate shortfalls, IRSA decided to close perennial canals in Punjab for ten days; this province would have to turn to groundwater instead.[1072] The provinces were called upon to present irrigation plans taking into account a 40 per cent cut.[1073] This drastic cut was perceived to be the maximum shortfall acceptable.[1074]

The sharp cut in water supplies put IRSA under pressure for the distribution formula it applied. Sindh and Punjab, the stakeholders most affected, regularly approached the federal government for clarification whether the return to the so-called historic use-scheme was legitimate. Interestingly, the one institution charged with settling such disputes, the CCI, was not called upon.[1075] The dispute would linger on until 2003 when IRSA established a measured three-tier formula to react to various levels of water availability. In the meantime, the federal government frequently intervened demanding the implementation of the 1991 Accord.

The season's shortfall, interestingly, has not caused an overall drop in production. Punjab, in spite of a 40 per cent cut in supplies, was able to cultivate a larger area than expected; Sindh, however, had to reduce its cultivated area by 30 per cent.[1076] This discrepancy indicates that not all shortfalls in supply are identical with a wholesale crisis. This also means that because of the firmly established mode of supply management, there is little incentive for the provinces to devise and apply methods of more economic irrigation.

Continued clashes between Sindh and Punjab over actual amounts of water used reflect a lack of transparency in this period.[1077] The remedy, a telemetry system, was not in place yet and would not become operational before 2006. The long wait undermined IRSA's role in bringing the stakeholders together to agree on water distribution schedules because it allowed the long-standing mistrust between Sindh and Punjab to swell.

Kharif 2001 started with continued water shortage as the main reservoirs had reached the so-called dead level. Following federal government mediation, Punjab agreed to limit its withdrawals for the benefit of Sindh.[1078] The row over the operation and refilling of the reservoirs, though, continued unabatedly, with Sindh demanding immediate water releases to meet current irrigation needs and Punjab preferring to refill the reservoirs for use in late Kharif and early Rabi.[1079] The situation continued to require frequent reviews in order to adjust water supplies for

[1071] Cf. Sindh, Punjab asked to share water shortage equally; *Dawn,* 29 Oct. 2000.
[1072] Cf. IRSA devises plan to meet Rabi water shortage; *Dawn*, 21 Nov. 2000.
[1073] Cf. Water situation worsening, says IRSA; *Dawn*, 2 December 2000.
[1074] Cf. Provinces' quota not to be cut beyond 40%: IRSA; *Dawn*, 16 Dec. 2000.
[1075] Cf. Punjab may appeal IRSA ruling before CCI; *Dawn*, 17 January 2000.
[1076] Cf. Provinces to discuss 40 % water shortage issue; *Dawn*, 30 Jan. 2001.
[1077] Cf. Punjab lodges strong protest with IRSA: Sindh charge over Indus water share; *Dawn*, 10 Feb. 2000.
[1078] Cf. Sindh to get more water: accord with Punjab reached; *Dawn*, 10 April 2001.
[1079] Cf. Dispute over Mangla Dam filling unresolved: IRSA to make study; *Dawn*, 13 April 2001. Mangla Dam water shortage to affect Rabi crop; *Dawn*, 24 August 2001; Punjab faces 51 pc cut for Rabi; *Dawn*, 30 Sept. 2001.

ten-day periods throughout most of the season.[1080] The smaller provinces remained exempted from sharing the shortfall.[1081]

Rabi 2001 saw an escalating water shortage, forcing IRSA to close Mangla reservoir for a period of two months which led to a cut in irrigation and power generation.[1082] Despite an order by the government, the row over the water sharing formula of 1994 persisted, with Sindh being accused of lacking *flexibility* and *rationality*.[1083] The season ended with a 70 per cent shortfall for Punjab and Sindh.[1084] For a brief period, Punjab agreed to close its canals in order to allow increased water flow downstream.[1085] This decision, interestingly, shed light on a rarely addressed issue in the context of water: economics. The *water donation* to Sindh, in order to support the downstream cotton crop, was assumed to have caused a $300m to $500m loss in national revenue because Punjab's wheat crop would not reach its production target, resulting in a zero – sum outcome in financial terms.[1086]

Kharif 2002 did not witness an end to the period of shortage. A request by Sindh that Punjab limit its withdrawals was denied by the upstream neighbour.[1087] Frequent shifts between the once agreed Water Accord and the 1994 ministerial committee formula reflected the fragile nature of the consensus behind the 1991 Accord.[1088] IRSA's authority was challenged when Punjab threatened to withdraw as much water as needed for its cotton crop at all the barrages on its territory if IRSA failed to open the Chashma – Jhelum link canal.[1089] IRSA, already under pressure from the federal government, acceded to Punjab's demand. While rainfall was short, the reservoirs received more water from the Himalayas which was used for storage, not for irrigation.[1090] Supplies were reduced by 30 per cent, inevitably generating opposition from Sindh and Punjab, which turned to the federal government for support, thus forcing IRSA to review its release plan once again and postpone refilling of the reservoirs until, finally, the Monsoon set in.[1091]

[1080] Cf. Tarbela water 're-allocation' seen as threat to cotton crop: IRSA meeting today*; Dawn*, 27 April 2001; Rift among the provinces over water shortage; *Dawn*, 4 May 2001; IRSA corrects itself, restores Punjab's share; *Dawn*, 11 May 2001.
[1081] Cf. Water shortage to hit Rabi crops; *Dawn*, 3 Oct. 2001.
[1082] Cf. Three-phase closure of Mangla for 62 days: unprecedented water shortage; *Dawn*, 23 Oct. 2001.
[1083] Cf. Sindh wants its share of water; *Dawn*, 23 Jan. 2002; Experts say Sindh stand unreasonable: Indus Basin water distribution; *Dawn*, 27 Jan. 2002.
[1084] Cf. Punjab, Sindh to face water shortage; *The News*, 7 Feb. 2002; Water level at Tarbela, Mangla dismal: provincial shares reduced drastically; *Dawn*, 13 Feb. 2002.
[1085] Cf. Punjab 'sacrifices" water for Sindh; *The News*, 15 March 2002.
[1086] Cf. Water donation could cost $300 – 500m to economy; *The News*, 23 March 2002.
[1087] Cf. Punjab turns down Sindh's request: restricting withdrawal from Indus; *Dawn*, 7 April 2002.
[1088] Cf. Water sharing issue unresolved; *Dawn*, 11 April 2002; IRSA chief restores '91 water accord; *The News*, 11 April 2002; IRSA decision reversed as CE Sectt intervenes; *The News*, 12 April 2002; IRSA to release water on basis of historic use; *Dawn*, 17 April 2002.
[1089] Cf. Punjab wants Chashma opened; *Dawn*, 13 April 2002.
[1090] Cf. Water supply to provinces cut; *Dawn*, 26 July 2002; Punjab, Sindh reject IRSA's water-cut demand; *The News*, 7 Aug. 2002.
[1091] Cf. IRSA move to affect cotton crop: Decision to fill dams slammed; *Dawn*, 9 Aug. 2002; IRSA to meet Punjab's demand*; Dawn*, 11 Aug. 2002; IRSA okays plan to refill Tarbela: rivers' flow improves; *Dawn*, 14 Aug. 2002; Mangla Dam filled after three years; *Dawn*, 16 Aug. 2002; Tarbela, Mangla to reach full capacity; *The News*, 27 Aug. 2002.

Rabi 2002, which started with an estimated 30 per cent shortage, nevertheless witnessed a record rice harvest in Punjab.[1092] Yet a new challenge to IRSA and the Accord emerged.[1093] Punjab demanded that Mangla reservoir be exempted from the water distribution mechanism because it was supposed to be a replacement for the rivers that are now under Indian control.[1094] IRSA had planned additional water releases from Mangla (after its raising to store more water) to be made available for the Katchi canal, under construction to augment supplies for Balochistan. IRSA stressed that *the water from future storage shall be treated as water of the Indus River system which is jointly shared amongst the provinces* and that the Indus Treaty was between India and Pakistan, *not India and Punjab*.[1095]

Theoretically speaking, Punjab applied the Harmon Doctrine of territorial rights which to some degree had guided the Indus Treaty to the current problem of water sharing within Pakistan which is determined by the Water Accord, a document that reflects the theory of equitable utilization. Unfortunately, the Accord – unlike the Indus Treaty – is not very precise about the sources of water; it plainly refers to the Indus River System (paragraph 1) which only means all surface water sources linked to the main river, and not any underground sources.

Kharif 2003 started with a marked change in water supplies thanks to record rainfall in late Rabi.[1096] The long dry spell, however, had left its marks. Rabi had ended with a 38 per cent shortage which was seen as an easing of the situation.[1097] The reservoirs could be filled a little earlier than before, securing supplies for the critical early Kharif period.[1098] Thanks to sufficient snowfall in the previous winter, there would be *no water shortage in summer*.[1099] When in late June the rains set in, the *highest water levels in ten years* were recorded.[1100]

The combination of favourable snowfall and Monsoon rainfall created a new challenge for IRSA: where to store excess water in order to prevent flooding. Some canals reached their maximum capacity, storage reservoirs had already been filled. IRSA urged the government to enhance the capacity of Kirthar Canal in order to improve water supplies to Balochistan.[1101] While not taking the initiative itself, it conveyed the provinces' positions regarding new reservoirs to the federal government.[1102] The lack of storage capacity meant that the amount of unused water also reached a record high.[1103]

[1092] Cf. Record rice production in Punjab; *Dawn*, 10 Jan. 2003.
[1093] Cf. IRSA water distribution plan for Rabi; *Dawn*, 29 Sept. 2002.
[1094] Cf. IRSA move baffles Punjab Katchi feeding from Mangla; *Dawn*, 8 Oct. 2002.
[1095] Cf. All provinces to share Mangla water: IRSA; *Daily Times*, 16 Oct. 2002; IRSA rejects Punjab's Mangla stand; *Dawn*, 5 Dec. 2002; Punjab again claims sole water rights; *Dawn*, 13 Dec. 2002.
[1096] Rain was recorded at a 30-year high for winter. Cf. Dams level up but WAPDA action may cause water shortage; *Dawn*, 20 Feb. 2003; Release from Mangla stopped; *Dawn*, 21 Feb. 2003.
[1097] Cf. Irrigation water shortage; *Dawn*, 21 Feb. 2003; Indus River System Authority gives more water to Punjab and Sindh; *Business Recorder*, 4 March 2003.
[1098] Cf. IRSA delays Mangla filling; *Dawn*, 13 May 2003; Water position satisfactory: IRSA chief; *The News*, 27 May 2003.
[1099] Cf. No water shortage expected in summer; *The News*, 23 May 2003, quoting the deputy director of the Pakistan Meteorological Department.
[1100] Cf. Water level highest in 10 years; *Daily Times*, 27 June 2003.
[1101] Cf. IRSA asks govt to increase Kirthar Canal's capacity; *Daily Times*, 2 July 2003.
[1102] Cf. Construction of dams: IRSA to send proposals of provinces to government on August 4; *Business Recorder*, 3 Aug. 2003.
[1103] Water wasted by irrigation authorities; *The Nation*, 14 Aug. 2003.

Rabi 2003 experienced relative water sufficiency.[1104] As water releases were sufficient for irrigation, IRSA's focus was on saving water for the end of the season and early Kharif.[1105] Coordination between irrigation needs of Sindh and Punjab was eased by Punjab assuring its neighbour of *smooth supply of water from the Chashma-Jhelum link canal*.[1106]

Kharif 2004 saw a now typical early season shortage exacerbated by a brief winter and high temperatures in spring.[1107] Disputes between Sindh and Punjab continued over the ten-day allotments determined by IRSA, with each side advocating a higher or earlier water release to benefit crops in a particular area of the respective province.[1108] The seasonal water situation improved with *a remarkable increase of inflow at both major reservoirs*.[1109] Due to the great distance between the upper reaches of the basin and the downstream plains, the water took a while until it reached Sindh, where a *20 per cent shortage* still persisted at that time (mid-July), prompting Sindh's Irrigation and Power Department to announce a rotation schedule for some districts which would receive water on the basis of an interval.[1110]

The season ended with renewed shortage and – for the first time in its history – the reservoir at Tarbela Dam could not be filled, threatening the water supply of the coming winter season.[1111] IRSA decided to give preference to the current crops, with a cut of only ten per cent, expecting a 51 per cent shortage in Rabi 2004.[1112]

Rabi 2004 brought another consequence of water shortage to the fore: insufficient power generation. From an institutional perspective, according to the IRSA Act, the Authority is to *determine priorities … for river and reservoir operations for irrigation and hydropower requirements* (Art. 8). This means it is within IRSA's authority to decide how much water would be used for irrigation and how much for power generation. In a move that was seen as *bypassing IRSA*, the federal government once again stepped in and called a meeting of representatives of the provinces, IRSA and WAPDA in order to ensure that enough water for sufficient power generation would be available.[1113] Towards the end of the season, water availability improved to

[1104] Cf. Tarbela, Mangla contain enough water; *Dawn*, 3 Dec. 2003.
[1105] Cf. IRSA rejects Sindh's claim on water release; *Dawn*, 8 Dec. 2003.
[1106] Cf. Punjab promises Sindh and Balochistan water; *Daily Times*, 18 Dec. 2003.
[1107] Cf. Shortage of water hits wheat output target; *Dawn*, 4 March 2004; Dead level of Tarbela Dam pushed down; *Dawn*, 5 March 2004;Water shortage increases to 12.3% across Pakistan; *Daily Times*, 26 March 2004.
[1108] Cf. Reduced water release irks Sindh; *Dawn*, 17 May 2004; Sindh frets over Punjab's higher intake of water; *The News*, 2 May 2004; IRSA revises water distribution: Punjab and Sindh to get less water; *Daily Times*, 2 July 2004; Punjab rejects cut in water share; *Dawn*, 9 June 2004.
[1109] Cf. IRSA says water level at dams improving; *Dawn*, 13 July 2004.
[1110] Cf. 20pc water shortage persists at Sukkur Barrage; *Dawn*, 15 July 2004; Water rotation programmes announced; *Dawn*, 21 July 2004. According to IRSA calculations, water released at Chashma Barrage in July/August (the peak of the Monsoon period) on average takes six days to reach Sukkur, which is 470 miles further downstream. In November (when water levels are lowest) it takes ten days. I am grateful to the staff at IRSA for providing me the Schematic Diagram of the Indus Basin Irrigation System during my visit in Sept. 2003.
[1111] Cf. Water alarmingly low at Tarbela; *The News*, 17 Aug. 2004.
[1112] Cf. IRSA to reduce provinces' share by 10pc; *Dawn*, 18 Aug. 2004; IRSA warns of calamity; *Dawn*, 1 Sept. 2004; IRSA indecisive over Rabi water share; *Dawn*, 26 Sept. 2004; 56pc water shortage estimated for Rabi; *Dawn*, 28 Sept. 2004; IRSA reduces water shortage forecast*; Dawn*, 29 Sept. 2004.
[1113] Cf. Release of water to avert load-shedding; *Dawn*, 30 Dec. 2004; Tarbela discharge stopped; *Dawn*, 3 Jan. 2005; quote in: WAPDA allowed water discharge; *The Nation*, 5 Jan. 2005.

a level that allowed IRSA to announce that water would be distributed according to the Water Accord, i.e. that in Kharif 2005 the provinces *for the first time* would get their full shares.[1114]

The period of shortage has exhibited another aspect of water distribution: water theft. The illegal tapping of irrigation canals in order to divert supplies to individual farms has developed into a national concern in the years of water shortage. While in some cases this practice may reflect the desperate economic situation of small-scale farmers, in other cases it exhibits the manipulation and even corruption of the water sharing mechanism by an alliance of large-scale farmers and irrigation authorities. The federal government intervened to curb water theft on the local level using the army as a police force.[1115] On the provincial level, water theft was admitted by at least one irrigation department (Sindh).[1116]

IRSA, confronted with claims of water theft from Punjab and Sindh in connection with diminished supplies, was forced to investigate.[1117] The Authority found that *hundreds of individual farmers in Punjab as well as Sindh* resorted to illegal tapping of the canals.[1118] While this constituted an *administrative problem* of the respective province about which IRSA could do little, it furthered the rift between the two provinces. The Authority, in 2008, estimated that between Tarbela Dam and Sukkur Barrage up to 50 per cent of water was lost due to illegal withdrawals – against water losses of 10 to 15 per cent which was considered *average*.[1119] According to IRSA, none of the provincial irrigation departments responded to its initiative.[1120]

In sum, the blame game between Sindh and Punjab has been one of the most persistent features of discussions at IRSA. The provinces, now stakeholders, failed to settle their dispute over water distribution within IRSA and did not show any willingness to seek other ways to remove this problem. In the absence of an agreement on making more water available in the whole basin – either through

[1114] Cf. Water distribution under 1991 accord: IRSA; *The News*, 29 March 2005.
[1115] CF. CE asks growers to identify water thieves; *Dawn*, 26 Jan. 2000. Reports on the work of the Army Monitoring Cells included the arrests of over 200 farmers in the Gujranwala District (*Dawn*, 30 Jan. 2000) and of several *Abadgars* in the Khairpur District (*Dawn*, 1 March 2000). In several cases, *influential landlords-cum-politicians* were incriminated; cf. Irrigation water theft: employees of Abida, Faisal jailed; *Dawn*, 15 Jan. 2000; Water theft probe irrigation engineers held guilty; *Dawn*, 19 Feb. 2000; Seven booked for water theft; *Dawn*, 24 Feb. 2003. The involvement of army officers in civilian administration was part of Musharraf's plan to fight corruption and improve governance; cf. Senior army officials for civilian duties; *Dawn*, 3 Jan. 2000; Commanders conference ends: new law and order plan discussed; *Dawn*, 21 Oct. 2000; Army role in desilting; *Pakistan News Service,* 18 Jan. 2001.
[1116] Cf. Sindh faces 60 per cent water shortage*; Business Recorder*, 24 Dec. 2004. The Minister of Irrigation and Power of Sindh was reported to attribute the current water shortage in part to *unparalleled corruption in the provincial irrigation department*. In Punjab, the federal Minister of Petroleum and Natural Resources, himself a landlord, was convicted of water theft, cf. Minister fined for water theft; *Dawn*, 19 March 2003.
[1117] On an investigation at Chashma Barrage: No water theft, says Sindh official; *Dawn*, 23 March 2002. Punjab countered by claiming that *58 per cent of water flowing between Sukkur and Kotri barrages during the early Kahrif simply disappears*: Punjab seeks IRSA probe into Sindh's water losses; *Dawn*, 19 June 2002.
[1118] Cf. Indus water being stolen, say officials; *Dawn*, 22 Jan. 2004.
[1119] Cf. Explanation sought from provinces over high water losses; *The News*, 9 June 2008.
[1120] The World Bank, a major funding agency of Pakistan's irrigation, has repeatedly criticized irrigation authorities for mismanagement and corruption; cf. WB wants end to corruption in PIDA, Irrigation; *Dawn*, 24 Nov. 2003.

increased storage or through greater efficiency or both – the situation promised to worsen, much to the detriment of the provinces as well as the nation as a whole.

Sindh, being the one stakeholder to complain most about insufficient supplies and at the same time demand all provinces to share the minimum requirement at Kotri to prevent its low-lying areas from the influx of destructive seawater, could have been expected to make a constructive contribution towards a solution, yet it did not do so. A readiness to compromise was hardly ever noticed. Even the analysis of the Kotri situation was blocked. The only point of agreement between Sindh and Punjab was that the Accord as such was to be upheld; disagreement, however, persisted over Clause 14 b regarding periods of shortage.[1121]

At this point of the analysis, the provinces act like antagonists, not like stakeholders or partners. They do not pursue any other interest than their respective shares of water. A collective goal or stake in water management does not seem to be part of provincial government objectives. The CCI, throughout the period analyzed above, was mentioned occasionally, yet never actually approached for a solution to the dispute, as provided for in the Accord, which indicates a lacking readiness to remove obstacles to cooperation.

Thus the Accord has not been fully implemented. Instead, critical issues were simply avoided, necessary measures not taken. Though steps to reduce water wasting and inefficiency came up in the course of discussions of the often lamented *water crisis*, lacking implementation – particularly in Sindh, the province that complained the most about not receiving its due share – confirmed a striking absence of determination and willingness of provincial decision-makers.

Though the Water Accord of 1991 was finally restored, its weaknesses became all the more obvious, particularly in the long period of shortage. The inevitable question of how to deal with shortage, whether seasonal or continuous, was not approached, partly because the Accord simply didn't require any action. Consequently, measures to tackle the problem of rising demand versus shrinking supplies were not taken. The issues of new water reservoirs and strategies to reduce wasting were systematically kept out of IRSA's agenda.

Federal government to the rescue: *water crisis*

Water shortage had so far been treated as an issue of Monsoon-related dynamics typically felt in the late Rabi, early Kharif seasons after reservoir supplies had been used up. Only in recent years has it come to be seen as a more fundamental problem concerning not just seasonal but year-round supplies of water.

One of the reasons why this critical issue was not addressed earlier appears to have been the institutional change in the water sector that was triggered by the Water Accord. Until the establishment of IRSA, the only authority to oversee water management on a national scale had been WAPDA. A forum to discuss water issues of a national concern, like the question of reservoirs and irrigation efficiency, simply did not exist. The provinces received water supplies on the basis of a fixed pattern

[1121] CF. Independent interpretation of Water Accord sought; *Dawn*, 8 March 2002.

which more or less satisfied their demands. They were left to manage the water resources at their disposal free of wider concerns. Instead of being stakeholders, they were in a capacity to focus entirely on their own specific interests, without a need to coordinate with other riparian neighbours.

With the establishment of IRSA, water distribution did not automatically become a stakeholder issue, as the first decade has shown. Instead it was a seasonally repeated clash of opposing views and claims that had dominated this institution. A collective interest in the improvement of water availability – through a concerted effort – was not identified, in spite of the more and more pressing water situation. IRSA remained focussed on the process of seasonal water allocation; little, if any, attention was paid to other issues. In the absence of stakeholder activity, it was the federal government that took the initiative to address the problem of a seemingly chronic water shortage as a national concern.

The federal government has since 2000 become more actively involved in tackling the *water crisis*.[1122] Several initiatives have focussed on

- the process of seasonal water sharing,
- the question of minimum water levels downstream of Kotri Barrage, and
- the initiation of a water management policy.

The intervention in the season-wise distribution of water meant interfering with the IRSA process, even though the strengthening of this institution might actually have been the motivation of the government. Direct meetings with the stakeholders, taking place on a sporadic level since spring 2000, aimed to mediate between Sindh and Punjab in order to prevent further confrontation.[1123] During the period of the first major water shortage since the enactment of the Accord, the government, namely the President, sought to affirm the validity of the WAA against claims of Punjab and NWFP that the existing shortage required the implementation of the 1994 ministerial committee formula. This initiative has faced protracted opposition from Punjab, and only in 2004 did IRSA effectively return to the Accord's formula.

A second intervention, in 2000, also targeted the Sindh – Punjab row during the dry spell and came in the form of an institutional change: the position of the chairman, usually rotating among the members every year, was given to Sindh for two years in a row, covering the prolonged period of water shortage.[1124] This move was rightly seen as pro-Sindh and in violation of the IRSA Act – notwithstanding the legitimate criticism of the rotary system as such. It was also one of the rare cases of the federal government openly taking the side of one province in the area of water management. On the other hand, it might be interpreted as an effort to promote equitable water sharing that sought to balance the hydrological advantage of Punjab. The inevitable consequence, though, was increased opposition from Punjab, culminating in the demand to remove the chairman from office for *biased conduct*.[1125]

[1122] Cf. Meeting to review water crisis today; *Dawn*, 29 June 2000; Gen. Musharraf presides over high-level meeting; *Pakistan News Service*, 30 June 2000.
[1123] Cf. Cotton sowing season: Sindh to get more water; *Dawn*, 9 April 2000; Meeting to review water crisis today; Dawn, 29 June 2000; Water shortage: IRSA told to work out strategy; *Dawn*, 3 July 2000; Briefing on water issue today; *Dawn*, 30 Aug. 2000; Water management meeting this month, *Dawn*, 10 Sept. 2000; Sindh to get more water: accord with Punjab reached; *Dawn*, 10 April 2001; More water for Sindh from May 1; *Dawn*, 28 April 2001.
[1124] Cf. Centre asked to forego right to vote in IRSA; *Dawn*, 5 July 2001.
[1125] Cf. Punjab wants IRSA chairman removed; *Dawn*, 2 April 2003.

A third initiative in this direction was a contingency plan for the water shortage during Kharif 2001.[1126] Presented at a meeting with stakeholders, the plan entailed a change of crops in Sindh (from rice to cotton) and a number of financial incentives to farmers aimed at greater irrigation efficiency and water productivity. Sindh, in turn, announced that it had started a *water conservation and management plan that envisaged cultivation of less water-consuming crops and avoiding wastage of water*.[1127]

The government's intervention in favour of Sindh, which took place several times during the dry seasons of 2000 – 2002, had a side-effect: It triggered further demands by Sindh. Instead of seeking a vote in IRSA, Sindh continued to approach the federal government, thus avoiding the procedure set out in the Accord and the IRSA Act.[1128] This, in turn, aroused suspicion in the Punjab as the Punjab Water Council criticized the federal government for its pro-Sindh stance, prompting Islamabad to declare its commitment to *equitable distribution* of water.[1129]

The involvement of the Pakistan Army, on orders of President Musharraf, in water management on provincial and federal levels met with mixed reactions. While the performance of some public institutions, particularly in the water sector, might indeed have required tighter control, it is questionable how an outside actor not familiar with a particular sector could possibly enforce better governance or better management. Efforts to avoid wasting – by changing crops or closing canals – were necessary, yet it is unlikely that the Army's intervention which came in the form of directives rather than advice had a lasting effect.[1130]

To improve inter-provincial as well as province-centre relations in general, the federal government resorted to a facility that had lingered in the political shadow of larger institutions: the Inter-provincial Coordination Committee (IPCC).[1131] This *ad hoc* forum, first convened in 1974, goes back to a political initiative of President Zulfikar Bhutto. Since the establishment of the CCI as a constitutionally sanctioned body, the IPCC has played a marginal role. It met again in May 2000 with a 24-point agenda that included financial and economic as well as law-and-order issues, yet not water distribution.[1132]

Thus the IPCC stayed out of IRSA's waters. In 2003, however, the IPCC, after an approach by the Punjab Government to the Ministry of Water and Power overseeing

[1126] Cf. Scheme to meet water problem finalized; *Dawn*, 25 March 2001.
[1127] Cf. Sindh may face another water crisis in May; *Dawn*, 13 April 2001.
[1128] Cf. No water for Sindh from Tarbela dead level; *Dawn*, 12 March 2002.
[1129] Cf. Punjab body wants the 1991 Accord abolished; *Dawn*, 29 March 2002; Govt to ensure just distribution of water; *Dawn*, 29 March 2002. In response to the rift between the provinces, the federal government held a conference on *Water for National Integration* in which participants from all provinces *unanimously agreed that the 1991 Water Accord was sacrosanct*; cf. Experts agree to uphold 1991 Water Accord; *Dawn*, 22 June 2002.
[1130] The Army's involvement was a phenomenon of the early Musharraf years based on the Chief Executive's conviction that the Army was the *last ray of hope* of the people; quote in: CE asks growers to identify water thieves; *Dawn*, 26 Jan. 2000; cf. NWFP governor writes to Chief Secretary: Army asked to stay away from routine affairs; *Dawn*, 16 March 2000; Sindh told to curb rice growing in some areas: meeting at GHQ on water issue; *Dawn*, 23 March 2001; AEC strategy on water crisis soon; *Dawn*, 24 March 2001; Most of drainage schemes likely to be shelved: Army engineers see wastage of money; *Dawn*, 6 July 2001; Army pullout: WAPDA's clarification; *Dawn*, 20 July 2001.
[1131] Cf. Inter-provincial body restored; *Dawn*, 16 Feb. 2000.
[1132] Cf. IPCC to discuss Sindh grievances; *Dawn*, 30 May 2000.

the IPCC, the Committee did make water a topic.[1133] As the provinces had failed to seek an agreement through regular channels (IRSA, CCI), the federal government agreed to convene the IPCC, apparently hoping to reach a go-ahead for plans to build storage reservoirs.[1134]

The problem of Kotri Barrage was to become the main issue of the IPCC meeting of July 2003, the first meeting on water since the agreement on the Water Accord. The relevance of this problem, which has developed into another facet of the Sindh – Punjab dispute, was acknowledged in the Water Accord (Art. 7), along with Sindh's position that a minimum of 10 MAF would be required to prevent saltwater intrusion from the Arabian Sea. The question as to how much water would actually be needed to prevent saltwater from mixing with the Indus River, thus making river water in lower Sindh unsuitable for irrigation, has remained an open question ever since.[1135] In the absence of an official assessment, various privately initiated studies have surfaced, particularly from activist groups and NGOs in Sindh, highlighting the environmental, social and economic conditions of the delta region which used to be *the most productive land in Sindh,* according to Panhwar.[1136]

The need for a study to establish required quantities was agreed on, yet not the so-called terms of reference.[1137] An earlier effort within IRSA to establish requirements through a study failed in 2000 because of criticism from Sindh over the terms of reference.[1138] This time again, Sindh demanded a study of a wider scope that would include a range of environmental aspects, drinking water and livestock needs, whereas Punjab insisted on a limited, strictly focused study. The meeting ended without agreement. Thus the effort to solve the Kotri issue failed at the very first stage because neither side was ready to compromise for the sake of progress on an important element of the water dispute.[1139]

[1133] Cf. Punjab seeks provincial moot on water; *Daily Times*, 11 July 2003; Inter-provincial body to act in place of CCI: Govt seeks consensus on water projects; *Dawn*, 14 July 2003.

[1134] The federal government, in May 2003, had invited the Secretaries of Irrigation and Power of Sindh and Punjab to reach an agreement on the proposed study in a bilateral meeting: As this meeting didn't take place, apparently for organizational reasons, both sides were told to send in their statements; cf. Study on water releases delayed; *Dawn*, 19 May 2003.

[1135] The variations in water levels are significant. According to WAPDA statistics, water releases below Kotri ranged from 91.83 MAF (1994/95) to 0.77 MAF (2000/01), averaging 33.8 MAF between 1976 and 2007; www.wapda.gov.pk/htmls/water-index.html (April 2008).

[1136] Most publications, extending from soil salinity to the decline of the fishing communities due to the degradation of the Mangroves, identify a host of causes, from water shortage to mismanagement and corruption. Cf. Sikander Brohi: Indus flow downstream Kotri Barrage: need or wastage? Karachi: SZABIST, 2003; Sikander Brohi: Degradation of Indus Delta and its impact on local communities; Karachi: Pakistan Fisherfolk Forum, 2004; M. H. Panhwar: Water requirement of riverain area of Sindh; Hyderabad: Sindh Education Trust, 2002, p. 43. The main findings are by and large supported by the World Bank; cf. WB: Pakistan Strategic Country Environmental Assessment; Report No. 36946-PK, Washington, D.C.: WB, 2006, p. 7 (referring to a survey of rural Sindh undertaken by IUCN: Indus Delta, Pakistan: Economic Costs of Reduction in Freshwater Flows; Karachi: IUCN, 2003).

[1137] Cf. Inter-provincial body to tackle water dispute; *Dawn*, 22 July 2003.

[1138] Cf.: Sindh opposes another reservoir; *Dawn*, 6 Feb. 2000; Agreed water share from Tuesday; *Dawn*, 14 May 2000. For this study, funds had been granted by UNDP, but were later returned because Sindh and Punjab didn't agree on the conditions of such a study. Cf. IRSA to take up sea intrusion issue; *Dawn*, 28 Aug. 2001; IRSA rejects Sindh plea on waterflow; *Dawn*, 31 Aug. 2001; IRSA slammed for rejecting Sindh's demand; *Dawn*, 3 Sept. 2001; Sindh denied water share, says official; *Dawn*, 13 Oct. 2001.

[1139] Another meeting of the IPCC – this time on reservoirs – was considered by the federal government, but not convened; cf. Settling historical water disputes; *Dawn*, 4 Aug. 2003. A year later, in May 2004, the IPCC addressed water reservoirs, yet without any agreement; cf. Committee to

The formulation of a comprehensive water policy has been the target of a series of initiatives starting in 2000 with a committee headed by the federal Minister of Agriculture.[1140] The objective was outlined by the President himself: a National Water Management Policy that would *take into account all aspects of water management*.[1141] Critics like Fateh Ullah Khan have long been demanding a more comprehensive approach to water management based on a policy framework for the whole nation, with a particular focus on new reservoirs and improved drainage.[1142]

The World Bank, a partner in the development of Pakistan's water resources since the 1960s, called for a more economic way of managing water and the strengthening of water institutions, especially IRSA.[1143] Over the coming years various attempts followed, some with a focus on necessary investment, others pointed at towards reducing water wasting and enhancing water productivity.[1144]

The Pakistan Water Sector Strategy was the first concrete result, a 5-volume study funded by ADB and compiled with participation from all provinces.[1145] The main problems identified were *insufficient water resources for the demands of the future* and *inefficient use of water in all sub-sectors, with greatest potential for improvement in the irrigation sub-sector*.[1146] Among the institutional challenges identified in the study were:

- *Inadequate coordination between all water user organisations;*
- *Difficulties in reaching consensus between the provinces on the issue of additional storage, retarding growth in water resources development;*
- *Absence of an inter-ministerial, inter-provincial body to oversee water sector planning, development and management;*
- *Changing administration under the Devolution Plan, and uncertainty in technical ability during the transition, especially in the domestic water supply and sanitation sub-sectors;*
- *Insufficient data base and information on water*.[1147]

The study, published in 2002, explored two agricultural production scenarios. For the lower demand scenario, it calculated a 12.6 MAF shortage of water for irrigation in 2000 which was expected to rise to 31.9 MAF in 2010 and 30.2 MAF in 2024.[1148]

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discuss water sharing on 25th; *Dawn*, 22 May 2004. The IPCC was invoked a number of times over the coming years, addressing various non-water issues.

[1140] Cf. Water management demanded; *Dawn*, 4 Oct. 2000.

[1141] Cf. Prepare National Water Management Policy, directs Musharraf; Associated Press of Pakistan / Government of Pakistan, 9 April 2000; www.pak.gov.pk/public/news/app/app09_Apr.htm#3 (Jan. 2002); National water policy soon; *Dawn*, 1 April 2001.

[1142] Cf. Fateh Ullah Khan: Lack of a water policy; *Dawn*, 29 Jan. 2001, and: We share a country, but not its water; *The News*, 25 Feb. 2001, and: Wrong planning leads to drought; published by the Sustainable Development Networking Programme (no date), www.drought.sdnpk,org/wrong.htm (March 2001).

[1143] Cf. WB calls for overhauling of 1991 water accord; *Dawn*, 24 March 2004.

[1144] Cf. Water sector strategy being finalized; *Dawn*, 4 Feb. 2002. The plan was funded by ADB.

[1145] Ministry of Water and Power: Pakistan Water Sector Strategy, vol. 1 – 5, Islamabad: GOP, 2002; www.waterinfo.net.pk/splight4.htm (hereafter PWSS), (May 2004). The study, it is interesting to note, was conducted with the participation of various government institutions (federal and provincial), yet without that of specialized non-governmental institutions like IWMI or that of other Pakistani water management experts; cf. PWSS, vol. 4, p. III.

[1146] PWSS, vol. 1, p. 9.

[1147] PWSS, vol. 1, p. 8.

[1148] PWSS, vol. 4, p. 76.

For the higher demand scenario, the shortfall was expected to rise to 66.6 MAF in 2010 and 51.2 in 2024.[1149] The authors concede that the existing shortage could be eliminated because *there is currently significant overuse of water as evidenced by the water-logging and salinity problem*.[1150] Yet even if Pakistani farmers manage to use water more economically, the expected shortfall would still be 19 MAF in 2010 and 18 MAF in 2024.

The recommended improvements included
- a focus on expanding Rabi crops (especially wheat),
- an expansion of water reservoirs for Rabi crops,
- better funding for research in agriculture and irrigation, and
- better stakeholder participation at the farm level.[1151]

The National Water Policy was the next step, a framework document drafted in 2003 on the premise that the *anticipated population increase (will) require a large increase in water availability*.[1152] It is the result of a National Workshop on Water Policy held in 2002, with participants of all water-related institutions of the federal and provincial governments, NGOs, farmers' representatives and resource specialists.[1153] Its objective is that *by 2025 Pakistan should have adequate water available through proper conservation and development*.[1154]

While the draft's main findings are similar to that of the more elaborate, more analytical ADB study, its conclusions are often vague and non-committal: *Increased storage and better groundwater management* and *improved functioning of IRSA* are among the proposed remedies, yet a concrete path towards of greater water availability is missing.[1155]

The document's main institutional recommendations include
- the creation of a **Federal Water Council**, a permanent body with provincial representation and headed by the prime minister which would be *responsible for all water-resource matters*;
- the creation of a **Federal Water Commission** out of a merger of the Office of the Chief Engineering Adviser, parts of WAPDA's Planning Organization, and the Federal Flood Commission, which would be tasked with *integrated planning of all water-related activities in the field of irrigation, drainage, flood control and hydropower*; and
- an **Inter-provincial Drainage Accord**.[1156]

[1149] PWSS, vol. 4, p. 79.
[1150] PWSS, vol. 4, p. 78, 179.
[1151] PWSS, vol. 4, p. 80, 177, 181. Other recommendations included the lining of canals, the promotion and marketing of better seeds and the recovery of costs related to the operation and maintenance of canals.
[1152] Document text: www.waterinfo.net.pk/pdf/NationalWaterPolicy.pdf, p. 20 (hereafter NWP); (March 2004).
[1153] NWP, p. 18.
[1154] NWP, p. 19.
[1155] NWP, p. 21, 25. One marked difference to the PWSS is the assumption that *there is sufficient power generation available to meet the anticipated needs up to 2025* (p. 24). This indicates a strong lack of realism given the chronic power cuts in cities throughout Pakistan.
[1156] NWP, p. 17, 31, 36.

The lack of provincial participation at WAPDA is mentioned between the lines, but the document merely notes that *clear-cut lines of responsibility* and *certain basic institutional changes* may be *advisable*.[1157] The provincial authorities, on the other hand, are expected to *strengthen their own design and construction organizations* in order to *relieve WAPDA of the undesirable burden of provincial work*.[1158]

This document is remarkable as it summarizes the most important aspects of the existing situation and likely future of water management in Pakistan from an official point-of-view. The biggest problem of the National Water Policy is that it has remained a draft ever since, suggesting a lack of political willingness to either adopt or revise the policy framework.[1159]

The fate of the National Water Council (or Federal Water Council), one of the most significant changes that the National Water Policy provided for, is illustrative of the obstacles which the Policy has been facing. This *apex body* was meant to be the supreme water management authority of the country, flanked by provincial water councils. From an institutional perspective, it could have closed the gap between WAPDA (the authority to execute large water projects) and IRSA (the water distribution body) by making decisions on a basin-wide scale. Thanks to provincial participation, its decisions would have had the necessary legitimacy. It could have elevated the manifold water problems to greater importance by binding the provinces as stakeholders to decisions of fundamental importance to the nation as a whole, not just the wellbeing of one province.

The federal cabinet, in 2004, approved the Policy as well as the formation of the Council, a move that was greeted with some optimism, especially regarding the *disagreement among the provinces* which would now be settled on the basis of *give and take*.[1160] The federal government went ahead, setting up a Water Sector Policy Cell in order to speed the implementation of the Policy.[1161] However, critical questions soon emerged, particularly as to the organizational relationship between the new Council and existing bodies.[1162] As a result the federal cabinet and the Planning Commission finally rejected the plan presented by the Ministry of Water and Power in July 2005 on the grounds that

- the NWS's authority collided with that of CCI and IRSA, and that
- the NWC's legal status was unclear.[1163]

The federal government, in September 2005, announced that it would go ahead with establishing the NWC in spite of objections.[1164] Yet nothing happened. Neither was

[1157] NWP, p. 35.
[1158] NWP, p. 17.
[1159] According to an enquiry by the Global Water Partnership, the draft was sent to the Law Division in 2012 which in turn requested the participation of the provinces; cf. GWP: Pakistan stakeholder perspectives on a water goal and its implementation; Stockholm: GWP, 2014, p. 5; www.gwp.org (June 2014).
[1160] Cf. Permanent water body to settle vital issues: Provinces to have similar management forums; *Dawn*, 5 Nov. 2004; National Water Council announced; *The Nation*, 5 Nov. 2004; Needed a blue revolution: national water policy on anvil; *The News*, 8 Nov. 2004; Breaking the logjam; *Dawn*, 6 Nov. 2004; National Water Council urged*; Dawn*, 13 Nov. 2004.
[1161] Cf. Water cell soon to resolve disputes; *Dawn*, 12 May 2005.
[1162] Cf. An exercise in futility; *Dawn*, 9 Nov. 2004.
[1163] Cf. Draft water policy placed before cabinet; *Dawn,* 20 May 2005; Ministry told to revise national water policy; *IUCN Water News Service*, 12 July 2005.
[1164] Cf. National water body planned; *Dawn*, 25 Sept. 2005.

the draft revised and put up for discussion again, nor were any further steps taken. The draft policy document did not evolve to a solid foundation of water management binding on all actors, and none of the institutional changes that it envisioned took shape. The provinces a.k.a. stakeholders did not raise the issue again.

In sum, the federal government's initiative in two fields of water management – water distribution and water policy – met with mixed results. The intervention in IRSA's handling of the water crisis benefited Sindh, yet threatened the authority of IRSA and CCI. While this intervention was seen as a one-sided support of that downstream province, it probably was a pragmatic step in order to end the deadlock over the interpretation of the Water Accord and, possibly, to gain Sindh's approval for planned reservoirs. The federal government, particularly the President, followed an economic approach to the water problem, with a view to increasing overall revenue. The dispute between Sindh and Punjab has developed into an antagonism that stands in the way of economic progress because it blocks necessary improvements in the way water resources are utilized, with inevitable consequences for the nation as a whole.

The provinces, though being involved in both the National Water Policy and the Water Sector Strategy, did not take any initiatives of their own to indicate that the matter was a collective concern to all of them. The only institutional change that took place in the provinces was the Sindh Water Management Ordinance (2002), a law to repeal the PIDA Act of 1997 and to introduce a more comprehensive irrigation and drainage management in this province.

The IPCC offered an opportunity to solve one element of the water dispute, the Kotri issue. This forum, because of its purely political nature (as opposed to that of the CCI), would have allowed both sides (Sindh and Punjab) to seek an agreement without being bound to a legal procedure. It is difficult to see why neither side moved from its position for the benefit of a clarification of this open issue. From a rational choice perspective, the benefit to Sindh would have been considerable. What Sindh expected from the comprehensive study it demanded remains unclear. It seems that either that outcome was considered more important, or the refusal of Punjab was politically more valuable. This, in turn, would mean that the actual problem (Kotri) was not a priority.

For Punjab, agreeing to Sindh's terms would have hardly meant a real sacrifice, because – no matter what the outcome would have been – it would not have had any effect on Punjab's water situation. This again means that in all likelihood the refusal as such (and the continuation of the dispute) was considered of greater value. Against this background it remains doubtful whether the provinces would have made the National Water Council work, or whether a change of WAPDA – in order to allow provincial participation – would have improved water management. Instead it seems not unlikely that both provinces might have used that institution as another vehicle for their respective political causes, rather than for improving water management.

Hydro-rationality, episode two: water availability

The debate over new water reservoirs has become another major element of the water dispute between the provinces. The diminishing capacity of the large reservoirs at Tarbela, Mangla and Chashma (due to heavy silt loads from the rivers) has

reduced the basin's combined volume of storage needed for the winter season. Together with other water-related problems and the steady rise in demand for water, the situation has become acute: *Pakistan is in the grip of a water crisis* (Khalid Hussain).[1165] How do the provinces react to this crisis? Does the fact that they all are equally affected make them partners? A joint stakeholder initiative has so far not materialized as IRSA did not consider itself responsible.[1166]

The dams debate has been going on since the early 1990s, with several projects emerging in the discussion. The growing need for storage in order to compensate for frequent periods of shortage in the Indus Basin region is not new. Back in the early 1960s, after the conclusion of the Indus Treaty, a need for more reservoirs was observed, as well as a lack of suitable locations.[1167] The increasing silt levels of the existing reservoirs, built as a result of the Treaty, has since been giving cause for alarm.

The debate has almost from the start become a hotly contested political issue, aggravating the existing dispute over water shares between the biggest provinces, Sindh and Punjab.[1168] The Kalabagh project has been the most controversial of all dam proposals and has become a synonym not only for the divide between the provinces but also for various forms of criticism, ranging from anti-Punjab and anti-WAPDA to anti-government and anti-federation. The politicization of water reaches from the lower tiers of government to the provincial and federal levels, as Hussain and Ruttig observe.[1169]

On the side of the more pragmatic voices, some stress the need for swift action and point at the steady rise in demand for food and cheap electricity. Kalabagh is favoured because it could be realized within a few years, unlike other proposals which lack feasibility studies.[1170] Malik, also highlighting the dwindling reservoir capacity at Tarbela and Mangla, observes that the project has received the support of the World Bank and other major lending institutions.[1171] He notes that the unused amount of water would add 2.1 MAF of water to Sindh's Rabi supplies and is sufficient to allow for a 10 MAF minimum level at Kotri.

Others caution because of anticipated side-effects and potentially lower-than-expected returns, particularly at the farm level. One prominent voice was Omar

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[1165] Khalid Hussain: Policy needed to solve water problems; *Dawn*, 23 April 2001. According to WAPDA figures, Tarbela has lost 25% of its original capacity by 2010, Mangla 17%; Government of Pakistan: Report of the Technical Committee on Water Resources: Examination of TORs, conclusions and recommendations, Part II; Islamabad, 2005, p. 66.

[1166] Cf. Reservoirs' water level up but no relief for Rabi crops; *Dawn*, 19 Feb. 2003.

[1167] Michel: Indus Rivers, *op. cit.*, p. 273 – 274.

[1168] Cf. The blame game; *Herald*, July 2002, p. 54; Muhammad Feyyaz: Construction of Kalabagh Dam; PILDAT Background Paper, 2011, p. 2; www.pildat.org (May 2012).

[1169] Thomas Ruttig: Der große Streit ums Wasser (The great water dispute; in German); *Südasien* 6/1994, p. 64; Khalid Hussain: Staudammprojekte im innenpolitische Zwist (Dam projects as a factor of politics; in German); *Südasien*, 5/1999, p 59.

[1170] Cf. the position of the Pakistan Engineering Congress which demands the implementation of the Kalabagh Dam project because it is the only major scheme ready to be built and *the country cannot wait any longer*: Kalabagh dam only feasible project, says PEC chief*; Dawn*, 26 July 2000; South Punjab, Sindh to face water crisis: PEC; *Dawn*, 27 Nov. 1999; New dams must to avoid famine: PEC; *Dawn*, 11 Dec. 1999.

[1171] B. A. Malik: The case for Kalabagh; in: Kaiser Bengali, ed.: *The politics of managing water;* Islamabad/Karachi: SDPI / Oxford U.P., 2003, p. 170 - 171.

Ashgar Kahn, a former Minister of Local Government and Rural Development, who argued that small dams were preferable as they would not de a huge investment, social-economic disruption due to resettlement of whole communities, and unforeseeable ecological consequences.[1172] Fateh Ullah Khan, a former IRSA chairman, has reiterated the technical deficiencies of the Kalabagh scheme and lobbied for Katzarah Dam, also known as Skardu Dam, a project that promises much better hydrological characteristics, greater power generation and greater reservoir capacity and would not be prone to silt.[1173]

The position of Sindh has been voiced in a most outspoken manner, particularly during the period of water shortage, with hardly a week passing without a major agitation against the Kalabagh Dam.[1174] Countless activist groups have taken part in the fray, stating their opposition to the Kalabagh Dam project, many of them hoping to capitalize politically on the confrontation. Arguments range from focused opposition to particular projects to claims that dams serve as a means to suppress or even starve this downstream province – a prospect that prompts some *to pick up arms* (Qadir Magsi, STPP).[1175] Except for Governor Soomro, Sindh governments have usually opposed the Kalabagh Dam.[1176] The provincial assembly also voted against the project.[1177] The protest movement, made up of loosely aligned groups, includes political parties like the Pakistan People's Party (PPP), a Sindh-based rival of the Pakistan Muslim League in national elections.[1178]

Substantial criticism of the project has come mostly from Sindh and targets its limited lifespan due to expected high silt loads, a fate equal to that of Tarbela Dam, reduced overall supplies to Sindh and an undue benefit to Punjab. Khan proposes an extension of Tarbela Dam instead, allowing for greater storage, effective flushing out

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[1172] Umar Ashgar Khan: Kalabagh: harbinger of prosperity or agent of doom? www.binoria.org/albineng/july98/kalabagh.html (Dec. 2000); Aly Ercelawn, K. Ali & O. A. Khan: From waters of life to waters of strife; *Liberal Times*, 2/1998, p. 35.

[1173] Fateh Ullah Khan: Which dam to build first and why? *The News*, 28 Oct. 2003; F. U. Khan: Katzarah Dam: world's largest reservoir; *The News*, 1 Dec. 2003.

[1174] For example: Anti-dam protests lead to general strike in Pakistan; *World Rivers Review,* June 1998, www.irn.org/wrr/9806/kalabgh.html (Dec. 2000); PONAM observes 'black day'; *Dawn*, 28 July 2000; Protest rally against Kalabagh Dam; action alert by International Rivers Network and World Sindhi Congress, Washington, D.C., 8 Aug. 2000; http://irn.org./programs/India/action/00808.html (12/2000); Demo against Kalabagh Dam in Washington; *Dawn*, 16 Aug. 2000.

[1175] Cf. Moot on Kalabagh dam criticized; *Dawn*, 22 Jan. 2000 (various groups warning of a *conspiracy* of the World Commission on Dams against Sindh); PONAM leaders blame water scarcity on Punjab; *Dawn*, 14 May 2000; JSQM holds rally against water shortage; *Dawn*, 6 June 2000; Awami National Party blasts Punjab over Kalabagh dam issue; *Dawn*, 7 July 2000; Water crisis 'created': SNF; *Dawn*, 25 July 2000; Kalabagh dam issue revived to cover up failures: ANP chief; *Dawn*, 25 July 2000; Parties reject Kalabagh Dam; *Dawn*, 2 Aug. 2000; MQM slams cut in Sindh's share of water; *Dawn*, 3 Dec. 2000 (*depriving the people of Sindh* was seen as an attempt at *turning Sindh into a colony of Punjab*). The Sindh Taraqqi Passand Party chief quoted in: M. Ilyas Khan: Damned if we do; *Herald,* Oct. 2003, p. 29. The STPP claimed that IRSA's decision to cut Sindh's seasonal supplies was motivated by revenge for Sindh's opposition to Kalabagh; cf. Indus water being diverted to punish Sindh, says STPP; *Dawn*, 13 April 2000. Similar statements could be heard from the Sindh Research Council: Pakistan province faces water shortage; *Environmental News Network*, 25 May 1999.

[1176] Cf. Soomro urges people to accept Kalabagh Dam; *Dawn*, 29 July 2000.

[1177] Cf. To dam or not to dam? *Newsline*, Aug. 2000.

[1178] Cf. NGOS call for shelving Kalabagh dam plan: desilting of existing dams demanded; *Dawn*, 20 Aug. 2000; PPP suggests alternatives to Kalabagh Dam; *Dawn*, 30 July 2000. The *alternatives* included the lining of the river and the canals and the desilting of the Tarbela Reservoir– the feasibility of which has been questioned before.

of unwanted silt.[1179] Shaheen Khan argues that instead of adding more water to a system that already suffers from water-logging, the available water should be used more efficiently, thus raising resource productivity.[1180] Muhammad Gazdar presents a more fundamental criticism noting that the Kalabagh project is *economically unviable* and denounces WAPDA's *poor project design*, exhibiting an ignorance of important geological and hydrological factors.[1181] Abbasi and Kazi add that the project depends on an assumed availability of water which is just a matter of speculation.[1182]

The Reformers, a group of irrigation experts who set up the unofficial Water Management and Distribution Committee, stress that before considering a major new reservoir, the operation of the existing reservoirs and link canals should be reviewed. They find that reservoirs were used against their stated purpose, i.e. water was stored even during shortages, instead of it being released into the canal system. Similarly, the link canals, to be opened only in order to deliver surplus water, were opened throughout the season when there was a shortage thus aggravating the situation in the downstream region.[1183] Consequently, a reservoir operation pattern should be firmly established and safeguarded before a new dam is added to the system.

The position of Punjab has consistently been in favour of new dams, including Kalabagh, on the grounds that only additional storage would prevent water shortage.[1184] The province also views the Water Accord as consistent with a commitment to new reservoirs, i.e. if they are not built, it cannot be implemented. This view has invited suspicion from Sindh as some critics expect that due to additional supplies for Punjab the Water Accord would effectively be undermined.[1185] The position of the provincial government has remained by and large the same over the years, facing little, if any, opposition from the public.[1186] The Pakistan Muslim League, the major Punjab-based political party, has tended to favour large dams, including Kalabagh.[1187] The Punjab Water Council, the leading activist group in the water sector founded in 2001, has sided with the provincial government on water issues such as the Kalabagh Dam.[1188]

[1179] Shaheen Khan, *op. cit*., p. 178, adding that the feasibility of flushing was subject to further studies. The extension of Tarbela's power generation facility has meanwhile taken shape: World Bank to provide $840m for Tarbela extension; *Pakistan Today*, 13 June 2013.

[1180] Shaheen Rafi Khan: The case against Kalabagh Dam; in: Kaiser Bengali, ed.: *The politics of managing water*; Karachi/Islamabad: Oxford U. P. / SDPI, 2003, p. 175.

[1181] Muhammad Nasir Gazdar: An assessment of the Kalabagh Dam project on the river Indus. The Sabz Bagh: 'Promising a rose garden but delivering dust'; Karachi: Environmental Management Society, 1990, p. 21, 59,

[1182] A. N. G. Abbasi & Abdul Majid Kazi: Kalabagh Dam: look before you leap; ca. 2000, p. 2ß; http://sanalist.org/Acrobat/A-7.pdf (Feb. 2004).

[1183] The Reformers (A.N.G. Abbasi, Shaikh Manzoor Ahmed, Kazi Abdul Majid, Qamaruddin Sahto, Qamar uz Zaman Shah): Future reservoir & irrigation schemes. Some important considerations; Dec. 2000; http://members.shaw.ca/saveindus/Save_Indus/Resources_files/abbasi2.pdf (May 2014).

[1184] Cf. Report warns of disaster ahead: new storages indispensable; *Dawn*, 14 March 2000; Khar calls for more reservoirs; *Dawn,* 20 July 2000; Punjab to press ahead with Kalabagh; *Dawn,* 21 Feb. 2003; Punjab renews demand for Kalabagh Dam's construction; *Business Recorder*, 29 July 2003.

[1185] M. Idrees Rajput: Inter-provincial water issues, PILDAT *Background Paper*; Islamabad: PILDAT, 2011 (no page numbers).

[1186] Cf. Punjab farmers demand Kalabagh Dam; *Dawn*, 25 Feb. 2004.

[1187] Cf. Azhar for dams to solve water crisis; *Dawn*, 5 March 2002 (PML Quaid-e-Azam faction).

[1188] Cf. Seminar discusses water issues and the national priorities; *The Nation*, 9 Feb. 2003.

The position of NWFP/KPP has been dominated by fears that the proposed dam at Kalabagh would inundate fertile lands north of the dam site.[1189] Another aspect is the fear of aggravated flooding and potential damage to the drainage system in some districts.[1190] Kazi adds that the city of Nowshera might be submerged if the dykes envisioned in the Kalabagh plans break and points out the significant replacement works not entailed in the dam's budget.[1191]Opposition, though outspoken, was less unanimous than in Sindh or in Punjab.[1192] Groups like the Awami National Party have been unshakable in the opposition to the dam.[1193] The government and the provincial assembly have rejected the Kalabagh Dam. Other projects, like the smaller Gomal Zam Dam, have received official support.[1194]

The position of Balochistan has been determined by the fear that the proposed dam might lead to an overall cut in water availability downstream, leading to further problems over water supplies via Sindh. The Assembly of Balochistan, like that of Sindh and NWFP/KPP, has voted against the proposed Kalabagh Dam. The reason behind this opposition, Kazi suggests, seems to be less acute than in the case of Sindh but rather an apprehension that the dam might lead to losses in some way.[1195]

WAPDA's response to the dams debate was a comprehensive package of projects designed to harness an additional 26 MAF of water. Its Vision 2025, presented to the federal government in August 2001, at the height of a protracted water shortage, assessed the average volume of unused water and ways to store it.[1196] The Vision highlights projects that were ready for implementation as WAPDA had already carried out initial studies.[1197] Among the proposed projects were the Greater Thal Canal, the Basha Dam and the Gomal Zam Dam plus a number of smaller schemes.[1198] The controversial Kalabagh Dam project was also mentioned, yet not included because it was considered a *policy matter*.[1199] It was later added in a revised concept presented in 2007.[1200]

The federal government has favoured large dams, including Kalabagh, as a most effective remedy against water shortage. Pakistan, its National Water Resources

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[1189] Fateh Ullah Khan: Water problem, causes and solution: A view from North West Frontier Province; in: Cheema *et al.,* eds.: *Problems and politics of water sharing and management in Pakistan*; Islamabad: IPRI, 2007, p.133 – 134.

[1190] Cf. Centre asked to consult Sindh, NWFP on Kalabagh dam issue*; Dawn*, 27 July 2000; Muhammad Idrees Rajput: Inter-provincial water issues; *op. cit.*

[1191] Abrar Kazi: Kalabagh Dam: varying points of view; in: Kaiser Bengali: *The politics of managing water*; Islamabad/Karachi: SDPI / Oxford U.P., 2003, p. 182 - 183

[1192] PPP, ANP and others were opposed, Muslim League was in favour; cf. Political parties in NWFP oppose Kalabagh dam; *Dawn*, 25 July 2000; Parties oppose Kalabagh Dam; *Dawn*, 22 Aug. 2000.

[1193] Cf. WAPDA chief fails to woo ANP: Kalabagh dam; *Dawn*, 18 Aug. 2000.

[1194] Cf. Aminullah Khan Gandapur: Gomal Zam Dam – dream come true; *Pakistan Observer*, 24 Aug. 2001.

[1195] Kazi: Kalabagh Dam: varying points, *op. cit.*, p. 183.

[1196] WAPDA: Vision 2025; Lahore, August 2001; www.wapda.gov.pk/vision2025/default.asp (Jan. 2004). I am grateful to the staff at WAPDA for providing me a copy during my visit, 9 Sept. 2003.

[1197] Interview with Ahmed Khan Bhatti, Member of WAPDA's Water Wing, *Herald*, July 2002, p. 56.

[1198] A total of eleven major dams and irrigation canals are included in the package which would stretch over a three-stage, twenty-year period; cf. Matthias Paukert: Odyssey 2025: WAPDA und die Energieversorgung Pakistans (Odyssey 2025: WAPDA and Pakistan's power supply; in German); *Südasien*, 3/2002, p. 61 – 63.

[1199] Interview with A. K. Bhatti, *op. cit.*

[1200] Presentation by the Chairman of WAPDA to the Pakistan Development Forum, Islamabad, 27 April 2007.

Development Programme suggested in 1997, would soon become *a food deficit country*.[1201] The president, committed to *give our agro-based economy a boost* and appealing to the provinces to *reject the politics over the issue*, addressed the need for more storage facilities and pointed at the threat to agriculture if no new reservoirs will be made available.[1202] The apprehensions of NWFP/KPP and Sindh, particularly the expected diversion of water (Sindh) and the inundation of the Nowshera area (NWFP), were countered stating that the Kalabagh project would instead provide additional water for the critical Kharif sowing and it would not submerge large tracts of land in NWFP thanks to design modifications.[1203]

The federal government was forced to cancel its plans to implement the Kalabagh Dam in August 2000 and announced that alternatives were being explored.[1204] Yet only two months later announced that due to public opposition it was *desirable to wait for two to four years for the investigations of another project*, without excluding Kalabagh.[1205] In 2005, the President's Water Strategy 2020 was issued as part of a renewed campaign for the Kalabagh Dam.[1206] In another attempt to raise support for reservoir projects that were ready to be built and could make more water available in the foreseeable future, the President embarked on a tour of Sindh. Visits in Hyderabad, the centre of protest and home of many activist organizations, and Sukkur and Kohlu, however, failed to turn the tide in favour of the dam.[1207]

The only major dam project to be implemented was the raising of Mangla Dam. Started in 2004, this reservoir's capacity was increased by 2.9 MAF in response to the lake's growing sedimentation.[1208] Thus it was not expected to augment supplies but replace lost storage.[1209] The project, which was completed in 2013, was accompanied by the same kind of criticism as Kalabagh, yet on a smaller scale.[1210] The added water storage capacity meant a larger area would be inundated once the reservoir was filled to its maximum. New towns and villages plus the necessary infrastructure and employment opportunities had to be created and displaced people compensated. The resettlement issue has proved to be particularly thorny because in the past compensation was insufficient or not paid at all, and the resettled communities had failed to integrate socially and economically in the new locations.[1211]

[1201] National Water Resources Development Programme (NWRDP): Kalabagh Dam. A long-term solution to national water and power problems; publicized in 1997 and adopted by the Musharraf government in 1999; www.pak.gov.pk/Kalabagh_Dam.htm (Aug. 2000).

[1202] Musharraf speaking at the inauguration of the Second South Asia Water Forum, Islamabad, 14 – 16 Dec. 2002, quoted in: Water plan to help boost the economy: Musharraf; *Dawn*, 15 Dec. 2002; Dams must to end water shortage: Sindh to benefit the most; *Dawn*, 15 Dec. 2003.

[1203] NWRDP, *op. cit.*

[1204] Cf. Kalabagh dam plan shelved: Cabinet decides to tap other resources; *Dawn,* 31 Aug. 2000; WAPDA move to build 2 reservoirs; *Dawn,* 4 Sept. 2000. Feasibility studies were commissioned for Basha Dam and Thal Canal.

[1205] CF. Govt has not backed down on Kalabagh dam: CE; *Dawn*, 11 Oct. 2000.

[1206] Document text: www.presidentofpakistan.gov.pk/waterstrategy.aspx (July 2006).

[1207] Cf. President's address at Hyderabad, 23 Dec. 2005; President's address with public in Sukkur, 22 Dec. 2005; President's speech at Kohlu, 16 Dec. 2005; www.presidentofpakistan.gov.pk (July 2006)

[1208] Saheeb Ahmed Kayani: Mangla Dam raising: a review; *Science, Technology and Development*, vol. 32, no. 2, 2013, p. 150.

[1209] At the time of its conception, the project was expected to deliver additional water for the dry season: Mangla Dam raising to add 3-month extra irrigation water; *The News*, 4 Oct. 2002. An estimated 44,000 people were to be replaced.

[1210] Tariq Naqash: Raising Hackles*; Herald*, Sept. 2002, p. 51 -52.

[1211] Kayani: Mangla Dam, *op. cit.,* p. 150.

The sharing of benefits from the reservoir extension was initially opposed by the Punjab, claiming an *exclusive right over the Mangla Dam*.[1212] Punjab's official argument that the dam extension was *not a project of increasing storage but a development project* aimed at excluding the reservoir from the collective system by redefining it as a provincial project. Absurd as it may seem, this move by Punjab's Secretary of Irrigation and Power hinted at the increasing competition between the provinces. Not surprisingly, it was rejected by IRSA.[1213]

The Greater Thal Canal project, though of a smaller dimension than the Kalabagh Dam, proved to be equally controversial and attracted similar reactions from the stakeholders. Conceived in the colonial era as an instrument to irrigate the Eastern half of the Thal desert in Punjab, it had become a bone of contention between Punjab and Sindh since 1923, with the former using the project in order to put pressure on its downstream neighbour.[1214]

The project that was raised again in 2001 envisioned the Thal Flood-Water Canal as a system that would divert excess water to lands in the Thal Doab, a dry region that Punjab hopes to irrigate without tapping its allotment of water according to the 1991 formula. Punjab expects to use flood water in a way that would provide six months worth of irrigation to this region.[1215]

While the likely benefits for Punjab are obvious as this project, with its vast network of canals and distributaries, would make more land economically viable, the benefits for Sindh are doubtful. Sindh's government has been opposing the project because the canal *will reduce irrigation water supplies to Sindh canals in the years of shortage like Kharif 2000*.[1216] Hakro and Lashari find that farmers in many parts of the respective area will face a disruption of social-economic networks.[1217] Communities in the so-called Seraiki Belt of Southern Punjab have voiced their opposition to the project.[1218]

The canal project has given rise to renewed claims from Sindh activists that *Punjab is stealing water from Sindh's share* and is working towards *the dismemberment of Pakistan*.[1219] Like in the case of the proposed Kalabagh Dam, widespread opposition has formed in Sindh.[1220] This time, Sindh was alone; the other provinces tended to support the project because its potential side-effects would only be felt downstream.

While a dam on the upper reaches of the basin might make more water available that could be shared by all stakeholders, this canal system delivers gains to only one stakeholder; and it may even involve losses for the downstream provinces. From an economic perspective, both the one-sided gains and the potential losses call for a

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[1212] Cf. Punjab claims exclusive right over Mangla water; *The Nation,* 2 Oct. 2002, citing an official source.
[1213] *Ibidem*.
[1214] Aloys Michel: The Indus Rivers, *op. cit*., p. 121.
[1215] Anwar Ahmad; The contentious canal; *The News*, 13 May 2002.
[1216] Cf. Sindh opposes Thal canal; *Dawn*, 11 Oct. 2000.
[1217] Ahmed Nawaz Hakro & Azhar Lashari: Greater Thal Canal. Another misadventure; Islamabad: Sungi Development Foundation, 2005, p. 17 – 20. The authors note that WAPDA failed to make a comprehensive survey of villages to be relocated; p. 30.
[1218] Cf. The Greater Thal Canal project; *Herald*, July 2002.
[1219] Ansar Naqvi: Thal Canal – a controversy set in motion; *The News*, 17 March 2002
[1220] Cf. Call to launch joint struggle: Greater Thal Canal project; *Dawn*, 19 March 2002; Floodgates of discord; *Newsline*, April 2002; Turbulent waters; *Herald*, July 2002.

compensation scheme. But is there has not been any. The federal government's support of the project was viewed as hurried and unbalanced and aroused suspicion in Sindh.[1221] Again, like in the case of the Dam, technical deficits were accompanied by political-psychological factors. As Kazi observes, *major decision are taken without taking Sindh into confidence which always results in reduced water share for the province*.[1222]

The political process reveals a number of discrepancies. The federal government, obviously fearing opposition, had given the go-ahead for the project as early as August 2001, without involving the stakeholders or the legislature or IRSA or the Central Development Working Party (for technical approval) or the Executive Committee of the National Economic Council (ECNEC, for budgetary approval). The Government of Sindh objected to the project in February 2002, arguing that the proposed canal was not presented to the provincial government ahead of the CDWP meeting of February 2002 (which resulted in approval of the canal) and that the project did not conform to the Water Accord.[1223] IRSA, it demanded, would have to officially confirm that sufficient water will be available, by issuing a water availability certificate. The project, it noted, was initially termed Thal Flood Water Canal, suggesting that it would only be operated during the Monsoon period, but the Greater Thal Canal's concept envisioned a regular operating pattern for which there wasn't enough water.[1224]

IRSA took until May 2002 to vote in favour of the project.[1225] The provincial assembly of Sindh vetoed the project another nine months later, in February 2003, recommending the government to address the CCI over this issue – a move that never happened.[1226] In the months that followed opposition from Sindh seems to have lost momentum. Hakro notes that the *Chief Minister of Sindh has approached the Prime Minister in June 2003* in order to constitute the CCI, yet to no avail.[1227] The CCI, however, does not require federal government sanction. According to the Constitution, it can be invoked by any provincial government.[1228]

[1221] Manzoor Chandio: To build or not to build? *The News*, 5 March 2002; Thal Canal to benefit civil-military bureaucracy; *The News*, 3 June 2002; One big cantonment; *Herald*, Sept. 2003.

[1222] Abrar Kazi: Why 'no' to the Greater Thal Canal; *Dawn Economic and Business Review*, 7 – 13 July 2003. Kazi views the Canal as part of a sequence of Punjab-centred water decisions, starting with the early post-independence period, culminating in the *selling* of the Sutlej, Ravi and Beas rivers to India which Kazi terms an *enormous crime*. Similarly A. A. Musalman: Indus waters imbroglio; *The News*, 21 July 2003.

[1223] Government of Sindh, Planning and Development Dept., letter to Cabinet Division, GoP, 26 Feb. 2002, Doc. No. SO(Dev)CD19/24P&D/2001. I am grateful to the staff at IRSA for providing me a copy during my visit in Sept. 2003. A copy of this document is also reproduced in Hakro: Greater Thal Canal, *op. cit*., appendix F.

[1224] Cf. GoP, Planning and Development Division: Summary for ECNEC, 16 Feb. 2002; document reproduced in Hakro: Greater Thal Canal, *op. cit*., appendix G.

[1225] Cf. IRSA okays Greater Thal Canal project; *The News*, 8 May 2002.

[1226] Cf. Sindh PA rejects Thal Canal; *Dawn*, 1 March 2003. The Sindh Assembly, in June 2003, again demanded that the project be halted; cf. letter of Government of Sindh, Irrigation and Power Department, to Cabinet Division, GoP, 23 July 2003; Doc. No. 10/1390-SO(PI)/-II, reproduced in Hakro: Greater Thal Canal, *op. cit.*, appendix E.

[1227] Ahmed Nawaz Hakro: Decision making, transparency and accountability process of water projects in Pakistan. A case study of Greater Thal Canal; *Freedom. A Journal of Civic and Political Education*, vol. 1, no. 4, Nov. 2007, p. 46.

[1228] Constitution, § 155 (2).

A lack of technical preparation and transparency plus an apparent reluctance of the federal government to discuss the project have drawn widespread criticism, particularly from Sindh. Sindh's position received support from the World Bank which questioned both the feasibility and the economic viability of the Canal.[1229] The Bank, expected to pay for part of the project, also doubted that water supplies were sufficient even when additional supplies from the enlarged Mangla Dam were factored in, thus reiterating a central point made by Sindh.

In sum, the debate over water projects has arrived at a dead end. Hardly any group or stakeholder has changed its position – especially on the most controversial subject, Kalabagh. The high degree of politicization, particularly prominent among the so-called Sindhi nationalists, means that the actual water problem has been sidelined by other concerns, resulting in a paradox as this downstream province is expected to be the most affected by any major scheme on the upper reaches, for better or worse.

The failure to win the support of the provinces for any dam means that the federal government's initiative to improve the water situation has been unsuccessful. One reason, as Fateh Ullah Khan suggests, is the inability of the government and WAPDA to *select the best site for a storage dam*.[1230] Kalabagh is likely to encounter the same fate as Tarbela: quickly losing storage capacity due to heavy silt.[1231] Besides the particular deficits of Kalabagh there are principal problems common to most, if not all large dam schemes. In spite of the long debate, many of these side-effects do not seem to have been addressed adequately.

The case of the GT Canal is similar. Like the Dam, the GTC is aimed at making use of surplus (flood) water. But while the Dam could hypothetically bring benefits to all provinces – in terms of extra water or in the form of non-water benefits – the Canal promises merely one-sided gains. In the absence of some form of benefit sharing – in the form of water supplies from Punjab or non-water benefits – there is no reason to expect Sindh to go alongside Punjab. Apart from a lack of incentives to cooperate on these projects, the deep-seated mistrust of Punjab has been cited as a common reason of Sindh's opposition. This political-psychological factor has been aggravated by poor transparency and inadequate preparation, further undermining chances for any form of cooperation.

The decision to go ahead with the Canal in spite of mounting criticism from Sindh adds to the existing apprehension that Punjab tends to be favoured by the federal government. On the other hand, Sindh refrained from making its opposition more solid – by addressing the Council of Common Interests or launching an offensive in the National Assembly – indicating a lack of determination on the part of the Sindh government. The Kalabagh Dam was halted because it faced the combined opposition from three provinces. Interestingly, the provincial opposition was not the result of some coordinated effort – which could have been interpreted as a step towards cooperation in the water sector – but occurred independently.

[1229] Cf. WB questions viability of new water projects; *Dawn*, 15 July 2004.
[1230] Interview with Fateh Ullah Khan: The rise and fall of reservoirs; *The News Weekly Edition*, 18 Feb. 2001.
[1231] Interview Khan, *ibidem*; Shaheen Rafi Khan: The Kalabagh controversy; Islamabad: SDPI, 1999, http:||sdpi.org/ceesp/pub/kalabagh.htm (Sept. 2001).

Has the critical water situation prompted the stakeholders to go alternative ways to avoid the consequences of shortage? Efforts to improve efficiency have been discussed but not implemented on a large scale. But can sophisticated irrigation techniques and improved drainage alone help farmers cope with water shortage? By some neutral assessments, the answer is no.[1232] What are the consequences of inaction, and are the stakeholders ready and able to pay the costs?

The stalemate on the water front suggests that either

- (1) the stakeholders assume that solutions other than large dams – especially small dams – will be successful in averting the water crisis because the price of agreeing on a large dam is too high, or that
- (2) they opt for improving water management as a potentially sufficient step to avoid water shortage, or that
- (3) they do not consider the situation dramatic enough or the political pressure big enough to act.

This means that in the case of

- (1) the stakeholders might either seek a coordinated strategy to build small reservoirs, or do so individually,
- (2) they decide to improve irrigation efficiency and water productivity, either through a coordinated effort (IRSA, IPCC and CCI), or on an individual path (through the Irrigation and Power Departments and PIDAs),
- (3) they might wait out the situation until political conditions are more favourable for a decision.

Potential benefits in the case of

- (1) a coordinated strategy to develop small reservoirs could be the elimination of adverse effects of small dams on the established water distribution mechanism – an reward that an isolated individual move would lack,
- (2) a joint effort to improve water management might come in the form of an exchange of expertise,
- (3) waiting out are that the risk of political deadlock due to public protest might be avoided.

It remains to be seen if the stakeholders have taken any initiative in one direction or the other.

Hydro-pragmatism: enter the experts

The stalemate over the issue of water shortage prompted the federal government to return to a pragmatic path. In the absence of any initiative on the part of IRSA or any of the stakeholders, the President took an initiative that was reminiscent of the period that led to the Water Accord. But unlike earlier efforts to promote a solution of water-related problems, the government this time involved both water experts and lawmakers. In August 2003, the formation of a Technical Committee on Water Resources (TCWR) and a Parliamentary Committee on Water Resources (PCWR)

[1232] See earlier chapters on the hydro-economy and on managing the Indus in this study.

was announced.[1233] As a gesture towards Sindh, the Technical Committee was to be headed by A. N. G. Abbasi, a former Minister of Irrigation and Power and widely respected expert on water management.

The TCWR consisted of eight regular members (two each from all provinces) plus the chairman.[1234] The Technical Committee, in the words of Shams ul Mulk, Committee member and former chairman of WAPDA, was tasked to *lay down a schedule for the construction of large dams and related infrastructure*.[1235] The guidelines, according to Shams ul Mulk, were the Vision 2025 programme of WAPDA and the Water Accord of 1991. In the beginning, however, its objective and status were less than clear. The so-called terms of reference (TOR), i.e. the actual objective of the Committee, initially just the assessment of reservoir options, were seen as *vague and confusing.*[1236] Though the government declared that the Technical Committee would have *complete autonomy*, a number of organizational problems marked the first months after the President's announcement.[1237]

The expectations ran high as the government repeatedly called for new reservoirs to be built within one year in order to end the water shortage. With a view to the committees' expected findings, the President declared that a *tremendous responsibility* rested on both committees.[1238]

Though the terms of reference of the Committee had proved to be a source of irritation, the federal government finally accepted a more comprehensive agenda, thus rejecting a move by the Punjab to exclude the question of water availability.[1239] When in February 2004, six months after the announcement of the committees, the TOR were finally issued, they covered not just the dams, but all controversial water issues:

- *(1) Review issues relating to **distribution of water** according to 1991 Water Apportionment Accord and submit recommendations for streamlining water distribution amongst the provinces.*
- *(2) Assess the need for **constructing dams**/reservoirs for future requirements and to make up for the shortages of water due to silting of Tarbela and Mangla dams and recommend sequencing of future storages.*

[1233] Cf. Bodies on Kalabagh Dam, Thal Canal formed; *The News*, 26 Aug. 2003. According to the official announcement of the committees, the decision was reached after two meetings with representatives and activists of Sindh.

[1234] Members from Punjab: Chaudhry Mazhar Ali, Mehmood-ul-Hassan Siddiqui; Sindh: Iqbal Ali; Sardar Ahmad Mughal; NWFP: Shams ul Mulk, Sardar Muhammad Tariq; Balochistan: Abdul Razik Khan, Muhammad Azam Baloch; cf. Government of Pakistan: Report of the Technical Committee on Water Resources: Elaborations; Islamabad, May 2005, p. 2; www.ppib.gov.pk/1.pdf. Other parts of the Report are listed at the same location (May 2006).

[1235] Personal discussion with Shams ul Mulk, Islamabad, April 2004.

[1236] Cf. Confusion over working of body on water resources; *Dawn*, 4 Dec. 2003; Water body's future hangs in balance; *Dawn*, 26 Jan. 2004.

[1237] Cf. Water resources body to be fully autonomous: Sherpao; *The News*, 9 Dec. 2003. The Technical Committee met eight times between March 2004 and March 2005.

[1238] Cf. Work on dam must start by next year: Musharraf wants end to row; *Dawn*, 10 Dec. 2003.

[1239] Cf. Decision on new dams delayed till Abbasi's report; *Dawn,* 12 Feb. 2004; President okays ToRs for water committee; *Daily Times*, 13 Feb. 2004; Technical committee on contentious water issues holds first meeting; *Daily Times*, 15 March 2004. Government of Pakistan: Report of the Technical Committee on Water Resources: Part I: Background, logistics and procedure; Islamabad, 2005, p. 9, and Part II, p. 2.

- *(3) Review the progress so far regarding study on escapages below **Kotri** and recommend measures to expedite the completion of the study.*
- *(4a) Determination of **water availability** for future reservoirs and irrigation schemes.*
- *(4b) Ascertain actual quantity of water passed downstream **Kotri** from 1976 – 2003.*
- *(5a) Examine the **filling criteria** of Mangla Reservoir and make recommendations in this regard.*
- *(5b) Examine the **operational criteria** of link canals and future reservoirs.*[1240]

The Committee's findings were issued in August 2005:

- (1) **The Accord's formula** has proved adequate to *meet the existing uses*. Implementation of the Accord should *continue to be followed till injection of major storage(s) in the system,* i.e. until new reservoirs are available.[1241] The exemption of NWFP/KPP and Balochistan from sharing shortages was rejected because it is in violation of the Accord. The 1994 formula that had been adopted during the period of shortage was found to have been in practice between 1999 and 2003, even though no formal decision was made by IRSA. It was termed *highly unfair and unjust* because it gave one-sided benefits to one province (Punjab) at the expense of another (Sindh). IRSA's new three-tier formula for different water availability scenarios was also found to be in violation of the Accord.[1242]

- (2) **The need for new reservoirs** was acknowledged in principle. While the members agreed by and large with the basic line of WAPDA's Vision 2025 that new reservoirs were necessary, the chairman cautioned that planning of reservoirs must take into account the hydrological conditions of the respective basin.[1243] Whereas WAPDA has been keen to promote new reservoirs, the Authority's misleading figures on available water and its inability to act on earlier recommendations for silt removal at existing dams as well as the findings of the World Commission on Dams were criticized.[1244] The lack of a feasibility study of the Katzarah Dam (Skardu) was criticized because this dam

[1240] Report of the Technical Committee on Water Resources: Elaborations; *op. cit.*

[1241] Government of Pakistan: Report of the Technical Committee on Water Resources: Part II: Examination of TORs, conclusions and recommendations; Islamabad, 2005, p. 109, 111. The published report is a condensed version of the full report that was sent to the governments in August 2005, extending to over 3,000 pages.

[1242] Report, Part II, p. 117, 121, 122.

[1243] Report, Part II, p. 64 – 65.

[1244] Report, Part II, p. 68 - 71. The said recommendations were included in an assessment by consultants H. R. Wallingford, UK, and Tippetts, Abbett, McCarthy & Stratton (commonly referred to as TAMS), USA. For an overview see M. Roca: Tarbela Dam in Pakistan. Case study of reservoir sedimentation; *River Flow 2012*, vol. 2, p. 897 - 901. The widely quoted WCD report cited the Tarbela project as an example of underestimating the social dimension of large dams; cf. World Commission on Dams: Tarbela Dam and related aspects of the Indus River Basin, Pakistan; Islamabad/Cape Town: Asianics/WCD, 2000. WAPDA issued its own study in response to the TAMS-Wallingford study, concluding that the central proposals (silt removal via dykes and by flushing out) carry risks and may endanger other barrages further downstream; cf. Izhar ul-Haq & S. Tanveer Abbas: Sedimentation of Tarbela and Mangla reservoirs; presentation at 70th Annual Session of the Pakistan Engineering Congress, Islamabad, 2007, p. 29 – 30; http://pecongress.org.pk/images/upload/books/Paper659.pdf (May 2014).

would have a very large storage potential and might have significant geological advantages over Kalabagh.[1245]

- (3), (4b) **On the Kotri issue** the Technical Committee was divided, with Punjab maintaining that it was Sindh's responsibility, not a collective obligation, to prevent seawater intrusion.[1246] Chairman Abbasi countered that the Water Accord envisioned it as a separate allocation, not to be taken from the provincial shares.[1247] The issue was referred to the Parliamentary Committee which *succeeded in developing consensus amongst the four provinces on the issue* towards initiating three studies by neutral experts.[1248]

- (4a) **On the question of water availability** for future reservoirs, the Committee faced internal division over data.[1249] Though it was established that on average 84 per cent of the annual volume of water is available during Kharif, and 16 per cent during Rabi, data provided by WAPDA proved to be controversial. While most members, except one delegate from Sindh, accepted the WAPDA figures, their own individual assessments differed from the Authority's calculations. External factors (water works in India and projects by Afghanistan) were found to be significant, requiring negotiations (with India) and a water treaty (with Afghanistan, on the Kabul River) respectively in order to secure water availability in the Indus Basin.[1250] But again WAPDA did not provide reliable data on the volume of water. Similarly, an assessment of the practicality of projects was not possible because, according to the chairman, WAPDA provided incomplete data which failed to include ongoing projects.[1251]

  The question whether water for new projects was taken into account in the **Water Accord** showed a surprising result: Seven members agreed that the total amount noted in the Accord (117 MAF) included prospective schemes, only one member from Sindh disagreed. Chairman Abbasi found that the other members' position was *not correct* because the total amount represented the water to be allocated for current regular use, not for feeding new dams or canals: *This quantity has been allocated to the provinces under para 2 of the Accord for the existing canals (…) The Accord allocations meant for these canals cannot be denied to them and the water allocated to the existing canals cannot be diverted to be used for new projects*.[1252]

  The overall water use was assessed sector-wise (irrigation, industry, household), resulting in differences between one member from Sindh, the other seven members, WAPDA, and the chairman's calculations. While the data set proved to be an obstacle again, it was established that – based on historic records – at least in average and surplus years, water would be available to fill two or three dams at least some of the time. Abbasi noted that in spite of different figures for sector-wise water consumption, there is an

[1245] Report, Part II, p. 73.
[1246] Report, Part II, p. 23.
[1247] Report, Part II, p. 23.
[1248] Report, Part II, p. 123.
[1249] Report, Part II, p. 8 – 16; cf. Progress on water availability issue for future reservoirs; *Business Recorder*, 24 Nov. 2004; Body nears consensus on water availability; *Daily Times*, 23 Dec. 2004.
[1250] Report, Part II, p. 6 – 16, 20 – 21.
[1251] Report, Part II, p. 25.
[1252] Report, Part II, p. 26.

undisputed large quantity of surplus water which requires to trapped and stored. As most of the average annual volume of water is being consumed, *the filling of future dams would be an occasional event*.[1253]

The canal projects (Greater Thal Canal / Punjab, Rainee / Sindh, Kachhi / Balochistan) were found to be of subordinate importance. Priority was given to new reservoirs.[1254]

- (5a) Regarding **the operation of Mangla Reservoir,** the lack of operational criteria was found to be a major cause of division among the provinces. Decisions to fill the reservoir and to release water over the past four decades have been made *in an ad hoc and arbitrary manner* because of a complete **absence of regulation**. Officially, WAPDA would start diverting water into the reservoir once 80 per cent of canal requirements were met; in reality, it was found, this rule was not reliably followed, as reservoirs were filled even in times of shortage.[1255] Punjab at times benefited from releases of water even after its due share had been allotted. While seven members saw the existing method as satisfactory, one member from Sindh demanded a more transparent, reliable modus with a legal guarantee that *no storage should be allowed unless the Accord allocations of all provinces are met*.[1256]

- (5b) **The operation of link canals and future reservoirs** also lacked operational regulations. According to IRSA, the canals linking the main river with its tributaries (Chashma – Jhelum, Taunsa – Panjnad) are operated mainly for purposes within Punjab's allotment. While the water needs of the upper Punjab were usually covered by the regular water allocation without added supplies from link canals, the lower Punjab was more prone to shortfalls, thus more likely to rely on additional supplies through link canals. Link canal operation was found to be arbitrary, i.e. not synchronized with reservoir operation and the local water requirements.[1257] As a basic condition, the Committee recommended, water transfers through link canals should only be made in times of shortage unless water is diverted to the reservoirs.

  For **future reservoirs**, the Committee established the following preferences: readiness for implementation, cost effectiveness and storage *cum* power generation capacity. While Kalabagh had been presented by WAPDA as a ready-to-implement project, the chairman criticized that its feasibility study was almost twenty years old and did not take into account Accord-related changes. In contrast to most members, the chairman noted a number of technical deficits that render the Kalabagh Dam a much less attractive project.[1258] Katzarah Dam (Skardu), the northernmost project with the greatest reservoir capacity and altogether a much more promising profile, could not be reviewed completely because its pre-assessment was still in the making.[1259]

[1253] Report, Part II, p. 31 – 34.
[1254] Report, Part II, p. 36.
[1255] Report, Part II, p. 39, 41.
[1256] Report, Part II, p. 42.
[1257] Report, Part II, p. 57 – 58.
[1258] Report, Part II, p. 78 – 84.
[1259] Report, Part II, p. 92 – 96. Abbasi criticized WAPDA for an unnecessary delay of the feasibility study of Skardu and *adverse comments* on this project even before facts were on the table (p. 96). As

Interestingly, the findings of the members have differed from those of the institutions involved, particularly WAPDA. The members' assessment, however, did not always take into account the full scale of the subject at hand, *e.g.* the qualities of the proposed dams. In this situation, it was the chairman who proved essential to arrive at a balanced, thorough conclusion.

In sum, the President's initiative to have experts discuss and present a solution in a sense handed the issue over to the stakeholders, though within a framework determined by the federal government. Unlike in previous committees initiated by the government, this time the provinces played an active role. They effectively determined the outcome of the committees. This was particularly true in the case of the Technical Committee. Its thorough review of the more controversial elements of the wider dispute brought the previously heated debate down to a more factual level. In a sense, these committees prompted the provinces to act like stakeholders whereas in IRSA they more or less remained tied to their individual positions, unable or unwilling to move in any other direction.

This thorough investigation into some of the most controversial subjects brought to light a number of important characteristics s of the water dispute:

- The Water Accord proved to be lacking **precision**, particularly with regard to the Kotri issue and total water availability. No consensus was reached on the question whether the stated figure of 117 MAF represented the status quo or whether it included water to be made available through prospective water projects.

- The planning of additional reservoirs, though undoubtedly necessary, depends on **reliable data** on water availability. Abbasi's focusing on the establishment of solid figures as a basis of discussion was an important factor in a debate that readily accepted commonly available information. With regard to the ideologically charged debate outside the committee, this factor signalled the importance of solid knowledge *per se*. Unfortunately, a lack of transparency in data generation and dissemination as well as the quality of data meant a major obstacle to that effort. The very institution in charge of executing dam projects, WAPDA, was the one which failed to provide the mathematical foundation for the projects it advertised so much.

- The discussion of water availability in the context of planned reservoirs and canals revealed a common dominator of all positions. The fact that the promised amount simply isn't available was hardly ever mentioned – in a sense the existence of water shortage was eclipsed. Abbasi's stance, legalistic on the surface, was mainly another way of asserting provincial **water entitlements** based less on a legal concept of water sharing than on a culture of supply management. Thus the Committee did not move beyond the one-dimensional who-gets-what formula.

- Though the report is somewhat contradictory and inaccurate when it comes to the question of the **volume of water available for storage** in an average year, Abbasi concludes that two dams of 6 MAF storage capacity each could be filled for at least some years, given the previous 28-year records.

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of Mai 2014, Katzarah / Skardu was not among the *future projects* for which a feasibility study was available according to WAPDA; www.wapda.gov.pk/htmls/future-index.html.

- The suspicion of Sindh that Punjab in some cases received more water than its due share per Accord was confirmed, pointing at a **lack of regulations and supervision**. Though IRSA's Advisory Committee determined the operation of the reservoirs on a yearly basis, Sindh insisted on a more transparent procedure. As Abbasi rightly observed, the absence of transparent, precise rules for reservoir operations furthered apprehensions against future dams.

- **IRSA and WAPDA**, the main institutional pillars of water management, were found to be operating according to a mode set out by the institutions themselves, without much transparency. WAPDA received frequent criticism for incorrect, often incomplete information, exhibiting a lack of professionalism in project assessment and a lack of foresight in terms of water resources development and planning.

- The assessment of dam options was hampered by a **lack of data**, particularly because WAPDA had failed to initiate feasibility studies of some of the projects that had been in discussion for years. With the exception of Kalabagh, most other options, including Katzarah (Skardu), could not be reviewed simply because the necessary preparations were not made. Thus the Committees' findings inevitably remained incomplete. The fact that WAPDA has still not undertaken a full feasibility study of this promising project almost a decade after the TCWR's report is another sign of the Authority's lacking contribution to water resources development.

The Technical Committee provided a rare factual assessment of the water situation and options for its improvement. It inevitably pointed the finger at a number of deficits, mistakes, and misunderstandings to be attributed to the institutions involved, namely WAPDA and IRSA, and the actors. It thus prepared the ground for a more focused, less ideologically charged discourse. By applying a basin approach, it perceived the provinces as stakeholders, not political antagonists.

The reception of the Report, however, was mixed. The federal government used it as an instrument in its campaign to promote the swift construction of a large dam.[1260] The federal government's preference of Kalabagh was owed to the plain fact that it was the only one on which a full feasibility report was available. The point made by the Committee that this feasibility report was inaccurate and outdated was lost on the government. Likewise, the qualities of other schemes, particularly Katzarah (Skardu), went unnoticed because WAPDA had failed to deliver a feasibility study.

In Sindh, the Committee's report was viewed with scepticism by some quarters. In the provincial assembly, the Pakistan People's Party launched a *heated debate* aimed to discredit the Committee. The party's chief claimed that *the people of Sindh did not recognize the Technical Committee* because *it was bypassing the Constitution,* stating that only the CCI was legitimized to discuss water issues.[1261] This position, grotesque as it may sound, is another reminder of the degree of politicization of the water problem – a phenomenon that even the Technical Committee could not escape. Committee chairman Abbasi, himself a prominent

[1260] Cf. Musharraf issues fact sheet on importance of KBD, water reservoirs to MPs; *Pak Tribune*, 29 Dec. 2005; The water divide; *Newsline*, 10 Jan. 2006.
[1261] Cf. Water body's report to be discussed; *The News*, 26 Oct. 2005.

Sindhi, found himself struggling to deliver the report's findings within his home province.[1262]

Hydro-legalism: enter the people's representatives

The Parliamentary Committee on Water Resources was formally appointed by the National Assembly on 10 October 2003. This eight-member forum was composed of four Senators and four Members of Parliament, with equal representation of the provinces.[1263] Like the Technical Committee, it was chaired by a Sindhi, Nisar Ahmed Memon. Unlike the TCWR, its members were not experts of water management. Together with the TCWR, it was part of the President's strategy *to develop a consensus on the construction of reservoirs*.[1264]

The PCWR's Terms of Reference, or objectives, at first were limited to the formulation of a National Irrigation Strategy. The Committee later extended its task:

- *to develop a **National Irrigation Water Strategy** with national consensus in order to ensure sustainability of the irrigation system by reducing huge water losses through … lining of canals and to ensure that the quantum of necessary water storages … is secured;*
- *to suggest ways and means to ensure that the National Irrigation Water Strategy remains environment friendly … with a special focus on the minimum required outflow / discharge below **Kotri** …;*
- *to **review previous water accords** and to discuss their impacts for incorporation in the National Irrigation Water Strategy;*
- *to look into the areas of the country which fall outside of the Indus Basin and to suggest ways and means of using the **available water resources** …*[1265]

The PCWR held 16 meetings and conducted several on-site visits between November 2003 and August 2004, performing a somewhat busier schedule than the Technical Committee.[1266] Besides the obligatory discussions with relevant institutions (WAPDA, IRSA, Federal Flood Commission *etc*.), it held meetings with the Chief Ministers of the provinces.

[1262] Cf. Expert stresses rules for raising dams; *Dawn*, 18 Dec. 2006.

[1263] Report of the Parliamentary Committee on Water Resources, presented to the Senate by the federal government on 30 Dec. 2005; the full report was not published. The summary of the Committee's work and findings were made available: www.nisaramemon.gerrys.net/SECTION.asp (June 2006). The content has been moved to www.plp.org.pk/NAM%20CD%20Files/PCWRDetail.htm (May 2014). The members of the PCWR are: Nisar Memon (S, Sindh), Anisa Zeb Tahirkeli (S, NWFP), Mir Muhammad Naseer Mengal (S, Balochistan), Syed Dilawar Abbas (S, Punjab), Syed Abdul Qadir Jamaluddin Al-Gillani (NA, Balochistan), Jahangir Khan Tareen (NA, Punjab), Haji Muhammad Ali Malkani (NA, Sindh), Sher Akbar Khan (NA, NWFP); www.pakwaters.gov.pk (June 2006) – hereafter Report summary. The so-called Final Report of the PCWR, as published by the Senate, is basically a condensed version of the summary; www.senate.gov.pk (June 2006) – hereafter Final Report.

[1264] Cf. President calls for formation of water committees; *Dawn*, 26 Aug. 2003.

[1265] PCWR Report summary, para. 1.3, *op. cit.* (no page numbers).

[1266] Lacking technical knowledge of the subject, acquiring information was a primary purpose; PCWR Report summary, para. 2.2, *op. cit.* The summary notes that some visits had to be cancelled due to lack of financial resources. Budgetary constraints are a common phenomenon of parliamentary committees in Pakistan, as Masood observes, resulting in a lack of qualified support staff and equipment; Alauddin Masood: Parliamentary Committee system in Pakistan: comparison with American, Australian, British and Indian systems; *PILDAT Briefing Paper*; Islamabad: PILDAT, 2004, p. 14 – 15.

A source of division were two issue areas:

1) **Water Accord, overall implementation:**

- Sindh's position demanded the implementation of the Accord strictly according to the fixed allocation; shortages are to be shared by all, not only Sindh and Punjab;
- Punjab's position, while supporting the Accord as such, favoured water sharing according to the historical uses (1977 – '82) whenever and until the water availability had reached 114 MAF, reiterating its demand for new large reservoirs;
- Balochistan's position considered the below-Kotri release to be part of Sindh's share, not to be shared by all;
- NWFP's position focussed on improvements of the provincial irrigation infrastructure for which federal funds were requested in order to make better use of the allotment.[1267]

2) **Large dams:**

- Sindh's position identified Skardu / Katzarah as the only promising dam big enough to function as a carry-over dam which would hold surplus water for release in any period of shortage;
- Punjab's position gave preference to projects that could be built quickly, particularly Kalabagh, Akhori and Basha;
- Balochistan's position was pro dams as long as there was a consensus;
- NWFP's position was in favour of dams, particularly Basha.[1268]

The Committee's institutional analysis of the two main water authorities, which represents one of the more concrete findings of the PCWR, revealed that

- **IRSA staff** lacked qualification not only in terms of operating the newly installed telemetry system, but also regarding day-to-day operations;
- **outgoing provincial representatives** were not replaced swiftly enough, thus effectively blocking the decision-making process of the Authority;
- **WAPDA's data** lacked consistency and authenticity;
- **WAPDA's organizational set-up** should be reviewed towards *appropriate representation of all four provinces* in order to *build confidence and credibility in this national organization*.[1269]

This finding, which points in the same direction as some of the Technical Committee's observations, is important as it brings to light some of the institutional deficits critical not only to the success of the committees but also to the effect of day-to-day water management and distribution.

The outcome of the Parliamentary Committee was less substantial, concrete and comprehensive than that of its sister committee:

- A consensus was reached to uphold the **Water Accord** *in toto* as a *sacrosanct* principle of water distribution;
- the need to study the **Kotri** issue was recognized unanimously, and the government was recommended to initiate an expert study;
- the need for further large **reservoirs** was acknowledged; decisions should be based on a consensus of the stakeholders; one project received the support of

[1267] PCWR Final Report, p. 30 – 39.
[1268] PCWR Final Report, p. 41 – 45.
[1269] Report summary, para. 7.5 E and F.

all Chief Ministers: Basha / Diamer Dam; Punjab was in favour of a coordinated Basha *cum* Kalabagh scheme.[1270]

A National Irrigation Water Strategy, however, was not achieved. The reasons are unclear. One reason might have been that the provinces wanted to retain their prerogative in the field of irrigation. Another reason could be the organizational problems that the Parliamentary Committee – more so than its sister committee – had to struggle with.[1271] The lack of support from the National Assembly indicates that legislators were not willing to commit sufficient funds to the Committee.

The Committee's recommendations, intended as a confidence-building effort, were vague regarding the decision to build a dam. The suggested path towards a consensus was to either

- to seek a decision by the federal government after *a comprehensive debate* in the provinces and a simultaneous debate in the National Assembly and a media campaign, or
- let the issue be decided by the newly-established National Security Council, or
- *refer the matter to the CCI*.[1272]

The reception of the PCWR's report was similar to that of the Technical Committee's report. Some factions in the Senate termed the Committee illegal and unconstitutional.[1273] Behind this criticism apparently were not so much legal concerns or disapproval of its procedure or findings but its very origin and status. Some senators complained that no opposition members took part in it. While Committee chairman Nisar Memon argued that parties not represented in the Senate were invited to attend the PCWR meetings, the composition of the Committee was predetermined. Membership followed provincial representation, not party affiliation, as the Committee's main concern was confidence-building among the stakeholders. In this sense, the PCWR might look like a compromise. In strictly legal terms, the simple fact that Parliamentary Committee did not mirror party representation was not in violation of the Constitution. Though this mode of participation was indeed an established principle, it was by no means regular practice, as Masood notes.[1274]

The PCWR's most important contribution to solving the country's water problems might be the initiation of studies to establish a factual basis for the Kotri issue.[1275] Until then the requirement of such a study and the form of it had been contended.

[1270] PCWR Report summary, para. 3.2, *op. cit.*

[1271] The Summary notes a lack of staff and material resources; Report summary, para. 7.9.5ff. Announcing preliminary findings of the Committee, chairman Nasir Memon suggested that in order to counter the growing water shortage, *Islamabad would plan a national water strategy*. Whether he meant the said Irrigation Strategy or the planned National Water Policy remains unclear. Memon quoted in: Steps urged to avert water crisis; *Dawn*, 20 May 2004.

[1272] Report summary, para. 7.6.6 and 7.7. The media campaign should be based on data provided by WAPDA. The fact that some of this very data had been discredited by the Technical Committee apparently was not taken into account.

[1273] Cf. Parliamentary Committee on Water Resources presents report in Senate; *Pak Tribune*, 30 Dec. 2005.

[1274] Alauddin Masood: Parliamentary Committee system in Pakistan: comparison with American, Australian, British and Indian systems; *PILDAT Briefing Paper*; Islamabad: PILDAT, 2004, p. 12.

[1275] The initiation of three separate studies, rather than one comprehensive study, corresponded to Punjab's demand; cf. Three environment studies planned; *Dawn*, 12 Dec. 2003; Provinces agree to conduct study; *The News*, 17 Dec. 2003. Sindh initially suggested that IUCN, an international NGO

The Kotri issue which had been source of controversy since 1991 was the focus of a set of studies ordered by the federal government in October 2004, following a recommendation of the PCWR.[1276] With explicit reference to the Water Accord, the Government tasked a group of non-Pakistani experts to study

- *water escapages downstream Kotri to check sea intrusion,*
- *water escapages downstream Kotri to address environmental concerns of Sindh Province*, and
- *environmental concerns of four provinces.*

The comprehensive set of studies to be undertaken covered both the demands of Sindh and Punjab as well as aspects potentially affecting the smaller provinces (both of which had so far stayed on the sidelines in this part of the dispute).

An Independent Panel of Experts (IPOE), consisting of a former World Bank official and two water management experts from the U.S. and the Netherlands, assessed the studies and issued its findings in November 2005.[1277] Its main points are that

- the establishment of a minimum monthly water release of 5,000 CFS (cubic feet per second) throughout the year is required to check saltwater intrusion,
- *the problem of sea intrusion / coastal erosion is a national problem* because of the *reduction in sediment supply*, the *reduction in mangrove vegetation* and the *prevention of flooding of the outlying delta areas*,
- an additional amount of water is required in dry months (1.26 in an average year and 2.2 MAF in a dry year), and that
- in order to rehabilitate the coastal areas, an additional volume of 5 MAF of water per year should be released as a necessary sediment supply *in a concentrated way as flood flow*.[1278]

The report notes that the three studies, unlike earlier studies, were *jointly agreed by the stakeholders*.[1279] It assumes that the necessary steps *will require additional storage capacity to prevent a reduction of water availability for irrigated agriculture*.[1280] Thus the long-standing issue was resolved, at least in theory. No province openly objected to the Panel's findings, yet some critical voices noted the differences to earlier studies and questioned the figures arrived at by the study

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with offices in Karachi that has issued a series of studies of the delta situation, should conduct such a study.

[1276] Cf. Study on Kotri water discharge to begin soon; *Business Recorder*, 5 Oct. 2004; New studies on water planned: Kotri Barrage riverine areas; *Dawn*, 6 Oct. 2004. Regarding Kotri, the TCWR merely was to *review the progress achieved so far regarding study on escapages below Kotri* and *ascertain actual quantity of water passed downstream Kotri from 1976 – 2003*; Report of the Technical Committee on Water Resources: Examination of TORs, conclusions and recommendations; Islamabad, August 2005, p. 5; www.ppib.gov.pk/1.pdf (May 2006).

[1277] Final Report of IPOE for Review of Studies on Water Escapages below Kotri Barrage; Delft, 20 Nov. 2005; www.ppib.gov.pk (April 2006).

[1278] Final Report, p. II.

[1279] Final Report, p. 1. One of the more comprehensive studies was conducted by IUCN: Environmental degradation and impacts on livelihoods: sea intrusion – a case study; Karachi: IUCN, 2003. Its authors note significant economic losses suffered by various communities in the delta due to the recent shortage. Their recommendation in order to maintain the mangroves is a release of up to 500,000 m³/second, equivalent to 17,657,333 cusecs (p. 47). How they arrive at this figure, however, remains unclear. I am grateful to M. Tahir Qureshi, of IUCN Pakistan, for providing me a copy of this report.

[1280] Final Report, p. II, 13. Further recommendations include alterations of dams and canals in order to *allow for the through flow of sediment during periods of high flow* (p. 15).

teams.[1281] The implementation of these recommendations, however, would hinge on available water – in other words, on the construction of new reservoirs.

In sum, the role of the Parliamentary Committee remains limited. By appointing a Parliamentary Committee to operate side by side with the Technical Committee, the President apparently hoped to strengthen the case for dams. The National Assembly, re-established less than a year before, had just begun to redefine its mission when it was confronted with a trouble-laden subject such as water sharing and reservoirs. It was less prepared to contribute substantially than the group of experts of the TCWR, most of which had dealt with the issue before and were well aware of its political dimension. As the PCWR looked into some of the same issues as the TCWR, the justification for having two independent committees working simultaneously is not easily seen. The motivation on the part of the federal government, in particular the President himself, might have been to add legitimacy to its effort to seek a solution of the dams problem and to shed criticism of his *de facto* autocratic rule.
The Parliamentary Committee's purpose was to build bridges. By bringing the Chief Ministers to the discussion table, it provided a forum for the actual decision-makers, or stakeholders, to express their positions and dispel long-standing mistrust.

It is difficult to measure the effect of this committee and its sister committee. In spite of institutional obstacles beyond their reach, they provided a fairly comprehensive theoretical *status quo* which could and should serve as a foundation for major decisions in the water sector. Their representational set-up and transparent procedure provided them with a degree of legitimacy in the face of expected criticism, apprehensions and admonitions. Their recommendations were the result of their findings. To turn them into concrete action would be the task of the decision-makers.

Exit the committees: from theory to practice

The various experts and representatives have provided the stakeholders and the federal government with concrete proposals for action. What came out of their recommendations?

- **The Kotri study results** represent some of the more concrete outcomes of the Committees. However, precise as they were, they were not turned into reality, as the water release figures of WAPDA show.[1282] The study's figures were in response to paragraph 7 of the Water Accord, yet no effort was made to enter them in the document. Thus the study remained without consequences.

- **Rules for canal operation**, as recommended by the TCWR, have not been established by IRSA, as recent rows between Sindh and Punjab show.[1283] The Committee had left it to the stakeholders to agree on a regulation. The absence of such an important piece of water regulation is likely to further nourish the existing dispute between the stakeholders.

[1281] Abdul Waheed Bhutto: Seawater intrusion downstream Kotri; *Dawn*, 30 Jan. 2006.
[1282] Cf. Water Releases from Reservoirs, as published on www.wapda.gov.pk/htmls/water-release.html.
[1283] Cf. Punjab, Sindh water row settles; *Pakistan Observer*, 14 July 2010; the intervention of Prime Minister Gillani, by mediating between Sindh and Punjab, resulted in the *ad hoc* withdrawal of an IRSA decision – not, however, in the solution of the problem as such.

- **The construction of reservoirs**, while agreed on in principle, continues to face obstacles when it comes to concrete proposals. Of all the major dam projects discussed by the committees, only Basha has evolved from the drawing board status to the pre-construction level. Echoing the reminders of the committees, WAPDA, the chief executing agency, is faced with a major resettlement problem exacerbated by a lack of land, and a budgetary problem due to the absence of foreign investment.[1284] The controversial Kalabagh Dam seems to have been shelved for good. Its outdated feasibility study was not updated, and the project – once a WAPDA favourite – has disappeared from the Authority's current hydropower manifesto.[1285] The promising Katzarah / Skardu project in turn is barely mentioned, yet the necessary feasibility study has not been initiated.

- **A National Water Policy** framework, as suggested by the PCWR, has not been developed further. Neither has the World Bank recommendation to seek an inter-provincial drainage accord been picked up by the stakeholders.

- **Institutional changes**, as recommended by the PCWR, have not materialized so far. WAPDA has maintained its highly centralized apparatus and remains answerable solely to the Ministry of Water and Power.

The stakeholders have by and large not picked up the recommendations of the experts. Their inaction is most obvious in the case of the Kotri study. The formula for water releases downstream Kotri was a direct response to the demands laid out in the Water Accord. Yet the provinces did not seek a formal regulation of water releases below the last barrage in the river basin. Such a step, necessary to make this formula binding within the context of the Accord, could have been made via IRSA, the CCI or through a meeting of the provincial Chief Ministers. Similarly, the formulation of operational criteria for canals and reservoirs is a provincial prerogative that could have been executed with the existing institutional framework – a step that was not taken.

The federal government, realizing that the lack of consensus among the provinces on important issues remained a major impediment to a solution of the country's water woes, in 2007 responded with another institutional offensive: The new Inter-Provincial Coordination Division (IPCD), with the status of a ministry, was *designed to initiate strategic decision-making in exploring various options for greater understanding, trust and confidence-building*.[1286] Though water is not explicitly mentioned in its mission statement, the IPCD's objective – *general coordination between the federal government and the provinces in economic, social and administrative fields* – indirectly relates to water.

The Division's purpose is to revive the Inter-Provincial Coordination Committee (IPCC), a forum which, established in 1972 by the late Zulfikar Ali Bhutto, has so far

[1284] On the state of Basha Dam: Construction of Diamer-Basha Dam to start this year; *The Nation*, 10 Jan. 2010; Pakistan hopes China will fund Basha Dam; *The Nation*, 30 Aug. 2012; Non-acquisition of land delayed Basha Dam; *The Nation*, 28 May 2014; Basha Dam fate uncertain after funds refusal; *The Nation*, 9 May 2014.

[1285] WAPDA: Hydro potential in Pakistan; Lahore: WAPDA, Oct. 2013; www.wapda.gov.pk/htmls/water-index.html (May 2014).

[1286] Cf. ministry website: www.ipc.gov.pk (April 2008)

led a marginal existence.[1287] Under the new institutional umbrella of a federal government division, this Committee would serve as a forum for *the discussion of policy issues emanating from the provinces that have economic, social or administrative implications for the country as a whole*.[1288] It would thus be tied to the government, providing it with a degree of oversight of inter-provincial relations.

The IPCC's stated purpose is not easily distinguished from that of the Council of Common Interests (CCI). Much like the CCI, its objectives vaguely revolve around all aspects of inter-provincial and province – centre relations. Similar to the CCI, the IPCC is a non-permanent forum to be invoked by one party or more in cases of *major importance which require policy decision and mutual discussion between the federal and provincial governments*.[1289] Unlike the CCI, the IPCC (or the IPCD) does not have a constitutionally sanctioned mandate to reach decisions. It is merely a forum for debate, with no obligations or duties attached. The only difference to the original Committee is the institutional link to the government and the newly created Inter-Provincial Coordination Departments of the provinces. The provincial IPCDs were to function as a liaison between the federal and provincial governments, channelling information on relevant issues between both levels as well as within the provincial administrative network.[1290] Among those relevant issues, according to the IP Department of Khyber Province (KPP), was water distribution.[1291]

The Inter-Provincial Coordination Committee, according to the official record, has addressed water issues only rarely. The most recent topic, in the February 2010 meeting, was the Sindh – Balochistan dispute over water supplies which was referred to a special committee under the umbrella of the IPCC made up of the Chief Secretaries of both provinces.[1292] It has not since then picked up the issue again.

The federal government's Vision 2030 mirrors the dilemma that Pakistan is facing. This comprehensive framework document issued by the Planning Commission in 2007 makes food security a prime concern. Its starting point is the strong rise in agricultural output that was dwarfed by the dramatic population growth: *Despite an impressive increase in agriculture production, it has not resulted in improving the living standards of the rural population to the extent desired*.[1293] In what sound like an admission of defeat regarding the implementation of dam projects, the Commission warns that the necessary production increases will have to be achieved *with lesser land and water resources than are available for agriculture today*.[1294]

Interestingly, food and energy security, for the first time in an official policy document, has been entered into the context of national security. Thus water has been elevated to a matter of special political concern – a remarkable change given the country's

[1287] Inter-Provincial Coordination Division (IPCD): Annual Report on the Council of Common Interests, 2009 – 2010 of the Ministry of Inter-Provincial Coordination; Islamabad: GoP, 2010, p. 11; www.ipc.gov.pk (March 2013).
[1288] Ministry website, *ibidem*.
[1289] Ministry website, *ibidem*.
[1290] The provincial governments' information on the role of their IPCDs ranges from sketchy (Sindh) to concrete (NWFP/KPP). Cf. www.balochistan.gov.pk, www.sindh.gov.pk, www.punjab.gov.pk, www.khyberpakhtunkhwa.gov.pk (Sept. 2010).
[1291] This issue, which was still listed in 2010, has since been removed from the website.
[1292] See chronology of meetings, in: IPCD: Material for website, IPC section; www.ipc.gov.pk (6/2014).
[1293] Planning Commission: Vision 2030. Pakistan in the 21st century; Islamabad: GoP 2007, p. 51.
[1294] Planning Commission: Vision 2030, p. 52

continued preoccupation with matters of external security, namely India, Kashmir and Afghanistan.[1295] Whether this new awareness simply imitates commonly discussed concepts in the development arena or is in fact a prelude to action, remains to be seen.

In sum, the institutional development triggered by the federal government did not have a lasting effect. As of 2014, besides the federal IPCD there are only two provincial IPDs left, in KPP and Balochistan. Punjab, it seems, never had an IP Department in the first place, and Sindh, the first province to establish one, obviously abolished it.[1296] Whether the IPC Committee can be regarded as successful simply because of the fact that it has been convened for over 20 times since its inception (or less than once a year on average) is doubtful. Though the IPC Committee in its latest version, with a degree of institutional support from the IPC Division, has met more frequently and addressed a number of issues that concern several or all provinces, the outcomes of these meetings have basically been informal agreements to take action, yet without any binding commitment. As such the IPCC might have served as a confidence-building effort.

Does this make the IPCC indispensable? At least in the water sector a forum for discussion is already available: the National Assembly and Senate, with their own committees. For dispute resolution the CCI is the institution of choice. The fact that it had not been very active – thanks to lacking initiative by the provinces – does not automatically call for a new institution, unless the provinces could be expected to participate in the new one more actively. So it is not easy to justify an institution that does not seem to fit in the existing institutional landscape. Most significantly, it is not connected to IRSA, the crucial institution in the water sector where the provinces are supposed to act and decide as stakeholders. For the IPCC, whose meetings simply serve for debates but not to facilitate decisions or steps to be initiated, this means that it stands somewhere out of the actual theatre of water management. Whatever takes place there, strictly speaking, is without meaning. How the new extension of the IPCC, the IPC Division, is supposed to make up for these deficits is not obvious.

The stakeholders, in their capacity to reach an agreement through IRSA and CCI, have not used them towards that aim, but remain mired in dispute and tend to leave the initiative to the federal government. The Technical and Parliamentary Committees, together with the expert panel, have delivered the most substantial findings so far, yet to little avail. It is difficult to see what obstacles have been in the way of an agreement on important matters like the large reservoir to be built and canal operation criteria and drainage improvement. Has it been a lack of trust – or simply a lack of determination?

No effort was spent on pushing WAPDA or the Ministry of Water and Power to deliver a thorough feasibility study of Katzarah / Skardu. This scheme, by its mere figures, promises a much more substantial response to the water problem – but still it has failed to trigger the stakeholders into action. As a result, ten years after the committees, Pakistan – now with another 25 million people to feed, to house and to employ – faces a more acute water challenge than ever. What on the surface

[1295] Planning Commission: Vision 2030, p. 101 – 102.

[1296] Cf. provincial government websites as of June 2014 versus those of September 2010, at which time Punjab did not have an IP Department either. Sindh was the first province to establish an IPCD, in 2003 – even before the federal government.

appears to be a form of systemic inertia looks more like a lack of willingness of the stakeholders to actually take a stake in water management, rather than using water shortage as a political instrument aimed at internal and external targets.

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After the committees: provinces as stakeholders?

The Musharraf period ended with a number of promising proposals, some interesting initiatives, but few results. After the demise of the Musharraf government in 2008 and the return from exile of the previous prime ministers, Benazir Bhutto and Nawaz Sharif, with much fanfare, the solution of the water crisis awaited a response from the decision-makers.

The government of Asif Zardari, which rode on a wave of support after Benazir Bhutto's assassination, entered the political arena stating that water was one of its priorities. After assuming office, it announced that *water reservoirs will be constructed on priority basis*. Denouncing the previous government, it promised greater democracy and declared that *in order to achieve consensus among the provinces,* it *decided to activate the Council of Common Interests*. It found that now, *for the first time there is an atmosphere of complete harmony and cooperation between the centre and the provinces*.[1297] The new federal government has since taken a number of steps, the most promising of which appears to be the reactivation of an institution that had lingered in the shadows of water politics and formalized water distribution for two decades.

The Council of Common Interests, after many years of marginal existence, was strengthened by a Constitutional Amendment (No. 18 of 2010).[1298] Its most interesting elements are:

- The CCI is now required to hold regular meetings, at least every three months;
- the Prime Minister is the chairman of the CCI;
- the CCI now has a permanent office associated with the IPC Department, the CCI Secretariat;
- the CCI has been given policy control and a say in the decision to build water reservoirs.[1299]

The move to enhance the CCI's role might have been motivated by the fact that within a period of over thirty years, it had met only eleven times – a fact that Talbot attributes to political manoeuvring.[1300] While three of these meetings, of course, had facilitated the Water Accord, it has since been more or less inactive. The 2010 Amendment of the Constitution triggered an almost instant activity, starting with a

[1297] Prime Minister Yousuf Raza Gilani: Address to the Nation, Islamabad, 19 July 2008; press release at www.pakistan.gov.pk (Aug. 2008).

[1298] Document text: www.pakistani.org/pakistan/constitution/amendments/18amendment.html (semi-official website, accessed via www.pakistan.gov.pk , March 2012). The 18th Amendment is by far the most substantial and comprehensive amendment of all 20 amendments so far (1974 – 2012). Previous amendments have addressed issues of taxation, public office, election, administrative and procedural matters.

[1299] Shahid Hamid: Impact of the 18th Constitutional Amendment on federation – provinces relations; *PILDAT Briefing Paper*; Islamabad: PILDAT, 2010, p.13.

[1300] See IPCD: Annual Report 2009 – 2010, *op. cit.*, p. 23. Ian Talbot: Pakistan: a modern history; London: Palgrave, 1999, p. 299.

renewed focus on the problem that won't go away: water shortage and lacking reservoir capacity.[1301]

The dams debate was addressed by the CCI in one of its first meetings after its renovation as an institution. Only three months after the passing of the Amendment, in July 2010, the CCI achieved a consensus in favour of the construction of the Basha Diamer Dam.[1302] This vote by the Chief Ministers – who had earlier agreed in principle on a project to be specified in the course of the Parliamentary Committee in 2004 – represents a step forward towards alleviating the water crisis and can be read as a rare sign of joint stakeholder action. Based on this vote, the federal government's plans to build Basha went ahead. Unfortunately, due to a lack of funds, construction has since been halted.

The Kalabagh Dam project, which was considered abolished after the verdict of the last committees, resurfaced after a period of relative tranquillity. A petition to the Lahore High Court in 2012 by private citizens advocating the implementation of the project prompted an official reaction. Following a statement by WAPDA, the Court approached the Council of Common Interests. Curiously, the CCI, the constitutional body to mediate inter-provincial disputes, stated that it had no objection to the dam.[1303] As expected, this statement sparked a row of criticism, mostly from political parties and activists in Sindh and KPP, rejecting the CCI's position as well as the Court's involvement. The main arguments against the Kalabagh dam project were partly water-related and partly political, especially concerning provincial autonomy in matters of water management. This reaction in turn prompted the Court to affirm the provinces' autonomy, while stressing the need to build the dam to counter the chronic water and electricity shortage.[1304]

While the Awami National Party (ANP) termed the Court's move an attack on the federation, the Court upheld its judicial position and maintained that *a decision of the CCI has obligatory effect unless the same is modified by parliament*.[1305] The government of KPP, underlining the political nature of the dispute, demanded that the Supreme Court revoke the High Court's judgment and thus give priority to the vote of the provincial assemblies of KPP/NWFP, Sindh and Balochistan which had earlier rejected the project.[1306] In the absence of a Supreme Court response, the federal government felt compelled to state that *projects of national import are executed only after thrashing out a consensus of all stakeholders* – after a number of federal government representatives had earlier voiced their support for the project.[1307]

[1301] The renewed CCI made minor changes to its operational procedures; cf. Notification of the Ministry of Inter-Provincial Coordination: Rules of procedure of the Council of Common Interests; *Gazette of Pakistan Extraordinary*, 2 Aug. 2010; www.ipc.gov.pk (June 2014).

[1302] IPCD: Annual Report of the Council of Common Interests 2010 – 2011; Islamabad: GoP, 2011, p. 6; www.ipc.gov.pk (Dec. 2013).

[1303] Cf. No objection to Kalabagh dam, CCI tells LHC*; Dawn*, 31 May 2012; Kalabagh dam: LHC wants Centre's role for consensus; *Dawn*, 18 Oct. 2012.

[1304] Cf. ANP to oppose Kalabagh dam construction to „their last breath", *Dawn*, 25 Oct. 2012.

[1305] Chief Justice Umar Ata Bandial quoted in: Kalabagh dam: LHC ruling akin to attack on federation, says Afrasiab Khattak*; Dawn*, 30 Nov. 2012. The Pakistan Peoples Party (PPP) voiced a similar criticism of the court: Kaira urges judiciary to keep away from political affairs*; Dawn*, 1 Dec. 2012.

[1306] Cf. Kalabagh dam case: KP wants suo motu notice by SC*; Dawn*, 2 Dec. 2012.

[1307] The then Prime Minister Raja Pervez Ashraf quoted in: PM on Kalabagh dam verdict: Judicial order not enough to launch project; *Dawn*, 2 Dec. 2012.

The CCI, rather belatedly, responded to the public outcry by seeking a statement from the governments of KPP and Sindh, thus exposing its quasi-authoritarian move at the beginning of this latest round of the dispute over Kalabagh.[1308] The provincial assembly of Sindh within days passed no less than four resolutions against the project, reaffirming once again the province's solid position on the issue.[1309] Opposition from the Khyber Province (KPP) was equally unmistakable.[1310]

The latest chapter in the endless dams debate is remarkable for several reasons:

- **The CCI** apparently did not represent the common interest in its latest statement. In the face of widespread opposition, the CCI was forced to withdraw from its earlier position and seek the opinion of the provinces. It did so, but addressed only two. Besides the fact that two high-level committees had already presented the case of Kalabagh at length, the CCI considered the project worthy of a new discussion. The principal function of the CCI – to represent an opinion of the majority and to consider the opposition of any province to any legislation regarding its water supply– has been neglected, thus damaging the status of the CCI beyond the current case.[1311]

- **The readiness of the stakeholders** to open the dams debate again was minimal. Thanks to the aggressive rhetoric of some groups and activists, a public discussion of realistic options, as recommended by the PCWR, seems to be unrealistic in the near future because governments are not likely to risk more public demonstrations. The Kalabagh Dam issue, even after being declared unrealistic, has once again proven to be a source of division – or rather an appropriate tool to further division. This especially concerns Sindh province where opposition to the project is very widespread and commonly linked to political criticism of the Punjab. Conversely, in Punjab there seems to be a majority in favour of the project and doubtful about Sindh's claims and demands regarding water.[1312]

- **The involvement of the High Court**, whether appropriate or not, serves to illustrate the political nature of the water problem. While the need for more reservoirs was amply demonstrated by the Technical and Parliamentary Committees, it was this particular project that was considered the least recommendable. In the absence of a sound feasibility plan and the existence of better alternatives, it is difficult to see what practical purpose the petition had other than political motives.

The federal government, faced with the illusion of *harmony* and a hollow *consensus among the provinces*, proceeded somewhat half-heartedly on a proven course: to seek a commission. What was announced as a National Water Commission tasked *to regulate water uses* and facilitate the construction of new reservoirs within the

[1308] Cf. Kalabagh dam issue: CCI secretariat asks two provinces to submit opinions*; Dawn*, 3 Dec. 2012.
[1309] Cf. Sindh PA passes four resolutions against Kalabagh dam*; Dawn*, 8 Dec. 2012.
[1310] Cf. ANP, JUI oppose Kalabagh dam with one voice; *Dawn*, 11 Dec. 2012; Dictation of "big brother" unacceptable: Asfandyar; *Dawn*, 11 Dec. 2012; Politics on Kalabagh must end: QWP*; Dawn*, 17 Dev. 2012.
[1311] Constitution, § 154, Art. 2 and § 155, Art. 1.
[1312] The Kalabagh dam has become a notorious issue that is commonly referred to as a symbol of the disunity of Pakistan's provinces; this tendency was confirmed during my discussions with activists and political leaders in Sindh in December 2002, September 2003 and March 2004.

framework of a comprehensive water policy has not moved beyond a principal agreement to establish this Commission.[1313] This institution, designed to be a permanent body, appears to be identical with the ill-fated National Water Council regarding its objective. The government which had recruited the help of a former executive official of the Australian Murray – Darling Basin Commission had hoped to link the new institution with IRSA and WAPDA in order to promote a more comprehensive water management.[1314]

The merits of such an effort – to integrate water distribution into a wider concept of water management – are undeniable, as it could turn the existing supply management towards a more sustainable, productivity and efficiency-oriented demand management. However, the actors' determination remains doubtful. Measures to increase water productivity have not received a lot of attention. During discussions of the newly established Water Working Group, a joint Pakistani – U.S. forum as part of the bilateral Strategic Dialogue, efforts to improve irrigation efficiency were considered *not an immediate priority*.[1315] Thus it is hardly surprising that the Planning Commission, in its review of 2012/2013, finds that many water management targets could not be achieved *due to lack of interest of management authorities*.[1316]

Conclusion

The state of hydro-federalism in Pakistan represents a picture of many facets. While the provinces have established their sphere of autonomy within the federation and retained their prerogatives, especially in the water sector, their individual relations with the other provinces and with the centre have been ambiguous.

The objectives of this chapter were to find out the conditions for cooperation:

- Does the existing institutional framework satisfy the interests of the provinces or do they seek changes in the framework?
- Do the provinces operate within this framework as partners or as antagonists, i.e. are they really stakeholders or simply actors seeking individual gains?
- How do they handle the problem of asymmetry?
- Which options do the stakeholders choose to address the problem of water availability?
- What benefits do the stakeholders expect from the federation?
- What are the consequences for the federation?

The institutional arrangement in the water sector has remained by and large stable since the establishment of the Water Accord and the Indus River System Authority. The Accord, though challenged over some of its provisions, has been reaffirmed. Steps to clarify some of its provisions and fill some of its gaps have met with only limited success. Two committees, both with provincial representation, have delivered substantial assessments, yet no action was taken by the provinces. Instead most of the initiatives since the conclusion of the Accord came from the federal government.

[1313] Cf. Centre, provinces agree to set up water commission; *Dawn*, 22 April 2011.
[1314] Cf. Govt appoints two water advisers; *Dawn*, 9 July 2011.
[1315] Cf. Minutes of the 3rd Pak – U.S. Strategic Dialogue, meeting of the Water Working Group, Washington, D.C., 20 Oct., 2010; www.wapda.gov.pk (Dec. 2013).
[1316] Planning Commission: Annual Plan 2013 – 2014; Islamabad: GoP, 2013, p. 123; www.pc.gov.pk/?page_id=367 (April 2014).

The process of water sharing has exposed the positions of the provinces. IRSA has slowly developed into a forum where stakeholders could present their positions and negotiate a solution. In some cases, during the seasons of acute shortage, Punjab and Sindh – occasionally with federal government mediation – managed to compromise. Thus the principal problem of asymmetry was at least sometimes handled effectively. A scheme of benefit sharing that could have provided a more fundamental response to this problem, however, has not emerged. It did not even figure as a point of discussion. Thus cooperation remained sporadic and basically relied on third party involvement. Incentives were hardly recognizable in this process.

The provinces' reluctance to identify collective interests and act towards a common goal can be explained partly by the historic dominance of the centre in water management. Aside from the provincial irrigation prerogative, most water management aspects fall within the domain of WAPDA. The proposal (by the TCWR chairman) to open WAPDA to provincial participation was not picked up. WAPDA has ever since its establishment in 1958 remained the most stable institution in the water sector. The provinces appear to have accepted this situation and have not sought to change it – even when the failure of WAPDA to deliver sound assessments of reservoir options exposed its deficits.

The dams debate, more so than the problem of water sharing, has marked the relations between the provinces. In spite of a pressing need to provide for more reservoir capacity, it took the provinces nearly two decades to agree on a dam. From a rational choice point of view, this means that the benefits to be realized from such a project were not considered sufficient to warrant an agreement. One of arguments commonly stated by Sindh was that projects tended to benefit Punjab only. The striking aspect of this debate was the absence of a scheme that could have profited benefits to all provinces, not only one, whether in terms of water supplies or in any other form. This in turn suggests that the consensus so often referred to as a precondition of a plan to build a dam was not the highest goal. As a consequence, the provinces had to suffer further shortages, particularly the downstream provinces of Sindh and Balochistan.

The stagnation of the dams debate, the absence of any substantial response to the committees' recommendations and the lacking readiness to coordinate water management (*e.g.* through a National Water Council) goes in line with the mentality of the provinces exposed in the IRSA debates. The provinces perceive themselves chiefly as consumers entitled to a certain allotment, not as stakeholders which might be expected to work towards an improvement of the overall situation. Water shortage has mostly been viewed as a temporary problem of one province, not as a challenge to all provinces or the nation as a whole. The discussion of the Accord's provisions on water shortage typically focussed on allocation patterns, not on the root causes of the problem and not on collective strategies that would aim at the whole basin, rather than segments of it.

The existing institutional landscape, as a result, has seen little change. The limited scope of IRSA's responsibility has prevented the inclusion of irrigation matters in its routine debates. It is this particular point that marks the root of the stagnation: the separation of water distribution from water use. In a sense both the Accord and IRSA can be seen as simply keeping the provinces satisfied by somehow providing them

with their fixed shares in the common good, regardless of circumstances, actual needs, productivity or prospects of future water availability.

In this respect, the provinces have one characteristic in common: their positions are static and strictly based on quantitative entitlements. Their effort to defend these entitlements has been far greater than their willingness to engage in coordinated efforts to make better use of the existing resources or explore ways to enhance them. This position, however, inevitably means deadlock because – given the continuing rise in demand – water shortage will not go away but probably become chronic.

The federal government – the only actor which cannot be a stakeholder in the way the provinces could – has raised issues that could bridge the gap between water distribution and water management. The proposed National Water Council was designed to fill that role, but it received little support from the provinces, apparently for fear of losing authority over irrigation. This status quo-oriented mentality had been one of the factors in the failure of the National Drainage Programme. The Inter-Provincial Coordination Committee, with its structural extension (the IPC Division), has not been able to provide a substitute for the failed NWC.

The federation as such has not suffered from the inability of the provinces to cooperate on a vital issue of truly national importance. Water, in spite of sometimes fierce rhetoric, has not turned out to be a serious cause of friction. The country, however, as well as the provinces find themselves in a position worse than in 1991 when the Water Accord was concluded – the only formal manifestation of inter-provincial agreement so far. This Accord, together with IRSA, ties the provinces together loosely, not tight enough for effective cooperation, but just sufficient to keep them within the federation.

Conclusion
V. Hydro-solidarity or hydro-confrontation?

The objective of this study was to assess the status of, and potential for, cooperation over water in Pakistan. Is there cooperation among the stakeholders, or is their interaction marked by confrontation, even conflict? What does it take for them to cooperate? Do the provinces have a potential to reach a state of hydro-solidarity, as in the case of Australia?

The theoretical concepts discussed in the beginning helped to identify and explain at least some, if not most of the factors determining confrontation or cooperation in the process to share water. Institutional arrangements, stakeholder rationality, entitlements and legal frameworks all played a role in explaining when and why water sharing took place – or not. Most of all the cross-disciplinary perspective made it clear that water sharing is not simply a mathematical or economic or legal problem, nor is it only a hydro-engineering challenge.

Pakistan's Indus River proved to be a complex and particular case. Unlike commonly cited examples such as the Columbia River or the Rhine, the Indus is the defining factor in one nation's existence. A symbol of the Partition and the colonial legacy, the Indus River also holds the key to the country's future – in terms of

- water supply for agriculture, industry, power generation and households,
- employment, national prosperity and development,
- food security,
- public health, and
- the stability of regional ecosystems.

In order to adequately account for the River's paramount importance, a basin-oriented approach to the problem of water sharing was chosen. The result brought to light a number of factors that are likely to affect water sharing, especially

- the complex hydrological condition causing a multiple upstream - downstream asymmetry.

In addition, Pakistan as a country exhibited a number of problems relating – directly and indirectly – to cooperation in the water sector:

- the intricate nature of the dispute between the provinces,
- a political system in transition,
- a social – economic structure with strong oligarchic tendencies, and
- a fast growing population with a high percentage of unemployment and poor education.

These hydrological, political, economic and social characteristics would have exceeded the reach of a one-dimensional analysis, focusing only on interaction and institutional performance. The chosen context-based analysis instead delivered a more comprehensive understanding of the problems at hand. The analytic narrative approach turned out to be a valuable addition to the conventional rational choice model.

Reviewing the hypothesis that water sharing in an asymmetric relationship depends on incentives for the upstream side, a number of requirements have been identified without which cooperation is not likely.

- A) **Water norms** with strong legal foundation, clearly stated objectives and precise shared responsibilities;
- B) **inclusion of all stakeholders** (state/province governments and lower administrative levels);
- C) **integrated river management** targeted at the long-term use of rivers and, consequently, their sustainability, rather than short-term, single-purpose water management oriented towards satisfying the seasonal needs of water users;
- D) strong institutional **authority to enforce** laws and treaties, and to handle disputes;
- E) sound **reporting and monitoring** to ensure informed decision-making and transparency; and
- F) an institutionalized system of **incentives** and transferable water entitlements to promote cooperation, and penalties for confrontation.

The concept of hydro-solidarity is built on systematic cooperation. Stakeholders, guided by individual self-interests, pursue a collective goal, but expect benefits for their respective individual position from this collective effort. In theoretical terms, water sharing will have to result in a win-win situation for all stakeholders – in other words: cooperation must pay. A zero-sum result, with only one-sided gains, has to be avoided because it would likely cause the losing party to deny cooperation. Solidarity refers to the principal interest of all stakeholders in the basin as such and a general readiness to seek solutions agreeable to weaker members of the group for the sake of achieving a collective goal. How far the stronger actors would be willing to go in order to achieve this goal – from accepting a lower return to no benefit at all – is a different question.

The Australian case has shown that hydro-solidarity works if the above requirements are met. The elements of an effective mechanism of water sharing are diverse and complex. Cooperation over water distribution not only has to address acute seasonal water needs of federal units and take into account highly variable supplies, but also to recognize downstream concerns. An effective federal system allows stakeholders to take over a more active and more responsible role in managing their own water and their respective economies. The riparian states utilizing the waters of the Murray-Darling Basin have established systematic cooperation that turns all sides into active stakeholders participating not only in the use but also the development and rehabilitation of the river system. As a result, all sides – upstream and downstream states – have contributed to the improvement of river utilization, with benefits to be realized by all. This experience by and large has strengthened the mechanism of cooperation.

The Pakistan case confronts theory and model with a multi-dimensional reality. This study has shown that the conditions for water sharing between federal units (provinces) are markedly different from those in Australia. Many of the above requirements have yet to be met, though recent developments show that progress has been made on some issues.

Water norms: to share or to demand?

Water rights can promote cooperation as they establish entitlements of stakeholders. They can prevent confrontation by protecting established needs and by saving the collective resource from over-exploitation. In the Indus Basin, two major agreements – the Water Accord and the Indus Treaty – protect water needs. Both agreements are considered untouchable for fear that a review or adaptation might undermine the consensus reached by otherwise antagonistic parties. Whether or not this fear is justified, there has not been any serious attempt to discuss and improve the existing arrangements.

While the Indus Treaty manifested a water entitlement based on territorial rights, the Water Apportionment Accord represents a status quo-oriented manifestation of historic stakeholder demands. The Indus Treaty caters to the demands of the stakeholders by cutting the basin in half which frees both sides from the hideous task of sharing water. Such an entitlement, as Molle notes, in principle requires not only that the specified or expected amount of water is actually available (from whichever source) but also effective control and transparency.[1317] The Accord, rather than cementing entitlements, should reflect the *inherent uncertainty regarding quantity and location* (of water), according to Meinzen-Dick and Pradhan.[1318]

The Accord, as an element of the water rights framework in Pakistan, barely touches these vital aspects, yet without any provisions. Corresponding to the provincial prerogative in terms of agriculture and irrigation, it is exclusively addressed to the provincial governments. The actual stakeholders, the water users, are not mentioned. There is no mention of any obligations attached to these rights to receive set allotments of water. In other words, any province may use the allotted water regardless of concerns for other riparian neighbours. Even the implicit no-harm rule that was incorporated in the Indus Treaty is not existent in the Water Accord.

The integration of a binding legal rule in the Water Accord would be a signal to the downstream provinces that their position is legally protected. But to turn such an assurance into a guarantee would mean to install a verification mechanism in order to penalize any violation of this rule. Neither IRSA nor CCI have the legal capacity to enact such penalties.

Provinces as stakeholders: partners or antagonists?

The question whether the provinces really are stakeholders remains open. In the course of the water dispute as well as during the debate over river development, the provinces – that is the provincial governments – have mainly acted as political antagonists. A concrete interest in the improvement of the basin as a collective resource pool and a commitment to engage in collaborative efforts has not been evident in the provincial positions so far.

[1317] François Molle: Defining water rights: by prescription or negotiation? *Water Policy*, vol. 6, 2004, p. 212.
[1318] Ruth Meinzen-Dick & Rajendra Pradhan: Legal pluralism and dynamic property rights; *Collective Action and Property Rights Working Paper* no. 22; Washington, D.C.: IFPRI, 2002, p. 17.

Though the provinces, thanks to the establishment of the Council of Common Interests, now enjoy an institutionalized capacity to shape water management and policy have been less than enthusiastic in using the CCI towards a common goal. Several reasons are behind this **apparent lack of interest** in the one body that was explicitly tasked to solve inter-provincial problems:

- Parts of the existing institutional arrangement still are highly centralized. One large central authority in charge of water development (WAPDA), directed by federal government appointed officials, according to the WAPDA Act, without provincial representation.
- Other parts offer only limited provincial involvement: One small central institution with provincial representation (IRSA) focuses solely on water distribution from one source (surface water), according to the IRSA Act;
- one agreement regulating water distribution (WAA) according to a fixed schedule, based on the political consensus and the water situation of 1991;
- one body for dispute settlement (CCI), based on the Constitution, which only operates on an *ad hoc* basis*;*
- one institution for coordination of diverse matters (IPCC), which is part of a federal government division (IPCD);
- four provincial irrigation authorities (Irrigation and Power Departments), based on the Canal and Drainage Act, operating autonomously, without any institutionalized link.

Stakeholder representation does not seem to determine the relevance of institutions. Many committees and commissions lack provincial participation, but even the more recent technical and parliamentary committees, both with active provincial involvement, have not left much of an impact on water management in spite of detailed recommendations worked out to that end. Curiously, from decades of institutional development, only one permanent institution with provincial participation has evolved: IRSA. While IRSA has made some progress towards becoming an autonomous body *vis-à-vis* all-powerful WAPDA, it has been mired in disputes over water allocation and proved unable to establish operating rules for reservoirs and canals.

The sub-provincial level has an important role in the utilization of water because it is the district and town or village where this resource is actually being consumed. But these lower administrative units are not involved in the IRSA process, let alone in WAPDA's decision-making. Their only connection, through the Provincial Irrigation and Drainage Authorities (PIDA), is institutionally weak because of PIDA's status *vis-à-vis* the Irrigation Department. The translation of water needs into stakeholder positions is blocked because of lacking participation in the decision-making process which is reserved exclusively for the provincial governments.

Not surprisingly, discussions over optimal water use, water saving, system optimization and technical innovation typically are not part of regular IRSA meetings simply because they are not required by the Accord or the IRSA Act. Consequently, an important element of joint river use is not part of the management of the basin. In other words, the interests stated by the official stakeholders (the provincial governments) do not necessarily reflect the ground realities in the respective districts and lower units.

This is one major institutional difference to the Australian case. For the Murray-Darling Basin, not only the distribution of the resource is regulated but also its use. The institutional arrangement addresses the utilization of the basin and its resources, not simply the distribution of water. Another difference is the inclusion of the actual stakeholders, the communities, in the management of the basin.

Integrated river management: towards a comprehensive strategy?

Early efforts to build irrigation canals, reservoirs, dams, barrages and link canals were based on a pragmatic concept of resource utilization that promised maximum benefit with regard to crop production. This view persisted up to and even beyond the Partition of 1947. Towards the end of the Crown Colony, however, the prospect of an integrated development of the Indus, in spite of the expected rise in demand for water, had been in decline. By 1945, *no overall plan for the Indus system as a whole was under contemplation*, as Michel notes.[1319] During the Indus Treaty negotiations, the potential benefits of joint river management were sacrificed for the sake of a satisfying outcome of the Kashmir issue – a hope that has not been fulfilled to date, seven decades after independence.

Concerns for status, identity and influence have driven the development of inter-provincial relations in Pakistan, mirroring relations between India and Pakistan. Given the drawn-out, ruptured evolution of a federal system in Pakistan, the provinces have been facing an uphill battle to establish their political, social and economic positions within the new nation. A major obstacle has been the long absence of an effective parliament through which the once loosely associated provinces could voice their interests. Punjab from the start has found itself in a position superior to that of the other provinces in several respects. Without an equal starting point and without a federal system in place to state their interests, cooperation between the provinces – over water or other issues – has not been a major objective.

Integrated water resources management, perhaps inevitably, has so far remained an illusion, not a reality. WAPDA, with its comprehensive set of responsibilities, could hypothetically be an element in an IWRM concept. But its centralist set-up and to-down approach runs counter to the stakeholder model envisioned by IWRM. The institutional arrangement of water management in the Indus Basin is only loosely connected. Essential elements of integrated river management – like coordinated water withdrawals, irrigation and drainage, groundwater management and collaborative resource protection – are missing.

The Global Water Partnership, in its survey of IWRM mechanisms in 2004, found that in Pakistan *IWRM (is) going forward, with water sector strategy, public involvement, and multi-stakeholder platform. Water is at the top of the government agenda. Water sector reform has started*.[1320] While the merits of comparing IWRM of diverse countries are debatable in the light of highly specific ground realities, the GWP's optimistic assessment does not take into account the unsolved dispute between the

[1319] Michel, p. 218 – in spite of the Inter-Dominion Agreement of 4 May 1948 *integrated operation was dead in principle from April 1, 1948* (p. 205).
[1320] Global Water Partnership (GWP): Informal stakeholder baseline survey. Current status of national efforts towards sustainable water management using an IWRM approach; GWP 2004, p. 18; www.gwpforum.org.

provinces and the status of the National Drainage Programme.[1321] Though efforts have been made to involve the stakeholders on the ground, *i.e.* the farmers, they have not led to active participation on a larger scale because of a lack of institutional development and political and administrative support which could translate their voices into decisions. The traditional authorities of the provinces have instead retained their responsibilities. Efforts to coordinate agriculture have so far failed. Water distribution is commanded by supply management, regardless of the status of the resource as such, as the outcome of the Kotri issue has shown.

The purpose of a national policy on water management, according to a UN framework document, should be *optimum utilization, conservation and management of available water resources, maximization of benefits deriving from water conservation and utilization, valuation of water, and the satisfaction of present and future water requirements for all purposes*.[1322] This idea of water management identifies the economic dimension of water as a resource as well as a vital element of human ecology. It recommends a comprehensive, dynamic, long-term and multi-disciplinary type of management. According to Biswas, the actual water users should be involved in its formulation and regular adaptation to changing circumstances.[1323] Besides its dynamic nature, water policies need to reflect the complexity of managing water, particularly in a context where competing water uses and dynamic hydrological conditions require specific expertise. Information and communication, as a consequence, are a critical factor in water policy formulation, as Dinar points out.[1324]

Pakistan's National Water Policy, drafted nearly three decades later, has incorporated a number of important elements of IWRM. While some parts deserve greater precision, like the inclusion of groundwater, its strength lies in the fact that it incorporates all essential factors of water management from a basin perspective. Its objective is to improve water supply country-wide. To achieve this, the NWP focuses on greater coordination and integration, particularly in resource development and drainage and agriculture. Steps in this direction – which would inevitably require the provincial governments to change the way they manage water, not the federal government – have not been taken yet. To date, the Policy remains a concept without stakeholders.

The failure to adopt and ratify a national policy framework on water reflects not so much a lack of participation but apparently a lack of interest on the part of the respective governments. In other words, it seems that the Policy has become a victim of politics. The draft document prepared in 2003 has not been picked up again for discussion. Proposals from the World Bank and the ADB have met with a similar fate: The failure to reach an agreement on drainage and irrigation efficiency means that an instrument crucial for solving the problem of water shortage was ignored. As long as water management remains centred on securing fixed shares in the allocation

[1321] Peter Mollinga: IWRM in Asia: a concept looking for a constituency; in: P. Mollinga, Ajaya Dixit & Kusum Athukorala, eds.: *Integrated water resources management: global theory, emerging practice and local needs;* London/Delhi: Sage, 2006, p. 28 – 34.
[1322] Background paper for the UN Water Conference, Mar del Plata, 14 – 25 March 1977; quoted in: Asit K. Biswas: Water policies in the developing world; *International Journal of Water Resources Development*, vol. 17, no. 4, 2001, p. 491.
[1323] Biswas: Water policies, *op. cit.*, p. 493.
[1324] Ariel Dinar: Water policy reforms: information needs and implementation obstacles; *Water Policy*, no. 1, 1998, p. 368 – 370.

process, the provinces will hardly move to identify a collective target or agree on a policy framework that could bring all sides together to work towards such a goal.

Water institutions: facilitating cooperation?

Institutions, according to theory, can facilitate cooperation, particularly when jointly operated by all stakeholders. Water management in the Indus Basin has experienced institutionalization in various forms: laws, agencies, committees. The institutional chronology of the Indus Basin shows that temporary institutions such as committees and commissions have a prominent role, whereas permanent institutions such as agencies and authorities (like WAPDA) play a minor role; most institutions have an inter-provincial scope.[1325] But the occurrence of institutional initatives says little about the quality and impact of the measures taken.

On the surface, all pillars of the institutional network stand on their own legal feet and operate according to their respective tasks, by and large without overlap. But there are aspects that overshadow the relevance of these institutions and affect their impact.

An institutional vacuum indirectly related to water sharing concerns the utilization of water resources. As most of the water is consumed by agriculture, the relevant institutions in place are the provincial Irrigation Departments which, of course, cover only the respective provincial territory. As there is no institutional link between the irrigation authorities of the provinces, agricultural strategies and respective water needs remain uncoordinated. It is only in the course of discussions at IRSA on seasonal water distribution that they are being brought up at all, yet outside any binding arrangement.

Institutional effectiveness depends on precise tasks, status of authority and public acceptance, professionalism of staff, and coordination with other institutions. While WAPDA can show off decades of experience in water resources development and has a lot of skilled staff, IRSA by comparison is a new institution that suffers from both a lack of qualified staff and financial resources. The fact that the provincial delegates are not always in line with their respective government's position, as the seasonal water planning has shown, has been interpreted as a sign of IRSA's weakness as an institution. What has become another conflict – one between the provinces and IRSA, i.e. the delegates – actually appears to be a problem of lacking professionalism, or expertise, on the part of the provincial delegates, as Sardar Tariq and Shams ul Mulk argue.[1326]

Coordination between the various tiers of water management in the Basin varies. Better coordination between WAPDA and IRSA has enabled the latter to make water distribution more reliable, mainly thanks to water data delivered by the former. The installation of the telemetry system has facilitated communication between the two authorities and increased transparency, thus facilitating the settlement of the problem of water theft, an aspect of the wider water dispute. Though the provincial irrigation

[1325] See institutional chronology in the theoretical section.

[1326] Sardar Muhammad Tariq & Shams ul Mulk: Sustainable, accountable institutions; in: John Briscoe & Qamar Hasan, eds.: *Pakistan's water economy: running dry*; *World Bank Background Paper*; Washington: WB, 2005, p. 10 - 11.

departments also participate in the transmission of data, the coordination does not go further. Except for the routine water metering, there is no regular transfer of information among the users of the Basin.

IRSA's capacity to enact the Water Accord has been challenged frequently. Though both the IRSA Act and the Constitution regulate dispute settlement – by referring the conflicting parties to the CCI – no case has so far been transferred to this forum. Sardar M. Tariq and Shams ul Mulk suggest that *IRSA should have direct access to CCI*.[1327] Giving IRSA the mandate to address the CCI would require changes in the Constitution and the IRSA Act. Whether the provinces, through their voice in the Senate and National Assembly, would approve this change is unclear as it has not been officially debated in either chamber. Practically speaking, such a step would put IRSA, ideally its chairman, in a position to simply hand a disputed case over to the CCI for a decisive vote, saving the Authority from a costly escalation that might render the institution ineffective. The CCI, of course, is a forum manned by the respective governments themselves, i.e. by the Chief Ministers, plus another four members chosen by the federal government. This means that the deadlock that has crippled IRSA might be replicated at CCI which in turn would question the Council's effectiveness *per se*.

WAPDA, in charge of executing IRSA's orders in terms of water releases, is in a different position and not plagued by internal divisions. While its professionalism has received a lot of criticism, it has not shared the blame for the water shortage even though it is this Authority's responsibility to make water available. The fact that its highly centralized approach to water management, which does not take into account stakeholder concerns either on the provincial or on any lower level, has not been questioned so far is indicative of the overall tendency to view water management as a top-down issue. Consequently, this institution, established at a time when national unity and territorial integrity were a foremost political concern, has not evolved much beyond the bureaucratic behemoth that it was in its heyday, when the Indus Basin Project was implemented. Almost four decades after the completion of the major works of the IBP, WAPDA has yet to redefine its role in an ever-growing society with an ever-rising demand for water and electricity.

WAPDA has proved surprisingly ineffective with regard to water sharing and handling water shortage. The quality of its data was questioned frequently, and on some important issues (Kotri, Kalabagh dam site geology etc.) the Authority appeared speechless or lacking substantial arguments. Its Vision 2025 found few supporters. The federal government at that time, keen to fight water shortage and economic stalemate in an almost military fashion, stuck to this concept, if only for lack of alternatives. Fortunately, the government was wise enough to involve the provinces, the actual stakeholders, in the discussion of potential strategies to avert a destructive water shortage. As a result, the Technical Committee on Water Resources more or less finished off WAPDA's Vision.

Decision-making at IRSA has received frequent criticism, signalling that often one or more parties were not satisfied with the outcome. The Murray-Darling Basin Ministerial Council (MDBMC), by comparison, is required to seek a consensus whereas IRSA's decisions are based on simple majorities. This means three votes

[1327] Tariq & ul Mulk: Sustainable, accountable institutions, *op. cit.*, p. 12

are enough, leaving two parties to face defeat. In other words, the upstream provinces could team up with the centre to push through their interests, regardless of the interests of the downstream provinces.

Dispute settlement proved to be rather ineffective. In spite of the ongoing dispute between Sindh and Punjab, the mechanism described in the IRSA Act has hardly ever been activated. Instead of invoking the Council of Common Interests, outside mediation (by the federal government) has become a more frequently used instrument – yet without actually solving the dispute, as the long series of commissions and committees has shown. One factor is the nature of the CCI as an *ad hoc* institution, rather than a permanent instrument for the regular settlement of problems relating to water distribution. In the Australian case, a precise, time-bound mechanism is to be activated, with no detours possible. The basin committee has to reach a decision within two months – if not, the basin council has another two months for a response. The highest court of a non-basin, *i.e.* neutral state (Tasmania) is the final stage, its verdict binding on all sides. This mechanism leaves little room for political manoeuvring or endless debates and limits institutional damage – a consequence of constant bickering from which IRSA has suffered.

Insufficient transparency has nourished the widespread perception that IRSA is not up to the task: Though debates are routinely covered in the media, the Authority does not issue reports on its work. The regular online recording of water releases by IRSA (before by WAPDA) means a slight improvement. Other institutions, like the CCI, have only recently begun to go public. Only WAPDA has been issuing yearly reports for a long time. Much the same is found on the provincial level: With the exception of the Punjab, most Irrigation Departments do not regularly report on their work, and the government do not present their positions.

In the light of lacking trust among provincial governments and widespread popular suspicion, the relevance of transparency and accurate information becomes obvious. Unfortunately – unlike in the case of Australia – this aspect has not received a lot of attention in the context of the water dispute between Sindh and Punjab.

Incentives have played a critical role in the conclusion of the Indus Treaty. Once it was finalized, the dividend was paid – in the form of substantial investment and credit. Further incentives were not needed because the agreement was not in danger so long as the parties stuck to the rules. A negative incentive was the implicit threat by the third parties to revoke funding and support in case of non-compliance.

The Water Accord (WAA), by contrast, promises to allocate water to all parties, regardless of actual needs or factual availability. In what seems to be another example of an *incentive gap* (Saleth), the Accord cements water demands by ignoring the value of water in the light of shrinking supplies, widespread waste and an ever increasing population.[1328] In the absence of incentives to safe water or to make excess water available to water-short neighbours – as a means of overcoming hydrological asymmetry – the provinces stick to their formally established entitlements without moving towards a cooperative goal that could bring benefits for all. This lack of flexibility – to transfer water rights – is as great a deficit of the WAA as is the exclusion of groundwater.

[1328] R. M. Saleth: Towards a new water institution; *Economic and Political Weekly*, 24 Sept. 1994, p. A-147.

The Pakistan complexity: disputes, politics, rationalities

Besides the above deficiencies there are several aspects that add to Pakistan's challenge and distinguish it from the case of Australia:

- the nature of water disputes,
- the phenomenon of water politics, and
- a distinct rationality regarding water.

The dispute over water sharing has developed from a sporadic phenomenon in the early phase of the colonial irrigation project to a permanent problem since the installation of major reservoirs and barrages. The dispute ebbed down for a few years after the completion of the Indus Basin Project in the 1970s which made much more water available. It resurfaced in the 1990s when the exploding water demand from an ever increasing population started to outgrow water supplies on a regular basis.

The hydrological asymmetry which is particularly pronounced between the provinces of Punjab and Sindh continues to be the main physical obstacle to water sharing. Developments in the course of the Indus Basin Project provided only a brief respite. In a sense, the large reservoirs located in the upstream section of the basin eventually exacerbated the problem for downstream Sindh. While Punjab has benefited from its increased capacity to absorb huge quantities of water in its reservoirs and vast canal system, the less extensive irrigation network of Sindh offers a much smaller capacity to store water. In addition, Sindh's mostly flat surface, with little slope, makes it more prone to salination than any other province.

A growing economic asymmetry has been the inevitable outcome of this situation as Punjab's one-sided benefits in terms of water use (quality, quantity, and access) translated into economic gains. This condition, together with a political and military preponderance of Punjabis, has been viewed by many as a scheme to subjugate Sindh – especially since efforts to spread benefits from the improved canal system more evenly were few. Thus the hydrological asymmetry favouring Punjab has turned into a political-economic asymmetry.

Physical obstacles to cooperation in Pakistan's Indus Basin – besides the hydrological asymmetry – are water productivity and crop selection, river flow regimes and dynamics of rainfall and thaw, drainage mechanisms, irrigation schedules and reservoir operation patterns which together make up a complex hydrological, economic and administrative challenge. The Indus Waters Treaty regulated water distribution by taking into account some of these conditions, but not the social and political aspects. It divided the basin in two, establishing a hydrological demarcation line between the riparian nations that spared them the effort to seek a collaborative solution for which they were not ready anyway. Within Pakistan, the provinces remain separated by their distinct cultural, social and economic identities. While their lack of commonness has not led them towards conflict, sharing a river has not led them to cooperate either.

Shortage of water, which has become a more and more common phenomenon in the Indus Basin, has not driven the provinces to work together, but has instead furthered the existing confrontation. Yet contrary to the wide-spread assumption that water shortage promotes conflict, even war, the Sindh – Punjab case has shown that both sides accept a degree of confrontation while at the same time participating in

joint mechanisms (IRSA) and by and large adhering to established rules (WAA). The absence of an outright water conflict in the Indus Basin – both among the provinces as well as between India and Pakistan – in spite of the gravity of the water situation and the overall state of relations is remarkable. This on one hand disproves the famous water – war hypothesis and on the other hand it also proves the strong political factor.

In spite of the host of water-related problems that overshadow relations between Pakistan's provinces as well as Pakistan – India relations and relations between India and its neighbours, Pakistanis as much South Asians in general have by and large managed their water problems without turning to forceful means. This is remarkable given the population density and the shortage of the resource. Except for some local conflicts over water, the chronic water shortage has not generated major crises. Even the notorious conflict over Kashmir has not extended to the water issue.[1329] One could even state that water sharing between India and Pakistan has proved immune to attempts to link it with the Kashmir problem.[1330]

Behind this reluctance to cooperate which is combined with a restraint to engage into open confrontation are a number of reasons. First, historic developments tended to preserve dominant, i.e. asymmetric relations. In the Indus Basin the decision to split the basin in two practically eliminated, at least for the time being, the need for cooperation. The development plan that came out of the Indus Treaty strengthened the upstream riparian province (Punjab). Politically, thanks to much delayed efforts to introduce federalism, Punjab's role gained further prominence. By the time the federal system was reinstated, the other provinces had a long way to go in order to catch up with the dominant province. At the same time India's overall regional dominance and favourable hydro-geographical position allowed it to manage water more or less independent of concerns for its neighbours.

The lack of a stable and effective federal framework, secondly, allowed historic grievances between Pakistan's provinces to overshadow the post-colonial integration of the various entities into the new nation of Pakistan. The absence of effective provincial participation during the long centralist rule effectively precluded dialogue and cooperation in the critical formative period of the nation. The evolving federal and democratic system has since failed to promote cooperation between the provinces. Only since 1991 is there a constitutional provision for the involvement of the provinces. The centre's predominance even in matters relating to the provinces, however, has remained mostly unaffected.

[1329] Wirsing, praising the SFG's publication for its *respectability,* reiterates the water factor in the Kashmir conflict of 1947/1948; cf. Robert G. Wirsing: Rivers in contention: Is there a water war in South Asia's future? *Heidelberg Papers in South Asian and Comparative Politics*, no. 41, 2008, p. 9. His argument fails to support the SFG's hypothesis that water has been a more or less constant cause of conflict. The analysis of the post-IWT relations between India and Pakistan has shown that water does not nearly represent as prominent an issue in the public debate as suggested by those authors. In the course of an extensive literature survey over several years I have not come across any statement by pro-Pakistan activists from Kashmir indicating that water is a major concern of their struggle, if any.

[1330] That, of course, has not prevented some from assuming that behind Kashmir there is a water-related interest; cf. Strategic Foresight Group: The final settlement: restructuring India – Pakistan relations; Mumbai, 2005, ch. 8 (no page numbers); www.strategicforesight.com/finalsettlement.htm (Aug. 2012).

This lack of provincial involvement, thirdly, nourishes tendencies to use existing problems for short-term, one-sided political gains. The political factor is not necessarily adverse to water management. As Wegerich suggests, it seems that water management, and water sharing in particular, can hardly avoid becoming a political issue in dry regions with large populations like Pakistan and much of South Asia.[1331] Not surprisingly, political voices in Pakistan readily grabbed water-related issues whenever convenient but the inconsistency of their activism indicates that water was not a major concern – even when in reality there was plenty of reason to make it a priority. It seems that Ahmad's assessment that Pakistan's dams debate is *inherently a political contest* may be right.[1332] Unfortunately, though water – and water shortage in particular – certainly has invited political activism, it has rarely led to drastic action over water, for example in the form of legislation or even forceful intervention.

Growing political activism suggests that a number of activists on both sides, along with political actors, appear to benefit from the dispute more than from efforts to remove it. Populist voices like Kaiser Bengali, the Sindh Chief Minister's adviser who threatened an economic blockade of Punjab, come and go; the situation on the ground remains – and so does the suspicion that this is the very purpose of such activism.[1333] If there is a positive element in this, it might be the demonstration of a form of democratic engagement – and as such the symptom of growing political awareness which could eventually further the cause of participation.

Coordinated water management or IWRM, fourthly, has – in spite of centuries' worth of experience in utilizing transboundary rikvers – not developed into a widely accepted model. The people and governments of South Asia, as Wirsing notes, continue to follow a *strong compulsion to plunge ahead with river development* regardless of concerns of co-riparian states. This *imperative of unilateralism* espoused by both bigger and smaller nations seems to hold a growing potential for conflict, and collaborative efforts have frequently met with little success.[1334] The case of Pakistan's provinces is very much in line with this observation, as this study has found: Though expert committees have recommended coordinated efforts, river development continues to be governed mostly by individual concerns of the respective provincial authorities.

The handling of this dispute, fifthly, has followed strategies which did not prove successful. The colonial era witnessed approaches from an engineering perspective, to be followed (after independence) by a series of legal initiatives (tribunals, commissions) seeking to settle rights-based claims. However, the relations between the provinces, poisoned over decades, have not been targeted. Curiously, it seems that solving the India and Pakistan dispute over water took only thirteen years, whereas the Pakistani provinces of Sindh and Punjab needed 44 years to reach an agreement on water sharing. Why is that so? Is it, as Faruqui's pessimistic

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[1331] Kai Wegerich & Jeroen Warner: Is water politics? Towards international water relations. Introduction; in: K. Wegerich & J. Warner, eds.: *The politics of water: A survey*; New York: Routledge, 2010, p. 2 – 4.

[1332] Anwar Ahmad: The dam debate; *The News*, 1 Sept. 2003.

[1333] Cf. "If no water for Sindh, no port for Punjab"; *The Express Tribune*, 12 July 2010. In an unusual public statement, Foreign Secretary Shah Mehmood Qureshi said that despite frequent claims by Pakistani activists, *water is not being stolen in India. It's been wasted in Pakistan*; Qureshi interview with unnamed Pakistani TV channel, quoted in *Outlook* (India), April 2010.

[1334] Wirsing: Rivers in contention, *op. cit.*, p. 13, 14.

assumption suggests, that *the incentives to refrain from conflict are weaker within state boundaries, since concepts such as minority rights do not have the same persuasiveness as the concept of sovereignty, which serves as a strong check on outwardly aggressive state behaviour, and has been a long-accepted common norm*?[1335]

The India – Pakistan case benefited from the involvement of a third party which was accepted by both sides. The road to a settlement of the dispute was through a political-economic path. Economic and political rewards for cooperation – i.e. consensus – were perceived by both sides as much more appealing and reassuring than legal norms. Likewise, in the Sindh – Punjab case, legal norms have played a minor role so far. But here the third party – the central government – was generally not seen as a neutral mediator. Perceived pro-Punjab favouritism of the centre has been a continuous claim made particularly of representatives of Sindh. As a result, increasing antagonism, instead of a sense of common objectives, has been prevailing in discussions of the water dispute since 1991.

The Water Accord of 1991 which established fixed allotments partially settled the dispute over water for the near future. The provinces did agree on shares as a sort of demarcation line but on very little else, particularly not the dynamics of water availability, the necessity of reservoir operation patterns, storage capacity, ecological concerns of the river and water quality issues. When water shortage did not permit the allocation of agreed shares, the dispute surfaced again – as in a case of trespassing a legally protected border. Practical steps to solve the problem of shrinking water availability were not taken; a collective goal was not agreed on as both sides stuck to their initial positions.

The rigid fixation of entitlements, without assessing actual needs and available resources (surface and underground water), has effectively prevented the introduction of benefit sharing. A market-based system of transferring unused entitlements for other benefits stood little chance as the opposing sides, alleged to be stakeholders, were allowed to routinely confront each other with quantitative demands, warranted or not and entirely independent of hydrological ground realities. The insistence on preserving the Accord – in the light of this antagonism – must be read as a determination to uphold the status quo, regardless of how unrealistic its foundations are. In this context it is not surprising that the available institutions for dispute settlement – particularly the CCI – have been addressed only rarely.

The rationality behind water confrontation – or simply non-cooperation – is the preservation of the status quo. Though politics do not necessarily prevent decision-makers from seeking and adopting pragmatic solutions, the preponderance of status and power-related concerns over acute economic concerns in this case indicates that practical benefits are seen as secondary – even in the face of sometimes dire water shortage and economic losses. But is the suspicion that drives Punjab – Sindh relations a lack of realism? Is it a kind of paranoia, as Cohen suggests dominates India – Pakistan relations, or an *obsession*, in Riedel's words?[1336] On the government side, the costs of stagnation and continued adversity obviously have not been

[1335] Naser I. Faruqui: Responding to the water crisis in Pakistan; *Water Resources Development*, vol. 20, no. 2, 2004, p. 190, fn. 5.
[1336] Stephen P. Cohen: Shooting for a century; Washington: Brookings, 2013, p. 11; Bruce O. Riedel: A new Pakistan policy: containment; *New York Times*, 14 Oct. 2011.

factored in, it seems. Yet there are gains that apparently supersede potential gains from coordination and cooperation. On the one side, those gains – positions, budgets – only concern those who hope to prevail in the political competition. On the other side, the status of the province as part of the nation is of a wider, more fundamental relevance. Seen from inside, it is this issue that has to be cleared before limited issues (like water sharing) are to be cleared.

The role of the actual stakeholders, i.e. the water users in the districts and smaller units, is very limited, mainly due to their lacking institutional representation. As they might be more susceptible to practical improvements on the water issue, the official representatives instead might not easily translate such improvements into political benefits – particularly not when elections are determined more by group loyalty than by autonomous votes.

If rationality is defined by the actors' interests and objectives, the dominance of water politics suggests that a solid agreement on water sharing and a consensus on improving water availability did not top the agenda. On the surface at least, the Pakistan example refutes both the famous water war hypothesis (Joyce Starr etc.) and the water cooperation hypothesis (Aaron Wolf etc.). The question is: will the growing water shortage become a trigger of cooperation in the future? The Australian case has shown that even where and when water is short, is does not necessarily have to become a victim of confrontational politics.

Rationality in this case – unlike in the Australian case – is not very much determined by the water issue. The Water Accord, which cemented allotments, is not only a symbol of narrow, static supply management; it is also a symbol of limited stakeholder objectives. The provinces stick to their positions – even in drought periods – without much readiness to move in any direction for fear of losing some of the water they are entitled to receive, even when overall shortages won't permit the expected allocation. In the course of the various committees and commissions that followed the Accord, the readiness to work towards a collective target hardly ever surfaced.

Water management, as a result, remains a provincial prerogative – as it was in the colonial era. But because of the nascent state of federalism in Pakistan and the lack of participation of lower tiers this prerogative continues to be more of a limitation than a potential for further evolution or development. Important aspects of water management that would very much affect water availability in the whole basin – like soil conditions, crop requirements, irrigation efficiency, canal maintenance, groundwater, water productivity – have played next to no role at all in the water dispute of the Indus Basin, a river system on which one of the fastest growing populations in the world depends. Like an old tradition, this attitude towards water is firmly engrained in the way water is used and managed in the Indus Basin. It is mirrored not only on the level of provincial governments but even down to the farm level, as this study has shown.

Is this a uniquely Pakistani or South Asian phenomenon? Waterbury points at a bizarre rationale behind water negotiations: *Those riparians who have traditionally built their claims on the principle of acquired rights generally suffer from perverse incentives to avoid technological innovations that improve efficiency. Because, were they to demonstrate their ability to do more, or as much, with less water, they would*

be undermining their claims …[1337] This psychological trap leads to a stalemate as both sides tend to stick to their original claims. According to Waterbury, one remedy to avert this is the introduction of incentives that reward greater water productivity, through the use of sophisticated irrigation technology for example.

Swain notes that *the lack of any international guidelines on the sharing of international rivers has not deterred certain river basins from working towards a cooperative management*. He argues that *complex water disputes can only be solved by cooperation and compromise, not by a strict insistence on rules of law*.[1338] In other words, regulations do play a role as a framework for river management, but they cannot guarantee that its resources will be shared in the desired manner. The Indus Treaty may serve as an example: both signatories stick to it, yet try to manoeuvre around it whenever the opportunity arises.

In sum, the context-based narrative analysis of Pakistan's water dispute explained why the provinces did not reach a lasting agreement on the improvement of water supplies even when both sides – Punjab and Sindh – could have gained from agreeing on new water reservoirs, to be chosen from among the projects discussed by the Technical Committee on Water Resources, for example. The rationale behind the provinces' refusal to do so could only be understood against the background of a century-old water dispute and a deep-seated mistrust among the provinces originating from the divide-and-rule strategy of the colonial era. The narrative approach addressed the political fabric of Pakistan and its diverse cultural traits, rendering a more complex set of preconceptions, motives, interests and objectives. This approach which augmented conventional rational choice helped close the gap between obvious technical and hydrological aspects of water decision-making and clandestine aspects reflecting historic experience and cultural identity.

Prospects: the path towards hydro-solidarity

The findings so far suggest that a number of steps be taken in order to approach a state of hydro-solidarity. The state of relations between the provinces may not be a realistic target of concrete short-term measures, but measures directed at water management may deliver tangible results more quickly.

If Wolf's model is applied, Pakistan is headed for conflict.[1339] All of the factors of vulnerability like

- rapid environmental change,
- rapid demographic and/or rapid social-economic change,
- large unilateral development projects (dams that cause displacement e.g.),
- inadequate institutions and
- negative overall relations

have been identified in the case of the Indus Basin.

[1337] John Waterbury: Between unilateralism and comprehensive accords: modest steps toward cooperation in international river basins; *Water Resources Development*, vol. 13., no. 3, 1997, p. 286.
[1338] Ashok Swain: Constructing water institutions: appropriate management of international river water; *Cambridge Review of International Affairs*, vol. XII, no. 2, p. 219.
[1339] Aaron T. Wolf: Shared waters: conflict and cooperation; *Annual Review of Environment and Resources*, vol. 32, no. 3, 2007, p. 4 – 5, 12 – 13.

A combination of three steps is recommended
- improving institutions,
- redefining water policy, and
- economizing water.

Improving institutions: Institutional arrangements in the water sector can be very diverse, as Salman and Bradlow have shown in a global survey.[1340] There is no universal design or set-up. A few elements of effective institutions, though, have emerged from the discourse:

- **Professionalizing water management** means to introduce more experts in the water sector. The stagnation of institutions like WAPDA has been symbolized by the overrepresentation of bureaucrats and military officers. Professional water management requires expert knowledge in the relevant fields, from irrigation to climate and hydrology, and an understanding of rivers as systemic units. Staffing water institutions, especially IRSA and WAPDA, with experts rather than officers or political loyalists, will also help to depoliticize water management in Pakistan.[1341]

- **Substantial studies** of the Indus Basin undertaken by IWMI and other institutions, pointing at ways to save water or make more water available, do not seem to have played a role in decision-making. Proposals to improve water management deserve a more pragmatic, technical approach. All-encompassing solutions are not available, as the dams debate has shown. Large dams carry significant economic, social and environmental costs, as do nation-wide infrastructure schemes. While the need to store water and generate more electricity is beyond argument, the idea that only large dams can provide adequate storage and deliver sufficient electricity is outdated. Hydropower is not for free. A combination of small dams and local power facilities promises much greater returns. Localized approaches should also include the introduction of household-size solar power units and a network of many small reservoirs utilized only for irrigation and drinking water supply, plus water treatment facilities.

- **Stakeholder participation** in the process to share and manage water is essential. Water users and the water managers in particular will have to become stakeholders of their nation, their economy, and their water resources. For the water sector, this means that the provincial authorities have to involve the farmers directly. Waterbury suggests that *only those matters which the local "stakeholders" have neither the finances nor the expertise to undertake should be shunted to the next highest level*.[1342] The most important effect of this engagement of the water users will the adjusting of water demands to actual water needs and the discussion of ways to improve water productivity on the ground.

[1340] Salman A. Salman & Daniel Bradlow: Regulatory frameworks for water resources management; Washington, D.C.: World Bank, 2006. Similar findings also from Saleth and Dinar whose comparative study presents *best practices* of each case i. e. country: R. Maria Saleth & Ariel Dinar: Water challenge and institutional response: a cross-country perspective; *World Bank Policy Research Working Paper* no. 2045, Washington, D.C.: WB, 1999.

[1341] The World Bank has offered $ 6 million for *capacity building and support to IRSA*; cf. *Business Recorder*, 26 March 2008.

[1342] Waterbury: between unilateralism, *op. cit*., p. 286.

- **Information, communication and transparency** are vital elements of effective institutional operation. Improvements have taken place, like the telemetry system, but more needs to be done in order to prevent misuse or misinterpretation and avoid mistrust. The reception of the latest committee reports has shown that misconceptions about the water situation and potential remedies (such as dams) are still widespread. Parts of the farming community are still prone to be influenced towards unrealistic expectations and perceptions.

- **Institutional decentralization** is a major requirement of institutional reform in Pakistan's water sector in order to implement stakeholder participation and improve the effectiveness of water management and development. WAPDA's centralist approach to water and power management runs counter to the provincial prerogative. To hand over water development to the provinces means to make the provinces responsible for the entire water management. This would eliminate one level of dispute – between different water users (hydropower, irrigation) – which has made water sharing more difficult. Whether provincial representation in WAPDA would be better deserves a closer look from a policy-making perspective. Restructuring WAPDA and opening it to the provinces instead of revamping it altogether might prove more feasible, given the vested institutional interests that this monumental institution represents.

- **Institutional integration** targets the separation of irrigation, drainage, system rehabilitation and basin development. The existing Provincial Irrigation and Drainage Authorities are a useful platform, but their mandate should be extended to include other water uses (like power generation) and resource development. The justification of separating irrigation from other uses is hard to see in a case where most water uses depend on a single source of water. An important side-effect would be to signal to the farming community that irrigation and system rehabilitation have to go hand in hand in order to provide for future water utilization. Unless this core aspect of integrated water management is not delivered, there is little hope for the situation to improve, as the various water availability models have shown. By making the provincial water body responsible for all types of water use, the provinces would have to turn to each other to find an agreement and thus become active stakeholders. In order to reap benefits from water management, they would have to approach their riparian neighbour – not the federal government.

- **IRSA's authority**, similarly, should be extended from mere allocation to qualified assessments of water needs. The current task of IRSA is too narrowly focused on the quantity of water supplies and shares. IRSA would be in an ideal position – with its equal representation of all provinces – to become an advocate of integrated management of the river basin, rather than just the one-dimensional, short-term distribution of its resources.

- **The contractual basis** of such a reform will have to be an agreement on drainage and river development. This long-standing recommendation of the World Bank and others would require a review of provincial prerogatives.[1343]

[1343] Cf. WB calls for overhauling of 1991 Indus water accord; *Dawn*, 24 March 2004.

At this point negotiations will become important. Realizing benefits from extending the provincial scope ……..

- **Institutional effectiveness** will have to increase. One way would be to tighten coordination between relevant institutions. The CCI should be tied very closely to IRSA. The current procedure to activate CCI in case of a water dispute requires government action. This only delays a process that could otherwise be much more efficient if it was more direct, i.e. from IRSA to CCI, without any third party involved.

  Strengthening both institutions is a must in order to put a stop to seemingly endless debates over seasonal water sharing. But to show real effect, CCI would have to be in charge of a binding rule. Otherwise, the CCI would remain the toothless tiger that it has so far been.

Redefining water policy: With the federal government holding a dominant position in the water sector in spite of the provincial prerogative in irrigation and agriculture, it would be on the GoP to initiate a new understanding of water use and management:

- **Redefining** the national interest would be a first step. Rather than simply dumping the old India threat a new focus should be set on the natural resources, in particular water, as drivers of social and economic development and cohesion of the nation. To make more out of the existing water by improving institutional performance, inter-provincial coordination and a comprehensive scheme of enhancing irrigation and rewarding efficient water use at the farm level, the government should create a system of economic incentives and opportunities.

- **Greater provincial participation** would have to be a second step. Without adequate representation of provincial interests progress towards cooperative water management and water sharing appears to be unrealistic, as the vulnerability of the water issue to instrumentalization for various political purposes has shown.

- **The social impact** of development generally tends to be overlooked by governments. Recent floods have shown how easily radical groups recruited followers from among the desperate victims of the combined catastrophe, flooding and official neglect. The chance to retake the initiative on the ground – in the countryside – is there. Major funding organizations have been signalling support for many years.

- **The introduction of integrated river management** will need the GoP as a sponsor. After the productive committees and a series of reports all pointing in the same direction, it is now on the GoP to initiate the actual implementation of the framework Water Policy. Instead of permitting another round of pointless debates and reviews, the federal government should retake the initiative from the provinces – which have not reacted to the committees' proposals so far. Again the financial carrot could serve as an incentive – development funds for water-efficient projects.

Economizing water: The understanding of water as a resource rather than an entitlement is an important step towards better water management and better water sharing:

- **Traditional water entitlements** play a dubious role in Pakistan. The dispute over water shares has shown that in a dynamic environment such as the Indus Basin fixed allotments are neither practicable nor advisable. The fixation on agreed amounts of water precluded a coordinated effort to supply water to where it is needed. Instead of fixed allocations, a flexible mode based on legally protected water rights is the need of the day.

- **The preponderance of supply management**, very much the result of the traditional understanding of water entitlements, has been amply demonstrated by the practice of the Indus River System Authority. The Water Apportionment Accord, considered sacrosanct by the provinces, firmly established quantitative entitlements regardless of actual water needs or future availability. Water is an entitlement that reflects needs and specific circumstances. To further this understanding, a pricing scheme should be introduced that reflects the value of this resource. Water prices, if applied sensitively, can contribute to saving water and using it efficiently. This applies to all levels – individual and collective, from farm gate to province. For the provinces, the economic value of the resource, as reflected in its sector-wise productivity, has to be adequately assessed. Cotton production, for example, may be lucrative in some areas, but not in others. Only a comprehensive pricing scheme will render realistic evaluations of economic viability.

- **A shift towards demand management** would open the door to a realistic assessment of actual needs of the agriculture sector and ways to use available water more productively, cut waste and save water. This means to replace fixed entitlements with a flexible system of dynamic allocations, rewards for greater efficiency and a network of storage facilities to cover the whole basin. Inevitably this approach will involve the lower administrative units, from district downward, more than before.

- **A concept of sustainable resource use** should become a priority in all areas – not only but especially in the water sector. The existing and (by most accounts) worsening water shortage dictates that living within limitations should become the paramount formula for the economy and the society as a whole. This includes measures to check the rapid growth of the population.

- **Groundwater resources** should be included in the overall water budget. Water withdrawals would have to be managed by the same criteria as surface water, with a focus on system rehabilitation. Excessive water withdrawals from aquifers should be countered by economic sanctions – just as economic use should be met with rewards.

- **Benefit sharing** instead of mere water distribution would have to include a system of economic balancing in order to overcome asymmetry, both hydrological and economic. The case of the National Drainage Programme has shown that benefits sometimes require translation where reforms face

engrained mentalities and traditions.[1344] Identifying and delivering benefits is crucial to the success of such an endeavour.

In sum, opportunities do exist even in this case where water shortage already has become chronic. Suggestions and recommendations are on the table but for them to become realistic tools they need to reflect the context, in other words, the setting.[1345] This study has aimed to present "the wider picture", exhibiting the particular challenges of the chosen case.

To turn the tide in favour of Pakistan as a nation will require a concerted effort. Hydro-solidarity may serve as an orientation on the way towards better resource management on all levels. Besides structural reforms and procedural improvements, a prime challenge in this process will be participation. The people will have to become stakeholders – just as the water users will have to be managers of their water – in order to prevent this country from turning into a nation suffering from over-crowding, shortage of essential resources, a lack of education and the burden of militarization. For Pakistan the management of its limited water resources might be the crucial factor in becoming an autonomous nation.

[1344] Jean-Daniel Rinaudo & Zubair Tahir: The political economy of institutional reform in Pakistan's irrigation sector; in: Phoebe Koundouri, P. Pashardes, T. Swanson & A. Xepapadeas, eds.: *The economics of water management in developing countries*; Cheltenham/Northampton: Edward Elgar, 2003, p. 42 – 44.

[1345] Ruth Meinzen-Dick, P. Mollinga & E. Karar: Policy and institutional reform: the art of the possible; Sri Lanka: IWMI, 2007, p. 219; cf. R. Maria Saleth & Ariel Dinar: Water institutional reform: theory and practice; *Water Policy*, no. 7, 2005, p. 3 – 4, referring to the *institutional ecology*.

Annex

1. Abbreviations

Abbreviations of important institutions referred to in the text and footnotes

2. Map: the Indus Basin, with provincial boundaries

Map of Pakistan with main rivers and provincial boundaries. Source: Department of Geography, South Asia Institute of the University of Heidelberg.[1346]

3. Documents

Unabridged texts of the most important documents on water sharing referred to in the text:

- **a) Draft Agreement between Punjab and Sindh (1945).** Source: Department of Irrigation and Power, Govt. of Punjab.[1347]
- **b) Indus Waters Treaty (1960).** Source: official website of the World Bank (March 2013). Treaty text without attachments.
- **c) Water Apportionment Accord (1991).** Source: official website of the Indus River System Authority (Feb. 2014).
- **d) Indus River System Authority Act (1992).** Source: official website of the Indus River System Authority (March 2013).

[1346] I am grateful to Nils Harm, the Institute's cartographer, for the preparation of this map.
[1347] I am grateful to Chaudhry Mazhar Ali, adviser to the Department, for making a copy of the text available to me.

Abbreviations

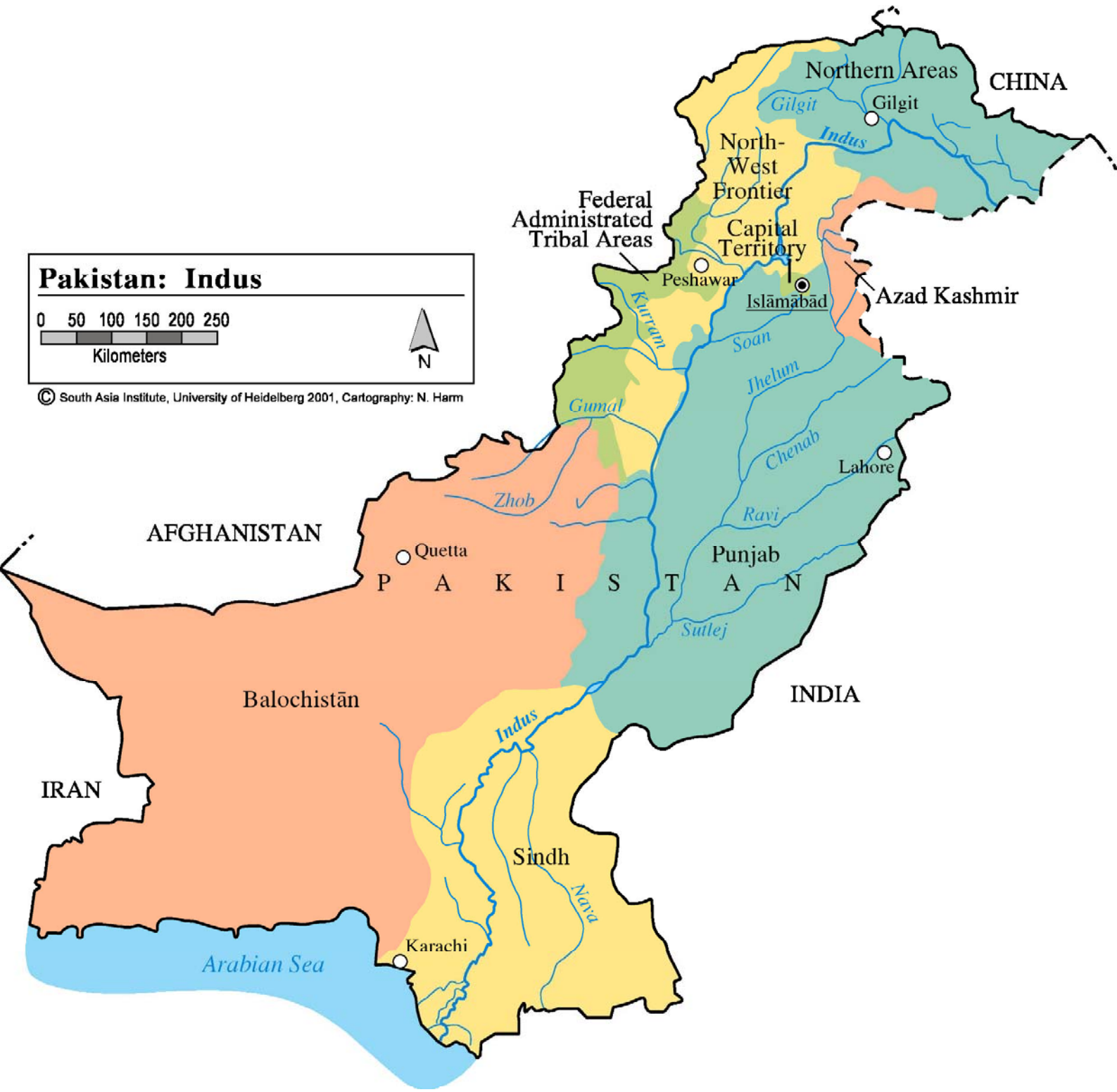
Pakistan*

CCI	Council of Common Interests (1973)
CDA	Canal and Drainage Act (1873)
FFC	Federal Flood Commission (1977)
GoP	Government of Pakistan (Islamabad)
IBDF	Indus Basin Development Fund (1964)
IPCC	Inter-Provincial Coordination Committee (1991)
IPD	Irrigation and Power Department (provincial)
IPRI	Islamabad Policy Research Institute (Islamabad)
IRS	Institute of Regional Studies (Islamabad)
IRSA	Indus River System Authority (1992)
ISSI	Institute of Strategic Studies Islamabad (Islamabad)
IWT	Indus Waters Treaty (1960)
PCWR	Parliamentary Committee on Water Resources (2003)
PIC	Permanent Indus Commission (1960)
PIDA	Provincial Irrigation and Drainage Authority (1997)
PILDAT	Pakistan Institute of Legislative Development and Transparency (Islamabad)
PMD	Pakistan Meteorological Department (Islamabad)
SDPI	Sustainable Development Policy Institute (Islamabad)
SZABIST	Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (Karachi)
TCWR	Technical Committee on Water Resources (2003)
WAA	Water Apportionment Accord (1991)
WAPDA	Water and Power Development Authority (1958)

General

ADB	Asian Development Bank
FAO	Food and Agriculture Organization (UN)
GTZ	Gesellschaft für Technische Zusammenarbeit (Association for Technical Cooperation, Government of Germany, recently renamed GIZ, Deutsche Gesellschaft für Internationale Zusammenarbeit / German Association for International Cooperation)
GWP	Global Water Partnership (UNDP, World Bank, SIDA)
IBRD	International Bank for Reconstruction and Development (World Bank)
ICID	International Commission on Irrigation and Drainage
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund (UN)
IUCN	International Union for the Conservation of Nature
IWMI	International Water Management Institute (formerly International Irrigation Management Institute, Lahore/Colombo)
NGO	Non-governmental Organization
SIDA	Swedish International Development Cooperation Agency
SIWI	Stockholm International Water Institute
UN	United Nations Organization
UNDP	UN Development Programme
UNEP	UN Environment Programme
UNESCO	UN Educational, Scientific and Cultural Organization
UP	University Press (*e.g. Oxford UP*)
WB	World Bank
WFP	World Food Programme (UN)
WHO	World Health Organization (UN)
WWF	Worldwide Fund for Nature

* Pakistani institutions with location and/or year of establishment.


Pakistan: Indus
0 50 100 150 200 250
Kilometers
N
© South Asia Institute, University of Heidelberg 2001, Cartography: N. Harm
Northern Areas
CHINA
Gilgit
Gilgit
Indus
North-
West
Frontier
Federal
Administrated
Tribal Areas
Capital
Territory
Peshawar
Islāmābād
Azad Kashmir
Kurram
Soan
Jhelum
Gumal
Chenab
Lahore
Zhob
Ravi
AFGHANISTAN
Quetta
Punjab
P A K I S T A N
Sutlej
INDIA
Balochistān
Indus
IRAN
Sindh
Nara
Karachi
Arabian Sea

DRAFT AGREEMENT BETWEEN PUNJAB & SINDH

DRAFT AGREEMENT BETWEEN THE PUNJAB AND SIND REGARDING THE SHARING OF THE WATERS OF THE INDUS AND FIVE PUNJAB RIVERS

From

THE SECRETARY TO THE GOVERNOR OF SIND.

To

THE SECRETARY TO THE GOVERNOR-GENERAL (PUBLIC),
New Delhi.

Subject :—Sind Punjab Indus Dispute.

Ref :—This office letter No. 3383-I of 10th and 19th October 1942 and of 21st Janauary 1944.

Sir,

I am directed to request that the orders of His Majesty in Council may be obtained in this dispute, and that until they are passed, the Punjab should be stopped from proceeding in any way with any of the schemes referred to in Sind's complaints, which became the subject matter of the Report of the Indus Commission (the Rau Commission).

2. The negotiations which have been proceeding between the two Governments arose out of the Commission's suggestion that mutual agreement would be the best solution to the dispute. In April 1943 discussions were started between Mr. Hawes (Chief Engineer, Sind) and Mr. Montague (Chief Engineer, Punjab). After protracted discussions and compromises from both sides on important points, an unofficial agreement on the technical issues was reached after eighteen months between Mr. Grant (Sind) and Rai Bahadur Khosla (Punjab). However on further examination, the other Chief Engineers in the Punjab were not satisfied on certain points.

3. Further discussions ensued between Mr. Grant and Messrs. Haigh and Protheroe (Punjab), when after more give and take a "draft agreement" (Annexure I) was signed by both sides on the 28th September 1945, and this agreement was subsequently officially ratified by the Punjab in their letter of the 13th October 1945 (Annexure II) subject to a satisfactory solution of the financial issue; the letter includes certain terms on which they were prepared to agree on this latter point.

4. As a result of this agreement, the Punjab asked for a postponement of the reference to His Majesty in Council by six months to enable the financial agreement to be reached. In reply by the Secretary to the Governor-General (Public's) D. O. No. 204/41-G.G.-(A.) of October 1945, His Excellency the Viceroy refused the deferment as this would delay construction work in both Provinces, and suggested that a clause be inserted providing for arbitration on the financial issue. Sind agreed entirely with this standpoint, by the Secretary to Governor's D. O. No. 1001 of the 7th November.

5. With regard to the financial issue, it is first of importance to notice that Clauses 15 and 18 of the "draft agreement" provide for no change in the allocation of water even in case there was no agreement on the financial issue, and the matter had to be arbitrated.

6. Correspondence ensued on this issue between Mr. Halford (Finance Secretary, Sind) and Mr. Foy (Chief Engineer, Punjab), copies of which are attached (Annexures III to X), whose tenor on Sind's side will be seen to be merely clarification, some other minor modifications and a readiness to depart from the "traditional" test of productivity in the interests of reaching an agreed solution; but it will be seen that from the outset, the Punjab was concerned to change the "draft agreement" on the allocation of water, and was hardly interested in discussing the financial issue at all.

7. Finally, a conference was arranged at Simla in the attempt to settle the matter, when the same attitudes were more marked. Throughout it was Sind's attempt to arrive at a decision on the financial issues involved, and it was the Punjab's stand that they were not prepared to discuss these issues unless Sind would first agree to a modification of the allocation of water. Copies of the record of the discussions are attached (Annexures XI to XIV), which were agreed to be treated as *aides memories*, and binding on neither side. From these copies it will be seen that all attempts on the part of Sind to settle the issues for wihch the conference was called proved abortive, and even when they were discussed on one of the days, the Punjab refused to make any comment at all binding even on quite simple points of financial procedure and principle.

8. The conference having failed to arrive at a decision, the Punjab promised to send a further letter on the matter, which it took them four months to do. This letter

(Annexure XV) conveyed the same arguments as before, which as the foregoing history shows, were evidently entirely unacceptable to Sind. In reply therefore Sind informed the Punjab (Annexure XVI) that the letter was entirely unsatisfactory—the technical reasons for refusing the changes put forward by the Punjab are attached (Annexure XVII)—and presumed that the *status quo* would be maintained until the orders of His Majesty in Council were received. It seems evident to Sind that it is inequitable in the extreme for the Upper Province to be allowed to prejudice the issue by even starting works which would affect the distribution of the available water, and then urge that they cannot stop them as they have already been started.

9. In reply the Punjab stated (Annexure XVIII) that the matter should be referred to His Majesty in Council, as would have occurred in the first place had the Provinces not attempted to carry out the natural course of trying to reach an agreement as proposed by the Rau Commission. This was to be expected; but it was not to be expected that at the same time the Punjab would refuse to suspend operations of the Bhakra Dam and also threaten Sind with the consequences if we carried out some of our works. As for the first point, the facts are that a complaint had been made by Sind with regard to these works (including the Bhakra Dam), and Sind had successfully urged before the Rau Commission that a recommendation be made to His Majesty in Council calling on the Punjab to suspend operations; in fact such a recommendation was made, but with a time limit of 3 years, which expired in October 1945; the time limit was imposed as apparently it was the Commission's view that the dispute should be settled within it, which for no fault of Sind's has not proved to be the case. Independently of the merits of the remainder of the case, Sind must urge that an injunction should be passed on the Punjab without delay until final orders are issued. With regard to the second point, certain works in Sind, the facts are even simpler. The Punjab presume that Sind will accept the consequences of proceeding with them, as they propose to complain to the Governor-General. The short answer to this threat is that when an official communication is addressed to Sind by the Governor-General a complete reply will be sent, and Sind is quite prepared to abide by any consequences which may ensue from the normal procedure to be followed in such matters as laid down in the Government of India Act.

10. To recapitulate, it is Sind's view that the Punjab should not be permitted to resile from the "draft agreement" since by no stretch of imagination can the correspondence and discussions on the financial issue be construed into a breakdown of negotiations. It is understood that the Punjab relies on the legal point that if an offer is not accepted as it stands, it can be impugned *in toto*, and that consequently she is at liberty to withdraw not only from the financial part of the offer, but from the water allocation part also. Sind feels that negotiations between Governments on matters as complicated as this one can scarcely proceed in this sort of way.

11. The matter may accordingly be referred to His Majesty in Council without further delay—and Sind desires to place on record that a study of the correspondence will show that she is not to blame for the inordinate time that has elapsed. Sind further seeks strong support to her request which the foregoing shows to be justified, for an immediate injunction restraining the Punjab from any action which may prejudice the proper settlement of the whole field of the dispute, including in particular operations to implement any of the schemes complained of, and as a special case, the Bhakra Dam and the Nangal weir project which is an integral part of the Bhakra Dam.

12. One final point remains. Sind recognises that the orders of His Majesty in Council can only relate to the *corpus* of her complaint, and must be related to the recommendations of the Rau Commission. But Sind is still of the view that the best method of settlement would be by mutual agreement—agreement which was so nearly reached, as the financial principles involved are not such as would take more than a few days to determine. As a last attempt at a final closure of this dispute—and orders by His Majesty in Council on the Rau Commission will leave a very substantial part of the matter unsettled, to be the subject of future complaints and future Commissions, which will continue to cause much avoidable work to the officers of both Provinces—and if it is not yet too late for such action, Sind would welcome a decision to refer the matter back to the two Provinces for settlement on the basis of the "draft agreement" on the water clauses, and for the financial issue to be settled by a commission of arbitration over the whole financial field. In other words Sind would not seek to limit the terms of reference to such a tribunal by any of the safeguards which she has so far regarded as necessary.

I have the honour to be,

Sir,

Your most obedient servant,

S. H. RAZA,
Secretary to the Governor of Sind.

Accompts :—
Annexures I to XVIII.

ANNEXURE I.

DRAFT AGREEMENT BETWEEN THE PUNJAB AND SIND REGARDING THE SHARING OF THE WATERS OF THE INDUS AND FIVE PUNJAB RIVERS.

1. *Scope of the Agreement.*

This agreement refers to the sharing of Indus water between the Punjab and Sind. The Punjab share comprises the withdrawals controlled by the Punjab from the Indus and its tributaries for the use of the Province of the Punjab and certain Indian States. The share of the Punjab under Priority V detailed below shall also include the share of the North-West Frontier Province. Sind's share under Priorities I, III, IV and V, as detailed below, comprises withdrawals for the use of the Province of Sind and Khairpur; its share under Priority II (as detailed below) is, however, for British Sind Canals only.

2. *Grading of Priorities.*

(1) To give effect to this agreement, five grades of Priorities are recognised :—

I. Existing withdrawals on—

A. Panjnad (Punjab rivers). (First Priority on Punjab rivers).

B. Indus. (First Priority on Indus Main and the next Priority on Punjab rivers).

II. Primary, *i.e.*, prescriptive supplies, for projected canals. (*i.e.*, canals specified in Clause 11).

III. Secondary additional supplies for projected canals.

IV. Storage water and other subsequent allocations.

V. Balance supplies.

(2) Except as otherwise provided, allocations under a higher priority will have precedence over those under all lower priorities.

3. *Priority I.* (*Existing Withdrawals.*)

(1) *Period* (*1st April to 30th September except as otherwise provided*).

(A). *Panjnad.* (*Five Punjab rivers.*)

(i) This priority comprises :—

(*a*) The supplies taken by old canals, *i.e.*—

(1) Northern Canals (*i.e.*, Upper* and Lower Chenab, Upper* and Lower Jhelum and Bari Doab canals).

(*For the Upper Chenab and Upper Jhelum canals, the "supplies taken" shall be the supplies used plus absorption losses).

(2) Upper Bari Doab Canal and Kashmir Canal.

(3) Sirhind Canal.

(*b*) The supplies taken in the past by the undeveloped canals, *i.e.*—

(1) Sutlej Valley Canals.

(2) Haveli Canals including the Pakpattan Link.

(3) Panjnad Canals.

with additions providing for their future development.

(ii) These withdrawals will have the first claim on the waters of the Punjab Rivers and no claims on the waters of the Indus; subject to the limitation that such withdrawals shall not on any day exceed those given in Table I (*a*)

unless, with due allowance for time lag, water is sufficient for the requirements of Priorities I-B, II and III specified below.

(B). *Indus.*

(i) This priority comprises the supplies allocated to—

(1) Thal canals.

(2) Sukkur Barrage canals including Khairpur State Canals.

(ii) The Thal and the Sukkur Barrage Canals will have an equal claim on the waters of the Indus River and of the five Punjab rivers surplus to Priority I-A subject to the limitation that the Punjab withdrawals shall not on any day exceed those given in Tables I (*a*) and I (*b*), unless with due allowance for time lag, water is sufficient to meet the requirements under Priorities II and III.

(2) *Period* (*1st October 31st March except as otherwise provided*).

(A). *Panjnad* (*Five Punjab rivers*).

(i) This priority comprises :—

(*a*) the supplies taken by old canals, *i.e.*—

(1) Northern Canals (*i.e.*, Upper and Lower Chenab, Upper and Lower Jhelum and Lower Bari Doab canals).

(2) Upper Bari Doab Canal and Kashmir Canal.

(3) Sirhind Canal.

(b) The supplies taken in the past by the Sutlej Valley Canals with additions providing for development upto perennial capacity.

(c) The supplies authorized for the Pajnad and Haveli Canals.

(d) Further allocations to Panjnad and Haveli upto their perennial capacities, as provided in B(v), below.

(ii) The withdrawal under (a), (b) and (c) above will have the first claim on the waters of the Punjab rivers and no claims on the waters of the Indus.

(iii) The withdrawal under (a) and (b) shall be limited only by the river supplies available or by the rabi capacity of the canals.

(B). *Indus.*

(i) This priority comprises the rabi supplies allocated to—

(1) The inundation canals merged in the new Sind Barrage, as prescriptive supplies, equal to the average withdrawals of the three lowest years in any decade.

(2) The inundation canals to be merged in the Punjab Indus Barrages, on their conversion to weir control as prescriptive supplies, equal to the average of the three lowest years in any decade.

(3) Sukkur Barrage Canal including Khairpur State Canals.

(4) Thal Canal, upto its authorizations.

(5) Thal canal, in addition, upto its capacity (6,000 Cs.).

(ii) The mean monthly allocations for (1) to (4) above are given in Table I (c). If Indus supplies plus Panjnad supplies surplus to Priority I-A are below the allocations of these canals; after meeting the allocations for (i) and

(2) above [*vide* Table I (c)] the balance supplies will be shared in the proportion given in Table I (d), which is based on an assumed lag of 15 days. Provided that in the period 17/2 to 8/3 (Sukkur dates) the Sukkur canals will have priority on Indus water upto their capacity of 34,000 cusecs.

(a) over Thal alone till the Punjab Indus inundation canals are converted to weir control, and

(b) over Thal and the Punjab Indus Inundation canals when the latter are converted to weir control;

while in periods 11/12 to 24/12 and 3/3 to 31/3 (Kalabagh dates),

(a) Thal will have priority upto its capacity of 6,000 cusecs till the Indus Inundation canals are converted to weir control, and

(b) Thal will have priority upto its capacity of 6,000 cusecs and the Punjab inundation canals upto the authorizations laid down in Table I (e) when the Punjab inundation canals have been brought under weir control.

(iii) During periods of shortages the Punjab shall be at liberty to make good supplies to the Thal upto its capacity by using Indus water at Kalabagh, provided that equivalent supplies of the same duration are released below Panjnad from the Punjab share of the five Punjab rivers over the same period, with due allowance for time lag and losses or gains.

(iv) When the Indus supplies plus Panjnad supplies surplus to Priority I-A are in excess of the allocations of Sukkur Barrage and Thal as specified in Table I (c), the canals, mentioned under (i) (1) and (i) (2) above, may draw supplies as laid down in Table I (e). Thereafter the Thal canal may draw on balance supplies upto its capacity of 6,000 cusecs, after which the Sukkur Barrage Canals may draw upto their rabi capacity (34,000 cusecs) subject to the proviso under (v) below. The Punjab and Sind inundation canals, when brought under weir control may then draw upto their authorized perennial capacities.

(v) The Sukkur Barrage canals have priority on Panjnad water surplus to Priority I-A until their allocations in Table I (c) are met. Thereafter Haveli and Panjnad may take water upto their capacities as given in Table I (f) after which the Sukkur Barrage Canals may withdraw upto their rabi capacity (34,000 cusecs), as in (iv) above.

(vi) The water accounts during the rabi shall be maintained and balanced in ten-day periods as well as in calendar months.

4. *Priority II.* [*Projected Canals*]*Primary*, i.e., *prescriptive supplies*)].

(1) The total withdrawal for the Punjab and Sind under this Priority are detailed in Table II (a).

They comprise :—

(a) Ravi water set free by the Haveli project, less supplies utilized in Pakpattan Link.

(b) Prescriptive rights for Grey Canals to be utilized on Bhakra Canals.

(c) Prescriptive rights of inundation canals merged in the new Sind Barrages.

(d) Prescriptive rights of the Punjab Indus inundation canals, when brought under weir control.

(2) Withdrawals for projected canals by either party may be made only when water is surplus to the actual requirements of the Punjab and the allocations of Sind under Priority I-A and I-B.

(3) When water is short of the requirements of Priority II, the balance supply left, after meeting the requirements of the Punjab and the allocations of Sind for Priority I in full, shall be divided between the Punjab and Sind in the ratio of their prescriptive rights, with due allowance for time lag, *i.e.*,—

(*a*) till the Punjab Indus inundation canals are converted to weir control in the proportions laid down for the relevant period in Table II (*b*), and

(*b*) when the Punjab Indus inundation canals are converted to weir control in the proportions laid down for the relevant period in Table II (*c*).

In both these tables a time lag of ten days has been assumed.

Thus, where Pe and Se are the Kharif allocations for the Punjab and Sind weir-controlled existing canals respectively [*vide* Tables I (*a*), I (*b*) and II (*d*)], P1 is the Punjab requirements against the allocations for their existing canals, R is the total river supply to be distributed, and n′ and 1-n′ are the proportions of prescriptive rights for Punjab and Sind respectively [*vide* Table II (*b*) or II (*c*), as the case may be], then—

Sind's share S_e plus 1—n′ (R—P_1—S_e)

Punjab's share P_1 plus n′ (R—P_1—S_e)

5. *Priority III.* [*Projected canals (Additional or Secondary supplies)*].

(1) The mean monthly withdrawals under this head are detailed in Table III (*b*) being the difference between the total allocations [*vide* Table III (*a*)] and the primary supplies of the Punjab and Sind projected canals [*vide* Table II(*a*)]. They comprise :—

Sind :—(*a*) Additional or secondary allocations for the new Lower Sind and Upper Sind Barrages.

(*b*) Allocations for Sailab areas in Khairpur and Middle Sind.

Punjab :—(*a*) Additional allocations for the Balloki Suleimanki Link or an accepted variant (*e.g.*, Marhu Tunnel).

(*b*) Flow water for Bhakra Canals (including Grey Canals), Bist Doab Canal and Sutlej Valley Sailab areas.

(2) Withdrawals for Priority III shall be made only when water is in excess of the actual requirements of the Punjab and the allocations for Sind under Priorities I(A and B) and the allocations of Punjab and Sind under Priority II.

(3) When water is short of the full requirements of Priority III, the balance supply left, after meeting the requirements of the Punjab and the allocations of Sind under Priorities I (A and B) and II in full, shall be divided between the Punjab and Sind in the proportions laid down for that period in Table III (*c*) which is based on an assumed time lag of 10 days. Thus, where

P_A = allocations for the Punjab existing canals [*vide* Tables I (*a*) and I (*b*)] plus the prescriptive rights for the Punjab projected canals (*vide* Table II (*a*)].

P_1 = the prescriptive rights of the Punjab projected canals [*vide* Table II (*a*)] and the *actual* Punjab requirements for the period against the allocations of their existing canals.

S_A = allocations for the Sukkur Barrage Canals plus the prescriptive rights of the new Lower and Upper Sind Barrages, [*vide* Tables II (*d*) and II (*a*)].

R = total river supplies to be distributed between existing and projected canals.

$\overline{n}$ & 1—$\overline{n}$ = the share ratios of Punjab and Sind respectively of the secondary or additional supplies [*vide* Table III (*c*)].

Sind's share S_A plus 1—$\overline{n}$ (R—P_1—S_A).

Punjab's share p_1 plus $\overline{n}$ (R—P_1—S^A).

(4) Whenever water is short of the total authorizations of the three Sind Barrages, the withdrawals of the Balloki Suleimanke Link or its accepted variant (*e.g.*, Marhu Tunnel) will be limited to Punjab's unused share for the projected canals under Priority III or to a daily maximum withdrawal as specified in Table III(*d*), Column 2, whichever is less.

(5) The provision of this clause shall be subject to the conditions laid down in sub-clause (6) of clause 6.

6. *Priority* IV. (*Storage water and other subsequent allocations*).

(1) The provisions of sub-clauses 2 to 5 (inclusive) shall have effect subject to the conditions laid down in sub-clause 6.

(2) After the indents of the two new Sind Barrages and the Sukkur Barrage upto their allocations have been met, the Punjab shall be entitled to withdraw the allocations detailed in Table IV (*a*) for use by flow comprising :—

(*a*) 2nd allocations for the Thal canals.

(b) 2nd additional allocations through the Balloki Suleimanke Link or its accepted variant (*e.g.*, Marhu Tunnel) subject to the proviso of sub-clause (3) below.

(*c*) 2nd allocations to Punjab existing canals on the Panjnad.

(3) After the indents of the three Sind Barrages, upto their allocations have been met, the withdrawals under sub-clause (2) (*b*) above shall be restricted to the unused portion of Punjab's share for the projected canals under Priority III or to the mean monthly figure given in column 3 of Table III (*d*), whichever is less.

(4) In the months of July and August, however, the link or its accepted variant may transfer water under this Priority, subject to the proviso of clause 5 (4), up to a limit of 19,300 cusecs for supplementing the Punjab canals or for the generation of hydro-electric power, in which case water will flow down the Sutlej instead of the Chenab.

(5) After the indents of the two new Sind Barrages and the Sukkur Barrage Canals, upto their allocations have been met, the Punjab shall be at liberty to store at the storage specified in clause 11 upto the limits of their respective capacities shown therein. Such storage water may be subsequently released and used at will. Storage water so used will not count against allocations of flow water under any priority.

(6) Withdrawals by the Punjab for their projects specified in Clauses 11 and 12 (*c*), falling under Priorities III and IV, shall be subject to the following conditions :—

(*a*) no withdrawals shall be made for any such project before 1954 or before the completion of both the new Sind Barrages whichever is earlier, except as provided in sub-clause (*d*) below ;

(*b*) in the years 1954 to 1957, withdrawals may be made for—

(i) the Punjab projected canals, as specified under Priority III ;

(ii) storage at Bhakra, except in the period 1st to 30th September ; and

(iii) storage at Dhiangarh and the other small storages in July and August only [Sukkur dates with respect to (i) and (ii)].

(*c*) even after the year 1957, withdrawals for the Dhiangarh Dam and the small storages shall be made during the calendar months of July and August only (Sukkur dates), except as may be subsequently provided under clause 14 (2).

(*d*) Punjab may construct at any time the Bist Doab canal scheme and its linked storage dams on the Soan and Sirsa torrents provided that the combined live storage capacity at these two dams does not exceed 500,000 acre-feet and provided that no water shall be stored in these reservoirs nor direct withdrawals made into the canal from the river, in the months other

than July and August (Sukkur dates) if as a result of such withdrawals the supplies to the Sind inundation canals or the new Sind Barrage Canals likely to fall below the prescriptive supplies as laid down in Table II (*a*).

7. *Priority V.* (*Balance supplies*).

(1) Until the expiry of the period specified in Clause 12, either party will have the right to use water surplus to Priorities I to IV in any canal or storage reservoir upto the limit of its capacity, but such use will not confer any prescriptive rights in respect of any additional withdrawal taken under this sub-clause. Such additional withdrawals may be made only with the previous consent of the other party. This consent will be given, as early as practicable, and may only be refused by the other party if *in its opinion*, the additional withdrawal is likely to injure its interests.

(2) After the expiry of the period specified in Clause 12, the balance supplies including water used under sub-clause (1), will become the property of the parties in the proportions laid down in Table V (*a*) and either party may thereafter frame and carry out projects for the use of such waters with the consent of the other party. The second party will have the right to object to the construction of such projects only if it can show that the projects infringe its rights under this agreement.

(3) For the purpose of sharing under this clause :—

(i) The balance supply in Indus at Ghazighat shall be obtained by deducting from the measured discharge at Ghazighat, the equivalent at Ghazighat, after allowing for losses or gains, of :—

(*a*) the existing rights between Ghazighat and Mithankot [*vide* Table V (*b*), Column 2] ;

(*b*) the authorized withdrawals for Sukkur Barrage canals and the new Sind Barrages and the existing rights of the Middle Sind Inundation canals and Middle Sind and Khairpur Sailab areas [*vide* Table V (*c*)] ; and

(*c*) the authorized withdrawals of Thal [*vide* Table V (*b*)] minus the actual withdrawals.

75 per cent. of this balance supply shall be taken as Sind's share of the Indus at Ghazighat and transferred to Gudu.

(ii) The balance supply from the five Punjab rivers at Panjnad shall be obtained by deducting from the measured discharges at Panjnad (below)—

(*a*) the existing rights of the Punjab canals [as specified in column 4, Table V (*b*)] minus the actual withdrawals at the time ; and

(*b*) the equivalents, at Panjnad of the authorized withdrawals of the Punjab projects [*vide* columns 5 and 6 of Table V (*b*) and of withdrawals for storage (*vide* clause 6)] minus the actual withdrawals in these at the time.

The shares of this balance supply from the five Punjab rivers at Panjnad for the Punjab and Sind shall be as laid down in Table V (*a*). The shares from the Panjnad as so calculated shall be added to the shares of each party from the Indus Main, obtained under sub-clause (3) (1), to give the Party's total apportionment of the balance supplies under Priority V.

(4) In the event of disagreement under sub-clause (2) *supra*, the matter in dispute shall be referred to arbitration as provided under Clause 17.

8. *Rights of Inundation Canals.*

(1) Inundation canals have the right to take whatever river levels permit. The existing authorized capacities of the inundation canals shall not be increased to take increased supplies until such time as they come under weir-control. No water will be specially released in order to ensure any water levels required for them.

(2) Whenever any inundation canals are brought under weir control they will be given supplies as under :—

(*a*) during Kharif under Priority II—

(i) for the months of April, May and June equal to the average withdrawals of these canals in any ten consecutive years prior to the date of this agreement ;

(ii) for the months of September and October supplies equal to average withdrawals of the canals in the same or any other ten year period prior to the date of this agreement.

(iii) for the months of July and August full authorized discharge of the canals ;

and (*b*) during rabi (November to March) under Priority I—

(i) in periods when river supplies are short of the authorizations of the Sukkur Barrage Canals and Thal, supplies equal to the average of the three lowest years in any ten consecutive years prior to the date of this agreement ; and

(ii) in other periods supplies equal to the average withdrawals in any ten consecutive years prior to the date of this agreement.

(3) Additional supplies for such future projects shall be met from the party's apportionment of balance supplies and will rank under Priority V.

9. *Provisions relating to Sharing of Supplies.*

(1) (*a*) The share supplies specified under Priorities I to IV shall be given at the off-takes of the canals mentioned therein or their accepted variants.

(*b*) The Punjab Government shall be responsible to see that Sind is supplied its due share of water under Priorities I to IV. Should the Punjab at any time use, or store, any water to which Sind has a right, an equivalent supply of water shall be returned to Sind from the supplies to which the Punjab has at that time a right. This return shall be made at such rates of release and at such times within two months of the commencement of such use or storage, as shall be selected by Sind, and at such site at which it is practicable to return the water.

(*c*) Water permitted by Sind to be wasted to the sea at times when it might have been used to meet Sind's rights, *i.e.*, up to indents under this Agreement shall be considered to have been so used and Sind shall have no rights under this Agreement in respect of any shortage of supply which might have been avoided by the use of this water.

(2) (*a*) For sharing balance supplies under Priority V, the share for the Punjab shall be as at Ghazighat in respect of Indus supplies and as at Panjnad in respect of supplies in the five Punjab rivers and the supplies for Sind shall be as at Gudu.

(*b*) If any supply in excess of the Punjab share is withdrawn by the Punjab, the Punjab shall return to Sind an equivalent supply of water in any 15-day period within two months of the excess withdrawal, the period to be fixed at the discretion of Sind.

10. *Transference of Share Supplies.*

Either party may use the water to which it has a right in any of its canals at will subject to the limit of existing or agreed capacities and subject further to the following provisos :—

(*a*) Allotments to the Punjab for its canals under Priorities I to IV on the Panjnad shall not be met from the Indus.

(*b*) In periods when supplies under Priorities II and III are not sufficient for the Sind projected canals, the Punjab shall not transfer supplies allotted for its existing canals under Priority I to its projected canals or their accepted variants ; but when water is surplus to the full requirements of the three Sind Barrages, supplies allotted for the Punjab existing canals may be transferred to its projected canals provided that during the periods of years specified in clause 12 the previous consent of Sind will be obtained.

(c) Any transfer of supplies between projected canals *inter-se*, in the Punjab, shall be restricted to periods of shortages on the Sutlej-cum-Beas and be limited—

(i) during periods of shortages for the three Sind Barrages, to the unused share of the projected canals or to a daily maximum withdrawal specified in column 2 of Table III (*d*), whichever is less;

(ii) in other periods, to the unused share of projected canals or the mean monthly withdrawals given in column 3 of Table III (*d*), whichever is less.

11. *Projected Canals and Storages.*

(1) The construction of the following works is agreed to :—

I. *Sind.*

(*a*) A Barrage across the Indus in Upper Sind with canals of 40,000 cusecs capacity.

(*b*) A Barrage across the Indus in Lower Sind with canals of 47,000 cusecs capacity.

(*c*) Canals from Sukkur Barrage of capacity of 2,000 cusecs for Sailab areas.

II. *Punjab.*

(*a*) A link or links totalling 19,300 cusecs capacity from the Chenab and the Ravi to the Sutlej.

(*b*) The Bhakra Dam with a live storage capacity of 40,00,000 acre-feet.

(*c*) The Dhiangarh Dam with a live storage capacity of 25,00,000 acre-feet.

(*d*) Four small storages on the tributaries of the Punjab rivers as under :—

Three storages on Ravi (including Deg) ...	10,28,520	
Woolar Lake on Jhelum	3,34,000	
	13,62,520	
Less : Deg storage	4,34,520	
	9,28,000 acre ft.	

(*e*) The Bhakra Canals with a capacity of 13,000 cusecs.

(*f*) An increase of Kharif capacity of Thal canal to 10,000 cusecs.

(*g*) The Bist Doab canal with a capacity of 1,200 cusecs and storages on the Sirsa and Soan Torrents of an aggregate capacity of 500,000 acre-feet.

(*h*) An increase of capacity of the Sutlej Valley Canals of 1,800 cusecs for Sailab areas of Bahawalpur and Punjab.

(2) Either party may with the consent of the other party substitute a substantially equivalent variant or variants for any one or more of these works. The second party shall have the right to withhold such consent only if they can show that the variant or variants proposed will throw a greater burden on the river supplies than the replaced project or projects. Provided that the Punjab shall not construct more than two major storage dams (including the Bhakra), each having a capacity exceeding 500,000 acre-feet.

(3) In the event of disagreement under sub-clause (2), the matter in dispute shall be referred to arbitration as provided under clause 17.

12. *Future Projects.*

(1) No new works other than those specified in clause 11 or modification of old works designed with the object of increasing river withdrawals will be constructed by

either party without the consent of the other party, until after the expiry of 10 years from the date of completion of the two new Sind Barrages, or 20 years from that of the first Barrage, or twenty-five years from the date of agreement, whichever is earlier provided that—

(*a*) minor projects involving a storage capacity of less than half a million acre-feet or a canal capacity of less than 1,500 cusecs may be undertaken earlier by either party after obtaining the specific consent of the other party; and

(*b*) until the new Sind Barrages are built, no withdrawals for storage or direct supplies to new canals shall be made in September (Sukkur dates);

(*c*) subject to the conditions of clauses 3 and 4 and sub-clause (2) below, the Punjab shall be permitted to construct a barrage across the Indus above Ghazighat with canals not exceeding 20,000 cusecs capacity.

(2) Any additional supplies required for projects constructed under sub-clause (1) above shall be met from the party's share under Priority V.

13. *Sind Non-Perennial Canals.*

The non-perennial canals of the Sukkur Barrage and the two proposed new Sind Barrages may be opened in the first fortnight of April and may remain open from 16th to 31st October if water is surplus to the requirements of the Panjnad and Haveli canals as specified in paras. 25, 26 and 34 (*b*) of the Anderson Committee Report (1935), Vol. I, provided that no prescriptive rights shall be established by Sind in respect of these additional withdrawals. Nothing in the above shall adversely effect the existing rights of the Sutlej Valley Canals in this respect.

14. *Sharing of flow rights and freshets.*

(1) Irrespective of whether allocations under Priority I are met or not, the Punjab shall be entitled to store water in the Bhakra Reservoir in the months of November, February, March and April whenever the combined discharges of the Sutlej and Beas rivers is less than 19,000 cusecs and in the months of December and January whenever the combined discharges of the rivers is less than 17,000 cusecs. For the purpose of this clause the Sutlej discharge shall be the storage at Bhakra plus the discharge at Rupar (above) and that of the Beas shall be at Mandi Plain.

(2) When other storage reservoirs are constructed by the Punjab, the question of giving similar storage rights will be considered and the Punjab will be given such rights as are compatible with no injury to Sind.

(3) The Punjab and Sind shall have the right during the period 1st January to 31st March (Punjab dates) to store or use by flow in any of their canals half the freshet water as measured at the point of offtakes of these withdrawals. Freshet water is defined as all water in excess of Sind and Punjab withdrawals under Priority I (A and B).

(4) The Punjab shall have the right to diurnal storage at any time when this is necessitated by variations within the twenty-four hours in the electrical load; but the total volume of water discharged from a reservoir, within every period of twenty-four hours, shall be not less than that entering the reservoir except when this is inconsistent with the day to day storage permissible under this agreement.

(5) In the event of disagreement under sub-clause (2) *supra*, the matter in dispute shall be referred to arbitration as provided under clause 17.

15. *Allocations not to be revised.*

Allocations made under this agreement shall not be revised or prejudicially affected without the consent of both the parties.

16. *River data, etc.*

(1) Accurate measurements of river discharges shall be made *jointly* by Sind and Punjab, at all discharge sites, in the Punjab and Sind, with up-to-date equipment (including launches) and by the most modern method known at the time. For this purpose, one or more observers of Sind shall be permitted by the Punjab to be stationed at each Punjab site, in the hills or in the plains, as selected by Sind, and one or more observers of Punjab shall be permitted by Sind to be stationed at Sind discharge sites, as selected by the Punjab. Such observers shall take original and check measurement, either jointly or individually as may be considered necessary; and when duly signed by the parties, shall be considered to be correct.

(2) Gauges and discharges data of rivers, canals and storages should be made available to both the parties at agreed intervals in the quickest practicable manner.

(3) Wherever time lags have been provided in this agreement on assumed figures, these figures will be liable to modification in the light of experience gained, subject to agreement of both the parties.

(4) Wherever figures of percentage for losses and gains are required for the operation of the Agreement, such figures shall be determined in the light of experience gained, subject to agreement of both the parties.

(5) In the event of a dispute as to the scope or operation of this clause, the matter in dispute shall be referred to arbitration as provided under clause 17.

17. Any disputes for which arbitration has been provided under clauses 7 (4), 11 (2), 14 (2) and 16 shall be referred to an officer to be appointed by the Government of India who shall be acceptable to both parties and whose decision shall be final, and binding on the parties.

18. Agreement on all these clauses is subject to a satisfactory settlement of the financial issues on the lines of clauses (III), (IV) and (V) of the Grant Khosla Memorandum of February 1945 or by any other method acceptable to both parties.

Chief Engineer in Sind.

(Sd.) J. L. GRANT.

28th September 1945.

Chief Engineer, Punjab.

(Sd.) E. L. PROTHEROE.

(Sd.) F. F. HAIGH.

28th September 1945.

SIND-PUNJAB AGREEMENT

Table I (a)

[Reference Clause 3 (1) (A).]

Daily maximum withdrawals during Kharif to which the existing Punjab weir-controlled canals on the five Punjab rivers shall be limited during periods in which water is insufficient for Priorities II and III.

Month.	Period (Punjab dates).	In thousand cusecs.	Remarks.
	KHARIF.		
April	1—15	36.7	
	16—30	42.6	
May	1—10	54.9	
	11—20	60,0	
	21—31	68.2	
June	..	80,9	
July	..	88.3	
August	..	88.7	
September	1—10	98.5	
	11—20	94.0	
	21—30	88.3	

SIND PUNJAB AGREEMENT

Table I (b).

[Reference Clause 3 (1) (B).]

Daily maximum withdrawals on the Indus during Kharif to which the Thal Canal, under Priority I-B, shall be limited during periods in which water is insufficient for Priorities II and III.

Month.	Period (Punjab dates).	Thal (in cusecs).	Remarks.
April	1—15	4,000	
	16—30	4,000	
May	1—10	4,000	
	11—20	5,000	
	21—31	6,000	
June	..	6,000	
July	..	6,000	
August	..	6,000	
September	1—10	6,000	
	11—20	6,000	
	21—30	6,000	

SIND-PUNJAB AGREEMENT

Table I (c).

[*Reference Clause* 3 (2) (*B*) (*ii*).]

Mean monthly allocations for Sind and Punjab existing Canals under Priority I-B during the period November—March.

(*Allocations in cusecs*).

Month.	Prescriptive supplies of Sind inundation canals merged in projected Sind Barrages.	Prescriptive supplies of Punjab inundation canals to be merged in the Punjab Barrage on the Indus above Dera-Ghazi-khan.	Sukkur Barrage.	Thal.	Remarks.
1	2	3	4	5	6
November	1,435	973	23,482	6,000	
December	607	795	25,548	5,000	
January	532	485	24,923	2,000	
February	578	483	24,923	3,000	
March	430	656	25,721	3,600	

SIND-PUNJAB AGREEMENT

Table I (d).

[*Reference Clause* 3 (2) (*B*) (*ii*).]

Proportions for sharing supplies between Sukkur Barrage and Thal during periods of shortages in rabi, subject to the provisos of Clause 3 (2) (B) (*ii*).

Month.	Period Punjab dates.	Proportions for		Remarks.
		Punjab.	Sind.	
October	1—15	.157	.843	
	16—31	.204	.796	
November	1—15	.193	.807	
	16—30	.180	.820	
December	1—15	.073	.927	
	16—31	.074	.926	
January	1—15	.074	.926	
	16—31	.074	.926	
February	1—15	.126	.874	
	16—28	.123	.877	
March	1—15	.123	.877	
	16—31	.114	.886	

SIND-PUNJAB AGREEMENT.

Table I (e).

[Reference Clause 3 (2) (*B*) (ii).]

Supplies allocated to Punjab and Sind inundation canals when converted to weir control, when river supplies are in excess of the authorizations of Thal and Sukkur Barrage, in the periods November—March.

(In cusecs).

Month. 1	Supplies of Sind Inundation canals in the Projected Sind Barrage. 2	Supplies to the Punjab Indus Inundation canals when brought under weir control. 3	Remarks. 4
November	2,025	1,586	
December	1,157	1,282	
January	927	943	
February	941	888	
March	749	1,195	

SIND-PUNJAB AGREEMENT

Table I (f).

[Reference Clause (3) (2) (*B*) (V).]

Capacities of Haveli and Panjnad canals during Rabi.

Months.	Haveli. (in cusecs.)	Panjnad. (in cusecs.)	Remarks.
November to March	2,750	1,500	SOURCE.—Anderson Committee Report.

SIND-PUNJAB AGREEMENT

Table II (a).

(*Reference Clause* 4).

Primary *i.e.*, prescriptive supplies of projected canals in the Punjab and Sind under Priority II.

Period.	Primary supplies. Sind.	Primary supplies. Punjab weir controlled canals.	Punjab Indus Inundation canal on conversion to weir control.	Remarks.
April .. ..16—30..	904	452 (Apr. 1—30)	1,500 (Apr. 1—30)	
May	4,991	1,111	5,800	
June	28,984	3,530	11,200	
July	82,843	3,859	Full supply capacities not exceeding 20,000 cusecs.	
August	80,191	3,586		
September .. .. 1—10..	52,000	3,470	10,400	
11—20	37,000	2,213	7,400	
21—30..	22,000	866	4,400	
October .. .. 1—15..	5,466	352 (Oct. 1—31)	2,700 (Oct. 1—31)	

Table II (b)

(*Reference Clause 4*).

Proportions for sharing water available under Priority II [Primary, *i.e.*, prescriptive supplies for the Sind and Punjab projected canals) when water is insufficient for the total requirements of Priorities I-A, I-B and II (Time lag 10 days), *before* the Indus Inundation Canals are brought under weir control.

Month.	Period (Punjab dates).	Proportions for		Remarks.
		Punjab.	Sind.	
April	16—20	.333	.667	
	21—30	.083	.917	
May	1—10	.182	.818	
	11—20	.182	.818	
	21—31	.037	.963	
June	1—10	.109	.891	
	11—20	.109	.891	
	21—30	.041	.959	
July	1—10	.045	.955	
	11—20	.045	.955	
	21—31	.046	.954	
August	1—10	.043	.957	
	11—20	.043	.957	
	21—31	.064	.936	
September	1—10	.086	.914	
	11—20	.091	.909	
	21—30	.137	.863	
October	1—5	.061	.939	

SIND-PUNJAB AGREEMENT

Table II (c)

(Reference Clause 4).

Proportions for sharing water available under Priority II (Primary supplies, *i.e.*, prescriptive supplies for the projected canals in the Punjab and Sind) when water is insufficient for the total requirements of Priorities I-A, I-B and II (with time lag of 10 days), *after* the Punjab Indus Inundation Canals have come under weir control.

Month.	Period (Punjab dates).	Proportions for		Remarks.
		Punjab.	Sind.	
April	10—20	.683	.317	
	21—30	.281	.719	
May	1—10	.581	.419	
	11—20	.581	.419	
	21—31	.193	.807	
June	1—10	.337	.663	
	11—20	.337	.663	
	21—30	.151	.849	
July	1—10	.224	.776	
	11—20	.224	.776	
	21—31	.229	.771	
August	1—10	.227	.773	
	11—20	.227	.773	
	21—31	.312	.688	
September	1—10	.273	.727	
	11—20	.304	.696	
	21—30	.491	.509	
October	1—5	.358	.642	

Note.—The ratios for July and August are calculated with an assumed capacity of 20,000 cusecs for the Punjab Indus Inundation canals and would change if the capacity is revised.

SIND-PUNJAB AGREEMENT

Table II (d).

(Reference Clause 4).

Kharif allocations of the existing weir controlled Sind Canals.

Month.	Allocations (cusecs).
April	27,896
May	38,660
June	44,763
July	45,763
August	45,763
September	45,763
October	32,339

SIND-PUNJAB AGREEMENT

Table III (a).

(Reference Clause 5).

Total allocations for the Sind and Punjab projected canals and for Khairpur Sailab areas under Priority III.

Period.		MEAN MONTHLY ALLOCATIONS.				Remarks.
		Projected Sind Barrages.	Khairpur State and Middle Sind Sailab areas.	Total for Sind.	Punjab.	
1		2	3*	4	5	6
April	16—30	13,563	..	13,563	2,600	
May	..	34,504	..	34,504	20,455	
June	..	65,122	2,000	67,122	20,455	
July	..	82,843	2,000	84,843	19,210	
August	..	80,191	2,000	82,191	20,455	
September ..	1—10	80,200	2,000	82,200	20,455	
	11—20	60,000	2,000	62,000	17,605	
	21—30	40,000	2,000	42,000	16,655	
October	1—15	24,012	2,000	26,012	1,200	

*In column (3) 600 cusecs are provided for Khairpur State Sailab areas and 1,400 cusecs for British Sind Sailab areas between Sukkur and Kotri in Middle Sind.

SIND-PUNJAB AGREEMENT

Table III (d).

[Reference Clauses 5 (4), 6 (3) and 10 (c)].

Limits of transference of unused share for the Punjab projected canals under Priority III and under Priority IV.

Punjab dates.		UNDER PRIORITY III.	UNDER PRIORITY IV.
		Unused share of Punjab projected canals limited to daily maximum figures as under:—(cusecs).	Unused share for Punjab projected canals limited to mean monthly figures as under :—(cusecs) .
1		2	3
April		452	18,055
May		5,000	6,800
June		5,000	11,800
July		5,000	19,300
August		5,000	19,300
September	1—10	5,000	18,300
	11—20	5,000	11,800
	21—30	5,000	6,800
October		347	16,655

SIND-PUNJAB AGREEMENT

Table III (b).

(Reference Clause 5).

Additional (or Secondary) allocations for the projected Sind and Punjab Canals and for Khairpur and Middle Sind Sailab areas under Priority III.

(Assumed time lag 10 days).

PUNJAB.			SIND.		
Punjab months.	Punjab dates.	Additional allocations or secondary supplies.	Corresponding Sind dates.		Additional allo4ations or secondary supplies.
1		2	3		4
April	6—15	2,148	April	16—25	12,659
	16—20	2,148		26—30	12,659
	21—30	2,148	May	1—10	29,513
May	1—10	19,344		11—20	29,513
	11—20	19,304		21—31	29,513
	21—31	19,344	June	1—10	38,138
June	1—10	16,925		11—20	38,138
	11—20	16,925		21—30	38,138
	21—30	16,925	July	1—10	2,000
July	1—10	15,351		11—20	2,000
	11—20	15,351		21—31	2,000
	21—31	15,351	August	1—10	2,000
August	1—10	16,869		11—20	2,000
	11—20	16,869		21—31	2,000
	21—31	16,869	September	1—10	30,200
September	1—10	16,985		11—20	25,000
	11—20	15,392		21—30	2,000
	21—30	15,789	October	1—10	20,546
October	1—5	848		11—15	20,546

SIND-PUNJAB AGREEMENT

Table III (c).

(Reference Clause 5).

Proportions for sharing water available for Priority III (secondary supplies, *i.e.*, total allocations less primary supplies) for the Sind and Punjab during periods of shortages (assumed time lag ten days).

Month (Punjab dates).	Proportion for		Remarks.
	Punjab.	Sind.	
1	2	3	4
April .. .. .. 6—15	.145	.855	*Source*:—Derived from Table III (*b*) excluding 2,000 cusecs for Sailab areas for Khairpur and Middle Sind in June, July, August, September and October from the figures for additional allocations for the Sind projected canals.
16—20	.145	.855	
21—30	.068	.932	
May .. .. .. 1—10	.396	.604	
11—20	.396	.604	
21—31	.349	.651	
June .. .. .. 1—10	.319	.681	
11—20	.319	.681	
21—30	1.000	Zero	
July .. .. .. 1—10	1.000	Zero	
11—20	1.000	Zero	
21—31	1.000	Zero	
August .. .. 1—10	1.000	Zero	
11—20	1.000	Zero	
21—31	.374	.626	
September .. .. 1—10	.425	.575	
11—20	.461	.539	
21—30	.460	.540	
October .. .. 1—5	.044	.956	

SIND-PUNJAB AGREEMENT

Table IV (a).

(Reference Clause 6).

Mean monthly withdrawals of further allocations under Priority IV to the Punjab existing canals and other subsequent allocations to the Punjab projected canals or variants *(in thousand cusecs)*.

Months in Punjab.	Punjab further allocations.			Remarks.
	Further allocations to Further existing canals.		*Ex*-Marhu Tunnel.	
	On Panjnad.	For Thal on Indus.		
1	2	3	4	5
April	10.3	6.0	15.5	
May	6.4	5.0	1.8	
June	Zero ..	4.0	6.8	
July	Zero ..	4.0	14.3	
August	Zero ..	4.0	14.3	
September 1—10	Zero ..	4.0	13.3	
11—20	Zero ..	4.0	9.7	
21—30	Zero ..	4.0	5.6	
October 1—15	Zero ..	4.0	15.5	

SIND-PUNJAB AGREEMENT

Table V (*a*).

(Reference Clause 7).

Proportions for sharing balance supplies available under Priority V for the Punjab and Sind.

Month.	Indus.		Five Tributaries.	
	Punjab at Ghazighat.	Sind at Gudu.	Punjab at Panjnad.	Sind at Gudu.
April	25	75	62	38
May	25	75	66	34
June	25	75	94	6
July	25	75	94	6
August	25	75	94	6
September	25	75	66	34

SIND-PUNJAB AGREEMENT

Table V (b).

(Reference Clause 7).

Allocations made to the Punjab to be deducted from measured discharges at Ghazighat-Panjnad before distribution of balance supplies available under Priority V between Sind and Punjab.

Period (Punjab dates).		Mean monthly allocations in thousand cusecs of—				
		Inundation canals between Ghazighat and Mithankot.	Thal.	Canals on the five Punjab rivers including inundation canals	Punjab Projected canals.	Additional through the Link or its accepted variant, equal to Panjab's unused share for the projected canals limited to the following.
April	1—15 ..	0.7	10.0	51.8	....	....
	16—30 ..	1.0	10.0	51.8	2.6	15.5
May	.. ..	2.9	10.0	70.8	20.5	1.8
June	.. ..	6.5	10.0	83.8	20.5	6.8
July	.. ..	7.9	10.0	90.5	19.2	14.3
August	.. ..	7.5	10.0	91.8	20.5	14.3
September	1—10 ..	4.0	10.0	93.8	20.5	13.3
	11—20 ..	4.0	10.0	93.8	17.6	9.7
	21—30 ..	4.0	10.0	93.8	17.1	5.6

SIND-PUNJAB AGREEMENT

Table V (c).

(Reference Clause 7).

Allocations made to Sind to be deducted from measured discharge at Ghazighat before distribution of balance supplies available for Priority V between Sind and Punjab.

Period (Sind dates).		Mean monthly allocations in cusecs.			
		Sukkur Barrage.	Middle Sind inundation Canals.	Sailab areas in Middle Sind and Khairpur.	Upper and Lower Sind Barrages.
1		2	3	4	5
April	16—30	27,896	324	....	13,563
May	....	38,658	354	....	34,504
June	....	44,763	354	2,000	56,122
July	....	45,763	4,755	2,000	82,843
August	....	45,763	4,755	2,000	80,191
September	1—10	45,763	354	2,000	80,200
	11—20	45,763	354	2,000	60,000
	21—30	45,763	354	2,000	40,000
October	1—15	32,339	350	2,000	24,012

From

E. L. PROTHEROE, ESQUIRE, I.S.E.,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

To

THE SECRETARY TO THE GOVERNMENT OF SIND,
Finance Department, Karachi.
No. 013 Cn. Dated Lahore, the 13th October 1945.

SIND-PUNJAB INDUS DISPUTE

Sir,

I am directed to acknowledge receipt of your letter No. 1442-W. and S., dated 2nd October 1945, regarding the above and to say that the contents thereof have received the careful attention of the Punjab Government.

2. I am to confirm that the tentative agreement reached by the Engineer representative of the two Governments in their recent discussions at Karachi are acceptable to the Punjab Government, provided it is accompanied by a satisfactory solution of the financial issue.

3. Regarding the latter, it is noted that Sind considers it would be a concession on their part to accept a limitation of the suggested Punjab contribution to the cost of the new Sind Barrages to a minimum of three and a maximum of five crores. The Punjab also, after carefully considering this proposal, are of the opinion that such limitation is not desirable, and consequently this suggestion may be discarded.

4. The Punjab Government notes that the Sind Government were prepared to accept the proposal of the Grant-Khosla Memorandum of February last for assessment of the Punjab contribution by an independent committee and also to agree to the repayment clause. The Punjab Government is also prepared to entrust the assessment of this contribution, if it cannot be decided by agreement, to an independent committee. They consider, however, that the terms of reference suggested for the committee in the Grant-Khosla Memorandum are not quite suitable in that they impose on the committee the artificial standard that productivity shall be attained in a period of ten years. The Punjab Government consider that all components of the standard of productivity to be applied to the projects should be a matter for the committee itself to decide, and consequently the terms of reference should be framed in more general terms.

5. They also consider that the repayment clause of the Grant-Khosla Memorandum is not suitable in that it defines the profits of the projects as the difference between the return and an artificial productivity standard. A productivity standard usually contains provision for possible errors in estimating which is reasonable when applied to estimated figures. When however the profits are being calculated from actual revenue, working expenses and interest charges, there is no necessity for such a margin or for any artificial productivity standard. The actual profits should be taken *i. e.*, the difference between net revenue and the interest charges.

6. The Punjab Government have not yet received the statement of data regarding the new projects, which the Sind Government have so kindly promised to supply. They doubt, however, whether the data at present available would be sufficient for the framing of an accurate estimate of the proposed contribution. In any case, they are assured that it is quite impossible for an adequate examination of the financial prospects of these large projects to be made within a period of less than six months. They consider, therefore, that no useful purpose would be served by the suggested meeting of Ministers.

7. I am to say, however, that without prejudice to any claims that may be urged by the parties should the matter ultimately be referred to His Majesty's Government for decision, the Punjab Goverumet is prepared to agree to a settlement of the financial issue of the dispute on the terms detailed in the enclosed memorandum. These terms provided time for consideration of the Projects when ready, with a view to fixation of the contribution by Agreement, and failing this, arbitration by an independent committee on the lines of the Grant-Khosla Memorandum modified in accordance with the above. I am also to draw attention, in this connection, to the fact that, as a final concession to Sind in the interests of a quick settlement of the case, the repayment clause in these terms has been modified to reduce the rate of repayment to half the profits in any year instead of the whole.

8. The Punjab Government trusts that the Government of Sind will find these terms acceptable and thus enable both Governments to report a satisfactory settlement of this long out-standing dispute to the Governor-General.

I beg the honour to be,
Sir,
Your most obedient servant,

(Sd.) E. L. PROTHEROE,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

Enclosure :—

As above.

Memorandum of terms for settlement of the Sind Punjab Indus Dispute on the financial issue.

---

1. It is agreed that if it is established that the execution of the New Barrage Projects will result in financial loss to Sind, the Punjab will contribute towards the cost of these Projects a sum sufficient, with reasonable certainty, to obviate this loss.

2. Sind shall prepare these projects and shall provide the Punjab in due course with copies thereof together with their estimate of the amount of such contribution, if any.

3. The Punjab after examination of the Projects may accept Sind's estimate of the contribution or, if it is unable to accept Sind's estimate, may make its own estimate of an equitable contribution and forward the same to Sind with an explanation of the method by which the amount has been arrived at.

4. While the Punjab's estimate of the contribution is under preparation, Sind shall supply expeditiously any additional information that the Punjab may require, but the Punjab estimate shall be made available to Sind within six months of receipt of the Projects.

5. Should the contribution offered by the Punjab to Sind be unacceptable to the latter it shall be assessed by an independent committe to be formed for the purpose, whose award shall be binding on both parties. In case of disagreement among members of the Committee, the majority decision will be accepted as the award of the Committee. This committee shall consist of:—

(*a*) Two Chief Engineers from the Central Board of Irrigation or elsewhere unconnected with the Indus Basin.

(*b*) One Financial Expert, also unconnected with the Indus Basin.

(*c*) One Chief Engineer (or other officer deputed on his behalf) to be nominated by each province.

The members of the committee mentioned under (*a*) and (*b*) above shall be selected by the Central Government and shall be such as are acceptable to both Provinces. Retired Chief Engineers shall be eligible under categories falling within clauses (*a*) and (*c*) above.

The Committee may co-opt one Revenue Officer and one Soil Expert both unconnected with either province. In addition it may co-opt other members (including one or more officers in equal numbers from either province). The co-opted members will have no power of voting.

6. The terms of reference of the committee shall be.

To determine what contribution should be made by the Punjab to Sind in order that the Projects of the New Sind Barrages may be executed by Sind with reasonable certainty of no loss being involved."

7. It is also agreed that, should the contribution, by whatsoever method fixed, prove in practice to have been too liberal, and the revenue exceed the working expenses plus the interest on the sum at charge in any year within thirty years of the date of completion of the Project, Sind shall return to the Punjab a sum equal to half this excess in respect of each such year until such time as the original contribution and accumulated simple intrest thereon at 3½% shall have been repaid in full.

ANNEXURE III.

GOVERNMENT OF SIND,
FINANCE DEPARTMENT,
Karachi, 25th October 1945.

From

D. R. C. HALFORD, ESQUIRE, I.C.S.,
Secretary to Government.

To

THE SECRETARY TO THE GOVERNMENT OF THE PUNJAB,
Public Works Department, Irrigation Branch,
Lahore.

Subject.—**Sind-Punjab water dispute-Financial terms for the settlement of the—**

Sir,

I am directed to acknowledge receipt of your letter No. 013 Cn., dated the 13th October 1945, on the above subject and to that state its contents have received the careful attention of this Government.

2. The Sind Government notes.

(*i*) That the tentative agreement reached by the Engineer representatives is satisfactory to the Punjab Government providing that it is accompanied by a satisfactory solution of the financial issue.

(*ii*) That the limitation of the suggested Punjab contribution be abandoned.

(*iii*) That a time limit should be laid down for consideration by the Punjab of the estimates to be provided by Sind; but suggests that in order to make this time limit effective, provision should be made to give Sind the option of a reference to the independent committee if the Punjab's offer is not received in time

3. The Sind Government desires to make it clear that the fact of its being prepared to accept the Grant-Khosla Memorandum of Febuary last on the financial issue does not imply that it is or was prepared to accept only part and not the remainder. In particular, it was prepared to accept the repayment clause as drafted as being fair only on the assumption that the productivity test would be applied in the tenth year of working of the Projects.

4. In order to reach agreement, the Sind Government is now prepared to accept a modification of those terms to the extent that the period may be left open, but in those circumstances cannot agree to any non-reciprocating repayment clause, even on the basis of the Punjab Government's offer to demand only half of the excess profits, if any; in short, it is this Government's view-

(*i*) That no refund clause can be accepted unless there is a prior agreement satisfactory to it on the period in which productivity is to be attained. And

(*ii*) That if the period is above ten years, any clause allowing for repayment by Sind to the Punjab of part of excess profits must be counterbalanced by a similar clause permitting of extra payments by the Punjab to Sind in the case of possible deficits. And

(*i*) That the period within which any repayments or extra payment should be made is limited to 30 years after completion of the Project concerned.

In these circumstances, this Government suggests that clause 7 ot the draft memorandum accompanying your letter be omitted altogather, as it would seem that otherwise agreement will not be possible within the limited time still remaining.

5. The Sind Government is, however, also prepared to agree that the question whether the productivity rate and the interest rate should be the same may be left to the independent committee, provided that the depreciation or obsolescence charges are included as working expenses.

6. As regards the draft memorandum itself, the Sind Government feels that the wording is not sufficiently precise ; while it has no objection to the terms being considerably wider than those of the Grant-Khosla Memorandum, it is of the view that vagueness, with its certain consequences of much argument, should be excluded from the draft as far as possible. For this reason a modification has been made in clause I, by the substition of 'productive' for 'non financial loss', the term 'productive' being subject to what is stated in paragraphs 4 and 5 of this letter, as is explained in clause 7 of the agreement.

7. The other main variation of the draft which this Government would suggest, is concerned with the constitution of the Committee.

(*i*) This Government regards it as unnecessary to swell the numbers of the committee by inclusion of a Chief Engineer from each Province, since the only, effect this could possibly have would be to add one more vote to each side ; this Government would continue to maintain this position, even if clauses (*ii*) and (*iii*) of this paragraph are abandoned.

(*ii*) This Government regards it as most desirable that the proceedings shall be conducted in a qua ijudicial manner, for which purpose it considers the appointment of a High Court Judge as Chairman essential.

(*iii*) The members will then be four, and in order to avoid an equal a division this Government suggests an increase in the number of independent Chief Engineers from two to three.

8. This Government concurs in the suggestion that a majority vote in the committee shall decide, provided that the constitution is as in paragraph 7 above. This Government however regards it as essential that the view of the Financial Expert shall prevail on purely financial matters, *viz* : interest rates, productivity rates, the period after which the productivity test shall be applied, and whether the accumulation of the sum at charge should be at simple or compound interest.

9. This Government trusts that since it has now accepted further important concessions the Punjab Government will find it possible to agree to the new draft memorandum (attached) embodying the points set out in this letter.

I have the honour to be,
Sir,
Your most obedient servant.

D. R. C. HALFORD,
Secretary to Government.

Memorandum of terms for Settlement of the Sind Punjab Indus Dispute on the financial issue.

1. It is agreed that if it is established that, when executed, Sind's two new Barrage Projects will prove unproductive, the Punjab will contribute towards the cost of these Projects a sum sufficient to make them productive.

2. Sind shall prepare these Projects and shall provide the Punjab in due course with copies thereof together with their estimate of the anount of such contribution, if any.

3. The Punjab after examination of the Projects may accept Sind's estimate of the contribution, or, if unable to accept Sind's estimate, may make its own estimate of an equitable contribution, and forward the same to Sind with an explanation of the method by which the amount has been arrived at.

4. While the Punjab's estimate of the contribution is under preparation, Sind shall supply expeditiously any additional information that the Punjab may require, but the Punjab estimate shall be made available to Sind within six calendar months of receipt of the Projects; and failing receipt of the Punjab's estimate within this time, Sind may require that the question be referred to the indepdent committee constituted and working as described in clames 6 and 7 of this agreement.

5. Should the contribution offered by the Punjab to Sind be unacceptable to the latter, its assessment shall so soon as may be, be referred to an independent committee constituted and working as described in clauses 6 and 7 of this agreement.

6. The independent committee shall consist of the following members:—

(*a*) A Judge of a High Court as Chairman.

(*b*) Three Chief Engineers.

(*c*) A Financial Expert.

Provided that (*i*) None of these members shall be or shall have ben connected with the Indus basin, and shall only be qualified by a position held in India;

(*ii*) A retired official may be appointed under any of these sub-clauses, provided that had he not retired, he would be qualified under proviso (*i*) and (*ii*) All the members shall be selected by the Governor-General in Council, and shall be acceptable to both Provinces.

The Committee shall hear the parties.

The committee may co-opt one Revenue Expert and one Soil Expert who shall be subject to all three provisos of this clause, and may also co-opt other members (including one or more Chief Engineers or other officials of either Province in equal numbers). The co-opted members will have no power of voting.

In the decision of the matter referred to in sub-clauses (*ii*) (*c*), (*d*), (*e*) and (*f*) of clause 7 of this agreement, the opinion of the Financial Expert shall be conclusive; in all other matters, decision shall be by a simple majority vote.

7. The terms of reference of the independent committee shall be:—

(*i*) Will the new Sind Barrage Projects prove unproductive? And if so, what contribution from the Punjab will make them productive?

(*ii*) In determining these questions the Committee shall adopt the usual form of financial forecasts statements accompanying large Projects in India, but shall have power to decide—

(*a*) The Capital cost of the Projects.

(*b*) Net revenue attributable to the Projects.

(*c*) The rate of interest for perpetual money.

(*d*) the productivitity test rate.

(*e*) The period after which the productivity test shall be applied.

(*f*) Whether interest should be simple or compound for accumulation of the sum at charge.

ANNEXURE IV

Confidential.

No. 40772/Cn./712/39.

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch,
Lahore.

To

THE SECRETARY TO THE GOVERNMENT OF SIND,
Finance Department,
Karachi.

Dated Lahore, the 22nd November 1945.

Subject :—Sind-Punjab Indus Dispute.

Sir,

I am directed to acknowledge receipt of your letter No. 1442-W., and S., dated the 25th October, 1945, on the subject noted above.

2. As regards the financial issue the Punjab regret that they must adhere to their view that any contribution from the Punjab should be designed to ensure Sind against loss. If the contribution is so calculated as to provide the projects will be productive, this means in effect that Sind will be making a profit out of the Punjab contribution.

3. The Punjab are not prepared to waive their view that a clause would be inserted in the agreement providing for eventual repayment of the Punjab contribution if a profit should accrue from the projects after their completion. The Punjab consider that they have gone to all reasonable lengths in proposing that in each of the years concerned only half profits should go towards repayment. The Punjab are unable to accept the suggestion that a counterbalancing clause should be inserted providing for further contributions by the Punjab in the event of the return on the projects failing to come up to expectations. If the estimates are reasonably calculated, there should be no danger of this contingency arising. Such experience as the Punjab Government possess leads them to believe that if the projects are carried out with reasonable economy and if due care is exercised in their administration, there are good grounds for anticipating satisfactory financial results. A counterbalancing clause of the kind suggested by Sind would throw an entirely unknown liability on the Punjab. Its acceptance could in fact never be considered unless the agreement were to contain a provision that all departures from the original calculations, such as excesses over construction estimates, should be referred to the Punjab and, if necessary, to a succession of independent tribunals ; and any provision to this effect would go far to destroy all hopes of finality.

4. As regards the composition of the arbitrating committee, the Punjab agree that the committee should be reduced by the exclusion of the Sind and Punjab representatives. They do not, however, agree that it should be inflated by the addition of two more independent members. In the opinion of the Punjab Government it is likely to be sufficiently difficult to arrange for two duly qualified engineers of independent status, let alone three ; moreover it is to be apprehended that the committee will tend to be unwieldy if the number of independent members is increased beyond three, namely two engineers and one financial expert. Nor do the Punjab Government see their way to accept the proposal that the financial expert should be given over-riding powers in any particular matters. On items in which he is peculiarly qualified to give his opinion his advice will no doubt receive all due consideration and he should have little difficulty in securing the assent of the majority of the committee. The Punjab agree that the Governor-General should nominate members acceptable both to Sind and the Punjab and also that retired engineers should be eligible. The Punjab further agree that it should be left to the committee to decide such matters as the rates of interest for long term loans etc.

5. The Punjab are in full accord with Sind in wishing to avoid any vagueness in the clauses relating to financial settlement—as indeed in any other part of the agreement. If Sind are prepared to concur in the main points as set forward above the clauses concerned can be examined by the legal advisers of the two Governments and if necessary, referred for advice to the Government of India.

6. Should the Sind Government consider that there is any point in this letter which is not clear or on which a personal discussion would be likely to prove of any practical advantage, the Punjab engineers concerned will be glad to discuss the question or questions involved with the Chief Engineer or any other representative of Sind, on his being directed to visit Lahore for the purpose.

7. I am to draw attention to the fact that the estimates which Sind have kindly undertaken to supply have not yet been received.

I have the honour to be,
Sir,
Your most obedient servant,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

ANNEXURE V

Confidential.

By Air Mail.

No. 1442-W. and S.

GOVERNMENT OF SIND,
FINANCE DEPARTMENT,
Karachi, 7th/12th December 1945.

To

THE SECRETARY TO THE GOVERNMENT OF THE PUNJAB,
Public Works Department, Irrigation Branch,
Lahore.

Subject.—**Sind-Punjab Indus Dispute—**

Sir,

I am directed to acknowledge receipt of your letter No. 40772-, dated 22nd November 1945 on the above subject.

2. As regards the financial issue, this Government welcomes the Punjab's agreement that vagueness should be avoided but points out that whereas Sind's difinitions are precise, the Punjab have said nothing beyond the general statement that the contribution should be designed to ensure Sind against loss. Apart from the merits it cannot be expected that Sind could agree to a clause as vaguely stated as this. Consequently until and unless the Government of the Punjab can make an accurate definition of how this phrase is to be interpreted, Sind must continue to adhere to the proposal put forward in its last letter.

3. The Government of Sind would desire to remind the Government of the Punjab that 6 meetings between the representatives of both sides have taken place—the first between Messrs. Hawes and Montague, the next four between Messrs. Grant and Khosla and the last between Messrs. Grant, Haigh and Protheroe in each of which this question came up for examination. For case of reference, the tentative agreements on this point are displayed below :—

First meeting.—The Committee should proceed to assess the contribution (if any) required to ensure that the projects comply with the code definition of remunerative project.

Second meeting.—The Committee shall assess the Punjab contribution (if any) sufficient to make the projects productive in the eleventh year after completion of construction.

Third meeting.—There was a difference of opinion on detail but the essence was left unaltered.

Fourth meeting.—The Committee shall assess the Punjab contribution (if any sufficient to make the projects productive in the *tenth* year after completion of con-) struction. The change from the " eleventh year " was made specifically to bring the provision into agreement with the code definition.

Fifth meeting.—No change was made in this clause.

Sixth meeting.—This meeting confined itself to a decision on the water clauses only, the financial clauses being left undecided as an agreement was being sought on a lump sum contribution, but without results. It was at this meeting for the first time that the possibility of other methods of arriving at the contribution was mentioned by the Punjab representatives, but it seems important to notice as described in the next paragraph—that the Punjab's later letter, signed by one of them, again affirmed the same basic principle.

4. It will thus appear that almost throughout the discussions it was taken for granted that the usual code method should be employed, even when at the fifth meeting a suggestion was made by R. B. Khosla to permit of repayment, the basic principle was again affirmed. As mentioned above, even the Punjab's letter of the 13th October 1945 re-affirms it, but with the suggestion that all components of standard of productivity should be a matter for the Committee to decide. This suggestion has been incorporated in clause 7 (*ii*) of the draft clauses sent with this Government's letter of the 25th of October, in view of Sind's having fallen in with the Punjab views on the point, I am directed to say that this Government is at a loss to understand how a futher modification has been made.

5. In spite of this, if the Punjab Government will put forward a precise interpretation of the phrase " ensure against loss", this Government will give the question further careful consideration.

6. This Government considers it as one-sided for the Punjab to insist on a repayment clause without a similar clause allowing for the payments by the Punjab to meet the deficit and would therefore suggest that since the committee will make the most reasonable estimate possible all mention of repayment or extra payment be omitted.

7. The Sind Government notes the agreement of the Punjab Government to the exclusion of the Chief Engineer representatives of the two Governments ; but this Government adheres to its views that the services as Chairman of an officer with a considerable experience in the weighing of complicated and diverse views, such as would be available in the person of a High Court Judge, would be of the greatest value to both sides.

8. In fact it would appear to this Government that the most suitable course should be that employed in the U. K. for similar purposes, namely that the sole member of the Committees hould be a High Court Judge, assisted by technical assessors.

9. The Sind Government would be glad to be informed of the reason why the Punjab Government considers that the Finance Member's views should not be binding on the four matters described and in the absence of such reasons is not inclined to depart from its stand in this matter.

10. I am further to say that this Government is of the opinion that at this stage, a personal discussion would be desirable. But for the purpose of such a discussion, the Punjab Government will readily understand that this Government must have time to examine the implications of any precise definition which the Punjab Government may put forward of the term " ensure against loss". This Government would therefore suggest that the Punjab Government may reply now on this point only. After this, a delegation from Sind will come to Lahore led by the Honourable Minister-in-charge of the case with power finally to commit this Government on the terms of these disputed clauses.

11. In view of the conflict on these clauses, this Government considers that for the present no useful purpose would be served by sending the estimates of cost.

I have the honour to be,
Sir,
Your most obedient servant,

(Sd.) D. R. C. HALFORD,
Secretary to Government.

ANNEXURE VI.

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Public Works Department, Irrigation Barnch.

To

THE SECRETARY TO GOVERNMENT OF SIND,
Finance Department, Karachi.

No. 034/C. N.-712/39, dated Lahore, the 7th January 1946.

Sir,

I am directed to acknowledge receipt of your letter No. 1442-W. and S., dated 12th December on the above subject.

As suggested in the penultimate para. of your letter, the Punjab Government reply is confined to the formulation of a specific d finition of the term "ensure no loss" to Sind. This definition might be framed thus:—"No loss means that the annual net revenue should equal the annual interest charges in the capital at charge when the Project is fully developed. The net revenue consists of gross revenue less working expenses. The gross revenue will comprise all revenue properly creditable to the project whether derived from water rates, water advantage rate, increase of land revenue or from the lease of waste lands or from interest on the sale proceeds of waste lands as well as miscellaneous receipts. The working expenses shall comprise all expenditure on maintenance and repairs and such expenditure on Extensions and Improvements as are permissible under Public Works Department and Account Code rulings at the date of completion of the agreement as well as expenditure on establishment correctly debitable to the Project."

It is trusted that this definition will enable the Sind Government to agree to the clause in question and to take the action suggested in the penultimate para. of their letter.

I have etc.,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
Public Woks Department, Irrigation Branch.

ANNEXURE VII.

Confidential.

No. 1442-W. S.
Karachi, dated 30th January 1946.

From

D. R. C. HALFORD, ESQUIRE, I.C.S.,
Secretary to Government of Sind,
Finance Department, Karachi.

To

SECRETARY TO GOVERNMENT, PUNJAB,
Public Works Department, Irrigation Branch, Lahore.

Subject.—Sind -Punjab Indus Dispute.
Reference.—No. 034/C. N./712/39, dated 7th January 1946.

Sir,

I am directed to acknowledge with thanks receipt of your letter.

2. This Government would invite the attention of the Government of the Punjab to clause 7 (*ii*) of the draft agreement sent with letter No. 1442-W. and S. of 25th October 1945, and would point out that the Punjab's definition of 'ensure against loss' is nothing more than a firm decision on some of the seven points mentioned in that clause. Altough this Government agrees to some extent with some of the aspects of the Punjab's definition, it is not prepared to go the whole way, and therefore feels that the decision should be left to the independent committee.

3. I am to add that this Government has never been actuated by the hope of making any profit out of the Punjab but has merely been concerned to determine a procedure which should give the greatest chance of a decision fair to both sides. The clause was drafted solely with that end in view, as bringing into firm relief only those points on which divergence of opinion was likely.

4. I am finally to say that this Government is now prepared to discuss the whole question with the Government of the Punjab as described in paragraph 10 of the letter of the 7th December. But now that the election results have been declared, this will have to await the formation of the new Ministry early in February. I am therefore to request that the Punjab Government will communicate suitable dates so that a choice can be made later.

I have, etc.

D. R. C. HALFORD,
Secretary to Government,
Finance Department.

ANNEXURE VIII

By Air Mail.

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

To

THE SECRETARY TO GOVERNMENT OF SIND,
Finance Department, Karachi.

Confidential.

No. 053-S./C.N./712-39, dated Simla E., the 22nd June 1946.

Subject.—Sind-Punjab Dispute.

Sir,

With reference to your No. 1442-E., dated the 23rd May 1946, I am directed to say that the Punjab Government will welcome the representatives of the Sind Government to Simla and that the period 12th to 16th August inclusive will be the most convenient.

2. I am to say that the present Punjab Ministry has examined the water clauses of the draft agreement prepared at Karachi in September 1945, and finds that in some respects these clauses would be most difficult to justify to the Punjab Assembly, and to the Indian states who draw water from the Punjab Canals.

3. The Punjab is as desirous as Sind that these negotiations should reach finality. The Punjab Government considers the modifications proposed below to be reasonable and just and unlikely to affect Sind adversely ; in any case the modifications asked for are small compared to the advantages Sind would gain from the new Barrage Canals.

4. The Sind Engineers are aware that the Sutlej and Beas are very poor rivers and that there is no supply passing below Islam until June in most years and in some years not till July. The supply below Islam ceases between the 10th and 20th of September. The Punjab Government urges that the canals on the Sutlej cum Beas system should, on account of their poor supplies, be excluded from the necessity of sharing drring periods of shortage and submited that this will have no effect at all on Sind during such periods.

5. The Phulkian States, Bahawalpur and Bikaner draw water from canals on the Sutlej cum Beas system and Bahawalpur also depends on the Panjnad Canal. The water allocations to these States are a matter of treaty or agreement, which it is not possible for the Punjab to break or modify unilaterally. If the proposal made in paragraph 4 above to exclude the Sutlej cum Beas system from sharing shortages is accepted, the allocations will not be disturbed except those for the Panjnad canal. The Punjab is not in a position to agree to the limitation of supplies to this canal.

6. Supplies in the Ravi are also very poor in years of deficit winter rainfall. The Upper Bari Doab Canal has a large area dependent on it, and cannot stand a reduction in early Kharif. The balance supplies passing Balloki have been allocated by the Anderson Committee to the Link canal to help out the deficit on the Sutlej. Further there are heavy absorption losses on the Rayi between Balloki and Sidhnai. The Sind Engineers are aware of the very small volumes reaching Sidhnai. The Punjab Government considers that it will greatly simplify regulation and have no material effect on Sind if this River is excluded from sharing during shortages.

7. The only tributaries of the Indus which contribute materially to the discharges reaching Sind in early Kharif are the Chenab and the Jhelum. The modicfiations suggested in paragraphs 4, 5 and 6 above are based mainly on a recognition of this fact and on the belief that the agreement will be very much simpler to draft and to work if restrictions and regulation are limited to supplies which will in fact exist. The Punjab Government is accordingly prepared., in the interests of a settlement with Sind, to

accept a restriction on its existing canals taking off from the Chenab and Jhelum. But it is unwilling to agree to any restriction on its canals not equally applicable to the canals taking off at Sukkur. In brief, it holds that the same capacity factors should be applied to the Punjab as to Sind and that the basis of allocation should be mean monthly or ten daily withdrawals in both cases. Subject to this equality of treatment the Punjab Government is prepared to agree to such methods of regulation as may reassure Sind that the main purpose of the restrictions will be achieved. One such metho is :—

(*a*) To limit the maximum which these Punjab canals may draw on any day to 5,000 cusecs in excess of their mean monthly or period allocations.

(*b*) To regulate so that any quantity drawn in excess in any ten-day period by reason of (*a*) above is restored within the next ten-day period.

8. The Punjab Government has given most careful consideration to the changes proposed in the Draft Agreement in the supplies allotted by the Anderson Committee to the Thal Project. These changes are incorporated in Clauses 3 (*i*) (*b*) and 3 (2) B and in tables 1 (*b*) and 1 (*c*).

It is noted that the figures proposed in table 1 (*b*) for the Thal are daily maxima, whereas the Sukkur Barrage allocations are claimed as mean monthly. Both the allocations should, in the opinion of the Punjab Government, be broguht on to the same basis of mean monthly.

The Punjab Government points out that there is an error in the mean monthly allocations shown in column 5 of Table 1 (*c*) against the Thal. These should read :—

October	..	6,000 cusecs.
November	..	5,600 ,,
December	..	2,000 ,,
January	..	2,000 ,,
February	..	3,600 ,,
March	..	3,600 ,,

If the Sind Government agrees that this is an error, I am to request that it be corrected.

The Punjab Government has been unable to find authority for the fixation of the Rabi capacity of the Sukkur Barrage at 34,000 cusecs as assumed in Clauses 3 (2) B of the draft. The Rabi capacity sanctioned by the Secretary of State in the Sukkur Barrage Project is 27,020 cusecs and this was confirmed in Sind's evidence before the Rau Commission.

The Punjab Government finds the greatest difficulty in accepting a mandatory closure of the Thal for 20 days in February from 3/2 to 22/2 inclusive, Kalabagh dates, as allowing for the normal rotational programme the closure on all branches of the canal is likely to be so long as to imperil the crops. While wishing to afford the maximum assistance to Sind compatible with the safety of the Thal crops, the Punjab Government considers that the period of the mandatory closure should be substantially reduced.

9. The Punjab Government notes the very large allocations, which it is proposed in table III (*a*) should be granted to the Sind New Barrage Canals. The necessity for these heavy allocations has never been examined by an independent atbitrator or tribunal, and the Punjab Government considers that they require further discussion.

10. Subject to further discussion and adjustment on the points raised above, the Punjab (Government) considers that the settlement of the financial issues might be reached on the basis of fixed Punjab contribution repayable by Sind if and when the Projects return a net profit.

11. Finally I am to say that the Punjab Government has no desire to stand out for unreasonable terms, or break off the negotiations and await the result of the formal proceedings now pending in London. An agreement satisfactory to the Punjab and Sind is clearly preferable to an award, the announcement of which may be delayed indefinitely and which would not by itself settle all the matters in controversy. But the case is so important that it is well worth while for the Ministers concerned to discusss the water clauses as well as the financial clauses. From the Punjab point of view it is most desirable that the agreement should be as simple as the complicated nature, of the subject admits; should not give ground for intervention by Indian States which would occasion further delay ; and should not be open to public attack as imposing,

restrictions on the Punjab which are not equally applicable to Sind, or as creating new prescriptive rights on inadequate information. It is believed that the water clauses can be modified on the lines indicated without detriment to either party and that once the two Governments are satisfied with the water clauses, the settlement of the financial clauses will present much less difficulty. The Punjab Government will be glad to know if the dates suggested in paragraph 1 of this letter are convenient to the Government of Sind.

I ahve the honour to be,
Sir,
Your most obedient servant,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
P. W. D. Irrigation Branch.

22nd June 1946.

Note.—There was miscellaneous correspondence at this stage to fix a date, which was postponed from time to time at the request of the Punjab.

ANNEXURE IX

No. 1442-E., dated the 16th July 1946.

From

D. R. C. HALFORD, ESQUIRE, I.C.S.,
Secretary to Government, Sind (Finance Department), Karachi.

To

THE SECRETARY TO THE GOVERNMENT OF THE PUNJAB,
Public Works Department, Irrigation Branch, Lahore.

Subject.—Sind-Punjab Indus Dispute.

Sir,

I am directed to acknowledge your letter of 22nd June and to note that the 12th to the 16th August are dates suitable to the Punjab.

2. With reference to paragraphs 2 to 9 of your letter, I am directed to say that the Sind Government feels that the Punjab's agreement communicated in Mr. Protheroe's letter of the 13th October was the result of exhaustive discussions lasting almost two years between technical experts, it is of the opinion that they should not be re-opened.

3. With reference to paragraph 10, the views of this Government are already on record (para. 4 of my letter of 25h October), namely that the suggestion in equity involves its converse, that if the projects prove less remunerative than suggested, the Punjab will have to make further contributions. As it proved manifestly out of the question to secure agreement on these lines, Sind was and is prepared to consider an agreement resting on the definition of ' ensure gainst loss'.

4. If in these circumstances the Punjab Government feels that a personal discussion will be of use, the dates suggested are suitable to this Government.

I have, etc.,

(Sd.) D. R. C. HALFORD,
Secretary to Government, Sind.

ANNEXURE X

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Punjab Works Department, Irrigation Branch.

To

THE SECRETARY TO THE GOVERNMENT OF SIND,
Finance Department, Krachi.
No. 8669—S.-C.N./712/39, dated Simla, the 9th August 1946.

Subject.—Sind-Punjab Dispute.

Sir,

In continuation of my No. 8106-S. C.N./712/39, dated 2nd August 1946, confirming the telegram intimating that "Punjab Government regret date originally suggested unsuitable suggest August 26th September 1st.", I am directed to state that the letter No. 1442-E., dated 16th July 1946, has been considered by the Punjab Government. They feel that a personal discussion will be of use in clearing up the issues both on the financial side as well as on the water clauses and would accordingly welcome a visit from the representatives of the Sind Government.

I have the honour to be,
Sir,
Your most obedient servant,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
P. W. D., Irrigation Branch.

ANNEXURE XI

Memorandum of the discussions between the representatives of the Sind and Punjab on 26th August 1946.

Present.

Punjab.	Sind.
The Honourable Nawab Sir Muzaffar Ali Khan Quzilbash.	The Honourable Mr. M. A. Khuhro.
T. A. W. Foy, Esq., C.I.E., I.S.E.	M. P. Mathrani, Esq., O.B.E., I.S.E.
R. B., D. K. Khanna, I.S.E.	M. G. Hiranandani, Esq., S.S.E.
R. B., Kanwar Sain, I.S.E.	D. R. C. Halford, Esq., I.C.S.

1. Mr. Foy raised the question of the legal position of the Punjab States and said that they would legally be able to secure an injunction against the ditribution of the waters contained in the Agreement.

He therefore suggested that Sind should agree to the exclusion of the three rivers, Sutlej, Ravi and Beas from the Agreement, and stated he could satisfy Sind that this would not lose her any water.

Sind was tentatively of the view that the conference should proceed to discuss the financial clauses on the basis that the Agreement would be good in law. Especially, if there would be no change in Sind's water allocations there would be no change in the contribution.

Before proceeding with this point, Mr. Foy proceeded with his next issue.

2. He maintained that his Government would find it impossible to justify restrictions on existing canals to the Punjab Assembly, and that, therefore, the alterations as suggested in his letter of 22nd June 1946, should be examined.

Sind's view was that there should be no change under the Agreement, and that the financial issues should be discussed.

3. The Punjab then urged that the Thal allocations in Statement I (*c*) were a typing error which was admitted by Sind and the proper figures be substituted as below:—

November	5600
December	2000
January	2000
February	3600
March	3600

The Punjab also urged that the omission of figures for October was a typing error, and Sind agreed to examine the question.

4. The Punjab then raised the point that the figure in clause 3 (2) B. (ii) of 34,000 cusecs was a clear error for 27,020 cusecs which they endeavoured to prove to be the correct one. The point was left undecided when the conference adjourned for lunch.

5. After lunch Mr. Halford presented a statement in clarification of Sind's position :—

On reconsideration in the light of this morning's proceedings Sind desires to make its position clear.

A. Sind regards the Punjab Government letter of 13th October 1945 as binding and is not prepared to depart from it except in cases where there have clearly been clerical errors.

In particular, Sind accepts that the Thal supplies as shown in Table I (*c*) may be changed as shown, as Sind is satisfied that this is a clerical error. But Sind is not prepared to agree that either of the following are clerical errors and is not prepared to discuss them :—

(i) Omission of October figures in Table I (*c*).

(ii) The figures of 34,000 cusecs in para. 3 (2) B (ii) of the agreement.

In respect of the following matters raised this morning Sind's comment is:—

On (1) that the Punjab is unable to justify the restrictions on their canals to the Punjab Assembly.

Comment.—This is a matter in which Sind is not concerned and not interested.

And on (2) that the Punjab States have the power to seek for and get an injunction against the enforcement of the water distribution contained in the agreement.

Comment.—Sind does not consider that the States have a case against Sind and that any rights they may have are to be met from the Punjab allocations under the agreement. In any case if the States do have a case, Sind will be prepared to meet it. In each case Sind is not prepared to discuss the question further.

B. As regards the financial issue, Sind bases its arguments on the following extracts from para. 7 of the Punjab letter of 13th October 1945:—

"7. I am to say, however, that without prejudice.....the Punjab Government is prepared to agree to a settlement of the dispute on the terms detailed in the enclosed memoranum....."

Accordingly, it is Sind's view that if Sind is prepared to agree to these terms which include reasonable modifications on them, the Punjab is precluded from refusing to discuss the financial issue.

In modification, Sind now agrees to examine the question.

6. The conference then proceeded to discuss the financial issue when the Punjab agreed to consider the following modifications or clarifications of the memorandum attached to their letter of 13th October 1945 as clarified by their letter of 7th January 1946:—

The interest rate should be that for perpetual money; the actual figure to be the subject of an award by the Auditor-General.

Depreciation should be included as a working expense based on a life of 100 years and an interest rate of 1/2 per cent. less than that for perpetual money.

On account of Sind's land revenue system, 'increase of land revenue' be substituted for 'water rates, water advantage rates and increase of land revenue'.

For the same reason 9/10th only of increase in land revenue as now defined, lease money and interest on land sales be credited to the accounts of the project.

The calculations should be performed at compound interest subject, if necessary to an award by the Auditor-General.

7. The Punjab than asked for certain information on the cost and financial estimates for the Barrages. These were supplied as far as they were known, and the basis on which they rested were indicated.

(1) *Cost.*—Lower Sind Barrage .. .. 2,105 lakhs.

Upper Sind Barrage .. .. 1,800 } 1,650 lakhs.

Deduct possibly from Government of India 150 }

The figures for the latter being very approximate.

(2) *Land rates*—Lower Sind Barrage .. Rs. 103 per acre.

Upper Sind Barrage .. Rs. 125 per acre.

(3) *Assessment* Lower Sind rice Rs. 4/8 at a price of about Rs. 2/12.

Wheat Rs. 3/8 Do. Rs. 5/-

Dry Kharif Rs. 3/12

Upper Sind not given.

Sind pointed out that the figures under (2) and (3) were the rates estimated to be prevailing on the average upto full development, *i. e.*, 54 years after water started to flow in the Lower Sind Canals.

8. The Punjab then asked what contribution Sind would be prepared to accept. Mr. Halford explained that even though the official figures given in para. 7 might turn out to be under estimates, and that though Sind was confident of being able to support a higher contribution from an independent committee, yet, in the interests of finishing off this question, Sind was prepared to accept 4 crores for both Barrages with a condition for repayment as defined in the memorandum attached to the Punjab letter of October 13th.

9. Finally Mr. Halford said that if the Punjab were prepared to consider a lump sum contribution with no questions asked on either side, Sind was open to offers.

ANNEXURE XII.

Memorandum of the discussions held on the morning of 27th August 1946 between the representatives of the Punjab and Sind.

Present.

Punjab.	Sind.
The Honourable Nawab Sir Muzaffar Ali Khan Quzilbash.	The Honourable Mr. M. A. Khuhro.
T. A. W. Foy, Esqr., C. I. E., I. S. E.	M. P. Mathrani, Esqr., O.B.E., I.S.E.
R. B., D. K. Khanna, I. S. E.	M. G. Hiranandani, Esqr., S.S.E.
R. B., Kanwar Sain, I. S. E.	D. R. C. Halford, Esqr., I.C.S.

1. The memorandum of discussions of the previous day produced by Sind was considered and subject to the addition,

Dry Kharif .. .. Rs. 3-12-0,

below the assessment figures for the Lower Sind Barrage were accepted.

2. A statement produced by Sind showing the Punjab contribution on various assumptions was given to the Punjab representative. Certain questions were asked and answered.

3. The Honourable Minister for Revenue then stated that the Punjab did not accept Sind's view that the Punjab was bound. As a compromise he asked if Sind would agree either—

(1) to delay discussions pending taking legal advice on Sind's position *vis-a-vis* the Punjab States; or

(2) to proceed with the discussions on the understanding that Sind should agree to accept some share of any water reductions that the Punjab States might succeed in obtaining against the Punjab.

Sind stated that clause I of the accepted draft on the water issue expressly stated that the Punjab States allocation should be met from the Punjab share under the Agreement. Sind was willing to run the risk of the States succeeding also as against her, and would be bound only by the decree in such a case by the States if it were to be raised. Sind was further prepared to abide by the figure of 4 crores even though there was a risk of a reduction of water from such a decree which would certainly make 4 crores inadequate.

Sind was accordingly not prepared to agree to either of the suggestions.

4. In Statement I (c) it was agreed by both sides that the October figures had been omitted by a clear error and that they should be inserted. For the Thal the figure should be 6,000, and for the Sukkur Barrage 32,339; the ohter figures were to be inserted later.

5. Mr. Foy requested Sind to agree to—

(1) Change of figures from maximum daily to mean monthly;

(2) Change in the date of the Thal closure;

(3) Change of perennial capacity of Sukkur Canals from 34,000 to 27,020 cusecs.

After discussion Sind agreed to consider whether or not she would agree to considering these points.

6. The Punjab claimed that the water clauses were a substantial injustice to her and would, therefore, be unsustainable on examination by any Tribunal; accordingly it was in Sind's interests to come to a compromise.

Sind claimed that the general position must have been clear to the Punjab before she expressed her agreement of 13th October 1945, and that if it was not, then that was no concern of Sind's who could not agree to going behind that agreement. The Punjab's acceptance could be taken only to mean—

(i) that there was no injustice; or

(ii) if there was on some issues, then the advantage gained on others, or that gained in coming to an agreed conclusion, more than outweighed it.

7. The conference then adjourned until the next morning after deciding to hold exploratory talks on the financial issue between the finance experts in the afternoon. At this stage Mr. Halford presented a draft agreement on the financial issue on the assumption of a lump sum with a repayment clause for consideration.

Note.—The draft referred to is appended to Annexure XIII.

Statement showing the Punjab Contribution on Various assumptions.

Interest rate 3⅜ per cent.

	Land sales rate Rs	Assessment rate Rs	Contribution Rs Crores
Lower Sind Cost 21 crores	103	4 8 0	5·8
Do. do.	120	5 7 0	2·1
Upper Sind Cost 16½ crores	125	7 0 0	3·5
Do. do.	150	7 0 0	2·7

ANNEXURE XIII

Afternoon Session on 27th August 1946.

Present.

Punjab.	Sind.
Mr. Tandon, I. C. S., Finance Secretary.	Mr. D. R. C. Halford I. C. S.
Mr. Pearson, Finance Deputy Secretary.	Mr. M. P. Mathrani, O B E., I.S.E.,
T. A. W. Foy, Esq., C.I.E., I.S.E.	Mr. M. G. Hiranandani, S.S.E,
R. B., D. K. Khanna, I.S.E.	
R. B., Kanwar Sain, I.S.E.	

1. Mr. Halford's draft was discussed in a general way. It was first made clear that there were two courses:—

I. An Independent Committee.

II. (*a*) A lump sum with repayment.

(*b*) A lump sum without repayment.

The draft under II (*b*) would cause no difficulty. Under II (*a*), the Punjab stated without committing themselves that the draft was apparently acceptable, but that they would examine it. Mr. Halford said that the hoped that the outcome on the next morning would be acceptance by the Punjab subject to arbitration on some points, and that, if so, he would probably be prepared to advise acceptance.

2. Under course I , Mr. Halford explained that the agreement would be on the lines of the memorandum attached to the Punjab letter of 13th October 1945, subject to the definitions in his draft under course II (*a*) with certain fairly obvious additions, but with the following modifications:—

(1) Sind preferred the Independent Committee to consist of a High Court Judge sitting alone assisted by assessors as was the practice in the U. K.; the Punjab admitted that this was the modern trend and agreed to examine the point.

(2) Sind could only accept a one-sided repayment clause if the Independent Committee framed estimates of revenue on a long term average. If the Committee was to seek to decide likely rates from time to time, then a clause allowing for extra payments to Sind would be essential. Or, better still, the clause should be omitted altogether. The Punjab agreed to examine the point.

DRAFT OF THE FINANCIAL CLAUSES

1. It is agreed that the Punjab shall pay Rs. , crores to Sind on 1st April 1947 as a contribution to ensure Sind against financial loss in executing the two new Barrage Projects.

2. It is also agreed that should the contribution prove in practice to have been too liberal, and subject to the definitions which follow, should a profit arise in any year, within 30 years of the date of the first supply of water by the Lower Sind Barrage Project, Sind shall return to the Punjab a sum equal to half this profit in respect of each such year until such time as the contribution and accumulated simple interest at per cent. shall have been repaid.

Explanation.—In determining whether or not there has been a profit, Sind's administrative proforma accounts shall be accepted as final and conclusive.

DEFINITIONS.

Depreciation means that sum which contributed annually and accumulating at a rate of compound interest ½ per cent. less than the perpetual money rate will amount to the capital cost of construction in 100 years.

The interest rate used in all calculations shall be that for perpetual money unless the contrary is explicity stated. The actual figure to be used shall be settled from time to time by the Auditor-General for India if he agrees to arbitrate, and, if he does not agree, then by some other independent authority.

Working expenses mean—

(1) Maintenance and repais and extensions and improvements if permissible under the P. W. D. Account Code ;

(2) Establishment ;

(3) Depreciation.

Gross Revenue means—

(1) Nine-tenths of the increase in land revenue, of lease money and of interest on land sales receipts ;

(2) Miscellaneous receipts.

Net Revenue means gross revenue minus working expenses.

The sum at charge (subject to the Note under the definition of profit) at the end of any year is—

(1) The sum at charge at the beginning of the year plus interest thereon for the whole year ; plus

(2) The cost of construction during the year plus interest thereon for half the year ; minus

(3) The net revenue for the year.

Notes—If in any year there are capital receipts, they will be taken in reduction of the sum at charge under item (2) above.

If in any year the working expenses exceed the gross revenue, the difference will be added under item (3) above.

A profit in the meaning of clause 2 of the Agreement arises when and only when the sum at charge at the end of the year is less than the sum at charge at the beginning of the year, and its amount is the difference of these two sums.

Note.—In case a profit arises in any year, then in modification of the definition of the sum at charge, the reduction in the sum at charge will be by only half the profit as long as the other half is refundable to the Punjab.

ANNEXURE XIV

Memorandum of the discussions held on the morning of 28th August 1946, between the representatives of the Punjab and Sind.

Present.

Punjab.	Sind.
The Honourable Nawab Sir Muzaffar Ali Khan Qazilbash.	The Honourable Mr. Khuhro.
T. A. W. Roy, Esq., C.I.E., I.S.E.	M. P. Mathrani, Esq., O.B.E., I.S.E.
R. B., D. K. Khanna, I.S.E.	M. G. Hiranandani, Esq., S.S.E.
R. B., Kanwar Sain, I.S.E.	D. R. C. Halford, Esq., I.C.S.

1. The memorandum of discussions of the previous day produced by Sind was considered and was accepted subject to the addition of (3) under para. 5 :—

(3) Change of perennial capacity of Sukkur Canals from 34,000 to 27,020 cusecs.

2. Sind requested to be informed of the views of the Punjab on the financial discussions of the previous afternoon.

The Punjab replied that they would not discuss the financial issues at all until the water clauses were satisfactorily settled.

As a consequence, Sind produced a further statement on her position (attached), and refused to discuss the water clauses further.

3. The Honourable Sir Muzaffar Ali then inquired what was in Sind's view the course that should ensure to avoid a breakdown. The Honourable Mr. Khuhro then stated that although the suggestion lacked authorisation by the Sind Government, he would undertake to suggest to his colleagues that a settlement on the following basis would be satisfactory :—

(i) The water clauses to remain as they were, with a Punjab contribution of 3 crores ; or

(ii) A change as requested by the Punjab on the issues of the Thal closure, and of the change in the perennial capacity of the Sukkur Canals, provided that a contribution of 4½ crores was offered.

The Punjab then enquired whether this meant that Sind would definitely refuse to consider the third issue, or changing the terms of restriction on the Punjab Canals from maximum daily discharges to monthl means ones ; Sind replied that they were unwilling to give any assurance on this point, but that the Punjab would always be at liberty to make suggestions which would receive careful consideration, and that one factor that might lead Sind to agree would be an increase in the contribution. This matter was discussed inconclusively, Mr. Mathrani suggesting that it might be possible for Sind to agree provided that the maximum variation in the discharge of the Punjab canals wsa reduced from 5,000 to 2,000 cusecs.

4. Sind then inquired what offer the Punjab was prepared to make, and Mr. Foy replied that they would agree to a contribution of 3 crores with the water clauses changed as they desired. This was not acceptable to Sind.

5. It was finally decided to treat the conferences as informal talks, without prejudice, and neither side being bound. The various memoranda of the discussions and statements produced by Sind would be treated only as *aides memoire*. The talks showed the ultimate core of disagreement, and it would then be for the respective Governments to consider if the gap could be closed by some compromise. The Punjab agreed to consider the case further, and to write to Sind giving their conclusions ; Sind accepted this course, and pointed out that no suggestion on the water-clauses would be likely to prove satisfactory unless accompanied by a definite statement on the financial issue.

MEMORANDUM TO THE PUNJAB ON SIND'S POSITION.

1. Sind does not desire to be unreasonable but does not regard it as reasonable for the Punjab to seek to reverse its agreement of 13th October 1945.

2. Sind is satisfied that the Punjab is bound on the water clauses as indicated in para. 4 of this Memorandum. Sind has, however, agreed to two changes due to clear errors, but is not prepared to go further save as allowed for in para. 5 of this Memorandum.

3. In particular and with reference to the points raised in conference, Sind is not prepared—

(1) To accept any modification on account of possible claims by the Punjab, States, or to accept any clause which shall prejudice or seek to prejudice the outcome of such a case if raised, or to accept any liability beyond what may be decreed as a result of such a case ;

(2) To accept the change suggested in clause 3 (2) B (ii) of the figure of 34,000 cusecs to 27,020 cusecs ;

(3) To accept, subject to para. 5 of this Memorandum, any change in the dates of the Thal closure ;

(4) To accept the change from maximum daily to mean monthly withdrawals.

4. Sind is satisfied that the correspondence between the two Governments can bear no other interpretation than that the Punjab is bound on the water clauses provided that a satisfactory solution of the financial issue is reached. Sind is further satisfied that the correspondence can bear no other interpretation than that the financial issue is still open and must remain so until a satisfactory solution is reached or until the discussions on this issue break down. Sind is further satisfied that the discussions cannot be made to break down until all reasonable suggestions by both sides are examined.

5. Sind accordingly does not agree to any further discussions on the water clauses. But provided only that complete agreement is reached on the financial issue Sind is prepared thereafter to consider whether change in the Thal closure should be allowed provided only that Sind's view of whether the matter should or should not be considered shall be final and conclusive.

6. Sind is therefore ready to discuss only the financial issue. Sind repeats the agreement to accept Rs. 4 crores subject to a repayment clause as set out in the draft given to the Punjab, if this sum is offered.

ANNEXURE XV.

Without Prejudice.

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch, Lahore.

To

D. R. C. HALFORD, ESQUIRE, I.C.S.,
Secretary to Government of Sind,
Finance Department, Karachi.

No. 60081/Cn./712/39, dated Lahore, the 28th December 1946

SIND-PUNJAB INDUS DISPUTE.

Sir,

I am directed to inform you that the Punjab Government have carefully considered the proceedings of the Simla Conference in August 1946 and have reached the following conclusions :—

(*a*) That in addition to the correction of the clerical error relating to the allocations in Table 1 (*c*) of the Thal Canal in the months October-March inclusive in the draft Agreement, which correction was conceded by Sind, the Punjab Government must insist also on the following modifications of the water clauses of the draft Agreement, namely :—

(*i*) *Clause* 3 (1) (*A*) (*ii*).—The figures in Table 1 (*a*) to which the existing Punjab weir controlled canals on the five rivers shall be limited during *kharif* during periods in which water is insufficient for Priorities I and II, shall be regarded as mean monthly or period figures. These figures may be exceeded on any day during the month or period by 5,000 cusecs so long as the mean monthly or period allocations are not exceeded.

Modifications of clause 3 (i) A (ii) and 3 (i) B (ii) and of the heading of Table 1 (*a*) will be necessary.

(*ii*) *Clause* 3 (2) (*B*) (*ii*).—For the words " Provided that in the period 17th February to 8th March (Sukkur dates), the Sukkur canals will have priority on Indus water up to their capacity of 34,000 cusecs " in this clause, the words " provided that in the period 22nd January to 10th February (Kalabagh dates) the Sukkur canals will have priority on Indus water up to their maximum perennial capacity of 27,020 cusecs", shall be substituted, and any necessary consequential modifications made in the remainder of the draft agreement.

(*b*) That the Agreement must include a clause empowering either party to require such modifications of the Agreement to be made in the event of successful objections to the Agreement by all or any of the Indian States concerned in the waters of the Indus and its tributaries as may be consequential to those objections and necessary for implementing them. The manner in which such a demand will be decided is laid down in Clause 17.

2. That in consideration of an early and complete acceptance of the draft Agreement as modified in accordance with the suggestions contained in the preceding paragraph the Punjab Government have further decided to make an offer, without prejudice, to the Sind Government of a non-recoverable sum of rupees three croes.

3. In conclusion I am to stress that the modifications detailed in paragraph 1 (*a*) and (*b*) are the minimum which the Government of the Punjab are prepared to accept and to request an early acceptance if the Government of Sind should so wish.

I have the honour to be,
Sir,
Your most obedient servant,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

ANNEXURE XVI.

No. 1442-E.

GOVERNMENT OF SIND
FINANCE DEPARTMENT,
Karachi 20th February 1947.

Confidential.

From

D. R. C. HALFORD, ESQUIRE, I.C.S.,
Secretary to Government of Sind
Finance Department.

To

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to the Government of Punjab,
Public Works Department, Irrigation Branch, Lahore.

Subject.—**Sind-Punjab Indus Dispute.**

Reference.—Your letter No. 60081/Cn/712/39, dated the 28th December 1947.

Sir,

I am directed to state that this Government has given the most earnest and careful consideration to your latter, and finds itself quite unable to agree to any of the modifications in the water clauses which are proposed.

2. I am further to point out that while these discussions have been proceeding for the past two years, this Government, in the interests of arriving at a solution beneficial to both parties, has always shown itself entirely ready to consider the points raised by the Punjab from time to time. The only result of concluding a successful agreement on these points have invariably been the raising of new questions.

3. I am also to state that this Government considers that in equity the Government of the Punjab ought not to have departed from the previous agreement on all the water clauses accepted officially by it, solely on the ground that the financial issue—admittedly a matter simple to settle—was under discussion. This Government evidently had to put forward certian views on the financial issue in modification of those of the Punjab and the subsequebt discussions could hardly be construed to mean that a satisfactory solution had not been arrived at.

4. In these circumstances I am directed to state that this Government sees no further use in continually re-opening matters already once settled to the satisfaction of both sides, and is content to abide by the orders of His Majesty in Council.

5. I am finally directed to presume that the Government of the Punjab will accordingly suspend all operations with regard to works which were referred to the Rau Commission, and to add that the Secretary of State is being approached separately to maintain the *status quo ante* pending the decision of the case

I have the honour to be,

Sir
Your most obedient servant,

(Sd.) D. R. C. HALFORD,
Secretary to Government, Sindh.

ANNEXURE XVII.

A short note on the modifications in the water clauses of the draft agreement demanded by the Punjab under their letter No. 60081/Cn./712/39, dated the 28th December 1946, and the reasons why these modifications are not acceptable to Sind.

The Punjab, *vide* letter No. 60081/Cn./712/39, dated 28th December 1946, insist that the modifications described in paras. 1.0 and 2.0 below should be carried out and one additional clause described in para. 3.0 below should be introduced in the draft agreement (Annexure I), signed by Mr. Grant for Sind and Messrs. Protheroe and Haigh for the Punjab on 28th September 1945. In consideration of an early and complete acceptance of the modified agreement they have decided to make an offer, without prejudice, to the Sind Government of a non-recoverable sum of Rs. 3 crores. The technical reasons why Sind is not prepared to accept any modification of the water clauses of the draft agreement as desired by the Punjab are given below:—

1.0 Modification of clause 3 (1) (A) (ii) of the draft agreement. "The figures in table 1(*a*) to which the existing Punjab weir controlled canals on the five rivers shall be limited during kharif during periods in which water is insufficient for priorities I and II shall be regarded as mean monthly or period figures. These figures may be exceeded on any day during the month or period by 5,000 cusecs so long as the mean monthly or period allocations are not exceeded. Modification of clause 3 (1) A (ii) and 3 (1) B (ii) and of the heading of Table 1 (*a*) will be necessary."

1.1 Sind's comment.—The withdrawals of the Punjab existing canals have been limited to maximum daily basis in Table 1 (*a*) during the period water is insufficient for the requirements of Sind Canals. It is obvious that certain restrictions have to be placed on the maximum withdrawals of the Punjab, so as to secure some discharge for the Sind projected canals when full allocations are not available. The present demand of the Punjab consequently aims at increasing the maximum limit of withdrawals by another 5,000 cusecs, thus causing further shortages to Sind during such periods.

1.2 This question had already been raised by the Punjab Government *vide* para. 9 of their letter No. 07-CN-712/39, dated 10th June 1945, to which the Sind Government,, *vide* para. 9 of D. O. No. 3383-I of 4th July 1945, replied as under:—

"With regard to your para. 9, you have doubtless been apprised that there was a complete breakdown before and at the last conference over this question of existing rights for the Punjab canals in operation, until a suggestion barely acceptable to Sind was evolved, with the greatest difficulty in compromise of the contending claims. Our examination of the figures has confirmed our apprehensions that the shortages in Sind, more particularly in April, May and October even with the restriction of the Punjab existing rights to *daily maxima* (as has all along been intended) will be disastrous to the prospects and results of the new Sind Barrages and will cause appreciable harm to Sind. Inspite of this we have not ventured to ask for a modification of these rights because we know that the magnitude of these rights formed an integral and in fact, the most important part of the "Gentleman's agreement". I earneslty therefore request you not to reopen an issue over which further concessions on the part of Sind will be impracticable". This was on 4th July 1945 and the draft agreement was signed by the Punjab on 28th September 1945.

1.3. Sind has further examined the position regarding balance supplies available according to draft agreement after allowing for withdrawals by existing canals both in Sind and the Punjab and find that supplies are insufficient for Sind Projected Canals. Calculations show that in 12 years out of 13, during the period 1932-44 there would have been shortages in one month or more during the kharif months of April, May, June September and October.

1.4. As the demand of the Punjab will have the effect of increasing withdrawals by another 5 000 cusecs this will further aggravate the position in regard to shortages in Sind to which Sind cannot agree.

2.0. Modification of clause 3 (2) B (ii) of the draft agreement. "For the words 'provided that in the period 17th February to 8th March (Sukkur dates) the Sukkur canals will have priority on Indus water up to their capacity of 34 000 cusecs' in this clause the words 'provided that in the period 22nd January to 10th February (Kalabagh dates) the Sukkur Canals will have priority on Indus water up to thier maximum capacity of 27 020 cusecs' shall be substitued and any necessary consequential modifications made in the remainder of the draft agreement".

2.1. Sind's comment.—It was proved before the Indus Commission that the Anderson Committee had recommended fresh supplies to Haveli and Thal on the basis of inaccurate figures of Rabi discharges submitted by the Punjab. The Indus Commission, therefore, desired that closures should be so adjusted as to give adequate relief to

Sind during February and March, although they could not obtain an agreed programme of closures from the two provinces. The matter of closures is, therefore,of vital importance to Sind. Sind required Punjab to have closure for their systems in February to help Sind during the critical maturing period from 21st February to 18th March. In this connection reference is invited to paras. 57 and 58 of Sind's Representation on Rabi case. The Puhjab had finally agreed to the system of closures giving priority to Sukkur Barrage Canals during the critical maturing period from 17/2 to 8/3 (Sukkur dates), *vide* para. 3 (2) B (ii) of draft agreement.

2.2. Even with the closure of Thal Canal between 17/2 to 8/3 as agreed to by the Punjab, there will be considerable shortages at Sukkur. If the closure is now advanced from 17/2—8/3 to 6/2—25/2 as suggested by the Punjab, the loss to Sind during the period will be aggravated It has been worked out that out of 15 years during the period 1932-46, there will be further heavy deficits in 10 years, the effect of which will be disastrous on maturing of large Rabi areas in Sind.

2.3 The limit of 34,000 cusecs was accepted by the Panjab Chief Engineers, by mutual agreement and for other concessions received by the Punjab. Thal canal, *vide* clause (3) B (iv) has also been allowed to draw up to its kharif capacity of 6,000 cusecs although its Rabi capacity during December to March does not exceed 3,600 cusecs. Sind is therefore equally entitled to a Rabicapacity equal to the capacity of perennial canals which is 34,000 cusecs.

2.4. Sind is therefore not prepared to agree to the modifications suggested by the Punjab.

3.0. An additional clause sought to be included in the draft agreement.

" That the agreement must include a clause empowering either party to require such modifications of the agreement to be made in the event of successful objections to the agreement by all or any of the Indian States concerned in the waters of the Indus and its tributaries as may be consequential to those objections and necessary for implementing them. The manner in which such a demand will be decided is laid down in clause 17."

3.1. Sind's comment.—This is an entirely new clause sought to be included in the " draft agreement"

3.2. Sind Government is not prepared to agree to the inclusion of this clause, as clause 1 of the draft agreement already provides that "the Punjab share comprises the withdrawals controlled by the Punjab from the Indus and ... tributaries for the use of the Province of the Punjab and certain Indian States and Sind's share under Priority I, III, IV and V comprises withdrawals for the use of the province of Sind and Khairpur State."

3.3. The introduction of the above clause would mean that Sind will have to be a party to all disputes which have, hitherto, been the responsibility of the Punjab, Sind accordingly maintains that the rights of the Indian States if any should bemet from the Punjab allocation under the agreement which includes share of the States, even in the case of surpluses, as in the case of Sind which includes the share of Khairpur State.

ANNEXURE XVIII

From

T. A. W. FOY, ESQUIRE, C.I.E., I.S.E.,
Secretary to Government, Punjab,
Public Works Depatment, Irrigation Branch.

To

THE SECRETARY TO GOVERNMENT OF SIND,
Finance Department, Karachi.

Confidential.

No. 051-P.-712/39, dated Lahore, the 18th March 1947.

Subject.—Sind-Punjab Indus Dispute.

Reference.—Your letter No. 1442-E., dated 20th February 1947.

Sir,

I am directed to refer to your letter referred to above and to state that the Punjab Government notes with regret that the Sind Government is unable to agree to any of the very moderate modifications of the water clauses asked for in my letter No. 60081/Cn.712/39, dated 28th December 1946. In view of this decision the Punjab Government is also requesting the Governor-General to move His Majesty in Council to pass orders on the findings of the Rau Commission after considering the representations submitted by the Punjab and other interested parties.

2. I am also to inform you that the Punjab Government sees no reason to discontinue works in any case will take years to complete.

3. Finally, I am to inform you that the Punjab Government proposes to complain to the Governor-General against the allocation of additional supplies to the Sind New Barrage Canals and against the construction of the Lundi-Miranpur Feeder. It is presumed that the Government of Sind will either suspend all operations on these new Barrages and Canals or proceed with them at its own risk.

I have the honour to be,

Sir,
Your most obedient servant,

(Sd.) T. A. W. FOY,
Secretary to Government, Punjab,
Public Works Department, Irrigation Branch.

The Indus Waters Treaty 1960

The Indus Waters Treaty 1960

CONTENTS

PREAMBLE

The Government of India and the Government of Pakistan, being equally desirous of attaining the most complete and satisfactory utilisation of the waters of the Indus system of rivers and recognising the need, therefore, of fixing and delimiting, in a spirit of goodwill and friendship, the rights and obligations of each in relation to the other concerning the use of these waters and of making provision for the settlement, in a cooperative spirit, of all such questions as may hereafter arise in regard to the interpretation or application of the provisions agreed upon herein, have resolved to conclude a Treaty in furtherance of these objectives, and for this purpose have named as their plenipotentiaries:

THE GOVERNMENT OF INDIA:

Shri Jawaharlal Nehru,

Prime Minister of India,

and

THE GOVERNMENT OF PAKISTAN:

Field Marshal Mohammad Ayub Khan, HP., H.J.,

President of Pakistan;

who, having communicated to each other their respective Full Powers and having found them in good and due form, have agreed upon the following Articles and Annexures:—

ARTICLE I

Definitions

As used in this Treaty:

(1) The terms "Article" and "Annexure" mean respectively an Article of, and an Annexure to, this Treaty.

Except as otherwise indicated, references to Paragraphs are to the paragraphs in the Article or in the Annexure in which the reference is made.

(2) The term "Tributary" of a river means any surface channel, whether in continuous or intermittent flow and by whatever name called, whose waters in the natural course would fall into that river, e.g. a tributary, a torrent, a natural drainage, an artificial drainage, a *nadi*, a *nallah*, a *nai*, a *khad*, a *cho*. The term also includes any sub-tributary or branch or subsidiary channel, by whatever name called, whose waters, in the natural course, would directly or otherwise flow into that surface channel.

(3) The term "The Indus," "The Jhelum," "The Chenab," "The Ravi," "The Beas" or "The Sutlej" means the named river (including Connecting Lakes, if any) and all its Tributaries: Provided however that

(i) none of the rivers named above shall be deemed to be a Tributary;

(ii) The Chenab shall be deemed to include the river Panjnad; and

(iii) the river Chandra and the river Bhaga shall be deemed to be Tributaries of The Chenab.

(4) The term "Main" added after Indus, Jhelum, Chenab, Sutlej, Beas or Ravi means the main stem of the named river excluding its Tributaries, but including all channels and creeks of the main stem of that river and such Connecting Lakes as form part of the main stem itself. The Jhelum Main shall be deemed to extend up to Verinag, and the Chenab Main up to the confluence of the river Chandra and the river Bhaga.

(5) The term "Eastern Rivers" means The Sutlej, The Beas and The Ravi taken together.

(6) The term "Western Rivers" means The Indus, The Jhelum and The Chenab taken together.

(7) The term "the Rivers" means all the rivers, The Sutlej, The Beas, The Ravi, The Indus, The Jhelum and The Chenab.

(8) The term "Connecting Lake" means any lake which receives water from, or yields water to, any of the Rivers; but any lake which occasionally and irregularly receives only the spill of any of the Rivers and returns only the whole or part of that spill is not a Connecting Lake.

(9) The term "Agricultural Use" means the use of water for irrigation, except for irrigation of household gardens and public recreational gardens.

(10) The term "Domestic Use" means the use of water for:

(a) drinking, washing, bathing, recreation, sanitation (including the conveyance and dilution of sewage and of industrial and other wastes), stock and poultry, and other like purposes;

(b) household and municipal purposes (including use for household gardens and public recreational gardens); and

(c) industrial purposes (including mining, milling and other like purposes);

but the term does not include Agricultural Use or use for the generation of hydro-electric power.

(11) The term "Non-Consumptive Use" means any control or use of water for navigation, floating of timber or other property, flood protection or flood control, fishing or fish culture, wild life or other like beneficial purposes, provided that, exclusive of seepage and evaporation of water incidental to the control or use, the water (undiminished in volume within the practical range of measurement) remains in, or is returned to, the same river or its Tributaries; but the term does not include Agricultural Use or use for the generation of hydro-electric power.

(12) The term "Transition Period" means the period beginning and ending as provided in Article II (6).

(13) The term "Bank" means the International Bank for Reconstruction and Development.

(14) The term "Commissioner" means either of the Commissioners appointed under the provisions of Article VIII(1) and the term "Commission" means the Permanent Indus Commission constituted in accordance with Article VIII(3).

(15) The term "interference with the waters" means:

(a) Any act of withdrawal therefrom; or

(b) Any man-made obstruction to their flow which causes a change in the volume (within the practical range of measurement) of the daily flow of the waters: Provided however that an obstruction which involves only an insignificant and incidental change in the volume of the daily flow, for example, fluctuations due to afflux caused by bridge piers or a temporary by-pass, etc., shall not be deemed to be an interference with the waters.

(16) The term "Effective Date" means the date on which this Treaty takes effect in accordance with the provisions of Article XII, that is, the first of April 1960.

ARTICLE II

Provisions Regarding Eastern Rivers

(1) All the waters of the Eastern Rivers shall be available for the unrestricted use of India, except as otherwise expressly provided in this Article.

(2) Except for Domestic Use and Non-Consumptive Use, Pakistan shall be under an obligation to let flow, and shall not permit any interference with, the waters of the Sutlej Main and the Ravi Main in the reaches where these rivers flow in Pakistan and have not yet finally crossed into Pakistan. The points of final crossing are the following: (a)

near the new Hasta Bund upstream of Suleimanke in the case of the Sutlej Main, and (b) about one and a half miles upstream of the syphon for the B-R-B-D Link in the case of the Ravi Main.

(3) Except for Domestic Use, Non-Consumptive Use and Agricultural Use (as specified in Annexure B), Pakistan shall be under an obligation to let flow, and shall not permit any interference with, the waters (while flowing in Pakistan) of any Tributary which in its natural course joins the Sutlej Main or the Ravi Main before these rivers have finally crossed into Pakistan.

(4) All the waters, while flowing in Pakistan, of any Tributary which, in its natural course, joins the Sutlej Main or the Ravi Main after these rivers have finally crossed into Pakistan shall be available for the unrestricted use of Pakistan: Provided however that this provision shall not be construed as giving Pakistan any claim or right to any releases by India in any such Tributary. If Pakistan should deliver any of the waters of any such Tributary, which on the Effective Date joins the Ravi Main after this river has finally crossed into Pakistan, into a reach of the Ravi Main upstream of this crossing, India shall not make use of these waters; each Party agrees to establish such discharge observation stations and make such observations as may be necessary for the determination of the component of water available for the use of Pakistan on account of the aforesaid deliveries by Pakistan, and Pakistan agrees to meet the cost of establishing the aforesaid discharge observation stations and making the aforesaid observations.

(5) There shall be a Transition Period during which, to the extent specified in Annexure H, India shall

(i) limit its withdrawals for Agricultural Use,

(ii) limit abstractions for storages, and

(iii) make deliveries to Pakistan

from the Eastern Rivers.

(6) The Transition Period shall begin on 1st April 1960 and it shall end on 31st March 1970, or, if extended under the provisions of Part 8 of Annexure H, on the date up to which it has been extended. In any event, whether or not the replacement referred to in Article IV(1) has been accomplished, the Transition Period shall end not later than 31st March 1973.

(7) If the Transition Period is extended beyond 31st March 1970, the provisions of Article V(5) shall apply.

(8) If the Transition Period is extended beyond 31st March 1970, the provisions of Paragraph (5) shall apply during the period of extension beyond 31st March 1970.

(9) During the Transition Period, Pakistan shall receive for unrestricted use the waters of the Eastern Rivers which are to be released by India in accordance with the provisions of Annexure H. After the end of the Transition Period, Pakistan shall have no claim or right to releases by India of any of the waters of the Eastern Rivers. In case there are any releases, Pakistan shall enjoy the unrestricted use of the waters so released after they have finally crossed into Pakistan: Provided that in the event that Pakistan makes any use of these waters, Pakistan shall not acquire any right whatsoever, by prescription or otherwise, to a continuance of such releases or such use.

ARTICLE III

Provisions Regarding Western Rivers

(1) Pakistan shall receive for unrestricted use all those waters of the Western Rivers which India is under obligation to let flow under the provisions of Paragraph (2).

(2) India shall be under an obligation to let flow all the waters of the Western Rivers, and shall not permit any interference with these waters, except for the following uses, restricted (except as provided in item (c)(ii) of Paragraph 5 of Annexure C) in the case of each of the rivers, The

Indus, The Jhelum and The Chenab, to the drainage basin thereof:

(a) Domestic Use;

(b) Non-Consumptive Use;

(c) Agricultural Use, as set out in Annexure C; and

(d) Generation of hydro-electric power, as set out in Annexure D.

(3) Pakistan shall have the unrestricted use of all waters originating from sources other than the Eastern Rivers which are delivered by Pakistan into The Ravi or The Sutlej, and India shall not make use of these waters. Each Party agrees to establish such discharge observation stations and make such observations as may be considered necessary by the Commission for the determination of the component of water available for the use of Pakistan on account of the aforesaid deliveries by Pakistan.

(4) Except as provided in Annexures D and E, India shall not store any water of, or construct any storage works on, the Western Rivers.

ARTICLE IV

Provisions Regarding Eastern Rivers and Western Rivers

(1) Pakistan shall use its best endeavours to construct and bring into operation, with due regard to expedition and economy, that part of a system of works which will accomplish the replacement, from the Western Rivers and other sources, of water supplies for irrigation canals in Pakistan which, on 15th August 1947, were dependent on water supplies from the Eastern Rivers.

(2) Each Party agrees that any Non-Consumptive Use made by it shall be so made as not to materially change, on account of such use, the flow in any channel to the prejudice of the uses on that channel by the other Party under the provisions of this Treaty. In executing any scheme of

flood protection or flood control each Party will avoid, as far as practicable, any material damage to the other Party, and any such scheme carried out by India on the Western Rivers shall not involve any use of water or any storage in addition to that provided under Article III.

(3) Nothing in this Treaty shall be construed as having the effect of preventing either Party from undertaking schemes of drainage, river training, conservation of soil against erosion and dredging, or from removal of stones, gravel or sand from the beds of the Rivers: Provided that

(a) in executing any of the schemes mentioned above, each Party will avoid, as far as practicable, any material damage to the other Party;

(b) any such scheme carried out by India on the Western Rivers shall not involve any use of water or any storage in addition to that provided under Article III;

(c) except as provided in Paragraph (5) and Article VII(1)(b), India shall not take any action to increase the catchment area, beyond the area on the Effective Date, of any natural or artificial drainage or drain which crosses into Pakistan, and shall not undertake such construction or remodelling of any drainage or drain which so crosses or falls into a drainage or drain which so crosses as might cause material damage in Pakistan or entail the construction of a new drain or enlargement of an existing drainage or drain in Pakistan; and

(d) should Pakistan desire to increase the catchment area, beyond the area on the Effective Date, of any natural or artificial drainage or drain, which receives drainage waters from India, or, except in an emergency, to pour any waters into it in excess of the quantities received by it as on the Effective Date, Pakistan shall, before undertaking any work for

these purposes, increase the capacity of that drainage or drain to the extent necessary so as not to impair its efficacy for dealing with drainage waters received from India as on the Effective Date.

(4) Pakistan shall maintain in good order its portions of the drainages mentioned below with capacities not less than the capacities as on the Effective Date:—

(i) Hudiara Drain
(ii) Kasur Nala
(iii) Salimshah Drain
(iv) Fazilka Drain.

(5) If India finds it necessary that any of the drainages mentioned in Paragraph (4) should be deepened or widened in Pakistan, Pakistan agrees to undertake to do so as a work of public interest, provided India agrees to pay the cost of the deepening or widening.

(6) Each Party will use its best endeavours to maintain the natural channels of the Rivers, as on the Effective Date, in such condition as will avoid, as far as practicable, any obstruction to the flow in these channels likely to cause material damage to the other Party.

(7) Neither Party will take any action which would have the effect of diverting the Ravi Main between Madhopur and Lahore, or the Sutlej Main between Harike and Sulemanke, from its natural channel between high banks.

(8) The use of the natural channels of the Rivers for the discharge of flood or other excess waters shall be free and not subject to limitation by either Party, and neither Party shall have any claim against the other in respect of any damage caused by such use. Each Party agrees to communicate to the other Party, as far in advance as practicable, any information it may have in regard to such extraordinary discharges of water from reservoirs and flood flows as may affect the other Party.

(9) Each Party declares its intention to operate its storage dams, barrages and irrigation canals in such manner,

consistent with the normal operations of its hydraulic systems, as to avoid, as far as feasible, material damage to the other Party.

(10) Each Party declares its intention to prevent, as far as practicable, undue pollution of the waters of the Rivers which might affect adversely uses similar in nature to those to which the waters were put on the Effective Date, and agrees to take all reasonable measures to ensure that, before any sewage or industrial waste is allowed to flow into the Rivers, it will be treated, where necessary, in such manner as not materially to affect those uses: Provided that the criterion of reasonableness shall be the customary practice in similar situations on the Rivers.

(11) The Parties agree to adopt, as far as feasible, appropriate measures for the recovery, and restoration to owners, of timber and other property floated or floating down the Rivers, subject to appropriate charges being paid by the owners.

(12) The use of water for industrial purposes under Articles II(2), II(3) and III(2) shall not exceed:

(a) in the case of an industrial process known on the Effective Date, such quantum of use as was customary in that process on the Effective Date;

(b) in the case of an industrial process not known on the Effective Date:

(i) such quantum of use as was customary on the Effective Date in similar or in any way comparable industrial processes; or

(ii) if there was no industrial process on the Effective Date similar or in any way comparable to the new process, such quantum of use as would not have a substantially adverse effect on the other Party.

(13) Such part of any water withdrawn for Domestic Use under the provisions of Articles II (3) and III (2) as

is subsequently applied to Agricultural Use shall be accounted for as part of the Agricultural Use specified in Annexure B and Annexure C respectively; each Party will use its best endeavours to return to the same river (directly or through one of its Tributaries) all water withdrawn therefrom for industrial purposes and not consumed either in the industrial processes for which it was withdrawn or in some other Domestic Use.

(14) In the event that either Party should develop a use of the waters of the Rivers which is not in accordance with the provisions of this Treaty, that Party shall not acquire by reason of such use any right, by prescription or otherwise, to a continuance of such use.

(15) Except as otherwise required by the express provisions of this Treaty, nothing in this Treaty shall be construed as affecting existing territorial rights over the waters of any of the Rivers or the beds or banks thereof, or as affecting existing property rights under municipal law over such waters or beds or banks.

ARTICLE V

Financial Provisions

(1) In consideration of the fact that the purpose of part of the system of works referred to in Article IV(1) is the replacement, from the Western Rivers and other sources, of water supplies for irrigation canals in Pakistan which, on 15th August 1947, were dependent on water supplies from the Eastern Rivers, India agrees to make a fixed contribution of Pounds Sterling 62,060,000 towards the costs of these works. The amount in Pounds Sterling of this contribution shall remain unchanged irrespective of any alteration in the par value of any currency.

(2) The sum of Pounds Sterling 62,060,000 specified in Paragraph (1) shall be paid in ten equal annual instalments on the 1st of November of each year. The first of such annual instalments shall be paid on

1st November 1960, or if the Treaty has not entered into force by that date, then within one month after the Treaty enters into force.

(3) Each of the instalments specified in Paragraph (2) shall be paid to the Bank for the credit of the Indus Basin Development Fund to be established and administered by the Bank, and payment shall be made in Pounds Sterling, or in such other currency or currencies as may from time to time be agreed between India and the Bank.

(4) The payments provided for under the provisions of Paragraph (3) shall be made without deduction or set-off on account of any financial claims of India on Pakistan arising otherwise than under the provisions of this Treaty: Provided that this provision shall in no way absolve Pakistan from the necessity of paying in other ways debts to India which may be outstanding against Pakistan.

(5) If, at the request of Pakistan, the Transition Period is extended in accordance with the provisions of Article II (6) and of Part 8 of Annexure H, the Bank shall thereupon pay to India out of the Indus Basin Development Fund the appropriate amount specified in the Table below:—

Table

Period of Aggregate Extension of Transition Period	*Payment to India*
One year	£ Stg. 3,125,000
Two years	£ Stg. 6,406,250
Three years	£ Stg. 9,850,000

(6) The provisions of Article IV(1) and Article V(1) shall not be construed as conferring upon India any right to participate in the decisions as to the system of works which Pakistan constructs pursuant to Article IV(1) or as constituting an assumption of any responsibility by India or as an agreement by India in regard to such works.

(7) Except for such payments as are specifically provided for in this Treaty, neither Party shall be entitled to claim any payment for observance of the provisions of this Treaty or to make any charge for water received from it by the other Party.

ARTICLE VI

Exchange of Data

(1) The following data with respect to the flow in, and utilisation of the waters of, the Rivers shall be exchanged regularly between the Parties:—

(a) Daily (or as observed or estimated less frequently) gauge and discharge data relating to flow of the Rivers at all observation sites.

(b) Daily extractions for or releases from reservoirs.

(c) Daily withdrawals at the heads of all canals operated by government or by a government agency (hereinafter in this Article called canals), including link canals.

(d) Daily escapages from all canals, including link canals.

(e) Daily deliveries from link canals.

These data shall be transmitted monthly by each Party to the other as soon as the data for a calendar month have been collected and tabulated, but not later than three months after the end of the month to which they relate: Provided that such of the data specified above as are considered by either Party to be necessary for operational purposes shall be supplied daily or at less frequent intervals, as may be requested. Should one Party request the supply of any of these data by telegram, telephone, or wireless, it shall reimburse the other Party for the cost of transmission.

(2) If, in addition to the data specified in Paragraph (1) of this Article, either Party requests the supply of any data relating to the hydrology of the Rivers, or to canal or reservoir operation connected with the Rivers, or to any provision of this Treaty, such data shall be supplied by the other Party to the extent that these are available.

ARTICLE VII

Future Co-operation

(1) The two Parties recognize that they have a common interest in the optimum development of the Rivers, and, to that end, they declare their intention to co-operate, by mutual agreement, to the fullest possible extent. In particular:—

(a) Each Party, to the extent it considers practicable and on agreement by the other Party to pay the costs to be incurred, will, at the request of the other Party, set up or install such hydrologic observation stations within the drainage basins of the Rivers, and set up or install such meteorological observation stations relating thereto and carry out such observations thereat, as may be requested, and will supply the data so obtained.

(b) Each Party, to the extent it considers practicable and on agreement by the other Party to pay the costs to be incurred, will, at the request of the other Party, carry out such new drainage works as may be required in connection with new drainage works of the other Party.

(c) At the request of either Party, the two Parties may, by mutual agreement, co-operate in undertaking engineering works on the Rivers.

The formal arrangements, in each case, shall be as agreed upon between the Parties.

(2) If either Party plans to construct any engineering work which would cause interference with the waters of any of the Rivers and which, in its opinion, would affect the other Party materially, it shall notify the other Party of its plans and shall supply such data relating to the work as may be available and as would enable the other Party to inform itself of the nature, magnitude and effect of the work. If a work would cause interference with the waters of any of the Rivers but would not, in the opinion of the Party planning it, affect the other Party materially, nevertheless the Party planning the work shall, on request, supply the other Party with such data regarding the nature, magnitude and effect, if any, of the work as may be available.

ARTICLE VIII

Permanent Indus Commission

(1) India and Pakistan shall each create a permanent post of Commissioner for Indus Waters, and shall appoint to this post, as often as a vacancy occurs, a person who should ordinarily be a high-ranking engineer competent in the field of hydrology and water-use. Unless either Government should decide to take up any particular question directly with the other Government, each Commissioner will be the representative of his Government for all matters arising out of this Treaty, and will serve as the regular channel of communication on all matters relating to the implementation of the Treaty, and, in particular, with respect to

(a) the furnishing or exchange of information or data provided for in the Treaty; and

(b) the giving of any notice or response to any notice provided for in the Treaty.

(2) The status of each Commissioner and his duties and responsibilities towards his Government will be determined by that Government.

(3) The two Commissioners shall together form the Permanent Indus Commission.

(4) The purpose and functions of the Commission shall be to establish and maintain co-operative arrangements for the implementation of this Treaty, to promote co-operation between the Parties in the development of the waters of the Rivers and, in particular,

(a) to study and report to the two Governments on any problem relating to the development of the waters of the Rivers which may be jointly referred to the Commission by the two Governments: in the event that a reference is made by one Government alone, the Commissioner of the other Government shall obtain the authorization of his Government before he proceeds to act on the reference;

(b) to make every effort to settle promptly, in accordance with the provisions of Article IX (1), any question arising thereunder;

(c) to undertake, once in every five years, a general tour of inspection of the Rivers for ascertaining the facts connected with various developments and works on the Rivers;

(d) to undertake promptly, at the request of either Commissioner, a tour of inspection of such works or sites on the Rivers as may be considered necessary by him for ascertaining the facts connected with those works or sites; and

(e) to take, during the Transition Period, such steps as may be necessary for the implementation of the provisions of Annexure H.

(5) The Commission shall meet regularly at least once a year, alternately in India and Pakistan. This regular annual meeting shall be held in November or in such other month as may be agreed upon between the Commissioners. The Commission shall also meet when requested by either Commissioner.

(6) To enable the Commissioners to perform their functions in the Commission, each Government agrees to accord to the Commissioner of the other Government the same privileges and immunities as are accorded to representatives of member States to the principal and subsidiary organs of the United Nations under Sections 11, 12 and 13 of Article IV of the Convention on the Privileges and Immunities of the United Nations (dated 13th February, 1946) during the periods specified in those Sections. It is understood and agreed that these privileges and immunities are accorded to the Commissioners not for the personal benefit of the individuals themselves but in order to safeguard the independent exercise of their functions in connection with the Commission; consequently, the Government appointing the Commissioner not only has the right but is under a duty to waive the immunity of its Commissioner in any case where, in the opinion of the appointing Government, the immunity would impede the course of justice and can be waived without prejudice to the purpose for which the immunity is accorded.

(7) For the purposes of the inspections specified in Paragraph (4) (c) and (d), each Commissioner may be accompanied by two advisers or assistants to whom appropriate facilities will be accorded.

(8) The Commission shall submit to the Government of India and to the Government of Pakistan, before the first of June of every year, a report on its work for the year ended on the preceding 31st of March, and may submit to the two Governments other reports at such times as it may think desirable.

(9) Each Government shall bear the expenses of its Commissioner and his ordinary staff. The cost of any special staff required in connection with the work mentioned in Article VII(1) shall be borne as provided therein.

(10) The Commission shall determine its own procedures.

ARTICLE IX

Settlement of Differences and Disputes

(1) Any question which arises between the Parties concerning the interpretation or application of this Treaty or the existence of any fact which, if established, might constitute a breach of this Treaty shall first be examined by the Commission, which will endeavour to resolve the question by agreement.

(2) If the Commission does not reach agreement on any of the questions mentioned in Paragraph (1), then a difference will be deemed to have arisen, which shall be dealt with as follows:

(a) Any difference which, in the opinion of either Commissioner, falls within the provisions of Part 1 of Annexure F shall, at the request of either Commissioner, be dealt with by a Neutral Expert in accordance with the provisions of Part 2 of Annexure F;

(b) If the difference does not come within the provisions of Paragraph (2)(a), or if a Neutral Expert, in accordance with the provisions of Paragraph 7 of Annexure F, has informed the Commission that, in his opinion, the difference, or a part thereof, should be treated as a dispute, then a dispute will be deemed to have arisen which shall be settled in accordance with the provisions of Paragraphs (3), (4) and (5):

Provided that, at the discretion of the Commission, any difference may either be dealt with by a Neutral Expert in accordance with the provisions of Part 2 of Annexure F or be deemed to be a dispute to be settled in accordance with the provisions of Paragraphs (3), (4) and (5), or may be settled in any other way agreed upon by the Commission.

(3) As soon as a dispute to be settled in accordance with this and the succeeding paragraphs of this Article has arisen, the Commission shall, at the request of either Commissioner, report the fact to the two Governments, as early

as practicable, stating in its report the points on which the Commission is in agreement and the issues in dispute, the views of each Commissioner on these issues and his reasons therefor.

(4) Either Government may, following receipt of the report referred to in Paragraph (3), or if it comes to the conclusion that this report is being unduly delayed in the Commission, invite the other Government to resolve the dispute by agreement. In doing so it shall state the names of its negotiators and their readiness to meet with the negotiators to be appointed by the other Government at a time and place to be indicated by the other Government. To assist in these negotiations, the two Governments may agree to enlist the services of one or more mediators acceptable to them.

(5) A Court of Arbitration shall be established to resolve the dispute in the manner provided by Annexure G

(a) upon agreement between the Parties to do so; or

(b) at the request of either Party, if, after negotiations have begun pursuant to Paragraph (4), in its opinion the dispute is not likely to be resolved by negotiation or mediation; or

(c) at the request of either Party, if, after the expiry of one month following receipt by the other Government of the invitation referred to in Paragraph (4), that Party comes to the conclusion that the other Government is unduly delaying the negotiations.

(6) The provisions of Paragraphs (3), (4) and (5) shall not apply to any difference while it is being dealt with by a Neutral Expert.

ARTICLE X

Emergency Provision

If, at any time prior to 31st March 1965, Pakistan should represent to the Bank that, because of the outbreak

of large-scale international hostilities arising out of causes beyond the control of Pakistan, it is unable to obtain from abroad the materials and equipment necessary for the completion, by 31st March 1973, of that part of the system of works referred to in Article IV(1) which relates to the replacement referred to therein, (hereinafter referred to as the "replacement element") and if, after consideration of this representation in consultation with India, the Bank is of the opinion that

(a) these hostilities are on a scale of which the consequence is that Pakistan is unable to obtain in time such materials and equipment as must be procured from abroad for the completion, by 31st March 1973, of the replacement element, and

(b) since the Effective Date, Pakistan has taken all reasonable steps to obtain the said materials and equipment and, with such resources of materials and equipment as have been available to Pakistan both from within Pakistan and from abroad, has carried forward the construction of the replacement element with due diligence and all reasonable expedition,

the Bank shall immediately notify each of the Parties accordingly. The Parties undertake, without prejudice to the provisions of Article XII (3) and (4), that, on being so notified, they will forthwith consult together and enlist the good offices of the Bank in their consultation, with a view to reaching mutual agreement as to whether or not, in the light of all the circumstances then prevailing, any modifications of the provisions of this Treaty are appropriate and advisable and, if so, the nature and the extent of the modifications.

ARTICLE XI

General Provisions

(1) It is expressly understood that

(a) this Treaty governs the rights and obligations of each Party in relation to the other with respect only to the use of the waters of the Rivers and matters incidental thereto; and

(b) nothing contained in this Treaty, and nothing arising out of the execution thereof, shall be construed as constituting a recognition or waiver (whether tacit, by implication or otherwise) of any rights or claims whatsoever of either of the Parties other than those rights or claims which are expressly recognized or waived in this Treaty.

Each of the Parties agrees that it will not invoke this Treaty, anything contained therein, or anything arising out of the execution thereof, in support of any of its own rights or claims whatsoever or in disputing any of the rights or claims whatsoever of the other Party, other than those rights or claims which are expressly recognized or waived in this Treaty.

(2) Nothing in this Treaty shall be construed by the Parties as in any way establishing any general principle of law or any precedent.

(3) The rights and obligations of each Party under this Treaty shall remain unaffected by any provisions contained in, or by anything arising out of the execution of, any agreement establishing the Indus Basin Development Fund.

ARTICLE XII

Final Provisions

(1) This Treaty consists of the Preamble, the Articles hereof and Annexures A to H hereto, and may be cited as "The Indus Waters Treaty 1960".

(2) This Treaty shall be ratified and the ratifications

into force upon the exchange of ratifications, and will then take effect retrospectively from the first of April 1960.

(3) The provisions of this Treaty may from time to time be modified by a duly ratified treaty concluded for that purpose between the two Governments.

(4) The provisions of this Treaty, or the provisions of this Treaty as modified under the provisions of Paragraph (3), shall continue in force until terminated by a duly ratified treaty concluded for that purpose between the two Governments.

IN WITNESS WHEREOF the respective Plenipotentiaries have signed this Treaty and have hereunto affixed their seals.

Done in triplicate in English at Karachi on this Nineteenth day of September 1960.

FOR THE GOVERNMENT OF INDIA:

(Sd) Jawaharlal Nehru

FOR THE GOVERNMENT OF PAKISTAN:

(Sd) Mohammad Ayub Khan .....
Field Marshal, H.P., H.J.

FOR THE INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

for the purposes specified in Articles V and X and Annexures F, G and H:

(Sd) W. A. B. Iliff

INDUS RIVER SYSTEM AUTHORITY
Government of Pakistan

APPORTIONMENT OF THE WATERS OF THE INDUS RIVER SYSTEM BETWEEN THE PROVINCES OF PAKISTAN

21st March, 1991, will go down in the history of Pakistan as a pivotal breakthrough in its leap towards the 21st century and turning point in its march towards national consolidation. On that day was unraveled a dispute that had been festering in this part of the subcontinent for the past seventy years.

As a follow-up to the meeting of the Chief Ministers at Lahore on March 3, 1991, a meeting of the representatives of the four provinces was held at Lahore on March 04, 1991. Another meeting was held at Karachi on March 16, 1991. The list of participants is attached.

The participants agreed on the following points:-

1. There was an agreement that the issue relating to Apportionment of the Waters of the Indus River System should be settled as quickly as possible,
2. In the light of the accepted water distributional principles the following apportionment was agreed to:-

PROVINCE	KHARIF	RABI	TOTAL
PUNJAB	37.07	18.87	55.94
SINDH	33.94	14.82	48.76
N.W.F.P. (a)	3.48	2.30	5.78
(b) CIVIL CANALS**	1.80	1.20	3.00
BALOCHISTAN	2.85	1.02	3.87
TOTAL	77.34 + 1.80	37.01 +1.20	114.35 +3.00

***Including already sanctioned Urban and Industrial uses for Metropolitan Karachi.**
****Unguaged Civil Canals above the rim stations.**

3. N.W.F.P / Baluchistan Projects which are under execution have been provided their authorized quota of water as existing uses.
4. Balance river supplies (including flood supplies and future storages) shall be distributed as below:-

Punjab	SINDH	Balochistan	NWFP	TOTAL
37%	37%	12%	14%	100%

5. Industrial and Urban Water supplies for Metropolitan city, for which there were sanctioned allocations will be accorded priority.
6. The need for storages, wherever feasible on the Indus and other rivers was admitted and recognised by the participants for planned future agricultural development.
7. The need for certain minimum escapage to sea, below Kotri, to check sea instrusion was recognised. Sindh held the view, that the optimum level was 10 M.A.F., which was discussed at length, while other studies indicated lower/higher figures. It was, therefore, decided that further studies would be undertaken to establish the minimal escapage needs down stream Kotri.
8. There would be no restrictions on the Provinces to undertake new projects within their agreed shares.
9. No restrictions are placed on small schemes not exceeding 5000 acres above elevation of 1200 ft. SPD.
10. No restrictions are placed on developing irrigation uses in the Kurram / Gomal / Kohat basins, so long as these do not adversely affect the existing uses on these rivers.
11. There are no restrictions on Baluchistan, to develop the water resources of the Indus right bank tributaries, flowing through its areas.
12. The requirements of LBOD will be met out of the flood supplies In accordance with the agreed sharing formula.
13. For the implementation of this accord, the need to establish an Indus River System Authority was recognised and accepted. It would have headquarters at Lahore and would have representation from all the four provinces.
14. a. The system-wise allocation will be worked out separately, on ten daily basis and will be attached with this agreement as part and parcel of it.

b. The record of actual average system uses for the period 1977-82, would form the guide ;line for developing a future regulation pattern. These ten daily uses would be adjusted pro-prata to correspond to the indicated seasonal allocations of the different canal systems and would form the basis for sharing shortages and surpluses on all Pakistan basis.

c. The existing reservoirs would be operated with priority for the irrigation uses of the Provinces.

d. The provinces will have the freedom within their allocations to modify system-wise and period-wise uses.

e. All efforts would be made to avoid wastages. Any surpluses may be used by another province, but this would not establish any rights to such uses.

10 – Day Seasonal System Wise Adjusted Allocations
Excluding Flood Flows & Future Storages are as Under:-

10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

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PUNJAB – KHARIF

PERIOD		F.I.C.	M-R INT	CBDC	S.V.C. (Upper)	S.V.C. (Lower)	TRIMMU	PANJNAD	THAL	TAUNSA	CRBC	GREATER THAL	TOTAL (1000 X Cs)
APR	1.	24.2	0.1	1.8	8.3	3.9	2.9	4.3	6.0	4.9	1.3	2.6	60.3
	2.	24.7	0.3	1.8	10.8	3.7	3.4	5.1	6.4	4.3	0.18	3.4	64.7
	3.	28.1	1.1	2.0	13.3	5.5	5.5	7.3	6.4	7.9	0.5	4.9	82.5
MAY	1.	30.1	1.3	2.1	16.0	8.0	5.9	7.6	6.6	10.0	0.7	5.4	93.7
	2.	30.8	2.0	2.1	17.2	8.7	6.1	9.0	6.8	11.5	1.1	5.5	100.8
	3.	31.6	2.4	2.2	18.1	9.2	6.3	9.5	6.8	11.9	1.3	5.5	104.8
JUN	1.	32.3	2.6	2.3	18.5	9.4	6.6	10.5	6.8	13.0	1.7	5.4	109.1
	2.	33.2	3.6	2.2	18.7	9.7	6.7	10.4	6.9	13.5	1.8	5.5	112.2
	3.	34.0	4.0	2.2	19.2	9.6	6.7	10.7	6.7	14.0	1.8	5.7	114.6
JUL	1.	32.7	5.4	2.2	19.2	9.9	6.6	10.4	6.6	14.3	1.7	5.8	114.8
	2.	29.6	5.0	2.0	17.9	8.7	5.7	9.9	6.3	12.5	1.7	5.1	104.4
	3.	27.8	6.1	1.8	16.8	8.7	5.1	9.6	5.8	11.8	1.8	4.7	100.0
AUG	1.	28.2	5.8	1.7	17.4	8.2	5.3	9.6	6.0	11.5	1.8	4.8	100.3
	2.	31.5	6.1	1.8	19.3	9.3	6.3	10.6	6.3	11.3	1.8	5.4	109.7
	3.	34.6	4.9	2.0	20.6	10.1	6.8	11.1	6.6	13.9	1.8	5.9	118.3
SEP	1.	33.9	4.4	2.1	21.0	10.0	6.8	11.1	6.8	14.4	1.8	5.9	118.2
	2.	33.9	3.7	2.1	20.6	9.8	6.8	10.8	6.8	14.0	1.8	5.8	116.1
	3.	33.1	2.3	2.2	19.6	9.9	6.9	11.0	6.8	13.0	1.8	5.5	112.0
TOTAL MAF		11.18	1.24	0.74	6.31	3.07	2.15	3.40	2.37	4.19	0.55	1.87	37.07

10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

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PUNJAB – RABI

PERIOD		F.I.C.	M-R INT	CBDC	S.V.C. (Upper)	S.V.C. (Lower)	TRIMMU	PANJNAD	THAL	TAUNSA	CRBC	GREATER THAL	TOTAL (1000 X Cs)
OCT	1.	28.2	1.0	1.4	15.2	8.9	6.5	10.3	6.3	11.9	1.3	–	90.9
	2.	26.7	0.6	1.9	13.4	8.4	5.7	9.2	5.9	9.8	0.9	–	82.4
	3.	25.4	0.7	2.0	11.3	6.3	4.6	7.2	6.2	6.2	1.0	–	70.8
NOV	1.	24.3	0.3	2.1	9.6	4.3	3.6	4.9	6.1	4.5	0.9	–	60.5
	2.	23.5	0.1	2.0	8.6	3.3	3.1	4.0	6.0	5.0	1.0	–	56.7
	3.	22.4	0.0	2.0	8.7	2.9	2.9	3.7	6.0	3.1	1.0	–	52.7
DEC	1.	22.3	0.0	1.9	9.4	4.0	3.2	3.6	5.9	2.6	0.6	–	53.5
	2.	21.3	0.0	1.8	8.9	3.7	3.3	3.5	5.7	2.9	0.6	–	51.8
	3.	17.3	0.0	1.0	5.5	3.5	2.9	1.9	5.3	1.5	0.7	–	39.6
JAN	1.	9.9	0.2	0.1	1.0	6.7	4.1	1.4	1.8	0.6	0.8	–	26.7
	2.	8.7	0.1	0.8	3.5	4.3	2.6	2.1	0.1	1.8	0.8	–	24.7
	3.	10.4	0.1	1.3	7.1	0.5	0.2	2.9	2.0	3.1	0.9	–	28.6
FEB	1.	19.6	0.1	1.6	9.4	0.8	1.0	3.1	4.8	3.7	1.3	–	45.4
	2.	18.5	0.7	1.7	9.6	2.3	2.5	3.1	5.7	3.3	1.1	–	49.5
	3.	17.8	0.2	1.5	7.6	3.6	2.4	2.9	4.9	3.1	0.9	–	45.0
MAR	1.	18.0	0.6	1.1	10.1	4.3	2.9	2.9	4.8	3.4	1.5	–	49.7
	2.	20.0	0.1	1.2	11.3	5.2	4.0	4.3	5.3	3.7	1.3	–	56.4
	3.	21.3	0.1	1.2	10.0	5.5	3.5	4.3	5.6	4.4	1.2	–	57.1
TOTAL MAF		7.13	0.10	0.53	3.21	1.57	1.18	1.52	1.77	1.50	0.36	–	18.87

INDUS WATER ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

SINDH – KHARIF

PERIOD		GUDDU BARRAGE SYSTEM	SUKKUR BARRAGE SYSTEM	KOTRI BARRAGE SYSTEM	TOTAL (1000 X Cs)
APR	1.	0.00	34.00	6.20	40.20
	2.	0.20	34.30	6.80	41.30
	3.	1.40	31.60	6.90	39.90
MAY	1.	3.70	35.10	12.30	51.10
	2.	6.50	39.50	15.70	61.70
	3.	12.60	43.10	21.70	77.40
JUN	1.	22.70	49.10	26.90	98.70
	2.	31.10	56.00	32.50	119.50
	3.	35.20	60.60	33.80	129.60
JUL	1.	41.10	61.20	34.20	136.50
	2.	36.20	57.10	29.80	123.10
	3.	30.10	54.30	31.00	115.40
AUG	1.	28.50	54.00	27.60	110.10
	2.	27.80	54.40	23.40	117.80
	3.	28.70	54.60	23.80	107.10
SEP	1.	26.50	55.10	27.60	109.20
	2.	26.79	55.59	25.10	107.40
	3.	25.79	55.80	23.30	104.90
TOTAL MAF		**7.77**	**17.90**	**8.27**	**33.94**

INDUS WATERS ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

SINDH – RABI

PERIOD		GUDDU BARRAGE SYSTEM	SUKKUR BARRAGE SYSTEM	KOTRI BARRAGE SYSTEM	TOTAL (1000 X Cs)
OCT	1.	17.60	43.60	18.00	79.20
	2.	10.20	37.80	14.50	62.50
	3.	6.30	33.00	11.30	50.60
NOV	1.	4.10	31.40	9.60	45.10
	2.	3.50	31.40	7.50	42.40
	3.	3.20	31.10	5.70	40.00
DEC	1.	2.60	31.40	5.00	39.00
	2.	1.99	31.80	4.70	38.49
	3.	1.99	26.30	4.50	32.79
JAN	1.	5.40	12.30	3.10	20.80
	2.	10.40	5.40	8.60	24.40
	3.	5.50	20.30	11.70	37.50
FEB	1.	1.30	31.90	8.80	42.00
	2.	1.70	31.10	4.90	37.70
	3.	2.30	30.00	5.20	37.50
MAR	1.	2.70	29.70	4.40	36.80
	2.	3.40	29.40	4.20	37.00
	3.	2.00	28.50	4.70	35.20
TOTAL MAF		**1.73**	**10.34**	**2.75**	**14.82**

INDUS WATERS ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

NWFP – KHARIF

PERIOD		SWAT CANALS		KABUL RIVER CANALS	INDUS CANALS		OTHER CANALS	CIVIL UNGAUGED CANALS	TOTAL (1000 X Cs)	
APR	1.	3.10	2.91	0.89	3.56	4.53	0.16	4.91	12.44	13.19
	2.	3.31	3.39	0.94	3.75	4.20	0.50	4.91	13.71	13.94
	3.	3.89	3.60	1.16	3.76	3.71	0.58	4.91	14.24	13.92
MAY	1.	3.97	3.74	0.98	4.04	3.99	0.54	5.01	14.54	14.26
	2.	4.15	3.90	1.10	4.00	4.39	0.36	5.01	14.62	14.76
	3.	4.15	3.90	1.18	4.68	4.62	0.48	5.01	15.50	15.19
JUN	1.	4.09	3.84	1.16	4.93	5.37	0.50	5.11	15.79	15.98
	2.	4.10	3.84	1.12	4.71	5.45	0.40	5.11	15.44	15.92
	3.	4.11	3.90	1.20	4.82	5.55	0.34	5.01	15.34	16.00
JUL	1.	3.92	3.69	1.09	4.32	4.27	0.34	4.91	14.57	14.29
	2.	3.79	3.56	0.98	4.14	4.09	0.19	4.91	14.01	13.73
	3.	3.46	3.24	0.84	4.08	4.03	0.16	4.91	13.44	13.18
AUG	1.	3.75	3.54	0.84	4.69	4.62	0.10	4.81	14.19	13.91
	2.	3.80	3.10	1.04	4.29	4.24	0.16	4.81	13.60	13.35
	3.	3.12	2.93	1.08	4.68	4.62	0.26	4.81	13.95	13.70
SEP	1.	4.02	3.78	1.06	5.48	5.42	0.28	5.11	15.95	15.65
	2.	3.74	3.50	1.16	5.31	5.25	0.30	5.11	15.62	15.32
	3.	3.30	3.10	1.18	5.39	6.01	0.54	5.11	15.52	15.94
TOTAL MAF		1.36	1.28	0.38	1.62	1.70	0.12	1.80	5.28	5.28

INDUS WATER ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

NWFP – RABI

PERIOD		SWAT CANALS	KABUL RIVER CANALS	INDUS CANALS	OTHER CANALS	CIVIL UNGAUGED CANALS	TOTAL (1000 X Cs)
OCT	1.	3.67	1.16	4.94	0.42	3.73	13.92
	2.	3.25	1.20	4.97	0.48	3.73	14.13
	3.	3.86	1.12	4.01	0.56	3.73	13.28
NOV	1.	3.93	1.14	3.87	0.46	3.24	12.64
	2.	2.72	1.04	3.24	0.36	3.24	10.60
	3.	2.39	1.02	3.64	0.30	3.24	10.59
DEC	1.	1.74	0.98	2.19	0.10	3.41	8.42
	2.	1.78	1.05	1.96	0.10	3.41	8.30
	3.	1.74	0.94	2.00	0.22	3.41	8.31
JAN	1.	0.00	0.12	1.84	0.26	1.95	4.17
	2.	0.00	0.00	1.82	0.20	1.95	3.97
	3.	0.00	0.40	2.07	0.12	1.95	4.54
FEB	1.	1.32	0.10	2.52	0.16	3.73	7.83
	2.	1.33	0.60	2.93	0.14	3.57	8.54
	3.	1.48	0.59	3.81	0.06	3.57	9.50
MAR	1.	2.18	0.54	3.92	0.12	3.89	10.65
	2.	2.62	0.48	3.86	0.30	3.73	10.99
	3.	3.27	0.58	3.66	0.30	3.73	11.54
TOTAL MAF		0.81	0.26	1.12	0.11	1.20	3.50

INDUS WATERS ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

BALOCHISTAN – KHARIF

PERIOD		SUKKUR BARRAGE SYSTEM	GUDDU BARRAGE SYSTEM	TOTAL (1000 X Cs)
APR	1.	2.19	0.05	2.24
	2.	0.57	0.70	1.27
	3.	0.00	0.40	0.40
MAY	1.	0.00	0.68	0.68
	2.	0.60	1.24	1.84
	3.	0.70	2.54	3.24
JUN	1.	2.00	5.64	7.64
	2.	2.20	6.44	8.64
	3.	2.20	7.83	10.03
JUL	1.	2.20	9.49	11.69
	2.	2.20	8.80	11.00
	3.	2.20	9.80	12.00
AUG	1.	2.20	9.21	11.41
	2.	2.20	9.23	11.43
	3.	2.20	9.45	11.65
SEP	1.	2.20	9.22	11.42
	2.	2.20	9.78	11.98
	3.	2.20	10.24	12.44
TOTAL MAF		0.61	2.24	2.85

INDUS WATER ACCORD
10-DAY SEASONAL SYSTEMWISE ADJUSTED ALLOCATIONS
(EXCLUDING FLOOD FLOWS & FUTURE STORAGES)

BALOCHISTAN – RABI

PERIOD		SUKKUR BARRAGE SYSTEM	GUDDU BARRAGE SYSTEM	TOTAL (1000 X Cs)
OCT.	1.	1.00	3.74	4.74
	2.	0.90	3.15	4.05
	3.	0.90	3.15	4.05
NOV	1.	0.80	2.38	3.18
	2.	0.90	2.54	3.44
	3.	0.60	2.17	2.77
DEC	1.	0.70	2.21	2.91
	2.	0.65	1.68	2.33
	3.	0.50	1.32	1.82
JAN	1.	0.60	1.83	2.43
	2.	0.65	2.12	2.77
	3.	0.70	2.18	2.88
FEB	1.	0.60	1.91	2.51
	2.	0.70	2.01	2.71
	3.	0.60	2.03	2.63
MAR	1.	0.60	1.43	2.03
	2.	0.60	1.63	2.23
	3.	0.40	1.12	1.52
TOTAL MAF		0.25	0.77	1.02

Actual Average System Uses 1977-1982

D. O. No. WA-13(199)/88

Government of Pakistan
MINISTRY OF WATER AND POWER

From:

Maj Gen(Retd)
Agha Manzoor Rauf
Additional Secretary (Water)

Islamabad, the 25th March, 1991

Subject:- APPORTIONMENT OF THE WATERS OF THE INDUS RIVER SYSTEM BETWEEN THE PROVINCES

My dear

You would recall that in accordance with para 14(a) of the Agreement signed between the Provinces on the subject issue, the system wise allocation have to be worked out separately, on ten daily basis, and attached with the aforementioned agreement as a part of it.

2. Accordingly, I am sending herewith a statement of average canal withdrawals for the period from 1977-78 to 1981-82. You are requested to finalize the 10 daily averages system wise, through mutual consultations. A reply in the matter may kindly be provided by 30th March, 1991.

With regards,

Yours sincerely,

Encl: as above

Ch. Mazhar Ali,
Adviser to the
Punjab Irrigation and Power Department,
Lahore.

Dr. Mohammad Alim Baloch,
Additional Chief Secretary (I&P)/
Adviser Irrigation and Power Department
and Adviser (Technical) to the
Government of Sind, Karachi.

Mr. Khalid Aziz,
Additional Chief Secretary,
Planning and Development Department,
Government of NWFP,
Peshawar.

Mr. Mohammad Amin,
Secretary,
Irrigation and Power Department,
Government of Baluchistan,
Quetta.

BY SPECIAL MESSENGER

Copy forwarded for information and necessary follow up action forwarded to Mr. Asif H. Kazi, CEA/CEFC, Islamabad.

Maj Gen. (Retd)
Agha Manzoor Rauf,
Additional Secretary (W)

CANAL WITHDRAWALS (1000XCS)
(1977-78 to 1981-82)

Period		Punjab (Indus a/ Canals)	Trimmu+ SVC(L) Canals	Jhelum Chenab Zone Canal W/drawals	Total Punjab Canals	Sind Canals	Baluch. Canals	NWFP b/ Canals	Total
APR	1	15.7	6.8	34.8	57.3	33.9	0.9	8.4	100.5
	2	15.9	7.2	37.1	60.2	34.9	0.3	9.7	105.1
	3	21.8	11.1	44.9	77.8	34.3	0	10.5	122.6
MAY	1	24.4	14.1	51.1	89.6	44.0	0.4	10.1	144.1
	2	22.4	14.7	54.4	96.5	52.4	0.8	10.1	159.8
	3	23.3	15.4	55.8	99.5	66.3	1.2	10.4	177.4
Jun	1	30.2	25.9	56.9	103.0	84.1	2.0	10.5	199.6
	2	30.9	16.3	58.4	105.6	101.8	2.0	10.4	219.8
	3	31.2	16.1	59.7	107.0	111.6	2.8	10.3	231.7
July	1	31.1	36.2	58.3	106.6	115.4	3.5	9.9	235.4
	2	27.8	14.0	53.2	95.0	101.4	3.2	9.3	208.9
	3	26.2	13.2	51.2	90.6	92.0	3.3	8.9	194.8
Aug	1	26.0	12.7	53.6	92.3	91.6	3.3	8.7	195.9
	2	27.8	15.2	59.5	102.5	88.3	3.5	9.1	203.4
	3	31.2	16.8	62.6	110.6	87.5	3.3	9.3	210.3
Sep	1	32.1	16.8	61.5	110.4	91.3	3.7	10.0	216.4
	2	31.4	16.7	61.2	108.3	92.6	3.7	10.3	214.9
	3	30.4	16.8	57.9	105.1	90.7	3.7	10.5	210.2
DIFF(MAF)		5.83	5.17	19.61	34.66	28.55	1.55	3.55	67.61

a/ Thal + Taunsa + Panjnad Canals.
b/ Including Civil Canals.

CANAL WITHDRAWALS(1000XCS)
(1977-78 to 1981-82)

	Punjab (Indus a/ Canals)	Trimmu+ SVC(L) Canals	Jhelum Chenab Zone Canal Wdls:	Total Punjab Canals	Sind Canals	Balch: Canals	b/ NWFP Canals	Total
1	29.4	16.2	51.1	96.7	79.4	3.8	7.5	187.4
2	26.1	15.0	46.7	87.8	63.4	3.3	7.6	162.1
3	21.7	12.2	43.5	77.4	50.8	3.3	7.6	139.1
1	16.7	8.6	39.7	65.0	45.0	2.7	7.0	119.7
2	16.3	6.8	37.1	60.2	43.3	2.9	6.6	112.9
3	13.6	5.8	35.7	55.1	41.4	2.1	6.2	104.8
1	12.7	6.3	35.9	55.1	40.0	2.2	5.9	103.2
2	12.7	7.5	34.8	55.0	39.5	1.8	5.9	102.2
3	8.2	8.0	25.7	41.9	35.6	1.5	6.1	85.1
1	3.5	11.8	12.9	28.2	19.2	2.1	3.2	52.7
2	5.2	7.5	15.4	28.1	21.7	1.7	2.4	53.9
3	9.6	0.8	21.2	31.6	37.5	2.3	2.3	73.7
1	12.5	2.1	27.6	42.2	43.2	1.8	4.0	91.2
2	12.9	4.9	32.4	50.2	38.1	1.8	5.1	95.2
3	11.3	5.9	27.9	45.1	37.6	1.5	5.2	89.4
1	11.4	6.9	31.8	50.1	37.1	1.8	5.5	94.5
2	13.1	9.6	35.1	57.8	37.8	1.4	5.5	102.5
3	15.0	10.4	35.5	60.9	35.6	0.8	5.8	103.1
(MAF)	5.07	2.93	11.86	19.86	14.98	0.78	2.00	37.62
M(MAF) INDIA	14.95	8.10	31.47	54.52	43.53	1.63	5.55	105.23

a/ Thal + Taunsa -Panjnad canals.
b/ Including Civil canals.

INDUS RIVER SYSTEM AUTHORITY

CANAL WITHDRAWALS (1000xcs)
(1977-78 to 1981-82)

PERIOD		Punjab (Indus a/ Canal	Trimmu+ SVC (L) Canals	Jhelum Chenab Zone Canal W/drawals	Total Punjab Canals	Sindh Canals	Baloch. Canals	NWFP b/ Canals	Total
Apr.	1	15.7	6.8	34.8	57.3	33.9	0.9	8.4	100.5
	2	15.9	7.2	37.1	60.2	34.9	0.3	9.7	105.1
	3	21.6	11.1	44.9	77.8	34.3	0.0	10.5	122.6
May.	1	24.4	14.1	51.1	89.6	44.0	0.4	10.1	144.1
	2	27.4	14.7	54.4	96.5	52.4	0.8	10.1	159.8
	3	28.3	15.4	55.8	99.5	66.3	1.2	10.4	177.4
Jun.	1	30.2	15.9	56.9	103.0	84.1	2.0	10.5	199.6
	2	30.9	16.3	58.4	105.6	101.8	2.0	10.4	219.8
	3	31.2	16.1	59.7	107.0	111.6	2.8	10.3	231.7
Jul.	1	31.1	16.2	59.3	106.6	115.4	3.5	9.9	235.4
	2	27.8	14.0	53.2	95.0	101.4	3.2	9.3	208.9
	3	26.2	13.2	51.2	90.6	92.0	3.3	8.9	194.8
Aug.	1	26.0	12.7	53.6	92.3	91.6	3.3	8.7	195.9
	2	27.8	15.2	59.5	102.5	88.3	3.5	9.1	203.4
	3	31.2	16.8	62.6	110.6	87.5	3.5	9.3	210.9
Sep.	1	32.1	16.8	61.5	110.4	91.9	3.7	10.0	216.0
	2	31.4	16.7	60.2	108.3	92.6	3.7	10.3	214.9
	3	30.4	16.8	57.9	105.1	90.7	3.9	10.5	210.2
Kharif (MAF)		9.88	5.17	19.61	34.66	28.55	0.85	3.55	67.61

a/ Thal + Taunsa + Panjnad Canals.

b/ Including Civil Canals.

INDUS RIVER SYSTEM AUTHORITY

CANAL WITHDRAWALS (1000 xcs)
(1977 - 78 to 1981 - 82)

Period		Punjab (Indus a/ Canal)	Trimmu + SVC (L) Canals	Jhelum Chenab Zone Canal Wdls:	Total Punjab Canals	Sindh Canals	Balochistan Canals	NWFP b/ Canals	Total
Oct.	1	28.4	16.2	51.1	96.7	79.4	3.8	7.5	187.4
	2	26.1	15.0	46.7	87.8	63.4	3.3	7.6	162.1
	3	21.7	12.2	43.5	77.4	50.8	3.3	7.6	139.1
Nov.	1	16.7	8.6	39.7	65.0	45.0	2.7	7.0	119.7
	2	16.3	6.8	37.1	60.2	43.3	2.9	6.5	112.9
	3	13.6	5.8	35.7	55.1	41.4	2.1	6.2	104.8
Dec.	1	12.7	6.5	35.9	55.1	40.0	2.2	5.9	103.2
	2	12.7	7.5	34.8	55.0	39.5	1.8	5.9	102.2
	3	8.2	8.0	25.7	41.9	35.6	1.5	6.1	85.1
Jan.	1	3.5	11.8	12.9	28.2	19.2	2.1	3.2	52.7
	2	5.2	7.5	15.4	28.1	21.7	1.7	2.4	53.9
	3	9.6	0.8	21.2	31.6	37.5	2.3	2.3	73.7
Feb.	1	12.5	2.1	27.6	42.2	43.2	1.8	4.0	91.2
	2	12.9	4.9	32.4	50.2	38.1	1.8	5.1	95.2
	3	11.3	5.9	27.9	45.1	37.6	1.5	5.2	89.4
Mar.	1	11.4	6.9	31.8	50.1	37.1	1.8	5.5	94.5
	2	13.1	9.6	35.1	57.8	37.8	1.4	5.5	102.5
	3	15.0	10.4	35.5	60.9	35.6	0.8	5.8	103.1
Rabi (MAF)		5.07	2.93	11.86	19.86	14.98	0.78	2.00	37.62
ANNUAL		14.95	8.10	31.47	54.52	43.53	1.63	5.55	105.23

INDUS RIVER SYSTEM AUTHORITY
Government of Pakistan

IRSA Act No. XXII of 1992
(Rules and Regulations)
Government of Pakistan Islamabad

THE GAZETTE OF PAKISTAN
EXTRAORDINARY PUBLISHED BY AUTHORITY

ISLAMABAD, THURSDAY, DECEMBER 10,1992

PART -I

Acts, Ordinances, President's Orders and Regulations
SENATE SECRETARIAT

Islamabad, the 10th December, 1992

The following Acts of Majlis-e-Shoora {Parliament} received the assent of the President on, the 6th December, 1992, and are hereby published for general information:

Act No. XXII OF 1992

An Act to provide for the establishment of the Indus River System Authority

WHEREAS it is expedient to establish the Indus River System Authority for regulating and monitoring the distribution of water sources of Indus River in accordance with the Water Accord amongst the Provinces and to provide for matters connected therewith and ancillary thereto:

It is hereby enacted as follows:-

CHAPTER I

PRELIMINARY

1. Short title, extent and commencement :-
(1) This Act may be called the Indus River System Authority Act, 1992.
(2) It shall come into force at once.

2. Definitions :-
In this Act, unless there is anything repugnant in the subject or context:-
(a) "Authority" means the Indus River System Authority established under section 3;
(b) "Chairman" means the Chairman of the Authority;
(c) "Member" means a member of the Authority;
(d) "prescribed" means prescribed by rules made under this Act;
(e) "rules" means rules made under this Act; and
(f) "Water Accord" means the agreement entitled "Apportionment of the Water of the Indus River System Between the Provinces" signed by the Provinces on the sixteenth day of March, 1991, and approved by the Council of Common Interests on the twenty-first day of March, 1991.

CHAPTER II

AUTHORITY AND ITS FUNCTIONS

3. Constitution of the Authority :-
(1)As soon as may be after the commencement of this Act, the Federal Government shall, by a notification in the official Gazette, establish an authority to be known as the Indus River System Authority for carrying out the purposes of this Act.

(2)The Authority shall be a body corporate having perpetual succession and a common seal with power subject to provisions of this Act to acquire and hold property, both moveable and immoveable, and shall sue and be sued by the name assigned to it under sub-section (1).

4. Appointment and term of office of Chairman and members :-

(1) The Authority shall consist of five members, one each to be nominated by each Province and the Federal Government from amongst high-ranking engineers in Irrigation or related engineering fields.

(2)The first Chairman shall be the member nominated by the Government of Balochistan to be followed by the nominees of the Governments of North-West Frontier Province, Punjab, Sindh and the Federal Government and thereafter in that order.

(3) The term of office of the Chairman shall be one year and that of a member three years.

(4) Any member shall be eligible for re-appointment for one or more term or of such shorter term as the Provincial Government or, as the case may be, the Federal Government may decide.

(5) The Chairman and any member may, by writing under his hand, addressed to the Secretary to the Government of Pakistan, Water and Power Division, resign from his office:

Provided that the resignation shall not take effect until it is accepted by the Federal Government;

(6)In the absence of the Chairman, the member next due for appointment as Chairman shall act as the Chairman.

(7)In the absence of a member representing a Province, the Secretary, Irrigation Department of the Province shall represent that Province.

(8) In the absence of member nominated by the Federal Government the Chief Engineering Adviser or his nominee shall represent the Federal Government.

(9) The Chairman of the Water and Power Development Authority and Chief Engineering Adviser or their nominees shall be ex-officio members of the Authority, but they shall have no right to vote.

5. Remuneration and conditions of service :-

The Chairman and every member shall receive such salary and allowances and be subject to such Conditions of service as may be prescribed and shall perform such duties and functions as are assigned to them under this Act or by rules.

6. Removal of Chairman or Members :-

The Federal Government may, by notification in the official Gazette, after providing an opportunity of being heard and in consultation with the Provincial Government concerned, remove the Chairman or any member, where:-

(a) he refuses or fails to discharge or, in the opinion of the Federal Government, becomes incapable of discharging his responsibilities;

(b) he is declared insolvent by a competent court; or

(c) he is declared to be disqualified for employment in, or has been dismissed from, the service of Pakistan or of Province, or has been convicted by a competent court of an offence involving moral turpitude.

7. Meetings of the Authority :-

(1) The Authority shall meet at least once in every month at such time and in such manner as may be specified by regulations:

Provided that until regulations are made in this behalf, such meetings shall be convened by the Chairman as he deems necessary.

(2) The Chairman and two other members entitled to vote shall constitute quorum for a meeting of the Authority.

8. Powers and Duties of the Authority :-

1. The duties of the Authority shall be to:

(a) lay down the basis for the regulation and distribution of surface waters amongst the Provinces according to the allocations and policies spelt out in the Water Accord;

(b) review and specify river and reservoir operation patterns and periodically review the system of such operation;

(c) coordinate and regulate the activities of the Water and Power Development Authority in exchange of data between the Provinces in connection with the guaging and recording of surface water-flows;

Explanation:- Actual observation and compilation of the data shall be the responsibility of the respective Provinces, Water and Power Development Authority and other allied organizations, while the process shall be monitored by the Authority;

(d) determine priorities with reference to sub-clause (c) of clause 14 of the Water Accord for river and reservoir operations for Irrigation and hydropower requirements;

(e) compile and review canal withdrawal indents asreceived from the Provinces on 5-daily or, as the case may be, on 10-daily basis and issue consolidated operational directives to Water and Power Development Authority for making such releases from reservoirs as the Authority may consider appropriate or consistent with the Water Accord;

Explanation:- The directives issued under this clause shall be binding upon Water and Power Development Authority and the Provinces, and shall be followed in letter and spirit;

(f) settle any question that may arise between two or more Provinces in respect of distribution of river and reservoir waters; and

(g) consider and make recommendations on the availability of water against the allocated shares of the Provinces within three months of receipt of fully substantiated water accounts for all new water projects for the assistance of the Executive Committee of the National Economic Council.

2. Any question in respect of implementation of Water Accord shall be settled by the Authority by the votes of the majority of members and in case of an equality of votes the Chairman shall have a casting vote.

3. A Provincial Government or the Water and Power Development Authority may, if aggrieved by any decision of the Authority, make a reference to the Council of Common Interests.

CHAPTER III

ADVISORY COMMITTEE

9. Advisory Committee:-

The Authority shall have an Advisory Committee consisting of the following:

(a) Chairman of the Authority, who shall also be the Chairman of the Advisory Committee;

(b) Members of the Authority; .

(c) Chief Engineering Adviser to the Government of Pakistan;

(d) Members, Water and Power Development Authority, in-charge of Water and Power Wings;

(e) Secretaries, Agriculture Departments of the Provinces; and

(f) Secretaries, Irrigation Departments of the Provinces.

10. Meetings of the Committee:-

The Advisory Committee shall meet at such time and place to consider such matters as the Authority may from time to time, refer to it;

Provided that the Advisory Committee shall, at the start of each cropping seasons of Kharif and Rabi, hold its meetings without such reference.

CHAPTER IV

ESTABLISHMENT

11. Headquarter of the Authority:-
The Authority shall have its headquarters at Lahore.

12. Employment of officers and staff :-
(1)The Authority may from time to time, employ such officers and other members of staff or appoint such experts and consultants as it may consider necessary for the performance of its functions, as it may be prescribed.
(2)The Authority shall prescribe the procedure for appointment, terms and conditions of service of its officers and members of staff, experts and consultants and shall be competent to take disciplinary action against its officers and members of staff.

13. Immunity of the Authority and its employees:-
(1)The Chairman, members, officers and members of staff shall, be deemed to be public servants, within the meaning of section 21 of the Pakistan Penal Code (Act XLV of 1860).
(2)No suit, prosecution or other legal proceedings shall lie against the Authority, the Chairman, members or officers and members of staff of the Authority in respect of anything done or intended to be done in good faith under this Act.

14. Delegation of powers to and by Chairman:-
The Authority may, by general or special order, delegate to the Chairman, a member or officer of the Authority, all or any of its powers, duties or functions under this Act subject to such conditions as it may consider fit to impose.

CHAPTER V

REPORTS AND STATEMENTS

15. Submission of yearly reports and returns:-
(1) The Authority shall, after the close of each cropping seasons of Kharif and Rabi, furnish a Water Account Report to the Federal Government with copies thereof to the Provincial Governments and Water and Power Development Authority indicating Summary of the quantities of inflows and supplies utilised by the Provinces in relation to their authorized shares.
(2) Observations on the seasonal water forecast reports prepared by Water and Power Development Authority and other issues faced during all seasons shall be incorporated in the Water Accounts Report.
(3) As soon as may be, after the end of every financial year but before the last day of September next following, the Authority shall submit to the Federal Government, a report with copies thereof to the Provincial Government on the conduct of its affairs for that year.
(4) The Federal Government may require the Authority to furnish it with:-
(a) any return, statement, estimate, statistics or other information regarding any matter under the control of the Authority; and
(b) copies of every documents in the charge of the Authority.

CHAPTER VI

FINANCING

16. Fund of Authority :-
(1) There shall be a fund to be knows as the "Authority Fund" vested in the Authority which shall be utilised by it to meet all expenses and charges in connection with its functions under this Act including the payment of salaries and other remunerations to the Authority and to its officers and members of staff.
(2) The Authority Fund shall consist of:-
(a) Grants made by the Government;
(b) Loan obtained by the Authority; and
(c) all other sums received by the Authority.

17. Limited Liability :-
The liability of the Federal Government to the creditors of the Authority shall be limited to the extent of grants made by the Federal Government and the loans raised by the Authority as guaranteed by the Federal Government.

18. Maintenance of Accounts:-
The Authority shall maintain complete and accurate books of accounts in the form to be prescribed by the Auditor-General of Pakistan.

19. Annual Statement of Accounts:-
In the month of January each year, the Authority shall submit to the Federal Government, for approval, a statement of the estimated receipts and expenditures in respect of next financial year.

20. Audit:-
(1) The accounts of the Authority shall be audited every year by the Auditor-General of Pakistan in such manner as may be specified.
(2) Copies of the audit report shall be sent to the Authority which shall, along with its comments, present to the Federal Government and shall also make it available for public inspection.
(3) The Authority shall carry out any directive issued by the Federal Government for rectification of an audit objection.

CHAPTER VII

MISCELLANEOUS

21. Rules:-
The Federal Government may make rules to carry out the purposes of this Act.

22. Regulations:-

(1) The Authority may make regulations consistent with this Act and the rules framed there under for the purpose of giving effect to the provisions of this Act.

(2) In particular and without prejudice to the generality of the afore going provisions, such regulations may provide for all or any of the following matters, namely:

(a) the manner in which the meetings of the Authority may be convened and held and the procedure to be followed thereat; and

(b) formation of committees and conduct of business in such committees.

REGULATIONS
INDUS RIVER SYSTEM AUTHORITY
LAHORE*

Regulation [under section 22 of the Indus River System Authority Act, 1992.]

1. Short Title and commencement :-

1) These regulations may be called "IRSA Regulations"

2) They shall come into force at once.

2. Definitions :-

In these regulations, unless there is anything repugnant in the subject or context.-

(a)"Act" means the Indus River System AuthorityAct, 1992;

(b)"Advisory Committee" means the Advisory Committee set up under section 9 of the Act;

(c) "Authority" means the Indus River System Authority established under section 3 of the Act;

(d)"Chairman" means the Chairman of the Authority;

(e)"Member" means the Member of the Authority;

(f) "Secretary" means the Secretary of the Authority;

(g)"Water Accord" means the Water Accord, 1991, as defined in section 2(f) of the Act.

3.Meetings of the Authority :-

(1) The meetings shall be convened by the Chairman, in consultation with the Members, for the purpose of and in the manner specified as under:-

(a) regulations and distribution of the flow- cum-storage waters, as per sub-section (1) (d), (e) of section 8 of the Act;

(b) settle any question in respect of distribution of river and reservoir waters, if and when it arises between two or more Provinces, as per sub-section (f) of section 8 ibid;

(c) consider and make recommendations on the availability of water, against the allocated share of the Province concerned, whenever a new water project is received, as per sub-section 1 (g) of section 8 ibid;

(d) settle any question that may arise in respect of implementation of the Water Accord, as per sub-section (2) of section 8 ibid;

(e) consider such matters as are to be referred to the Advisory Committee, at the start of Kharif and Rabi cropping seasons, as per section 10 ibid;

(f) decide administrative and financial matters, as per chapter IV and VI of the Act;

(g) consider any matter under the Act that may arise at any time.

(2) The Chairman and two other Members shall constitute the quorum for a meeting of the Authority.

(3) In the absence of the Chairman, the Member next due for appointment as Chairman shall act as the Chairman.

4. Procedure of the Meetings :-

(1) The meetings shall normally be held at the headquarters at Lahore *, but under special circumstances these may be held at such other places as may be specified by the Authority.

(2) An agenda shall be prepared specifying the issues to be considered under sub-section (1) (a) - (g), section 8, or chapter IV and VI of the Act.

(3) The procedure to be followed in case of 4(2) supra shall be that the members shall express their views in alphabetical order, followed by an open discussion, with the Chairman summing up the discussion, the consensus reached at the meeting, and the decisions requiring voting.

(4) The decisions of the Authority shall be made by the votes of the majority of Members and, in case of an equality of votes, the Chairman shall have a casting vote, in accordance with sub-section (2), section 8 of the Act.

5. Minutes of the Meetings :-

(1) The minutes shall be a faithful reproduction of the views expressed and positions taken by the members and Chairman. In the event of a majority decision, as per 4(4) supra, the respective viewpoints, including dissenting views, may be recorded, if so desired, and annexed to the minutes.

(2)The minutes shall be recorded by the General Manager/Chief Engineer in case of section 8, 10; and by the Secretary in case of chapter IV and VI of the Act, and maintained in a Minutes' File.

(3) Copies of the minutes after approval by the Chairman shall be circulated to Members by the Secretary.

6. Formation of Committees :-

(1) The Authority shall set up committees of such experts and consultants as it may consider necessary for the performance of its functions.

(2) Such committees shall frame their own rules of procedure.

(3) The reports of the committees shall be submitted to the Authority within the stipulated time.

***Now in Islamabad vide Presidential Ordinance No. XLI of 2000, dated September 4, 2000.**

REGULATIONS-2010
INDUS RIVER SYSTEM AUTHORITY
Islamabad

Regulations [under section 16 (1)(2) & 22 (1) of the Indus River System Authority Act XXXII of 1992]

1. Short Title and commencement :-

1) These regulations may be called "IRSA Regulation for issuance of NOC & Water Utilization Cess for Hydel Power Projects/Power Projects requiring use of water"

2) They shall come into force at once.

2. Definitions :-

In these regulations, unless there is anything repugnant in the subject or context.-

(a)"Water Accord" means the Water Apportionment Accord 1991, as defined in section 2 (f) of the Act;
(b)"Act" means the Indus River System Authority Act XXII of 1992;
(c) "Authority" means the Indus River System Authority established under section 3 of the Act;
(d)"Chairman" means the Chairman of the Authority as defined in section 4 (2) of the Act;
(e)"Member" means the Member of the Authority as defined in section 4 (1) of the Act
(f)"Authority Fund" means the Fund of the Authority as defined in section 16 (1) & (2) of the Act;
(g)"Chief Engineer" means the Chief Engineer (Operation) of the Authority;
(h) "Secretary" means the Secretary of the Authority;
(i) "Power Project" means all hydel power projects and power projects requiring use of water;
(j) "Processing Fee" means the NOC fee to be deposited by the Project Authorities for grant of NOC for the power Project;
(K) "Water Utilization Cess" means annual water utilization charge to be deposited but the Project Authorities.
(l) "Water Utilization Cess Agreement" means agreement to be signed by Chairman IRSA & Project Authorities for collection of Annual Cess from the Power Project.
(m) "Project Director" means the Chief Executive officer or his nominee of the Power Project for which NOC is required.
(n) "Operation Wing" means the operation section of the Authority.
(o) " Admin Wing" means the admin section of the Authority.
(p) " Accounts Wing" means the accounts section of the Authority.

3. Levy of NOC Fee for All Hydel Projects/ Power Projects Requiring Use of Water. :-

1) The Authority will charge the Processing Fee (Non- Refundable) in advance for grant of NOC according to the following slab rates:

(a) 01- 50 MW	**Rs. 0.5 Million**
(b) 51- 200 MW	**Rs. 1.0 Million**
(c) 201- 400 MW	**Rs. 2.0 Million**
(d) 401- 600 MW	**Rs. 3.0 Million**
(e) 601- 800 MW	**Rs. 3.5 Million**
(f) 801- 1000 MW	**Rs. 4.0 Million**
(g) 1001 MW & above	**Rs. 5.0 Million**

2) The fee so collected will be deposited into the Authority Fund and will be utilized to meet all expenses and charges of the Authority including the payment of salaries and other remunerations of the Authority members and to its officers and members of staff. The Authority Fund will be a non-lapsable fund.

4. Water Utilization Cess On All Hydel Projects / Power Projects Requiring Use of Water :-

1) The Authority will charge the Water Utilization Cess from all Hydel power projects / Power Projects requiring use of water @ Rs. 0.02 (2 Paisa) / Unit on total units generated by any Project during the year. The water utilization cess will be the part of the agreement duly signed by the Chairman (on behalf of the Authority) with the Chief Executive Officer (competent authority) of the Project.

2) The fee so collected will be deposited in to the Authority Fund and will be utilized to meet all expenses and charges of the Authority including the payment of salaries and other remunerations of the Authority members and to its officers and members of staff. The Authority Fund will be a non-lapsable fund.

5. Procedure of Issuance of NOC & Implementation of Water Utilization Cess:-

1) When the Authority will receive a request for grant of NOC, the Chief Engineer or head of Operation Wing IRSA will inform in writing to the Project Director (Competant Authority) to deposit the NOC Process Fee (Non- Refundable)in the Authority Fund of IRSA according to the slab as defined in section 3 (1) supra;

2) The Chief engineer IRSA or head of Operation Section will prepare a comprehensive working paper for the grant of NOC for Power Projects and would place before the Authority for consideration / decision;

3) The procedures of the meeting as laid down in "IRSA Regulations" under clause 4 (1) (2) (3) (4) and 5 (1) (2) & (3) shall be adopted. The Authority has the right to issue or reject, after recording the reason thereof, the NOC for the Power projects;

4) In case of grant of NOC, Secretary IRSA in consultation with the Accounts Wing shall prepare a draft agreement between Chairman IRSA and project Authorities for the implementation & collection of Water Utilization Cess as defined in Clause 4 (1) supra;

5) Chairman IRSA will issue NOC for the Power Project and will sign the Water Utilization Cess Agreement on behalf of the Authority;

6) Secretary IRSA as well as Accounts Wing of IRSA will ensure the collection of Water Utilization Cess from all the operational Power

Projects at the closing of each finanacial year. The Project Authorities shall pay a penalty on late payments as per rates fixed by the Authority;

7) Without deposition of NOC Processing Fee (Non- Refundable) & signing of agreement of Water Utilization Cess Agreement no NOC will be granted by the Authority;

8) The Authority after receiving the NOC Processing Fee will be bound todecide the case with in 60 Days;

9) The Project Authorities will be bound after acceptance of issuance of NOC to Sign the Water Utilization Cess Agreement within 30 days with IRSA;

6. The Authority may review the NOC Processing Fee as well as the Water Utilization Cess rates as deem fit from time to time.

Dated: November 12,2010

GOVERNMENT OF PAKISTAN
MINISTRY OF LAW, JUSTICE, HUMAN RIGHTS AND PARLIAMENTARY AFFAIRS

F. No: 2(1)/98-Pub **Islamabad, the 16th July, 1998**

The following Ordinance made by the President is hereby published for general information

ORDINANCE NO. VIII of 1998

AN

ORDINANCE

to amend the Indus River System Authority Act, 1992

WHEREAS it is expedient to amend the Indus River System Authority Act, 1992 (XX11 of 1992), for the purpose hereinafter appearing;

AND WHEREAS the National Assembly is not in session and the President is satisfied that circumstances exist which render it necessary to take immediate action;

NOW, THEREFORE, in exercise of the powers conferred by clause (1) of Article 89 of the Constitution of the Islamic Republic of Pakistan, the President is pleased to make and promulgate the following ordinance:-

1. Short title and commencement.-

(1) This Ordinance may be called the Indus River System Authority (Amendment) Ordinance, 1998.

(2) It shall come into force at once.

2. Amendment of section 3. Act XXII of 1992:-

In the Indus River System Authority Act, 1992(XXII of 1992), hereinafter referred to as the said Act, in section 3:-

(a) for sub-section (1), the following shall be substituted, namely:-

"(1) There shall be an authority to be known as the Indus River System Authority for carrying the purpose of this Act." and

(b) after sub-section (2) the following new sub-sections shall be added, namely:-

"(3) The Authority shall consist of the following· members, namely:-

(i) Chief Engineering Adviser, Ministry of Water and Power, Government of Pakistan Chairman
(ii) Secretary, Department of Irrigation, Government of Baluchistan Member
(iii) Secretary, Department of Irrigation, Government of North-West Frontier Province Member
(iv) Secretary, Department of Irrigation, Government of the Punjab Member
(v) Secretary, Department of Irrigation, Government of Sindh Member

(4) If the Chief Engineer Adviser is, for any reason, unable to perform the functions of the Chairman, the person nominated by the Federal Government shall act as the Chairman.

(5) The Chairman of the Water and Power Development Authority and the Pakistan Commission for Indus Waters or their nominees shall be entitled to attend and otherwise take part in the meetings of the Authority but shall not be entitled to vote.

3. Omission of sections 4, 5 and 6, Act XXII of 1992:-

In the said Act, sections 4, 5 and 6 shall be omitted.

4. Amendment of section 9, Act XXII of 1992:-

In the said Act, in section 9,

(a) for clause (c) the following shall be substituted namely:- "(c) Pakistan Commissioner for Indus Waters"; and

(b) clause (f) shall be omitted.

5. Chairman and members to cease to hold office:-

Not with standing anything contained in any appointment order or contract any person holding the office of the Chairman or a member of the Authority immediately before the commencement of this Ordinance shall cease to hold the said office.

MUHAMMAD RAFIQ TARAR
President

(Ch. Irshad Ahmad)
Secretary

THE GAZETTE OF PAKISTAN
EXTRAORDINARY PUBLISHED BY AUTHORITY

ISLAMABAD, THURSDAY, OCTOBER 8, 1998

PART II

Statutory Notifications S.R.O.
GOVERNMENT OF PAKISTAN
MINISTRY OF LAW, JUSTICE, HUMAN RIGHTS AND PARLIAMENTARY AFFAIRS

ORDER

Islamabad, the 6th October, 1998

S.R.O. 1033 (1)98. - In exercise of the powers conferred by sub-clause (b) of clause (2) of Article 89 of the Constitution of the Islamic Republic of Pakistan, the President is pleased to withdraw the Indus River Authority (Amendment) Ordinance, 1998 (VIII of 1998).

[F. No. 2(1)/98-Pub.]

MUHAMMAD RAFIQ TARAR
President

CH. IRSHAD AHMAD
Secretary

THE GAZETTE OF PAKISTAN, EXTRA., SEPTEMBER 5, 2000

MINISTRY OF LAW, JUSTICE, HUMAN RIGHTS AND PARLIAMENTARY AFFAIRS

(Law, Justice and Human Rights Division)

Islamabad, the 4th September, 2000

No. F. 2(1)/2000-Pub. - The following Ordinance made by the President is hereby published for general information:-

ORDINANCE No. XLI OF 2000
AN
ORDINANCE

further to amend the Indus River System Authority Act, 1992

WHEREAS it is expedient further to amend the Indus River System Authority Act, 1992 (XXII of 1992), for the purpose hereinafter appearing;

AND WHEREAS the National Assembly and the Senate stand suspended in pursuance of the Proclamation of Emergency of the fourteenth day of October, 1999, and the Provisional Constitution Order No.1 of 1999;

AND WHEREAS the President is satisfied that circumstances exist which render it necessary to take immediate action;

NOW, therefore, in pursuance of the Proclamation of Emergency of the fourteenth day of October 1999, and the Provisional Constitution Order No.1 of 1999, as well as Order No.9 of 1999, and in exercise of all powers enabling him in that behalf, the President of the Islamic Republic of Pakistan is pleased to make and promulgate the following Ordinance:-

1.Short title and commencement:-

(1) This Ordinance may be called the Indus River System Authority (Amendment) Ordinance, 2000.

(2) It shall come into force at once.

2. Amendment of section 11, Act XXII of 1992:-

In the Indus River System Authority Act, 1992 (XXII of 1992), in section 11, for the word "Lahore" the world Islamabad" shall be substituted.

MUHAMMAD RAFIQ TARAR,
President.

MR. JUSTICE (Faqir Muhammad Khokhar)

Secretary.

THE GAZETTE OF PAKISTAN
EXTRAORDINARY PUBLISHED BY AUTHORITY

KARACHI, THURSDAY, MAY 11,2000

PART -II

Statutory Notifications containing
Rules and Orders issued by all Ministries
and Divisions of the Government of Pakistan and their Attached and
Subordinate Offices and the Supreme Court of Pakistan

GOVERNMENT OF PAKISTAN
MINISTRY OF WATER AND POWER
NOTIFICATION

Islamabad, the 25th April 2000

S.R.O. 76 (KE)/2000:

In exercise of the powers conferred by Section 21 of the Indus River System Authority Act, 1992 (XXII of 1992) and in supersession of Notification S.R.O. No. Admn. 11-10 (5)/ 92-IRSA, dated the 13th March, 1996, the Federal Government is pleased to make the following rules, namely:-

1. Short title and commencement:-

(1) These rules may be called the Indus River System Authority (Chairman and Members Conditions of Service) Rules, 2000.

(2) They shall come into force at once.

2. Interpretation:-

The words and expressions used but not defined herein shall have the meanings assigned to them in the Indus River System Authority Act, 1992 (XXII of 1992).

3. Appointment of members:-

Appointment of five members of Indus River System Authority shall be made in accordance with Section 4 of the Indus River System Authority Act, 1992 (XII of 1992).

4. Pay, allowances and perquisites:-

The post of a member shall be in BPS-21 and he shall be entitled to pay, entertainment allowance, accommodation, transport, personal staff, traveling allowance, residential telephone, medical facilities and other perquisites as are admissible to holder of post in BPS-21 under the Federal Government.

Provided that if a serving Government servant is appointed as a member, he shall be entitled, to the pay as admissible to him as such Government servant, and in addition thereto, shall be entitled to the allowances and perquisites admissible to holder of a post in BPS-21, but shall not be entitled to any deputation allowance.

5. Leave:-

(1) A member shall be entitled to leave as is admissible to a Government servant of the corresponding pay scale under the Revised Leave Rules, 1980.

Provided that rules 5(c), 8, 11, 14, 16, 17, 18, 18-A, 19, 27, 33, 34, 35, 36 and 39 of the said rules shall not apply to the members of the Authority.

(2) Leave, other than casual leave, shall be sanctioned by the Federal Government.

(3) The Chairman may proceed on casual leave with the permission in writing of the Federal Minister for Water and Power and a member with the permission in writing of the Chairman.

6. Pension:-

The service rendered in the Authority as a member shall not qualify for pension.

Provided that if a serving Government servant is appointed as a member, the Authority shall pay pension contribution at the prescribed rates in respect of such Government servant to the respective Government for the period of his service in the Authority.

7. Matters not provided:-

In all matters not provided for in these rules, a Member shall be governed by the rules and orders applicable to a Government servant of the corresponding pay scale under the Federal Government

(No. F.A. 11-6/1 /2000/IRSA).

SHAHID MUNIR BARLAS
Deputy, Secretary
