# GEOPOLITICS OF WATER SHARING:

# CASE STUDIES OF KISHANGANGA AND BAGLIHAR DISPUTES

*Thesis submitted to Jawaharlal Nehru University*

*for the award of the degree of*

**DOCTOR OF PHILOSOPHY**

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**Date:** 30/12/2022

## DECLARATION

I declare that the thesis entitled "**Geopolitics of water sharing: Case studies of Kishanganga and Baglihar Disputes**" submitted by me the award of the degree of **Doctor of Philosophy** of Jawaharlal Nehru University is my own work. The thesis has not been submitted for any other degree of this University or any other university.

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## CERTIFICATE

This is to certify that the dissertation/thesis titled Geopolitics of Water Sharing : Case studies of Kishanganga and Baglihar Disputes ..... submitted by Mr/Ms. Ritu Priya ..... in partial fulfillment of the requirements for award of degree of M.Phil/M.Tech/Ph.D of Jawaharlal Nehru University, New Delhi, has not been previously submitted in part or in full for any other degree of this university or any other university/institution.

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# CONTENT

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RITU PRIYA

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF FIGURES

## (Continued)

## LIST OF MAPS

## LIST OF ABBREVIATION

**CoA**: Court of Arbitration

**CPI:** Corruption Perception Index

**GBM:** Ganga Brahmaputra Meghna

**GDP:** Gross Domestic Product

**GEFC:** Global Environmental Flow Calculator

**IWMI:** International Water Management Institute

**IWRM:** Integrated Water Resource Management

**IWT:** Indus Water Treaty

**J&K:** Jammu and Kashmir

**KHEP:** Kishanganga Hydroelectric Power Project

**MAR:** Mean Annual Runoff

**MW:** Mega Watt

**NE:** Neutral Expert

**PCA:** Permanent Court of Arbitration

**WB:** World Bank

# CHAPTER 1

# INTRODUCTION

Rivers have always defied political boundaries. Because of its fluidity water has been a unique resource, always creating problems of appropriation for nation-states. In the geopolitics of water sharing, the primary concern of the countries sharing a river water system is to develop a mutually agreed formula to determine the quantity of water that each country shall use. Water sharing treaties have thus, traditionally, been more focused on the quantity of water to be utilised by concerned parties. However, there is an increasing awareness regarding the environmental implications of such treaties on sharing of watercourses. Since the mid-twentieth century, environmental ramifications are becoming a major part of international negotiations. The importance of maintaining the quality of water throughout the river is now universally acknowledged. Management of the aquatic environment and water quality across national boundaries is often problematic. The obvious issue is that ecological and political boundaries do not always overlap. Moreover, the logic of international state systems frequently leads states to act in self-interest. Often, this works against or at least reduces concern for aquatic environment of the pan-regional water body. Since time immemorial, geographical features like mountains and rivers have acted as natural frontiers between states. While being convenient, rivers are also troublesome as political boundaries. As they lack any geographical fixity, they create the problem of cartographic delineation of borders (Thomas 2021).

This is evident in South Asia too. Political boundaries are often non-congruent with geographical boundaries. The complex process of decolonisation has left the countries with a very unique border situation. Chester (2008) has highlighted that partition of the Indian Empire was an “extremely rushed affair” (Chester 2008:506), carried out within a period of months, which left little time to address the complexities involved in such an exercise. Rivers came to be shared among several states creating several cross-borders as well as through fare points. The Ganga-Brahmaputra-Meghna River system came to be shared among China, Nepal, Bhutan, India and Bangladesh. Similarly, the Indus River system, originating in China, flows through India, Afghanistan and Pakistan. Thus, it became necessary to develop protocols for sharing

water of these river systems. In order to deal with water-sharing issues cooperatively, several treaties have been signed between the countries of South Asia. All of them are bilateral treaties formulated in or after the mid-twentieth century. The major treaties signed in this time period include the Kosi Agreement (1954 and 1966), the Gandak Agreement (1959), and the Mahakali Treaty (1996) between India and Nepal; the Ganga Water Treaty of 1996 between India and Bangladesh; and also, the Indus Water Treaty (1960) between India and Pakistan. All these treaties are primarily focused on appropriation of water, with very little attention given to the water quality. However, of late concerns regarding water quality are being raised by the lower riparian countries.

### 1.1 The environmental question in Kishanganga and Baglihar Disputes

Discussion on water quality is still at a nascent level in South Asia where countries have not yet clearly formulated water quality policies for within their territories. It was only in 2018 that India prepared a minimum-flow criteria for the Ganga River System. It has been pointed out that this was also minimum flow, not optimum environmental flow (Kaur 2018). The present study sees how these environmental concerns become means to achieve political ends. The study carries out case studies of two disputes that arose within the Indus Water Treaty between India and Pakistan- the Kishanganga and the Baglihar disputes. These two disputes have important implications as within these disputes, new problems of environment (such as environmental flow levels)[1] and technologies of water harvesting (including drawdown flushing)[2] have been analysed on the basis of a treaty which is much older and had not incorporated these aspects at the time of its formation. The study shows how this reinterpretation of the Indus Water Treaty is happening. Situating these two disputes in the general political scenario in South Asia, it seems that genuine environmental concerns are being raised but the solutions remain elusive due to politicisation; particularly so in the context of determining a regional environmental flow in South Asia. In this case, a new dimension of hydro-politics based on

[1] Environment flow or e-flow level is a broad term which encompasses all aspects of a river system including but not limited to the quality and quantity of water flow that is essential in riverine and estuarine ecosystems for sustainability and well-being of life systems dependent on such ecosystems.

[2] Drawdown flushing is a technique for the management of sedimentation in man-made reservoirs.

environmental concerns is unfolding. It can have implications for other such treaties in South Asia.

In recent times there have been great technological advancements in harnessing hydropower. Our understanding of the impact of dams on river systems has also increased. These two factors are leading to a reinterpretation of these treaties signed decades ago. The Indus Water Treaty is an important case study in this regard. The treaty has distributed the tributaries of the Indus River among the signatories. India received the three eastern tributaries which are the Ravi, Beas and the Satluj. Pakistan got tributaries in the west, i.e. the Indus along with Jhelum and Chenab rivers, or the western tributaries (Indus Water Treaty 1960). In 1999, India started construction of 900 MW Baglihar Hydropower Project on Chenab. It was opposed by Pakistan. The latter country claimed that it would give India undue strategic leverage in controlling the flow of water downstream, which could be misused during times of conflict. In 2005, Pakistan raised these objections to the World Bank, which is the third party in the Indus Water Treaty. The Neutral Expert appointed to resolve the "difference" under the institution of the Permanent Indus Commission was Swiss engineer Raymond Lafitte. The final verdict that came in 2007 has three aspects: India was required to reduce its pondage capacity which would limit its flow control capability; the key issue that any dam constructed by India should be strictly "run of the river"[3] type was rejected; it acknowledged India's right to construct "gated spillways"[4] and use "drawdown flushing"[5] to get rid of sediment load in the reservoir (Zawhary 2008, Sinha 2010). The spirit of the verdict was that Indus Water Treaty did not freeze all future projects to 1960 technology, and state of art technology can be

[3] Run of River dams are "small dams where water flows freely over the crest of the structure, often referred to as 'run-of-river dams, but also known as weirs or 'overflow' dams (Born et al. 1998; Juracek 1999; Shafroth et al. 2002). Such dams differ from what are referred to here as 'impoundment dams' in which water levels upstream of the structure are maintained below the crest of the dam by controlled or uncontrolled releases through spillways" (Csiki and Rhoads 2010: 756). In Run of the river type of hydroelectric generation, little or no water storage is provided.

[4] A gated spillway is a structure used to provide the controlled release of flows from a dam or levee into a downstream area, typically being the river that was dammed. Spillways release floods so that the water does not overtop and damage or even destroy the dam.

[5] Draw down flushing is a method of sediment management in dams. "The flushing process by flow is defined as the process of the sediment removal by scouring sediment deposits (i.e. previous sediment accumulations) or passing incoming sediment-laden flow through a reservoir. The flushing process takes place when the desilting outlet such as sluice gate is opened to release sediment and water from the reservoir" (Lai and Shen 1996: 239).

adopted. By 2010, the two countries finally resolved their issues under the institution of the Permanent Indus Commission. But in the same year, Pakistan again approached the World Bank regarding the Kishanganga Hydropower Project (KGHP). KGHP is a 330 Megawatt power project being built by India on the Jhelum river's tributary Kishanganga (called Neelam in Pakistan, henceforth referred to as Kishanganga in this work). Construction started in 2006. Pakistan raised objections to the construction of a dam and the diversion of water. It said that the diversion of water will reduce water availability in Pakistan by fifteen per cent, and reduce the power generation capacity of the Neelam Jhelum Project being built downstream on the same river. Most importantly it raised the issue that it would disturb the "environmental flow" of the Kishanganga ecosystem (Permanent Court of arbitration 2013). This was Pakistan's retaliation to the Baglihar verdict: since India could use the latest technologies, it must also address the latest environmental concerns (Iyer 2013). The issues raised this time were considered serious enough to be categorized as "dispute". Accordingly, at the Permanent Court of Arbitration, The Hague, in the Netherlands, a court of Arbitration was set up in 2011 to adjudicate the matter. It was a seven-member court headed by Judge Stephen M. Schwebel. The Court gave its partial award on the India Pakistan dispute in February 2013. Out of two references filed by Pakistan against the project in India, the Permanent Court of Arbitration ruling was in favour of India for one, allowing India to divert the waters of Kishanganga for hydropower power generation. Regarding the second objection, the ruling was in favour of Pakistan. India was prohibited from reducing the level in the reservoir below the minimum drawdown level for sediment flushing. Regarding the third part consisting of environmental flows, the verdict came in December 2013. India was asked to increase environmental water releases from the damming by over two hundred per cent. India put in a plea for a reinterpretation of the final verdict which was however denied. Both India and Pakistan were asked to build a robust system for the analysis and implementation of environmental flows. The Court said that alternative techniques should be used for the Kishanganga hydroelectric project and other such future run-of-the-river projects (Parsai 2013). The verdict was final and not open for reinterpretation for seven years till 2020. Thus, between the Baglihar verdict and the Kishanganga verdict, new interpretations were made on the basis of the Indus Water Treaty (Burgess et al 2013, Hill 2013). For the first time, the concept of environmental flow, or e-flow, has been discussed in the context of the Indus Water

Treaty. However, the calculation of e-flow levels in the Kishanganga dispute has been ad-hoc. It was based on determining a minimum flow level rather than an environmental flow level (Thakkar 2014). This is a simplistic method assuming that if certain minimum levels of water flow are maintained in the river its environment will not be damaged. It is important to evolve a rational methodology based on a holistic approach for the region of South Asia. These developments have implications for all future constructions. Even as the Kishanganga dispute was being adjudicated, India and Pakistan were already in disagreement over the Ratle Hydropower plant (850 MW) being built over the Chenab. In 2013 India and Pakistan started discussions over four upcoming dams on Chenab in Jammu Kashmir over the Chenab- the Pakal Dul, the Mujar, the Ratle and the lower Kalani on Chenab. Meanwhile, construction at Ratle has already begun (Mustafa 2014). The technological and environmental factors brought in by the Baglihar and Kishanganga verdict will shape all future negotiations.

These discourses on freshwater give it a geographical fixity. Several authors have portrayed availability and control over freshwater as a zero-sum game. They paint a picture of inevitable scarcity leading to imminent "water wars" (Jackson et al. 2001). But such empowerment of water can be questioned. It implies "endowing a substance in itself with either an intentionality or a causality of which it is incapable" (Agnew 2011: 464). In fact, for some scholars, water management, both in terms of quantity and quality, is less a question of geographical constraint and more of political consensus. It is true that in recent centuries population has grown exponentially while water resources have not. If anything, they have become polluted and unfit for use. Yet, politics, not conflict, is the way out.

### 1.2 Survey of Literature

The review of literature is divided into four sections. The first section explores the various ways in which the discourse around transboundary water resources is built. The second section explores the literature looking at water as a security issue in South Asia. The third section enumerates works discussing the Indus Water Treaty along with the Kishanganga and Baglihar disputes. Finally, literature discussing new water harvesting technologies and their environmental impact is looked into.

*Critical perspectives on water crisis*

There is a vast body of literature talking about the increasing water crisis due to several developments in the past few centuries. The world has entered the twenty-first century in the gloomy reality of increasing water stress. Around the world, groundwater depletion, low or non-existent river flows, and worsening pollution levels can be observed. All these are indicators of water stress. In certain places, collecting more water for human needs jeopardises the health of important marine habitats (Postel 2000). At the global level, scientific attempts to assess water scarcity are facing technological challenges. Rijsberman (2006) uses the indicator of Falkenmark, citing that it is simple to apply and comprehend. He concedes, however, that describing the true essence of water scarcity does not help. The more complex indicators are not commonly used because of the lack of "data to apply them and the definition are not intuitive" (Rijsberman 2006: 16). A significant finding of the study is that the shortage, however, concerns water for food production and not water for domestic purposes, which is minute at this scale. The study concludes that in the coming decades, and particularly in Asia and Africa, water will be a major constraint for agriculture. Finally, the author proposes a "soft course" to combat water shortages, concentrating on increasing overall water efficiency. Global change and an increasing imbalance between freshwater availability, use, and population will drastically alter the water cycle in the coming century. Jackson et al. (2001) draw some assumptions based on the publicly available scientific data. Firstly, over half of the freshwater drainage available worldwide is now used for human consumption. In addition, access to clean drinking water and basic sanitation facilities is currently unavailable for a substantial portion of the human population. They expect that since the human population will rise faster than the quantity of available freshwater will increase, the supply of per capita freshwater will decline in the near future. In the next twenty years, there will be increased incidents of drought, evapotranspiration, storm outbreaks, and major improvements in water quality affecting biogeochemical processes. Finally, they state that 87.20 per cent of freshwater fish species are endangered or extinct worldwide. Their views summarise the current perception of rising global water shortages with a growing population and economic development.

For the past century, scholars have tried to make some sense of the political ramification of the increasing water crisis. State power and water resources are

interlinked. The three possible outcomes of any interstate water dispute are cooperation, conflict or status quo. Scholars have been trying to understand the situational reality that can lead to either of these outcomes. However, water is a very unusual resource and has been making a mockery of political boundaries for a long time. The primary reason is that water is not a static resource like minerals or forests. Water is fluid and an entire river basin is an interconnected water ecosystem. The water within a river is in a continuous system of flow. Moreover, river channels and other water bodies are often shifting their positions, leading to cartographic complexities. Yet, we have drawn political boundaries that are often cut across water basins. Management of these boundary points thus creates unique challenges for modern nation-states. The contradictions between the water world and the political world create a contradiction for the modern nation-state.

The most simplistic understanding and resolution of the contradiction is by looking at the problem through the framework of water scarcity. As discussed above, the world is facing increasing water scarcity. Some scholars have claimed that water scarcity often leads to water wars. Such ideas made it and were generally acknowledged. Several authors worked with this theoretical understanding. One of the most prominent works was on the Nile Basin by John Waterbury (Waterbury 1994). Studying the ten countries of the Nile Basin, he concluded that the impending water shortage is a big problem for the Nile Region. He concludes that the only way to resolve this would be to get a third party involved such as the World Bank and build a treaty, based on the national interest of each state. Several other prominent authors took the scarcity perspective and predicted future water wars (Postel 1992). The idea was so popular at one time that in 2001 the UN Secretary-General Kofi Anan also famously proclaimed that the fourth world war would be fought for water. The academic proclamations of scarcity fuelled violence also resonated with the military blocks across the globe and further solidified the securitisation of water. However, most of these predictions were based on case studies of basins that had a particular history of water shortage and violence. Most of the water war stories were focused on the areas with a history of conflicts such as the Nile basin, the Jordan Basin and the Indus Basin.

Gradually a more universal and systematic approach evolved and qualitative studies for a larger global scale began. In 1998, Aron Wolf et al. published the

*Transboundary Freshwater Database*. It presented a historical view of the various interactions among states with regard to shared waters. Analysing the data for over 60 years, they found evidence of fewer than 50 cases of water conflict. Interactions between states were overwhelmingly cooperative. While conflicts did exist, cooperation was the norm. Even in the situation of disagreements, most of the posturing by states was verbal. Cases of actual violence were even rarer. This development posed serious challenges to the previous water wars theory. After the publication of the Transboundary Freshwater Data Reserve, several other quantitative databases were also developed. Another prominent development was the development of the economic rationale theory. Studies were made which proved that fighting wars over water resources did not make economic sense, as the cost of wars far exceeded the benefits that would be acquired. A study by Undala Alam proved that fighting wars over water resources is simply irrational as it is financially unviable, i.e "cooperation is water rational" (Alam 2002: 341). With these two developments, the water wars theory was largely being questioned. Several other types of databases were also compiled during the same period taking other socio-economic indicators, and river basins as variables. Two can be discussed here. Furlong (2006) and Gleditsch et al. (2006) studied the impact of the shape of the river boundary on the potential for conflict. "A shared basin is positively and significantly related to conflict, while a river boundary is not. Support for the scarcity view of conflict is somewhat ambiguous" (Gleditsch et al. 2006: 378). Similarly, Furlong (2006) states that studies on transboundary waters, in general, have some common problems. In general, "(i) mis-theorize hegemony, (ii) adopt an unduly pessimistic stance vis-a`-vis the propensity for multi-lateral cooperation, (iii) assume that conflict and cooperation exist along a progressive continuum, (iv) neglect the conflict and violence that states exact within their 'container', and (v) depoliticize ecological conditions" (Furlong 2006: 453). These studies correlated the geographical aspects such as shape and size of the river basin, and river boundaries (through fare and border crossing) to International Relations studies on conflicts over shared waters through systematically collected data on a global scale. Overall, they found that border crossing rivers had a greater probability of disputes across them. While the Transboundary Freshwater Disputes Database was a treaty-based database, several other data compilations began to come up which were event-based. The databases record the nature of disputes between the countries and can establish a direct link between the event and shared

water resources. This was an important development in the theoretical understanding of transboundary waters theory. The ideas of 'conflict' and 'cooperation' over shared waters were further problematised by scholars analysing these databases in the last decade.

Instead of looking at conflict and cooperation as two opposite ends of a continuum, it was realised that a more nuanced approach is needed. A seminal work developing the theory of shared water conflict and cooperation was proposed by Mirumachi through the Transboundary Water Interaction Nexus (TWINS) model in 2007. Looking at the intensity of the incidences of cooperation and conflict, interactions between states can be seen as a nexus of cooperation and conflict of varying intensities. In other words, cooperation and conflict often coexist in a shared basin. Moreover, the automatic assumption that all cooperation is good and all conflict is bad is not congruent with reality. Taking examples, particularly from the global South, Zeitoun and Mirumachi have proved that treaties often reflect the interests of the local hegemon, rather than an equal rights scenario. In the case of the Jordan Valley, Nile Valley and the Ganga Valley, the existence of treaties over water sharing exist. However, they cannot automatically be assumed to be a result of willing cooperation among the countries in the basin. Instead, transboundary water instructions are inherently political processes influenced by the power structures in the valley. Thus, while the Mahakali Treaty was signed in the Ganga basin, it could never be implemented on the grounds. Similarly, for most of the treaties are signed, several stakeholders such as citizens and businesses have no participation or asymmetric participation in form of token participation. Mirumachi pointed out that cooperation in terms of a signed treaty often favoured the more powerful state and reflected the local power hierarchy. Thus, simply counting the incidents of cooperation and conflict in terms of a treaty signed can be reductive. The power balance between the states sharing the river basin is another important factor. Lowi (1995) showed through case studies that cooperation on shared watercourses is more likely in situations when the more powerful state has an interest in it. In such situations, even a treaty of cooperation ends up solidifying the pre-existing power imbalance even as it creates the illusion of cooperation. Thus often, upper riparian hegemonic states are less interested in cooperation than the lower stream, non-hegemons.

Another important aspect is the problem of scale. Holmatov and Lautze (2016) have explored the question of scale in shared river basins. They look at the correlation between treaties and the scale of the river basin for which it was signed. It is observed that transboundary water laws vary according to the scale to which it is applied. Based on this enquiry they found that "(i) treaties tend to focus on hydropower and flood control at smaller scales, and organizations and policies at larger scales; (ii) a temporal trend toward treaties concluded at larger scales; and (iii) a higher proportion of treaties is at larger scales in Africa and Asia than in Europe and the Americas" (Holmatov and Lautze 2016: 127). Based on these, it is seen that cooperation over large basins is difficult to achieve. Instead, small scale cooperation may be a more constructive scale to work within. Particularly in the basins of Asia and Africa, it would be more effective to focus on forming avenues of productive cooperation across smaller scales, involving fewer nation-states. Thus, one major dilemma in transboundary water management is that of scale. Or, in other words, the transboundary water problem is a problem of scale as it simultaneously seeks an alignment between water needs at local, national and international scales. While the events are local, perspectives on them seem to go to the national level and international levels. And, vice-versa, decisions made at national and international levels impact the local water use.

Cohen and Frank (2009) have identified four unique characteristics of riparian politics. Firstly, they observe that rights and needs are intertwined in a riparian conflict. Water is recognized as essential for human life by the conflicting parties. Moreover, in recent times increasing quantification of water resources has allowed for more efficient sharing. Thirdly, all sides share a mutual interest in maintaining the multiple uses and overall quality of water supply. And finally, states have often set apart their ideological differences to negotiate, largely keeping local requirements of water in mind. All these emphasize a change from "rights based" negotiations to "need based" ones. More recently, a relational approach to transboundary waters management has been emerging. Linton (2010) in the book "What is Water" explores how the discourse on water has developed over historical times. He poses a simple question "what is water" and then produces an enigmatic answer "water is what we make of it". The author describes water as a "process", "saturated with the ideas, meanings, values, and potentials that we have conferred upon it" (Linton 2010: 19).

The way we look at water is subjective. He argues that the modern imagination of water is very different from the traditional one. While traditionally water has been an organic part of civilization, in past few centuries it has come to be seen in isolation, hinting toward commodification. This leads him to build the idea of the "hegemony of modern water". Water which is practically a local phenomenon has come to be imagined at the global scale. It is in this context that he looks at the idea of a global water crisis. He argues that such concepts of crisis emerge from the incommensurability of the "gross abstractions of global water and world population" (Linton 2010: 173). Adding to this abstraction of water, John Agnew (2010) presents the idea of "Water Power". He questions the over-emphasis on the "physical side of access" to water at the cost of ignoring the political and social factors in determining the availability of water. He identifies three ways in which this empowerment of water has been going on in conflicts over water. The first portrayal of water is as a locally fixed natural resource, giving the advantage of the location to the one that owns it. The second way to look at water has been like any other natural resource, and countries will try to acquire more as their needs increase. The third narrative looks at water as an element of nature which is at peril due to unsustainable human practices. All these stories give power to a neutral substance like water. The need is for a practical politics of water resources to be negotiated at several geographical scales simultaneously-the national, the state and the local. The crux of his argument is the centrality of politics while dealing with the water crisis. Developing a critical perspective on water discourse he says that prophecies of acute scarcity of water and imaginations of future water wars present a gloomy and unrealistic image for the future. He is against the environmental determinism which lies at the foundation of such arguments. In fact, the very nature of water resources is such that a crisis of water has to be seen differently from that of other resources.

*A relational approach to Transboundary water*

The modern understanding of water is historically unique. While traditionally water has been an organic part of civilization, in the past few centuries, it has come to be viewed more instrumentally as a 'resource'. We generally tend to think of water as a homogeneous abstraction, chemically denoted as "$H_2O$". However, this abstraction

which has been “de-materialised” and “de-terretorialised” alienates water from its socio-cultural rooting (Linton 2010: 28). De-materialisation implies the material alienation of water and its reification as a universally uniform resource. In modern states approach it is imagined as a non-organic separate entity. It is disjointed from all the economic, cultural and social processes associated with it. Similarly, modern water is also de-territorialised. Water is never separate from its ecological environment. That is how it must be planned for. However, modern state does not take that into account. There is an implicit “placeless-ness” in the modern understanding of water.

> The characterization of water- its intellectual abstraction, scientific specification, material containment and its alienation from society and from the rest of the non human nature- hang together. The modern idea of water as an objective, homogeneous, a historical entity devoid of cultural content, is complemented by its physical containment and isolation from people and reinforced by modern techniques of management that have enabled. Most of us to survive without having to think much about it…….. modern water has entered a critical phase wherein each of these characteristics is recognized as untenable or unsustainable. And, as a result, it has begun to fall apart. That this crisis is forcing us to think about and get involved with water in ways to which we are not accustomed. (Linton 2010: 40)

Thus, there is an inherent contradiction in the modern approach to water, thus leading to a need to redefine how water is viewed. From a socio-hydrologic perspective, there is “the need to consider the two-way feedbacks between human and water systems in order to explain puzzles, paradoxes, and unintended consequences that arise in the context of water management, and to suggest ways to avoid or overcome these challenges” (Pande and Sivapalan 2017). Rather than being separate entities, water and society are interconnected. Water is always situated in the socio-cultural context, taking into account socioeconomics, technology, norms, and values associated with it. In other words, the human agency is “endogenous to water systems” (Sivapalan et al. 2011: 5). From this perspective, water becomes a “process”, “saturated with the ideas, meanings, values, and potentials that we have conferred upon it” (Linton 2010: 19). Such a deterministic approach, driven by narratives of surplus and scarcity creates a false water paradigm.

The ‘reductive’ understanding of water as a scarce resource is evident in all spheres, including transboundary waters. Von Lossow (2015) points out three

characteristics of approaches to transboundary water, in particular within academia. Firstly, it deals with issues of conflict, confrontation and warfare that are associated traditionally with masculine ideas of virtue and power. Secondly, state-centric models based on national interest dominate both research and policymaking for transboundary water. Thirdly, water management is usually seen in terms of hydro-engineering and the building of large-scale water infrastructure (Von Lossow 2015: 107). Jepson et al. (2017) points out how focusing on water security mainly in terms of scarcity and abundance of access and availability is a limiting approach. Integrating the politics and culture of water provides better context for existing scarcity or surplus. Looking at the relational approach provides "fuller consideration of the political structures and processes through which water is secured, with emphasis on the social relations of access as opposed to simply the politics around water supply" (Jepson et al. 2017: 48). Moreover, taking a relational approach also provides greater space for the cultural norms and their interactions with the water processes, most often observed in the gendered nature of international water relations (Zwarteveen 2010).

*Water as a security issue in South Asia*

There is a vast body of literature discussing the nature of cooperation and conflict among nations on interstate rivers. In the nineteenth century, as the number of sovereign states increased many political boundaries were drawn across river basins, leaving them prone to conflicts (Lepawskey 1963). United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses is the most prominent piece of international law which set guidelines for conflict resolution. Haftendon (2000), looking at the possibilities of cooperatively solving such conflicts, takes a game theory perspective. The dominant state often relinquishes its hydrological advantage in return for specific rewards or political and material side payment. Several other authors have implied that cooperation among riparian states depends on several factors. Aron Wolf and his collaborators have looked extensively into the various aspects of interstate conflicts on water by an analysis of Transboundary Freshwater Dispute Database. But even in this situation "water wars" is an extreme reaction not likely to happen (Wolf and Uttito 2002). Negotiations are the way out. While carrying out these cooperative efforts, Zawhary and Mitchell

(2011) observe, that the bilateral ventures are in general more successful and resilient than the multilateral ones. Looking at the fresh water availability scenario in South Asia, Brahma Chellany (2011) says that on a per capita water availability basis, Asia is the driest continent of the world. As the stress levels increase due to rising population, as well as water intensive lifestyles, water will dominantly emerge as a security issue for South Asian countries. Some glimpses of this "securitization" of water are already available. The historically estranged relationship between India and Pakistan will find their positions on water negotiations getting stiffer. However, according to Asian Development Bank(2010), an increase in population has led to a seventy per cent decline in per capita water availability between 1950 and 1995. The bilateral negotiations on the water in this region have been slow due to what Bandhyopadhyay (2007) calls "hydrological nationalism". But as the two major water systems in the region-the Indus and the Ganga-Brahmaputra-Meghna basin are not limited within the national boundaries, regional cooperation is needed for effective water management in South Asia. Salman and Upreti (2003) present a legal perspective on the issue. After making a detailed analysis of the treaties signed on various rivers-Indus, (India-Pakistan), Kosi, Gandak and Mahakali (India-Nepal) and Ganga (India-Bangladesh), the authors make some generalised comments about the nature of such efforts. They conclude that in the South Asian region, international water law rules have been interpreted and used differently. Regional efforts for effective water management, although very marginal, can be seen coming up within the larger framework of the United Nations Organisation. A truly regional effort is lacking. However, there are successful bilateral negotiations on the Indus water use as well as for individual rivers of the Ganga Brahmaputra Meghna water system (Subedi 1999, Alam 2002). Two important studies focusing on regional cooperation and conflict are carried out by World Bank scholars (Siddiqui and Tahir Kheli 2004). Within the broader framework of "water and security in South Asia", they explore the impeding water stress in this region, the socio-economic conditions in the four major countries in the region -India, Pakistan, Nepal and Bangladesh, as well as the way the bilateral treaties have been formulated by these countries. China annexed Tibet in 1950. Tibet is the source region for both the Indus River system as well as the Ganga–Brahmaputra–Meghana system. China is in fact the uppermost riparian state. However, Binayak Ray (2008) points out that with technological advancements the situation is gradually changing. Unresolved border demarcation, the issue of regional

leadership and the US-China–India–Pakistan relationship equation are bound to influence China's approach to riparian-water management.

*Indus Water Treaty*

River treaties between countries have been a central aspect of the study of water conflict and cooperation. Scholars have conducted studies to understand the role of treaties in the management of interstate water disputes. While neoliberal institutionalists believe that treaties are an effective tool for conflict management, the realist school believes that states readily defect from treaties when it is in their national interest to do so. Overall, prominent scholars seem to agree with the realist arguments. Zeitoum and Mirumachi (2008) have argued that treaties tend to strengthen the pre-existing power imbalance even while they create an illusion of cooperation as seen through the signing of the document. Most of the studies on various aspects of river treaties such as the content of the river treaties, factors contributing to treaty signing etc. But the signing of a treaty is not the final settlement of the dispute over water between the countries. Treaties do not produce a peaceful world merely by their existence. Several disputes and disagreements arise over the years as the treaty is being implemented (Brochman and Hansel 2009). This is a nascent area of study, particularly quantitative systematic studies on the effectiveness of treaties that are still going on. Overall, it is generally agreed that mechanisms of enforcing the treaty and flexibility and adaptability built into a treaty decide its effectiveness. In a study of several successful treaties, Mitchell and Zawahri (2015) found that genuine information exchange practices and well-defined enforcement mechanisms made a treaty more likely to succeed. On the other hand, (Dinar et al 2010) found that joint river commissions and monitoring are not very effective. In fact, built-in conflict resolution mechanisms within treaties increase the likelihood of subsequent disputes. The three elements of a good water-sharing treaty are flexibility, scale and enforcement mechanism (Zenter 2010).

The present study takes up the effectiveness of the Indus water treaty (IWT) in context of these theoretical developments. The IWT is the legal document signed between India and Pakistan to settle the rules for sharing the Indus Water System. The treaty was signed in 1960 at Karachi between Prime Minister Nehru on behalf of India and General Zia ul Haq on behalf of Pakistan. The World Bank acted as the broker as

well as a third party to the signing of the treaty. The design of the IWT consists of a preamble, twelve articles and eight annexures. The articles establish principles and methods of water sharing that both countries agree to. The annexures are elaborate and deal with technical issues. It provides a detailed dispute resolution mechanism. The Indus Water Treaty is unique in several ways. It is the only treaty in the South Asia region involving a third party-the World Bank. It was concluded at a time when hostilities regarding Kashmir between India and Pakistan were raging high. Thirdly, it has been carried out with great faith. Despite three wars between the signatory countries, the treaty was never abrogated (Zawahri 2008). The unique aspects of the IWT have been explored by researchers who have come up with a variety of perspectives. It has been highlighted, that cooperation was a coerced one. Past contingencies are believed to have essentially limited Pakistan's initial spectrum of operation. The deal was much more favourable to India although it appeared to make many concessions for Pakistan (Khalid 2014, Zawahari 2010). Friction kept arising, for example, when India wanted to build the Tulbul barrage over Wullar Lake and even when Pakistan planned to build the Diamar-Bhasha dam. Both countries kept objecting to constructions on the Indus ever since the treaty came into existence (Ray 2008). With time, the differences between India and Pakistan over water allocation within the Indus Water Treaty are becoming starker. In an article named “Fifty years of Indus Water Treaty: An Analysis”, Uttam Kumar (2010) argues that with the passing decades the treaty is becoming increasingly political. Both countries realise the strategic importance of the Indus Waters. Pakistan has repeatedly accused India of malicious interpretation of the words of the treaty. Indian side discards Pakistani concerns as unfound and unreasonable. Indeed, disputes between the countries which were earlier solved mutually have twice required third-party mediation. While the Tulbul Barrage dispute was resolved by the two countries mutually, a neutral expert was called for the Baglihar dispute and more lately, for the Kishanganga dispute, a court of arbitration had to be set up. Finally, it has been argued that while water was divided between the countries from the perspective of state securitization, what is really needed is a more humane approach. That is to say that a “human securitization” approach is needed taking as the reference point, not the sovereign state, but the people who are directly impacted by the water shortage or surplus in the region, such as the farmers and the women. The division of rivers has severed an interdependent river system, and whatever cooperation exists is “minute and passive” (Burgess et al.

2013). After more than five decades, recent technological and environmental changes have given rise to issues between India and Pakistan which were not imagined in 1960. This was apparent when Pakistan protested against the construction of Baglihar Power Project in 2005 and more recently against the Kishanganga project. Both these cases were looked into by a third party. For the Baglihar Dam, a Neutral Expert was appointed, and for the Kishanganga dispute, a Court of Arbitration was set up. These two judgements have brought up several questions. Writing in the context of the Kishanganga verdict, Ramaswamy Iyer (2013) says "determining e-flows was not within the remit of the as an arbitrator under the IWT or in terms of the treaty" as "the concept was unknown in 1960". While acknowledging the importance of determining environmental flow levels, he is of the opinion that "this issue cannot be argued on the basis of the 1960 treaty; it can only be argued on the basis of current concerns. The Permanent Court of Arbitration was fully justified in taking note of those concerns, but this meant that it was going beyond the treaty and dealing with issues not explicitly recognised in it" (Iyer 2013). Another critical review of the Kishanganga verdict by Himamshu Thakkar (2014) points out that apart from exceeding the mandate given by Indus water treaty, the verdict had several other problems. "The Permanent Court of Arbitration analysis as to how it reaches this conclusion of e-flow requirement of 12 cumecs is not very convincing, since this is protecting only the minimum flows and not looking at the river as an ecosystem that would require a range of flows. More worryingly, Permanent Court of Arbitration then reduces this requirement to 9 cumecs for even more unconvincing reasons" (Thakkar 2014: 16). It has used minimum flows instead of environmental flows in determining the e-flow levels. Secondly, it has not formulated a standard method of e-flow determination which would be mandatory. This leaves room for further tussles whenever a new hydropower project is going to come up. Indeed, Pakistan has already registered its reservations about the Ratle Hydro Power Project with the Permanent Indus Commission (Khalid 2014).

*New technologies of hydro-power generation and their environmental impact*

Hydropower and hydro-engineering have been aggressively pursued across South Asia since the mid-twentieth century putting freshwater diversity and

freshwater ecosystems in serious jeopardy (Dudgeon 2005). Dams have emerged as major barriers to biodiversity maintenance across Asia. Rivers in the monsoon region have high seasonal variability of flow. With the construction of flow barriers like dams several problems have emerged, like unusually low dry season flows, and excessive river bed erosion due to increased silt load. They have an impact on biodiversity due to habitat destruction or modification. The problems become more complicated when the rivers run across international boundaries like the Indus, the Ganga and Mekong. The actions of upper riparian states have consequences for lower riparian states. A major aspect that is still in the nascent stage in Asia is the determination of environmental flows. Very little effort has been made to address this issue in India or in China. No standard method of determining e-flows at the global level exists. In fact, Tharme (2003: 422) has identified over 200 individual methodologies consisting of "hydrological, hydraulic rating, habitat simulation and holistic methodologies". Out of these, holistic methodologies are generally identified to be most effective as they take into account the entire ecosystem while framing the ideal flows. Such methodologies are well developed in Australia and South Africa. However, they remain underdeveloped in Asia (Acreman 2014). Nonetheless, holistic determination of environmental flows is the most suitable for developing regions of the world "where environmental research is in its infancy and water allocations for ecosystems must, for the time being at least, be based on scant data, best professional judgement and risk assessment" (Tharme 2003: 423). If a dam is built on the rivers, it allows the sediments in the reservoir to settle. The original storage of the reservoir will then decline and have detrimental effects on the activity of the reservoir. Considering the seriousness of this issue, various approaches for sedimentation management and dam protection are used. These approaches include maintenance of watersheds, dredging, venting of current density and flushing. In flushing techniques, by releasing the drains, the soil previously collected will be drained from the reservoir. After carrying out several experimental tests, researchers agreed that the flushed sediment increased with the water level of the reservoir declining and with the discharge from the outlet increasing. Similarly, as the size of sediment shifted from coarse sediment to fine sediment, the flushed sediment rose under the same conditions (Emamgholizadeh et al. 2006). Thus, while the flushing method is useful for the functioning of the dam it simultaneously has negative environmental impacts on the

lower riparian ecosystem due to a sudden, unnatural influx of sediments which had accumulated at the reservoir bottom.

### 1.3 Definition Rationale and Scope

For this study, a transboundary freshwater resource is defined as any river system whose course runs across international boundaries. Environmental flow or e-flow has been taken to mean the minimum level of water flow that should be maintained in the water body for the aquatic ecosystem as well as the human population dependent on it to thrive.

This work aims to make a case for reconceptualising the ways in which transboundary waters are envisioned in South Asia. The first part of the work is an analysis of the nature of cooperation among nations of the region over this indispensable resource. Several factors can lead to such cooperation (Dinar et al. 2011). For this study, they have been categorized into four groups: water stress, its extent and impression on states; river configuration and geographical location of states along the river course; domestic institutions and governance; power asymmetries. The study looks at the successful water treaties between nations of South Asia since 1947. It then tries to establish a correlation between the number of treaties with the above-mentioned indicators.

The second aspect is trying to understand the reinterpretation of the Indus River Treaty in light of emerging water harvesting techniques and associated environmental concerns. For this, the Baglihar disputes (2007) and the Kishanganga disputes (2013) have been taken up as case studies. These two disputes have important implications as new problems of the environment (such as environmental flow levels) and technologies of water harvesting (including drawdown flushing) have been interpreted on basis of a treaty which is much older and had not incorporated these aspects at the time of its formation. The study explores how this reinterpretation of the Indus Water Treaty is happening. A new dimension of hydro-politics based on environmental concerns is unfolding in this case. It can have implications for other such treaties in South Asia. There is a need to formulate a standard e-flow framework for South Asia. The final section of the study is a study of the various methods of

calculating environmental flows. It highlights why the "holistic method" is most suitable for the region and makes recommendations on this basis.

It is important to study, on a case-to-case basis, the positions taken by India and Pakistan as well as the Court of Arbitration regarding environmental flow and interpretations of the Indus Water Treaty made by them. The quality of water in transboundary channels is a relevant concern of the states in South Asia. While some countries have national policies on this, they do have not much to say about shared rivers. Thus, the Kishanganga and Baglihar become important keystones for this region. All future concerns about environmental flows will see these disputes and the judgements over them as precedents. Therefore, it is necessary to make a detailed study of how the dispute was resolved as well as the verdicts. Looking at the overall nature of cooperation in the form of successful treaties over transboundary waters in the region provides a context for this.

### 1.4 Research Questions

This work explores some pertinent questions regarding transboundary water sharing in South Asia. The first question is to examine the nature of transboundary water interactions among the nation-states in general. It is also relevant to explore the role of geographical factors (such as riparian location and water stress) and non-geographical factors (such as political relations between two states) in the success of a water treaty. Flowing from this is the absence of regional/multinational treaties on water sharing in the region, and the unique position of the Indus Water Treaty (1960) in this context. What were the situations that led to the signing of the treaty with the involvement of the World Bank as a third partner? And is the IWT really unique in the region? Moving on from a historical context, it then becomes relevant to see the current validity of the Indus Water Treaty. The treaty is now six decades old. How is it being interpreted to address more modern concerns that were not conceived at the time of the signing of the treaty? Indeed, can an old river water sharing treaty (Indus Water Treaty 1960) address emerging technology and environmental issues (Kishanganga and Baglihar disputes) in current times? Finally, it is also important to situate the verdicts by the third parties in both Kishanganga and Baglihar disputes within the larger debate on shared freshwaters. Looking critically at the verdicts of the

Neutral Expert for the Baglihar dispute (2009) and the Permanent Court of Arbitration's verdict in the Kishanganga dispute (2013), it is relevant to see how the verdicts advance or limit the discussion on water quality. The four research questions for this study are as following:

1. What is the role of geographical factors (such as riparian location and water stress) and non-geographical factors (such as political relation between two states) in the success of a water treaties in South Asia?

2. What were the limitations of the Neutral Expert's verdict in Baglihar dispute (2009) and Permanent Court of Arbitration's verdict in Kishanganga dispute (2013)?

3. Can the old treaties address emerging issues of technology and environment in Kishanganga and Baglihar verdicts?

### 1.5 Hypotheses

The two hypotheses this study proposes and attempts to corroborate are as following:

1. Constant development in technologies of water harvesting, as well as their repercussions on environment have an impact on the politics of water sharing.

2. The scientific concept of environment flow is interpreted politically by the conflicting parties in the Indus Water Treaty.

3. Half-hearted cooperation among the countries of South Asia over transboundary freshwater resources is better explained by strained political relations between them than by increasing water stress levels.

### 1.6 Sources and Methodology

This study has been carried out using mixed methods. Mixed methods use both quantitative and qualitative data to find answers to the research questions. It involves the collection of both narrative and numerical data, the analysis of data both via statistical and content analysis and reaching conclusions based on integrating the

inferences gleaned from their qualitative and quantitative findings (Tashakkori and Newman 2010:514).

The first part of the study, exploring the nature of cooperation in South Asia (Chapter 2), has been carried out quantitatively. The primary sources for understanding the nature of the treaties signed between the countries in South Asia include the original texts of the treaties including the Indus Water Treaty, 1960 and the Ganga Water Treaty, 1996. Details about the other treaties have been taken from the Transboundary Freshwater Dispute Database (Hammar and Wolf 1998), and *the Atlas of International Freshwater Agreements (UNEP 2002).* For establishing the determinants of cooperation between states, the quantitative method has been used, keeping the number of bilateral treaties as the dependent variable. For the several indicators of cooperation, data has been taken from several sources. These are - *AQUASTAT, Food and Agricultural Organisation (FAO)* for the per capita availability of water at present as well as future projections. River configuration and geographical location of states along the river course have been classified based on the 14 types of configurations used in Dinar et al. (2011). For the figures on total and per capita national income United Nations Development Programme data has been utilised. All these indicators have been analysed on a temporal scale looking for variations within the region of South Asia. The aim is to see the causes of cooperation among states. Statistical tools like the bar graph and pie chart have been used to portray a graphical picture. The geographical location of the river basins, including the major rivers and their tributaries, have been presented with the help of maps.

For the second part, the Kishanganga and Baglihar Disputes have been qualitatively analysed as case studies, after a historical survey of the Indus Water Treaty (Chapter 3,4 and 5). The partial and full verdicts on Kishanganga and Baglihar have been sourced from the Permanent Court of Arbitration, the Hague. World Bank data set has also been used in the context of the Indus Water Treaty. A case study has been a prominent method of analysis in International Relations for a long time. Bennet (2007) believes this popularity of the case study method arises due to the very nature of international relations which is "studying complex and relatively unstructured and infrequent phenomena" (Bennet 2007). The Kishanganga and Baglihar disputes have been looked at as separate case studies. Both were unique incidents that do not lend themselves easily to formal modelling. The study aims to

describe, explain, or interpret these two particular cases. This is not a purely descriptive case study but the aim has been to maximise the inferences that can be drawn based on causality. Content analysis and word sentiment analysis using NVivo have been used for qualitative content analysis. Through qualitative content analysis using the software Nvivo, dominant narratives on water sharing on Indus have been identified, taking the case study of the Kishanganga disputes as representative. Sources of data for a thematic content analysis are - the Kishanganga Arbitration Award, Permanent Court of Arbitration, The Hague, 2013; review of academic writing on Kishanganga between 20010 and 2020, and; media coverage in Times of India and the Dawn between 2013 and 2014.

For the third part (Chapter 5), an attempt to identify levels of e-flow for the Kishanganga at the site of KHEP under various scenarios has been made. The analysis is made using the desktop analysis method as used in the GEFC. The Global Environmental Flow Calculator (GEFC) by the International Water Management Institute (IWMI), Sri Lanka (Smakhtin. and Eriyagama 2008) is a software that simulates e-flow classes for various river systems. The hydrological characteristic calculated include the monthly and annual time series, the monthly flow distributions, and a few other river statistics.

## 1.7 Organisation of the Study

The present research work has been organised into seven chapters. The current chapter introduces the present debate on transboundary fresh water and explores the different ways of looking at the water. Juxtaposing “water war” theories against “water politics” theories bring out a critical perspective in understanding discourse development on water. It then makes a case for a critical study of the Kishanganga and Baglihar dispute. Dam building and its impact on water flow quality as a key aspect of geopolitics has been established. The chapter also lays out the study plan for this work.

In the next chapter, Chapter 2, the geopolitics of water sharing in South Asia as a region is explored. Cooperation over shared freshwater resources is explored in terms of the number of successful river treaties signed. Thus, the chapter begins with an exploration of the relationship between the South Asian countries in terms of

bilateral water treaties. It presents a summary of all the treaties signed in the region from 1947 onwards. Using quantitative methods, the study establishes the causation for cooperation, ultimately bringing out what factors are most important for cooperation in South Asia. It explores the impact of various factors on interstate cooperation such as historical rivalries among states, political mistrust among the states, asymmetric power relationships and hydro-nationalism.

The third chapter focuses on the historical evolution of water sharing in the Indus River Valley. Beginning with a historical account of water governance in the Indus Valley, the chapter then goes into the details of the water management and sharing arrangement in the region during the colonial period. Further, it explores the first origins of water disputes in the region and their resolution, including Satluj Valley Tripartite Agreement (1920) and the Sindh-Punjab dispute which remained unresolved till the creation of the independent states of India and Pakistan. Since 1947, the interstate disputes changed in scale and became international water sharing concerns. This sudden change and its impact have also been explored in the chapter. Finally, the chapter describes and analyses the unique conditions that led to the signing of the Indus water treaty, in 1960. This chapter begins with a description of the Indus Water Treaty, 1960 between India and Pakistan. It traces the geographical compulsions and political circumstances under which the treaty was signed and examines its claim of "uniqueness" in the South Asia region.

The fourth chapter is a case study of the Baglihar dispute on the IWT and the verdict by the Neutral Expert. Beginning with a description of the Baglihar Hydropower Project, it then explores the disputes raised by Pakistan regarding the construction of the project. The chapter then provides a detailed description of the verdict given by the Neutral Expert in 2009. The three major points of difference-gated spillways, pondage area and use of anti-vortex devices in the hydropower plant structure are described and the verdict is explained. Finally, the whole case is critically analysed, highlighting missing aspects in the verdict.

The fifth chapter is a case study of the Kishanganga dispute over the Indus Water Treaty and the verdict on this dispute by the Court of Arbitration. The chapter begins with a description of the Kishanganga Hydropower Plant. It then describes the origin of the dispute between the two countries with regards to the Kishanganga

Power Plant, dividing them into pre-arbitration and post-arbitration phases. It then looks at the partial and full verdicts of the Court of Arbitration set up by the Permanent Court of Arbitration at the Hague. Finally, a critical analysis of the dispute is made. It explores the geographical imperatives and the political situation under which those judgments were made.

Chapter 6 deals with the emerging technologies and environmental concerns in shared freshwater courses. It begins with a survey of the ecological impacts of new and emerging riverine technologies. Next, the chapter explores the meaning and need for an environmental flow in the rivers. It analyses how well the new technologies like “drawdown flushing”, “spillway gates” and most importantly the concept of “environmental flow” can be incorporated into the existing treaties. It also explores the importance of developing a regional e-flow determination methodology for South Asia. The chapter ends with a discussion on the need for an institutionalised e-flow regime in Indus. An attempt to identify levels of e-flow for the Kishanganga at the site of KHEP under various scenarios has been made. The analysis is made using the desktop analysis method as used in the Global Environmental Flow Calculator (GEFC).

Finally, Chapter 7 concludes the major findings of this study and indicates some areas for further research. Along with highlighting the gaps in the two verdicts and the hydro-nationalistic behaviour of the two states, it makes a case for institutionalised e-flow regime management in South Asia.

# CHAPTER 2

# COOPERATION AND CONFLICT OVER SHARED WATER RESOURCES IN SOUTH ASIA

Among the various resources, probably the most unique is water. Indeed, some scholars have argued that water has come to be looked upon purely as a resource only in recent times, the traditional view is much more organic. The unique nature of water, universally, almost instinctively, acknowledged as a basic need, and its fluidity and utter indifference to political boundaries make it different from other resources. How countries share this precious fluid among themselves has been a question pondered over by many. In South Asia, cooperation among nations over transboundary freshwater resources has been moderately successful; having phases of great activity as well as inordinate delays and stagnations. However, looking at the number of treaties as a rough measure of cooperation, it can be said that tensions are on the rise in recent times. The present chapter has been divided into four sections. The first section gives an overview of the two major river systems in South Asia. The other part summarises major incidents of cooperation or clashes over transboundary freshwater resources among the countries in the region. The third section explores various causes of cooperation or conflict and the final section highlights determinants of cooperation or lack of it particularly relevant to South Asia.

## 2.1 Transboundary River Systems of South Asia

All the transboundary rivers of South Asia are part of two large river basins- the Ganga Brahmaputra Meghna (GBM) basin and the Indus River basin.

### 2.1.1 Ganga Brahmaputra Meghna Basin

It is the largest river system in South Asia. Both Ganga and Brahmaputra River systems have their origin in the Tibet region of China. The rivers then gradually descend to drain into the Bay of Bengal. The GBM flows across China, India, Nepal, Bhutan and Bangladesh.

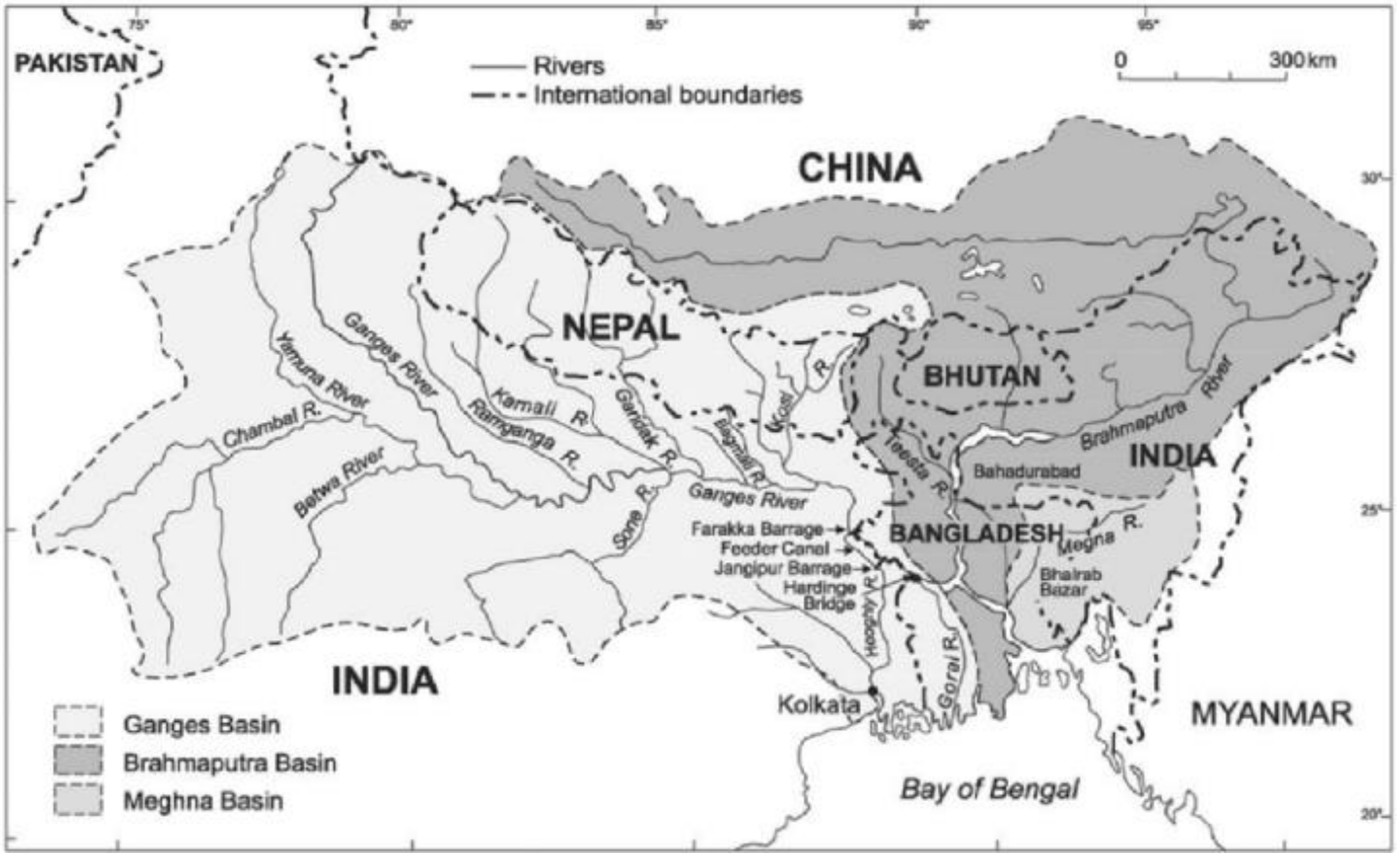
*The Ganga River System*

It consists of the master river Ganga and its numerous tributaries. The Ganga originates from the Gangotri glacier in the higher reaches of the Himalayas. The Bhagirathi and the Alaknanda meet at Devprayag to form Ganga. After travelling 280 km from the source Ganga reaches Haridwar which forms its entry into the plains. From here it flows in an eastward direction for a distance of 770 km to reach Allahabad. Here it is joined by the Yamuna, its largest tributary. The Yamuna has several tributaries of its own flowing northward to join the left bank of the river. These include Chambal, Sind, Betwa and Ken. The total length of Yamuna from its origin to the confluence with Ganga at Allahabad is 1,376 km. The Ganga sweeps another 300 km to reach the Bihar plains. In this stretch, it is joined by several important tributaries which originate in the Nepalese Himalayas and thus are transboundary. These are the Gomti, Ghagra, Gandak and the Kosi. The Ghagra originates in trans-Himalayas and is known as Karnali in Nepal. It is joined by tributaries like the Sarda, the Sarju and the Rapti to finally drain into Ganga as Ghagra. Similarly, the Gandak also flows through Nepal joining major tributaries like Kali Gandak and Trishuli and entering India as Gandak. The Kosi River consists of seven streams namely Sun, Tamba, Talkha, Doodh, Botia, Arun and Tamber. Together they are known as the Saptakaushik in Nepal. The Kosi flows for a distance of 730 kilometres in India to drain into the Ganga in Bihar. Near Rajmahal, the Ganga, now a massive water body, sluggishly turns to the southeast and south of Farakka, and ceases to be known as Ganga. It bifurcates into two. Flowing south it is called the Hugli. Its major tributary is the Damodar River. The eastward branch, entering Bangladesh is the Padma. After travelling another 200 kilometres southward in Bangladesh, the Padma is joined by the Jamuna (Brahmaputra) and is now called the Meghna. Further 100 kilometres, the Meghna drains into the Bay of Bengal. Between the Hugli and the Padma- Meghna lies the largest delta systems of the world known as the Sundarbans.

*The Brahmaputra River System*

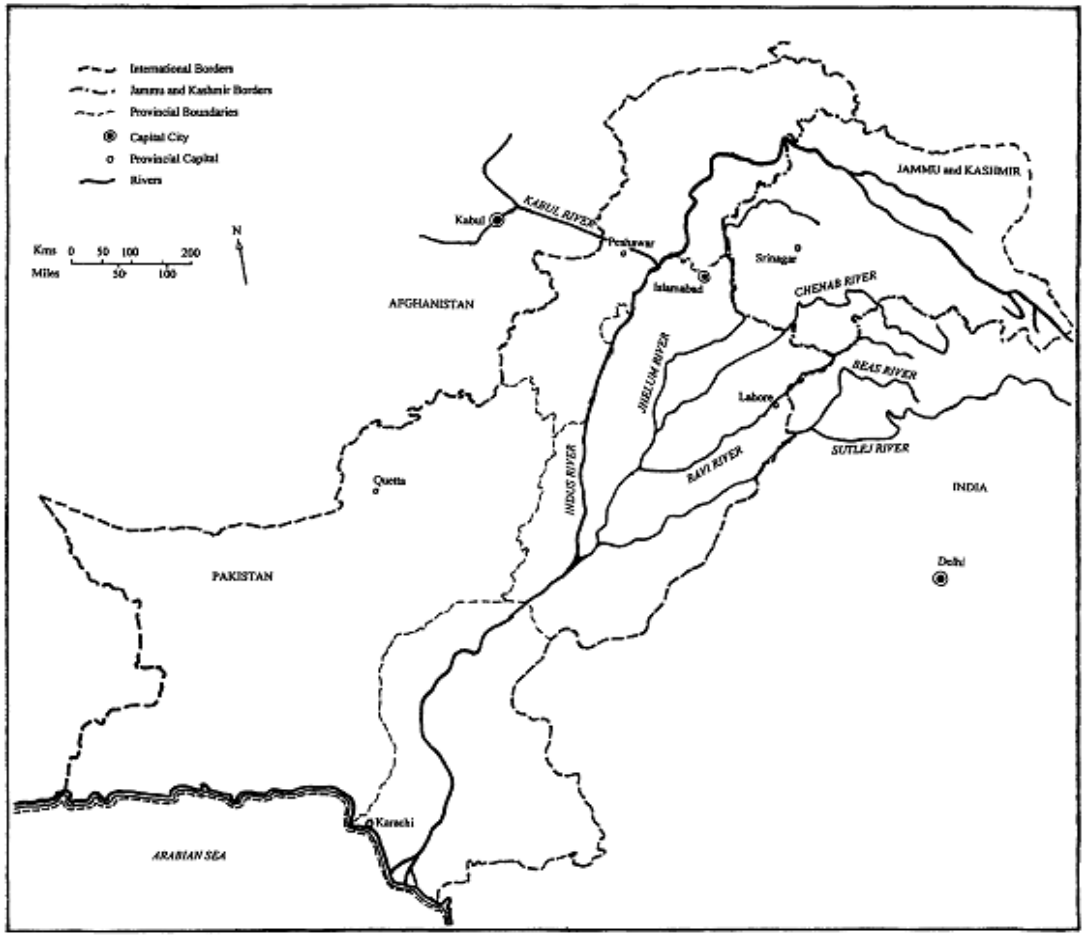
The Brahmaputra River originates in Tibet where it flows as the Tsang Po. Taking a hairpin bend, it enters India where Dibang and Lohit rivers join it and it is henceforth

**Map 2.1: The Ganga Brahmaputra Meghna Basin**




Source: Metcalfe (2003)

**Map 2.2: Indus River System**




Source: Alam (2002)

called the Brahmaputra. Major northern tributaries joining the river in this part are the Dehang, Dibang and the Subansiri. The Dhansiri is an important tributary on the left bank of the main channel. The Brahmaputra has a long, braided channel along its course, often reaching up to 18 km. South of Goalpara, the rivers flow into Bangladesh and continue for over 250 km before draining into the Bay of Bengal. The Padma is named for the combined flows of the Ganga and Brahmaputra south of the city. The Padma is joined at Chandpur by the Meghna River on the left bank, following which the combined flow continues for a further 100 km.

*The Meghna River System*

In India, the Meghna starts in the rugged hills of Manipur as the Barak River. Along the boundary of Bangladesh with India, the Barak divides into the Surma and Kushiyara rivers. Downstream in Bangladesh, the rivers merge again and are known as the Meghna.

### 2.1.2 The Indus River Basin

From the glaciers of the Kailash Range in western Tibet, near Mansarovar Lake, the mighty Indus rises. In the trans-Himalayan area, where it is called Singee Khabab, it flows for 257 km in the northwest direction before it is joined by the Dhar river. At an elevation of 4,206 m., it flows westward into India and continues westward until it enters the Zaskar Range. The Zaskar and the Shyok River are joined by it. Other tributaries are the Gilgit, the Gortang, the Drass, Shinger, and Hunza. It then takes a sharp southerly bend as it enters Pakistan. Close to Attock, the Kabul River joins it. It then travels through the Potwar plain and the Salt range. Indus is joined south of Attock by the Kurrum, the Toch and the Zhob Gomal. The Panchanad, that is, the accumulated water of the five eastern tributaries, the Jhelum, the Chenab, the Ravi, the Beas and the Satluj, is joined near Mithaikot, at an elevation of around 80 m. Finally, the river empties itself into the Arabian Sea and forms a broad delta. At an altitude of 4900 m. in the south-eastern Kashmir valley, the Jhelum rises in the spring at Verinag. The river runs across the Kashmir valley for 200 km and is joined by the rivers Lidar, Sindh and Pohru. It takes a sharp hairpin turn at Muzaffarabad and flows southward for 170 km to form the Indian Pakistan frontier. It joins the Chenab at Trimukh and flows eastward. Chenab is initially from India. The headwaters of the

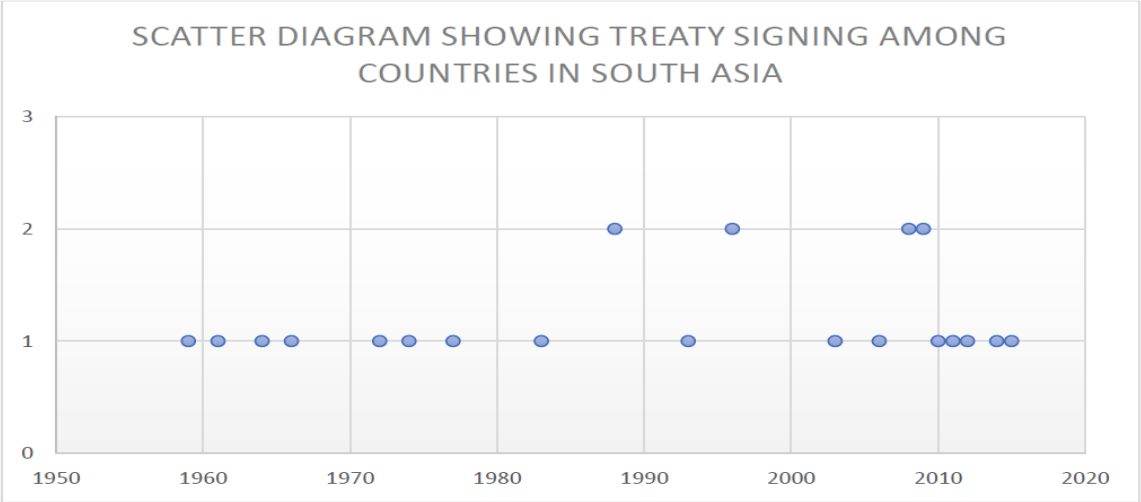
Chenab are created by two small streams on opposite sides of the Bara Lacha pass, namely the Chandra and the Bhaga. The famous river called the Chandrabhaga, like the Chenab River, enters the Kashmir Valley. It swings southwest to flow across the plains of Pakistani Punjab after entering the gorge. After receiving the waters of the Jhelum River and the Ravi River, it eventually reaches the Satluj at Panchnad. In Himachal Pradesh, the Ravi has its source in the Kullu hills near Rohtang pass. It crosses the Chamba Valley, flowing in the north-western direction from its source. It flows southwest and reaches Pakistan, entering the Chenab. It covers a cumulative distance from its source of 725 km. The Beas arise near the Rohtang Pass near the Ravi. After covering a distance of 460 km, it joins Satluj near Harike. It is the smallest tributary to the east. The most significant eastern tributary of the Indus is the Satluj. It rises in the Tibet region of China, at an altitude of 4,570 m., near the Mansarovar Rakas lake. It is really close to the Indus fountain. In Himachal Pradesh, it enters India via the Shipki La pass. Except for Spiti, which drains a broad trans-Himalayan zone, its tributaries in Himachal are short. At Rupnagar, it joins the plains and is joined by the Beas at Harike. It forms the border between India and Pakistan for 120 km from near Ferozpur to Fazilka, then receives the mutual drainage of the rivers Ravi, Chenab and Jhelum. It meets the Indus near Mithankot after covering 1,450 km.

## 2.2 Chronology of major river treaties signed in South Asia

As is clear from the previous section, there are several transboundary rivers in South Asia crossing two or more states. Between the states of Bangladesh, Bhutan, India, Nepal and Pakistan the following treaties have been signed between 1950 and 2015.

These have been depicted in Table 2.1. It is seen that overall incidents of cooperation as indicated by legal agreements have been increasing. However, no major treaties are signed during the period. From this data, it is evident that if the signing of treaties and agreements is taken as an indicator, cooperation over water resources has increased over the period. This information can be plotted against a time scale to see the trend of the increasing treaty signing in south Asia. This is very evident from the following scatter diagram. Greater clustering is observed after 2000.

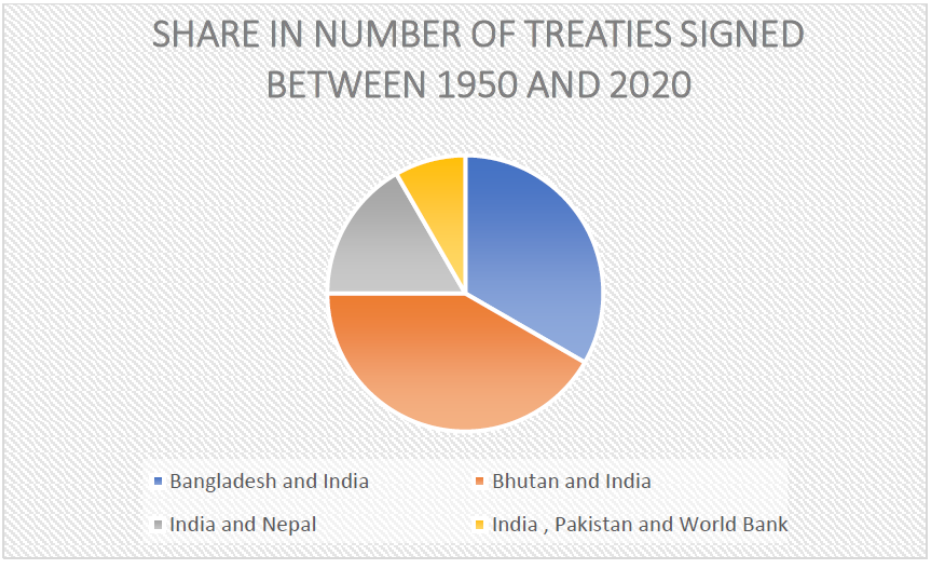
**Figure 2.1: Increasing trend of the treaty signing in South Asia**




**Source: MEA (2019)**

This data can also be plotted country wise to show which are the countries among which maximum treaties have been signed. From this diagram, it can be seen that Bhutan and India have signed the largest number of treaties among themselves. The only three-party treaties are between India, Pakistan and the World Bank. And finally, because of its geography, India is a member of all such water-sharing treaties as rivers cross through it.

**Figure 2.2: Share in number of treaties signed between different countries**




**Source : MEA (2019)**

**Table 2.1 Chronology of legal agreements between countries over shared water resources in South Asia**

| Year | Plans/Projects/Treaties | Countries | Main aspects |
|---|---|---|---|
| **1954-1966** | Joint commission for the exploitation of the Kosi river | Nepal and India | Hydropower generation and sharing between India and Nepal |
| **1961** | Indus river treaty | Pakistan and India | Water sharing between India and pakistan |
| **1959** | Joint commission for the exploitation of the Gandak river | Nepal and India | Hydropower generation and sharing between India and Nepal |
| **1964** | Master plan for water resources development was developed. | | Bangladesh This envisaged the development of 58 flood protection and drainage projects covering about 5.8 million ha of land |
| **1972** | Indo-Bangladesh Joint Rivers Commission (JRC) was established | India and Bangladesh | Maintains liaison between the participating countries to ensure the most effective joint efforts in maximising the benefits from common river systems to both the countries. |

| | | | |
|---|---|---|---|
| **2009** | Agreement on construction of Punat sangchu II Hdroelectric Project | Bhutan and India | As a part of the action plan on India Bhutan cooperation in development of minimum 100000 MW hydropower in Bhutan |
| **2010** | Agreement on construction of Mandechhu Hdroelectric Project | Bhutan and India | Construction of diversion dam (concrete, gravity) as approved in detailed project report. After completion the project will be owned by Royal Government of Bhutan. Surplus power to be sold to India. |
| **2011** | Cooperation in the field of fisheries | Bangladesh and India | Development of fisheries, aquaculture and allied activities |
| **2012** | Revised payment schedule for interests and principal loaned for Tala Hydroelectric Project | Bhutan and India | Regarding loans given b government of India to royal government of Bhutan for various hydropower projects. |
| **2014** | Agreement on development of joint venture hydropower projects through public sector undertakings of the two governments | Bhutan and India | |
| **2015** | Protocol on inland water transit and trade | Bangladesh and India | An extension of trade agreement 2015. Agreement to use their waterways for commerce and passage of goods between countries. Nine routes have been identified. |

Source: Ministry of External Affairs

( https://mea.gov.in/press-releases.htm?51/Press_Releases)

## 2.3 Factors explaining cooperation in South Asia

Brahma Chellany (2011) has said that contrary to popular imagination, not Africa but Asia is the driest continent of the world if we look at the per capita water availability. Thus, water is expected to play a dominant role in the emerging security issues of the countries, as well as China which is the source region for both the river basins under study. However, the water war theories do not fit well in the case of South Asia. In fact, a long line of literature has established that water wars are not the likely scenario in most situations (Wolf 2007). The states of South Asia sharing freshwater resources have shown several instances of cooperation. In a span of over six decades, there have been bilateral treaties over the major as well as minor rivers of the Indus basin as well as the Ganga Brahmaputra Meghna basin.

Interactions among states are influenced by a number of factors. Especially when it comes to shared resources certain factors become more relevant in one set of countries, which might not be equally applicable to another set of countries. All the treaties of South Asia are bilateral ones. India, for its sheer size and central location in the region, happens to be the common country that has signed treaties and agreements of cooperation with Bangladesh, Bhutan, Nepal and Pakistan.

For understanding the nature of cooperation in South Asia, four factors are being analysed. A similar approach has been adopted by Dinnar et al. (2011) to carry out a worldwide analysis of river treaties to look at the global picture and analyse the nature of freshwater resource-related interaction among states. For this study they have been categorized into four groups:

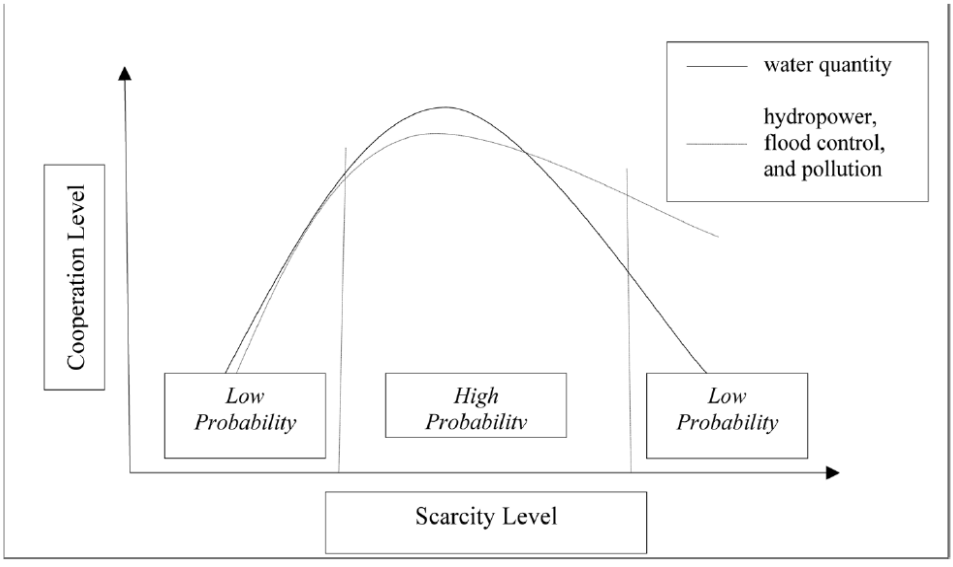
i. Water stress-its extent and impression on states
ii. River configuration and geographical location of states along the river course
iii. Domestic institutions and governance
iv. Power asymmetries

The chapter tries to find out empirically which of these factors plays a greater role and which one has a lesser role. The aim is to establish causation for cooperation or lack of it in South Asia. Since all the treaties in South Asia are specified at the level of individual rivers rather than river basins, the unit of analysis taken is the river itself rather than the Ganga Brahmaputra Meghna basin or the Indus basin which for their sheer magnitude cannot be treated as a single unit of analysis.

### 2.3.1 Water Stress

Water stress refers to the situation when either the demand for water exceeds the available amount during a certain period of time or when poor quality restricts its use. Water stress causes deterioration of fresh water resources in terms of quantity (aquifer over-exploitation, dry rivers, etc.) and quality (eutrophication, organic matter pollution, saline intrusion, etc.) (Jackson et al. 2001). The overall perception of scarcity in a country has a major impact on its negotiation positions over shared water resources. Water scarcity can initiate conflict as well as cooperation among states. Dinar (2009) says that though scarcity and cooperation among the states are related, there is no linear relationship, instead, such association follows an inverted "U" shaped curved. The tendency of states to cooperate over water issues declines in conditions of extreme water scarcity or availability. Only states facing a moderate shortage of water are more successful in carving out successful negotiation regimes. Other situations where cooperation may take place are envisioned. For example, when only one country faces a water shortage cooperation is possible by extending incentives in financial terms or linking it up with issues unrelated to water. Finally, there can be a situation when two countries sharing a river are facing scarcity regarding two different aspects, such as in the case of India and Bhutan. While Bhutan needs technology, India is hungry for more and more power. This relationship can be illustrated with the following model:

**Figure 2.3: Stylised continuum of Water Scarcity and Cooperation among States**




Source: (Dinar 2009: 121)

It is important to note that perception of scarcity is much more relevant for negotiations than actual scarcity. However, the perception and politics over water stress have been dealt with in a later section. This section focuses on the physical scarcity of water that would manifest if the present trend of water use, population growth and mismanagement continues in a similar fashion. It is also important to note that stress has been calculated at the national level. It has been rightly argued by several authors that water is a local phenomenon and calculation at the national level does not have much meaning (Agnew 2011). But it is relevant for the creation of a perception of threat and resultant hydro-nationalism. It is from this perspective that water stress is being looked at.

On a regional level, the problems of water stress-related to South Asia get even more accentuated. The rapid growth rate of population in the region has led to a sharp decline in water availability on a per capita basis. Climatic uncertainties also have an impact on the water availability in the region. The monsoonal precipitation results in great temporal and spatial inequities in its regional distribution. This causes very large river run-offs during the monsoon period and very low flows during the rest of the year. Taking the example of Bangladesh, the country receives heavy summer monsoon run-off and about 40 per cent of the country is usually inundated when this run-off drains out into the Bay of Bengal. During the pre-monsoon months, large parts of the country face scarcity conditions. The temporal variation is no less difficult in the basins of non-Himalayan rivers where the advantage of critical pre-monsoon flows provided by snow melting in the spring is not there. In addition, across the lines of the social divide, access to water is very much uneven and has caused chronic water insecurity for a great number of economically backward people (Bandhopadhaya 2007:866-867).

#### 2.3.1.1 Water scarcity in South Asia

This section looks at water scarcity in South Asia in terms of per capita water availability trends. First, the trend between 1950 and 2020 is analysed. Then future projections till 2100 have been analysed.

***Per capita availability of water***

Over a long period of time, the decline in per capita availability gives a picture of impending scarcity. Not only the water availability at present is considered but also the future trends calculated based on population growth predictions and perceived water shortages. Considering long term averages is important because a year of high rainfall or a year of drought does not influence a country's behaviour. It is the long term nature of resource scarcity which has to be taken into account (Dinar 2009). Several indicators for the availability of water have been developed but the most popular and basic one is the Falkenmark indicator (Brown 2011, White 2012).

**Table 2.2: The Falkenmark Indicator of Water Shortage**

| Annual per capita availability of water in cubic meters | Level of water shortage |
|---|---|
| Above 1,700 | No water stress |
| 1,700 | Water stress |
| 1,000 | Water scarcity |
| 500 | Absolute water scarcity |

**Source: (Brown 2011)**

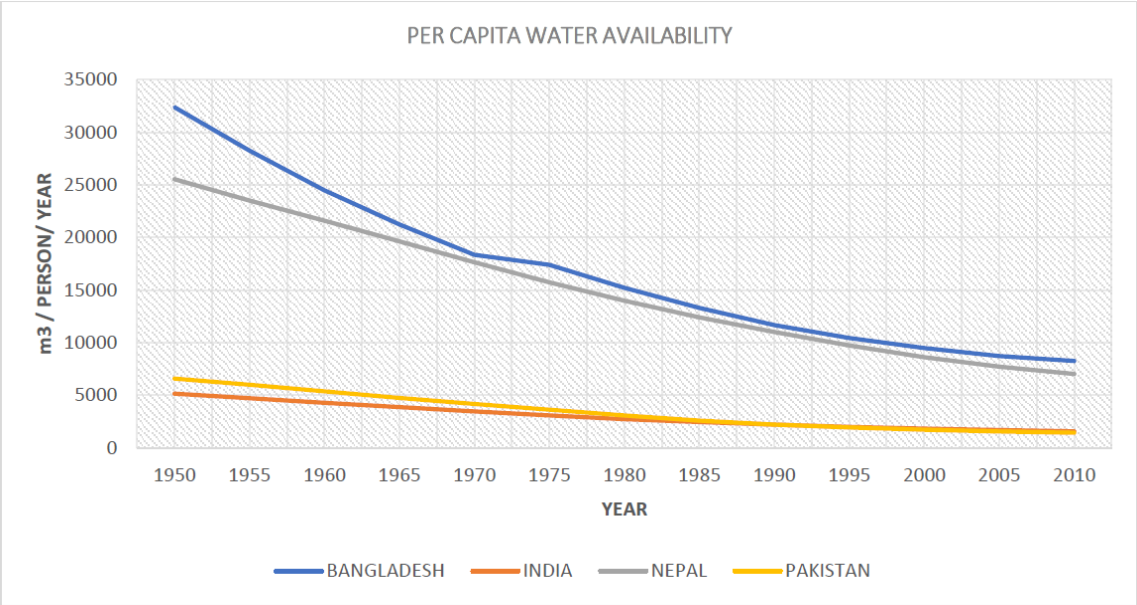
The per capita availability has been looked into since 1950. The trend has been analysed in two phases-one from the mid of twentieth century to the present. The second phase is a future estimation till the end of 2100. Since water scarcity is a longterm phenomenon a look into the future possibilities is imperative.

***Per capita availability of water (1950- 2020)***

During the last five decades, the countries of mainland South Asia have experienced increasing water shortages. The figures relating to total available water resources, and the per capita availability have been sourced from FAO AQUASTAT: Water Use, 2010. The average water availability taken for the five countries

(Bangladesh, Bhutan, India, Nepal, and Pakistan) over this period declined by more than five times. This can be associated with a fivefold increase in population over the same time period while the total availability of freshwater resources remained constant. While the levels of scarcity as defined by Falkenmark (1989) have not been reached, Pakistan and India have increasingly come under water stress.

**Figure 2.4: Per capita water availability**




Source: Calculated from FAO.AQUASTAT: Water Use. 2010 and Population Division, United Nations Department of Social and Economic Affairs (DESA) 2012. (Bhutan has been excluded from the figure for better visibility of other states.)

India and Pakistan have large reserves of fresh water at 1911 million and 247 million $m^3$/yr. However, as these two countries also have the highest population in the region, their per capita availability of water is the lowest in the region. The annual rate of decline in water availability in this region is highest for Pakistan, averaging 12 per cent. It is comparatively lower for India at 9 per cent. But overall, the region has seen a rapid annual decline in per capita water availability. From the analysis of the data up to the year 2018, it can be said that South Asia faces the problem of increasing water shortage. All the countries have experienced a sharp decline in available freshwater resources over less than five decades. As such the perception of water stress among

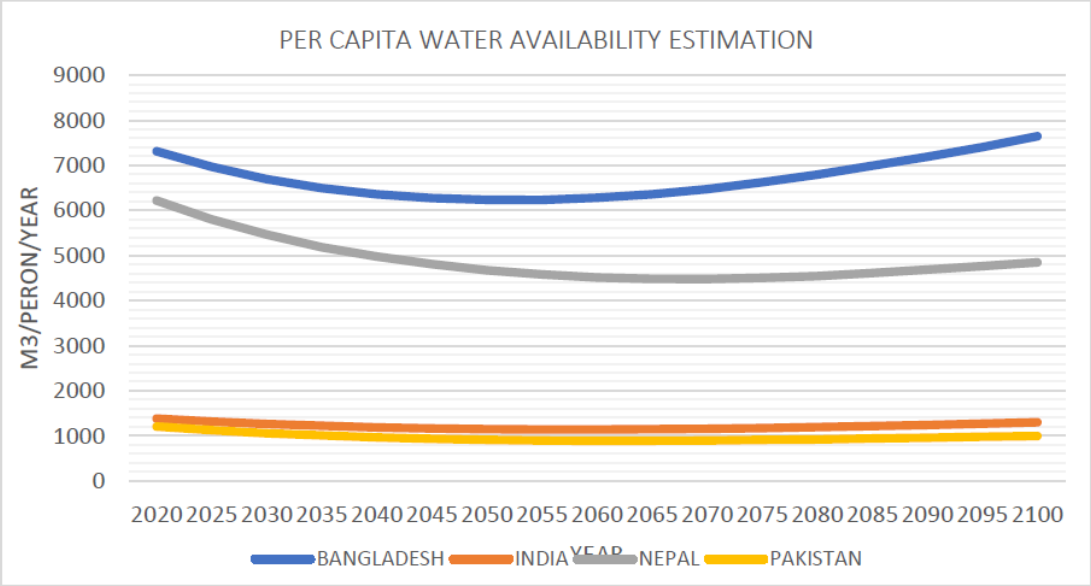
states would be moderate to high. The rate of decline in water availability peaked with the rising in population between 1970 and 1990 for all the five countries. Since then, although the per capita availability in absolute terms is declining, the rate of decline has begun to slow down.

***Estimated per capita availability (2020-2100)***

In order to understand a state's behaviour in the context of the perception of water scarcity, it is useful to look at future estimates and the emerging trend. For calculating the future trends, the population projection estimates of the United Nations Department of Social and Economic Affairs, Population Division, have been used. The data is based on probabilistic projections of total fertility as well as life expectancy at birth for all countries that do not have a high HIV/AIDS infection. The total freshwater availability has been taken at 2010 levels as calculated by AQUASTAT, Food and Agricultural Organisation. The per capita water availability has been calculated as a ratio of the two indicators. The annual rate of decline in the availability of freshwater has been calculated. The population projections estimate a rising population till 2050-2055. Accordingly, the per capita availability of water will decline in all five countries for the first half of the twenty-first century. While the second half of the twentieth century was marked by water stress, the availability levels decline further to reach levels of water scarcity in India and Pakistan in the future.

However, the rate of this decline will go on gradually decreasing. In other words, though the per capita availability of water will go on declining, the rate of this decline will go on decreasing. After 2050 the rate of increase in population has started to decline. As such the per capita availability goes on increasing.

**Figure 2.5: Per capita water availability estimates.**




Source: Calculated from FAO.AQUASTAT: Water Use. 2010 and Population Division, United Nations Department of Social and Economic Affairs (DESA) 2012. (Bhutan has been excluded from the figure for better visibility of other states.)

In Figure 2.5 it can be clearly observed that long term trend for this century is that of a slightly upward curved line. From the beginning, the per capita availability is declining for the four countries. Among the four, Bangladesh has the highest while Pakistan has the lowest per capita availability, closely followed by India. Below 1000 m3/person/year is the level of scarcity. Pakistan can clearly be seen entering this zone around the year 2040. India's situation is only slightly better. The trend begins to reverse after the year 2080. While the availabilities in India and Pakistan plateau out for the second half of the century, that of Nepal and Bangladesh takes an upward swing. Among the five countries under consideration, Bhutan is expected to have the least water shortage issues. By the end of 2100, its water availability per person is again expected to rise to 1,21,744 million cubic meters per person per year. For India, the lowest per capita availability is projected for the year 2060. But for the first half of the century water will increasingly become a scarce resource. Similar is the case with Pakistan, the lowest levels are expected around 2060-65 when the per capita availability will be approximately 891 million metric tonnes per person per year.

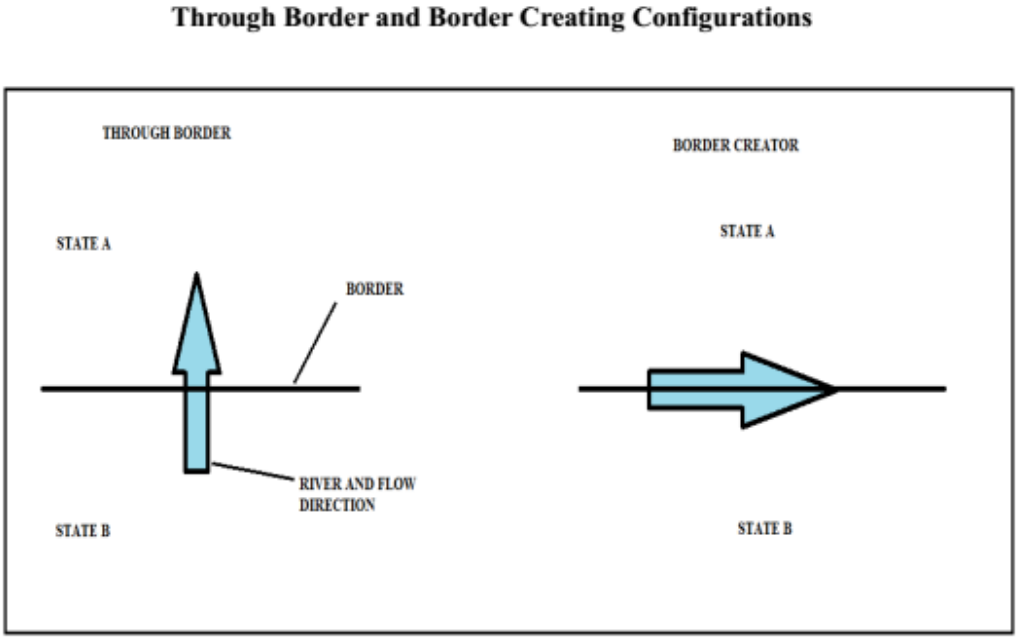
Pakistan will face water scarcity for the entire time period after 2040. The scenario improves for both the countries, in fact, the whole region as the century closes.

The situation is captured very well with a line graph. The above-used indicator for all its macro views and simplicity has certain limits. It presents an aggregate national level picture ignoring the regional variations. However, it fulfils the purpose of this work.

### 2.3.2 River Configuration

From a political geographic perspective, the next major factor is the geography of the river. The geopolitical aspect of negotiations over river waters becomes most apparent while considering the impact of location of a state vis-à-vis the river position. It is here that role of geography becomes most apparent. River configuration and geographical location of the states along the river course also has a major impact on their negotiating positions.

**Figure 2.6: Types of river configurations- through border and border creating**




Source: (Dinar et.al. 2008)

Dinar (2008:132-134) has identified fourteen types of river configurations, further categorising them into two groups. These "pure and extreme configurations" are "through border" and "border creating". The former is the case when a river runs across a state boundary once. The latter is when the river runs along the national borders.

Scholars have taken different positions regarding the role of geography in riparian negotiations. Dinar says that through-fare configurations create geographical "asymmetries". Usually, such positions give an upper hand to the upper riparian state which can control the flow of water. Through fare, configurations are more "symmetrical" and this is an inducement for the states to cooperate. However, the reality is generally influenced with other considerations, especially economic. As such, the asymmetrical configurations won't always be conflict-prone. For example, when the hegemonic state is lower riparian, often it leads to cooperation.

#### 2.3.2.1 Through Fare Configurations

In South Asia situations of both through fare and border creations exist. Between India and Pakistan, India is the upper riparian state. The relations between the two states have historically been strained. This is also reflected in the negotiation over rivers. There is always scepticism on both sides. This is amply reflected in the Indus Water Treaty, where the minutest technicalities are imagined and provided for, including provisions for the future are imagined. Thus, the geographical asymmetries have further accentuated constrained relations. This situation is compliant with the traditional explanation of across border conflict explanation (le Marquand 1977: 9-10). The situation is very different when India, the economically dominant state, is the lower riparian. Both with Bhutan and Nepal, India is the lower riparian. But bilateral relations among these countries are an example of cooperation. India and Bhutan present exemplary examples of cooperation. India provides technological and other resources to Bhutan for building dams for the generation of water. Bhutan in turn provides India with critical energy resources. The relations between India and Nepal also started off on a similar note. But increasingly domestic factors have been becoming more important (Vergheese 1997, Subedi 1999, Bandyopadhyay 2007). A section of the Nepalese society is sceptical about the encroachment by India over

Nepalese sovereignty. The treaties of cooperation over water resources have become more difficult to chalk out, as is apparent from the second Mahakali treaty. Yet overall, the relations have been cooperation, although with increasing tension between the two countries. This confirms the analysis of Lowi (1993). Explaining the "hegemonic stability theory" he explains that "interest of the hegemonic state along a river is often a prerequisite to cooperation. But cooperation is more likely to ensue if the hegemon is located in a strategically inferior position and if the hegemon's relationship to water resource is that of critical need. Conversely, cooperation will not be forthcoming if the hegemon is upstream".

But in the relations between India and Bangladesh, there is a new dimension. India is the upper riparian and also the more economically powerful nation. But the two states have been cooperating, as seen in the case of the Ganga water treaty of 1996. The treaty was signed when new governments came to power in both countries. So, cooperation was not much dictated by geography as much by economic benefits and international politics. According to Shlomi Dinar (2008), it had more to do with the role of "epistemic communities", i.e. the knowledge-based communities influencing policymaking.

#### 2.3.2.2. Border Creating Configurations

Most scholars agree that border creating river configurations are less prone to conflict. When a river forms a boundary between two states, it places both the countries symmetrically as far as a water resource is concerned (Dinar 2008, Lowi 1993, le Marquand 1977). One source of conflict is that the course of the river is not permanent. With time it submerges some areas while other areas emerge. Small stretches of land along the bank are prone to this. This has been evident in the case of Mahakali, a tributary of Ganga, between India and Nepal. However, no major water dispute has emerged over this, although some tensions have arisen (Bhattacharjee 2020).

### 2.3.3 Power Asymmetry

The role of power in negotiating river treaties has been debated at large. The neo-realist school believes that the chances of cooperation decrease when the hegemonic state is the upper riparian. Cooperation is most likely when the downstream state is more powerful and can coerce an agreement (Lowi 1993). However, neo-liberal school of thought still believes in the effectiveness of a legal treaty. Particularly, in shared watercourses, such arguments do not hold true due to the very nature of water resources. Wolf (1998) argues that brute power is highly inefficient in the realm of hydro politics. Cooperation is achieved by the use of soft power and incentives such as economic compensation.

To delve further into this debate, the role of power asymmetries in South Asia has been analysed. For it two indicators have been used:

i. Gross Domestic Product (GDP)
ii. Gross Nationalth Product per capita

The ratio of a country's total GDP gives an indication of the economic power of a state which in turn determines its military power in most cases. The per capita GDP is an indicator of the wealth of the nation or "welfare power" (Dinar et al. 2011).

**Table 2.3: Country wise GDP and per capita GNP for selected countries of South Asia**

| Country | GNP per capita US$ 2016 Constant 2010 (ppp) | GDP US $ billion 2016 (ppp) constant LCU |
|---|---|---|
| Bangladesh | 54220.95 | 167.77 |
| Bhutan | 80271.04 | 2.23 |
| India | 92056.47 | 2464.93 |
| Nepal | 26480.96 | 19.86 |
| Pakistan | 60815.08 | 227.75 |

Source: World Bank national accounts, and OECD National Accounts,2016.

***Economic Power as reflected through GDP***

The crude economic power can be gauged in terms of the total GDP. India is by far the biggest economy in the region. The size of India's economy is over ten times that of Pakistan, twenty times that of Bangladesh, more than hundred times that of Nepal and over a thousand times that of Bhutan. Thus, India is a much more strong and economically dominant state compared to other countries in South Asia. The second major power is Pakistan, followed by Bangladesh. This data shows that from an economic perspective, India is the most dominant country in South Asia.

***Welfare Power as reflected through GDP per capita***

Looking at the Gross Domestic Product is a very generalised method as it presents a very aggregated picture and completely ignores the issues of population and per capita distribution which is very important for a region like South Asia. This becomes apparent when we look at the per capita distribution of the economic resources. This is not so much an indicator of external power of the state as of the domestic conditions-thus the term "welfare power" (Dinar 2011). The picture changes quite a bit when we look at the wealth power in terms of the GDP per capita. Bhutan comes to the top with the highest per capita income of $5293 way ahead of India at $3,468 and Pakistan at $2,550. Bangladesh has the per capita income of $1,529 while Nepal has the lowest per capita at $1,160. In the negotiations of states over water resources the role of economic wealth is not very apparent. Bhutan has high per capita but it does not translate into state power in terms of economy. In fact, it also highly dependent on India for its military support. Overall, the neo realist idea of local hegemon dominating does not hold fully true for South Asia.

### 2.3.4 Domestic Institution and Governance

Among the various factors determining how states interact, one of the most important is the role of domestic institutions and governance. Domestic institutions include the political, legal and economic institutions which determine the state behaviour. It is these institutions that influence the position a state takes on environmental issues and also lend credibility to the international treaties it enters into

(Young 1989, Milner 1997). Vibrant democracies are slow to make decisions because of the long-drawn process of internal discussions and debates. They are also more likely to continue with the treaty once it is signed. Following Dinar et al. (2011) it is assumed that the "more politically stable countries may be deterred from forging cooperative ventures with institutionally weaker countries". Further extending the argument it is expected that there is "a higher likelihood of water treaty cooperation when the level of institutionalization and governance (that is an effective domestic government) is likewise high".

### G*overnance in South Asia*

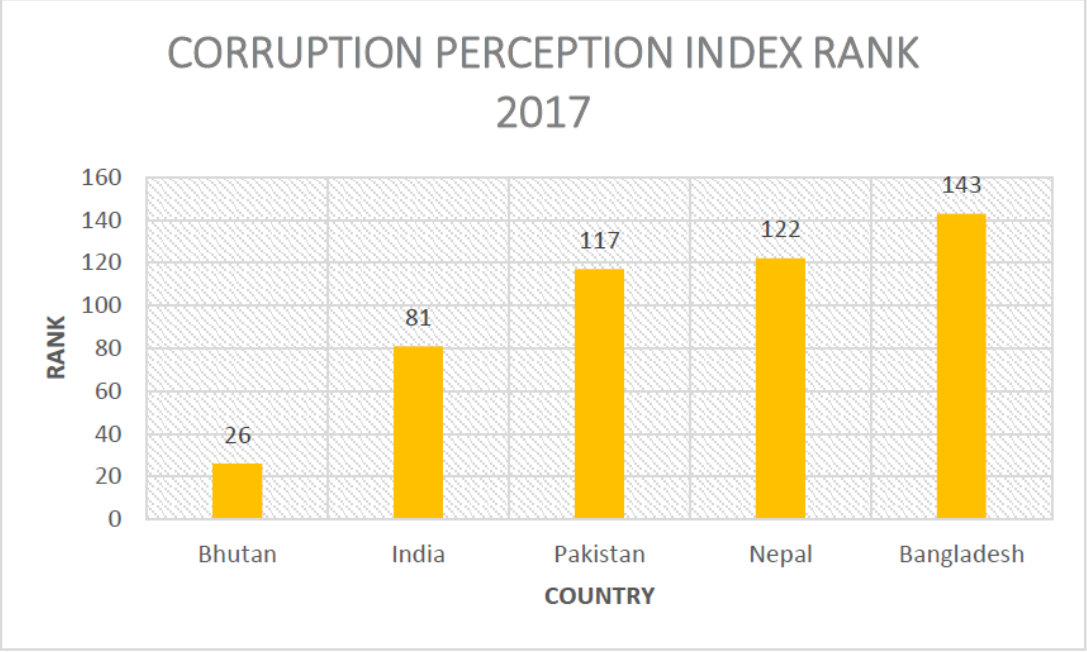
South Asia is a heterogeneous grouping of countries with diverse governance systems. State power is established through organs of legislation and execution. Separation of power and checks and balances are acknowledged across the region as desirable goals of statehood. Accommodation of the interests of diverse constituencies in decision-making is indicated by the existence of veto points such as elections and political parties suggests. A multi-tiered judicial system is present in all the countries. However, their independence is often challenged by pressure from the executive class.

The liberal and constructivists among the proponents of international relations believe that the domestic governance of a country has an impact on overall treaty formation. Domestic institutions that influence the position a state takes on environmental issues and also lend credibility to the international treaties it enters into (Young 1989, Milner 1997). Vibrant democracies are slow to make decisions because of the long-drawn process of internal discussions and debates. They are also more likely to continue with the treaty once it is signed. Following Dinar et al. (2011) it is assumed that the "more politically stable countries may be deterred from forging cooperative ventures with institutionally weaker countries". Further extending the argument it is expected that there is "a higher likelihood of water treaty cooperation when the level of institutionalization and governance (that is an effective domestic government) is likewise high". Thus, if the level of governance within a country is high, it has an impact on transboundary cooperation. But governance cannot be easily quantified. One way to look at it is to see the levels of corruption. It is a negative indicator. Higher is the level of corruption, lower is the level of governance. Corruption has been defined in many ways. Ranging from the realm of ethics to the

realm of materiality and accountability. A variety of definitions exist (Debroy and Bandari 2012:7-11). But the existence of any form of corruption is an indicator of a lack of governance capability of a state.

As no direct indicator for governance is available, corruption is taken as a proxy indicator for governance. Similar method has been adopted by Dinar et al. (2011). This picture can be captured through the Corruption Perception Index calculated by Transparency International. The Corruption Perceptions Index ranks countries/territories based on how corrupt a country's public sector is perceived to be. It is a composite index, drawing on corruption related data from expert and business surveys carried out by a variety of independent and reputable institutions. Scores range from 0 (highly corrupt) to 100 (very clean). The data also provides for percentile rank on CPI. It is the control of the corruption perception index. Control of corruption reflects perceptions of the extent to which public power is exercised for private gain. This includes both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

**Figure 2.7: Corruption perception rank of countries under study, 2017**




Source: Transparency International, 2017

The corruption perception index score of the five south Asian countries under study is depicted through Table 2.4. It is clear that on an average the score for the countries is

around 30 on a scale of 100. Bhutan scores exceptionally well and is thus the least corrupt state. All the rest of the countries can be bracketed together. For all these countries the values are low indicating high levels of corruption.

**Table 2.4: Corruption Perception Index Score for Countries of South Asia**

| Country | Score (Out Of 100) | Rank |
|---|---|---|
| Bangladesh | 28 | 143 |
| Bhutan | 67 | 26 |
| India | 40 | 81 |
| Nepal | 31 | 122 |
| Pakistan | 32 | 117 |

Source: Transparency International, 2017

The countries in decreasing order of CPI score are Bhutan, India, Pakistan, Nepal and Bangladesh. Bangladesh scores lowest and is thus the most corrupt state. If we try to correlate the levels of corruption with cooperation over water resources it is clear that no marked difference can be discerned because all the countries have similar scores. This indicates that the levels of governance in all these countries, as indicated by CPI, are equally poor. Thus, the impact of governance in the signing of international treaties in South Asia is not very apparent.

## 2.4 Emerging patterns of water sharing

Cooperation and conflict over shared fresh water resources in South Asia are dependent on several factors. It is not just one factor but a combination of all four that can lead to patterns of transboundary interactions. Increasing water stress, river configuration, power asymmetries and domestic governance have all contributed to the current transboundary water situation in the region. Generally, one set of factors becomes more relevant for one watercourse and another becomes important for other

watercourses. Following is an overview of determinants of bilateral relations among countries in the study area:

a. Historical rivalries

The political boundaries between all the states under study is not the product of a historical evolution or based on any geographical barrier but rather the result of the process of decolonization. The difficult colonial past of the countries with bitter rivalries over land often cast a shadow on overall present-day negotiations. Chester (2010) has shown how different national as well as international parties were trying to exert power through the drawing of the Radcliffe line. The distribution of canals and headways between India and Pakistan in Punjab created a ground for future tensions. Especially, the occurrence of water disputes in the past spills overall current negotiations. A case in point is the bilateral relations between India and Bangladesh which are still haunted by repercussions of past negotiations over one project, India's Farakka Barrage across the Ganges. It has been observed that "all subsequent discussion about water between these two governments, and in their national media, tends to be mired in the myths and coloured by the particular paths of past bilateral relations" (Crow and Singh 2009). Similarly, the sovereignty in South Asian countries got enmeshed with the assertion of their water rights as the water resource became one of the items through with the newly decolonised states tried to gain domestic legitimacy. Daniel Haines (2014) shows through the example of a dispute over Indus waters that "negotiating the contradictions between Commonwealth rules and the desire to assert sovereignty over territory and resources, made Indian sovereignty contingent on circumstances" (Haines 2014: 632).

b. Political mistrust

Deep political mistrust between the countries of South Asia has been hampering any sort of collective action on different fronts be it economic or environmental. Transboundary water treaties have been linked too deeply with national pride. Thus, any compromise or recession given to a neighbour through a

treaty is often seen as defeat domestically. It often does not board well for the politicians back home. Bilateral relations between India and Bangladesh can be viewed as a case in point. Bangladesh emerged as an independent nation in the 1970s. It was an era of close relationship between India and newly created Bangladesh. It was a situation promoted by the geopolitical situations of the region at that time. They even signed the Treaty of Friendship, Cooperation and Peace on March 19, 1972 and established the Joint Rivers Commission, signing its Statute on November 24, 1972 (Salman and Upreti 2003). But the situation began to deteriorate very soon. Bones of contention began to surface, particularly like the Farakka Barrage. In fact, Bangladesh's decision to take its case to the United Nations General Assembly was, indeed, a clear indication of the end of the era of friendship and cooperation. While the 1977 agreement represented a sudden improvement in relations with the changed political scenario in India, the memorandum of understanding signed in 1982 and again 1985 represented a negative development for Bangladesh. The expiry of the 1985 MOU was followed by a vacuum. India continued its diversion of the waters of the Ganga to the maximum capacity of the feeder canal even in the absence of a treaty. Bangladesh complained that not much water was left for its use. Yet both the countries continued dialogue at the diplomatic level. But both realized that the progress was very slow. Other political issues were influencing the talks such as the failure of India to resolve the Tin Bigha dispute, the conflicting claims over the South Talpatty Island and the issue of the Bangladeshi refugees in India, all contributed to the deadlock (Salman and Uprety 2003). The final solution came along with major political changes in the domestic politics of both countries. The two countries signed the 30-year Ganga Treaty on December 12, 1996. It is a major treaty of cooperation. The treaty has been called vague and limited, but it has been successful in creating an environment of cooperation.

This distrust is also visible in the limited hydrological data sharing between the countries. Absence of credible regional data on water as well as various hydropower structures further feeds into the mutual distrust. In fact, transparency and data availability across borders can be a key to greater cooperation across borders.

c. Asymmetric power relationships

Power asymmetries can sometimes be a great obstacle to cooperation. One fear among the countries is the "big brother–little brother" syndrome. Several scholars have identified India as the regional hegemon as it is located centrally in the region and also has political and economic dominance. This is evident in the case of India Nepal water treaties. The two countries have signed bilateral treaties on three rivers – the Kosi, the Gandak, and the Mahakali. The perceptions of the countries regarding the outcome of negotiations are often affected by the fact that the parties have different perspectives and priorities. Small countries often think that they have been dealt an unfair hand, and the cooperation is actually a coerced one (Mirumachi 2008). On the other hand, more powerful and often bigger-sized countries fear that they have been "more generous than necessary" (Iyer 1999). It's a zero-sum game attitude and therefore no country is ever fully satisfied. This argument seems particularly valid for the Kosi agreement between India and Nepal (1966). The terms of the treaty created great opposition in Nepal. It was viewed as an infringement of Nepalese sovereignty. When the next treaty, on river Gandak was signed both the countries were much more careful. In fact, India's disproportionately large size is one of the major factors in influencing inter-state relations in South Asia. Both Nepal and Bangladesh have distrust and misgivings regarding the "big brother-little brother syndrome". Ramaswamy Iyer says that despite overall wanting to come across as friendly and fair minded, there have been cases of transgression from India's side. "There is no doubt that Indian politicians, bureaucrats, engineers and businessmen have on occasion been unimaginative, patronising and insensitive in their dealings with the countries smaller neighbour; and there have been brief aberrant periods where even the word 'bullying' might not have been out of place" (Iyer 1999: 1516). Moreover, the reaction to this big country insensitivity from the neighbours is also apparent in several ways: "a 'tough' stance during negotiations for fear of appearing weak; complaints at a later stage that the negotiation had been between unequal parties; when difficulties or differences emerge in the course of operation of a treaty or agreement, a tendency to seek explanations in terms of deviousness or machination or malevolence on the part of Indians instead oof exploring solutions, and so on" (Iyer 1999 : 1516).

d. Hydro-nationalism

The political class in all the countries has a populist approach and often builds a discourse linking water issues with national sovereignty. This makes even a minor compromise domestically unacceptable. Any compromise of prior national objectives can be portrayed as a victory for the other side. It is also marred by a sluggish bureaucratic structure. “The management of water resources in South Asia operates under the heavy burden of bureaucratic political pathologies. Apart from this, however, at least two other often overlooked managerial problems that adversely impact water resource policy making exist: first, the paralysis of policy making process stemming in particular from the federal structure of governance in India and Pakistan and second, the systemic political non-accountability that stems from profound institutional weakness found in the democratic or quasi-democratic setups of most South Asian states” (Wirsing 2007:15). Thirdly, all countries have been developing their separate visions of water management. For example, in India, the national grid plan of India hoping to link all the major peninsular and extra peninsular rivers has been much more popular and discussed than plans with benefits for other countries or for the whole region based on the management of one river basin shared among different countries (Mehmood 2016).

Countries thus enter into negotiations with a zero-sum game attitude. The gain of one country is often looked at as the loss of the other. All the states negotiate with a nationally constituted-not regionally constituted-visions of water resources development. Taking a multilateral approach for negotiations with a vision for the region as a whole will be highly beneficial for the countries individually as well. For instance, Nepal would be able to supply hydroelectric power to India and Bangladesh. India would be able to supply navigation and transit rights, financing for construction as well as engineering expertise to Nepal, and to grant secure expectations of minimum flow as well as water storage benefits to Bangladesh. Similarly, Bangladesh would be able to provide navigation and transit rights to Nepal. For India, Bangladesh would be able to facilitate navigation as well as transit of Indian goods to or from its north-eastern States. But optimizing all these exploitable resources for the common good of the region means that all three countries would have to take a multilateral approach in negotiations with a regionally constituted vision of water resources development, an approach that may continue to meet resistance.

e. Absence of effective regional institutions and third part presence

The absence of properly formulated negotiating frameworks that could consider an overall development spectrum which could contribute to improving the standard of living in the countries concerned, and the emergence of other issues of conflict between the countries adversely affect the negotiating atmosphere. The South Asian Association for Regional Cooperation has failed to ensure the cooperation that was expected. While all negotiations have primarily been bilateral, third-party presence has also been assigned an important role by some scholars. Biswas (2002) points out how several media-savvy non-governmental organizations "that are more interested in promoting their own agendas and dogmas than improving the quality of life of the people whom they often claim to represent" has made negotiations difficult by influencing national opinion (Biswas 1992). But third parties can also sweeten the deal sometimes. Often quoted is the role of the World Bank in the Indus River Treaty. The Indus Waters Treaty of 1960 established that the rivers would be divided between India and Pakistan. Intervention that changed the nature of the game came in the form of external funding via the World Bank. The funds acted as an incentive for both the countries to cooperate. Moreover, the world Bank had certain clout among the South Asian countries which also helped carry out this feat. Eugene Black, President of the World Bank, played a critical role in the 1950s in the formulation of the Indus Water Treaty between India and Pakistan (Gilmartin 2016). However, the Indus Treaty remains the only one and in many aspects an exception to general water-sharing trends.

f. Bilateralism

In South Asia, with the exception of one meeting in 1986, negotiations over water have been exclusively bilateral, that is, involving only two states (Crow and Singh 2009). In fact, bilateralism has been the dominant approach for cooperation internationally, and South Asia is no exception to the norm. Unfortunately, this is not an ideal situation for regional basin development. "It has been argued that this focus (on bilateralism) encourages the perception that river development is a "zero-sum game", a common obstacle in international river discussions. This perception, that the gain of one country is necessarily the loss of another, gives the negotiations a

particular charge: any compromise of prior national objectives can be portrayed as a victory for the other side" (Crow and Singh 2009: 1910). India has come out strongly in favour of bilateral treaties. The argument is that multilateral treaties are "less focused, more complex and thus lengthy" (Salman and Upreti 2003). The additional complexity and lengthiness, often highlighted by the Ministry of External Affairs in India, are however not fully accepted by neighbouring countries. Bangladesh and Nepal have professed a preference for multilateral treaties. Yet they have entered into bilateral negotiations with India. The political and academics in these countries have argued that bilateralism "has been used as a shield to avoid opposing coalitions and preserving bargaining power" (Salman and Upreti 2003:199). This has led to limiting the mutual benefits of possible agreements on water development and usage.

## 2.6 Conclusion

This chapter has explored the nature of cooperation and conflict in South Asia. Taking the number of treaties and MOUs as an indicator of cooperation, it is seen that the number of treaties is increasing with time, which is an indicator of greater engagement between states. However, it is recognised that mere signing of a treaty cannot present the whole picture. Its content is also relevant. Similarly, in a region of greater power imbalance, such as South Asia, treaties can be often hegemonic. Thus, all cooperation cannot be taken as a positive development. Keeping these aspects in mind, four general indicators of cooperation are analysed at greater details in the chapter. These are – water stress including its extent and impression on states; river configuration and geographical location of states along the river course; domestic institutions and governance, and; power asymmetries. All these factors are found to impact the nature of cooperation and conflicts in South Asia in various measures. The region is facing increasing water stress, which is expected to go on increasing with time. This is particularly true for Pakistan and India and is a major issue determining interstate cooperation. The geographical location of a country in a river basin is also a major geographical factor influencing its riparian relations with its neighbours. Upper riparian and lower riparian dynamics are also found to influence relations in South Asia. Great power imbalance in terms of economic power and welfare power is a factor that balances the upper riparian, lower riparian dynamic in the region. Even

while being the lower riparian, India exercises considerable say in water treaties of the region. This can be a result of its economic power and technical power to construct huge power plants in the region. Overall, it is not just one factor but a combination of all four that creates patterns of transboundary interactions in the region. Increasing water stress, river configuration, power asymmetries and domestic governance have all contributed to the current transboundary water situation in the region. Generally, one set of factors becomes more relevant for one watercourse and another becomes important for other watercourses.

The primary conclusion is that water in often used as a tool of political play, as seen in case of the states of south Asia. This becomes evident by the fact that the region does not even have a multilateral treaty to deal with water resource although good cases have been made for a joint effort, for example, by Nepal, India and Bangladesh over the Ganga. Water also often becomes a victim of political rhetoric. The entire issue is very often perceived from a purely national perspective rather than a regional basis ensuring the equity of all parties, or at local perspective, bringing in more and more stakeholders. Thus, each negotiating party tries to extract the maximum it can, at the cost of the other party. At home, these victories on the negotiation table are projected in a way to gain maximum political mileage out of them. All these factors fan the national sentiments but are often not the optimum solutions and further add to securitization of water and fuel hydro-politics in South Asia.

# CHAPTER 3

# THE INDUS AND EVOLUTION OF WATER SHARING TREATIES

Indus valley is important both for India and Pakistan. In 2011, 145 million Pakistanis and 83 million Indians lived in the basin. Roughly 61 per cent of the basin's irrigated area lies in Pakistan, constituting 90 per cent of Pakistan's agricultural land (Aquapedia 2018). The history of disputes in this region goes back a long way before the independence of India. Understanding the development of irrigation and other water uses in the Indus valley from a historical perspective is important for a contextual understanding of the ongoing disputes. After presenting an overview of South Asia, this chapter looks specifically at irrigation in the Indus River basin.

## 3.1 Water Management and Irrigation Networks in the Pre-Colonial Period

Irrigation through canals has an ancient history in the valley. The Harappan civilisation flourished and generated surplus grains by adequately harnessing the inundated canals over the Indus River. H.T. Lambrcik discusses the role of overflow channels and local expertise in water management in his book *Sind before the Muslim Conquest, History of Sindh* (1973). Later, with the arrival of the Arabs and Turks, they began to adopt these technologies that evolved in the valley. Under the Delhi Sultanate dynasties, water management techniques reached new levels. Under the kingship of the Sultans of Delhi, some major waterworks were taken up. In the Twelfth Century, Iltutmish constructed the first historically recorded multipurpose lake in the valley. Soon afterwards, the western Yamuna canal (1355) came up under Feroz Shah Tughlaq. For agriculture too, new methods and techniques were popularised on a wider scale. The Mughals also gave great importance to the management of water resources. The *Babarnamah* offers a concise summary of several such activities that were ongoing at the time. These included the five Doabs, the Jallandhar Doab-Bist, the Doab-Bari, the Doab-Richna, Chaj Doab, and the last Sind Sagar Doab. A perennial canal system with permanent headworks was designed by the Mughals. In 1568, Emperor Akbar renovated the Yamuna Canal, which had

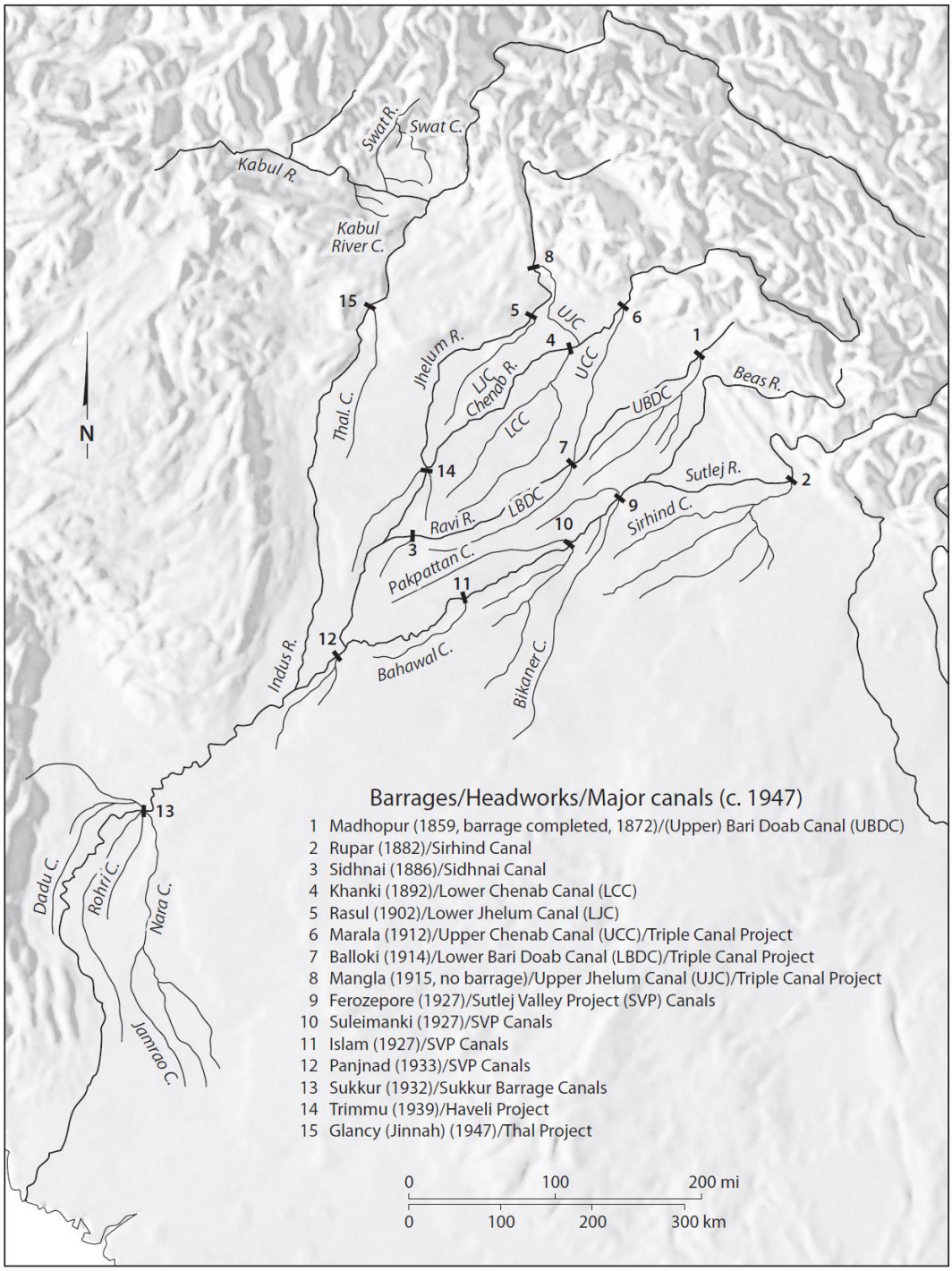
been built by Sultan Feroz Shah Tughlaq in 1351 (Ali 2013). Soon afterwards, in the seventeenth century, Emperor Jahangir created a similar form of a (perennial) canal from the Ravi River to a garden on the other side of the Lahore River (Ali 2013). The next Emperor Shah Jahan (1628-1658), constructed the Ravi River canal to provide water to Lahore's Shalimar Garden. The irrigation and farming activities had depended on underground water since the beginning of the sixteenth century. After the sixteenth century, dug Wells and Karez (underground water canals) were also built (Ali 2013). In current times, these irrigation methods are also highly practised in the Indus plain. From the above account, it is clear that since ancient times development of major water works was taken up by states. However, due to the limitations of technology, most initiatives were localised.

### 3.2 Water Management during the Colonial Period

This period has been called by Gilmartin a period of "colonial political-technological intervention in the Indus basin". The development of centralised water systems such as canals has often been a useful way of legitimising and entrenching state authority. This trend was visible in the Indus basin too. Sind and Punjab came under British rule in 1848 after the Sikh war. Several scholars have done detailed research explaining how water canals development during the British colonial rule in Punjab province was dictated and driven by geopolitical imperatives. While agricultural development would maximise revenue extraction, it would also aid military requirements and strengthen overall political support for the government.

When the Britishers came, Indus already had a system of non-perennial and inundation canals although not a very extensive one. But the colonial powers were chiefly rent-seekers. Thus, maximising the agriculture production by extensive canalisation into the then wastelands of Punjab was of keen interest to them. In the seventeenth century, agriculture was the main source of income for the state. Thus, the colonial government initiated various water management programmes so that they could earn a steady income from agriculture. The existing canal systems were surveyed in a systematic fashion during the period. Foreign engineering experts were also brought in (Ali 2013).

**Map 3.1 Perennial canal systems of the pre-colonial period in the Indus Basin**




Source: Gilmartin 2015

This indeed led to a boost in agricultural productivity. However, there were political ramifications too. In fact, some scholars argue that the extension of canals had other political motives (Gilmartin 2015). When it comes to the relation between the state and water resource management, twentieth-century thought was dominated by Karl Witfogel's idea of 'hydraulic societies' and the emergent 'oriental despotism'. But some scholars have presented a view radically opposite to the hydraulic societies that were discussed by Karl Witfogel. Turning the whole argument on its head they have claimed, that rather than being a geographical imperative, extensive canalisation was a deliberate colonial policy with several motives. "As the Report of the Food and Agriculture Commission of Pakistan noted many years later, the aim of the colonial irrigation regime that came to fruition in this period was not to maximize production per acre but to maximize the number of acres under irrigation 'command'. The goal was to "cover the maximum acreage per cusec of water rather than to get the maximum yield per acre." The result was a system that was intentionally built to embody water scarcity, spreading water "thinly and widely" in order to maximally underscore the centrality of engineering and bureaucratic authority to the operation of the system" (Gilmartin 2015:183). Large populations were settled in the erstwhile wastelands, thus coming under a centralised state-controlled environment. This helped the colonial masters set up a hegemonic state. Gilmartin (2015) has discussed how the act of canal construction was seen as benevolence on part of the ruler. The following quotation is but one example of how British engineers made to the Punjabi folklore:

> "Similar attitudes emerge in the Indus basin (whatever the regional differences in their cultural framing), as evidenced by Punjabi praise poems to nineteenth-century colonial irrigation builders and entrepreneurs, such as Popham Young, the administrator most associated with the settling of the Punjab canal colonies,or Captain L. J. H. Grey, who personally supervised the construction of a network of canals in the Punjab's Ferozepore district in the 1870s. Grey 'was terrible to look at like a king', a balladeer wrote in praise, but 'he performed all his works by kindness to the people'. With a formerly dry country watered, he was, the poet proclaimed, like a hundred Alexanders." (Gilmartin 2015: 3).

Different kinds of new irrigation canals were progressively established from the middle of the Nineteenth Century onwards to provide water between the five

| Name of the Colony | Period of Canalisation | Location in Doab | Where situated in District | Name of the Canal Work | Estimated Cost of construction in Rupees |
|---|---|---|---|---|---|
| Sidhnai | 1886-1888 | Bari | Multan | Sidhnai | 1,301 |
| Sohang and Para | 1886-1888 | Bari | Montgomery | Lower Sohang and Para | 1,803 |
| Chunia | 1896-1889 | Bari | Lahore | Upper Bari Doab | -- |
| Chenab | 1892-1905 | Rechna | Gujranwala, Jang, Lyallpur, Lahore, Shiekhpura | Lower Chenab | 53,072 |
| Jhelum | 1902-1906 | Jech | Shahpur, Jang | Lower Jhelum | 43,613 |
| Lower Bari Doab | 1914-1924 | Bari | Montgomery, Multan | Lower Bari Doab | 25,086 |
| Upper Chenab | 1915-1919 | Rechna | Gujranwala, Silakot, Sheikhpura | Upper Chenab | 43,596 |
| Upper Jhelum | 1916-1921 | Jech | Gujrat | Upper Jhelum | 49,770 |
| Nili Bari | 1926- not completed by 1940s | Bari | Montgomey, Multan | Satluj Valley Project | 83,787 |

**Table 3.1: Canal Colonies of the Indus Basin**

**Source: (Ali 1988)**

doabs for the highlands. The idea of construction was totally new, and several inundation canals were converted into perennial canals. A new age of irrigation was heralded in mid-nineteenth century with the construction of the Upper Bari Doab Canal. The Canal of Sirhind was completed in 1872. Many existing canals were rehabilitated, expanded and strengthened in addition to the development of the new canals. Consequently, between 1875 and 1900, the irrigated area in the Sind doubled from around 1.5 million acres to 3.0 million acres within a brief 25-year period (Biswas 1992).

### 3.3 Origin of Dispute

Canals brought in a new type of water politics in the region. Disputes among states over water sharing first emerged during colonial rule. The provincial government was the chief custodian of water and was expected to provide for the needs of all states. But since canal networks were more concentrated in certain regional pockets, it became a point of confrontation among provinces and states. Provincial politics was often based on demands for more canals from the centre. This was reflected in the conflicting demands at different scales- local, provincial and state.

#### 3.3.1 Satluj Valley Tripartite Agreement, 1920

Disputes began to emerge between the provincial government and the small princely states. The principalities of Bhawalpur and Bikaner were the first recorded states to raise concerns regarding water sharing. Bhawalpur is the lower riparian, lying in the lower course of Bikaner and Punjab Province. It raised protests against the excess withdrawal of water from the Satluj and Beas rivers by Punjab and Bikaner. This led to a shortage of water in Bhawalpur. The dispute was solved mutually. The three signed the agreement on water sharing, known as the Satluj Valley Tripartite Agreement in 1920. The Satluj Valley Tripartite Agreement was the first agreement that was signed in modern times regarding the sharing of Indus waters (Biswas 1992).

### 3.3.2 Punjab-Sindh Dispute

The Punjab Sindh dispute developed as a case of upper riparian and lower riparian rivalry. Punjab happened to be the upper riparian province of the Indus basin, and Sindh was the lower riparian. Punjab province was planning the Satluj valley Project which would divert water. The Bombay Government objected to Punjab's withdrawal of water, arguing it would affect the irrigation system in Sindh. A complaint was made to the central government which further forwarded this issue to the Secretary of States for India whose office was in the United Kingdom. The conflict was finally settled by the Secretary of State using an executive order. Two new river valley projects were sanctioned so that the water requirements of both provinces could be met. The Sutlej Valley Project was to be constructed in Punjab and the Sukkar Water Project would be built in Sindh. This would ensure the availability of water in both the provinces and settle the conflict. However, proposals of other new projects by Punjab and its vehement opposition by erstwhile Bombay continued. The most prominent was the proposed Thal project of Punjab which could not see the light of the day due to opposition by Maharashtra. Subsequently, due to these frequent contestations, the government had to set up a committee to find a permanent solution to the problem. Anderson, who was the then chief engineer of United Provinces was appointed the head of the eight-member committee. It gave the first doctrine on sharing river water for the states. It recognised the basic principle of sharing water with equity. The Anderson Committee suggested that the upper riparian state of Punjab should not be allowed to draw any further fresh water which could harm the lower riparian. The water use of an upper riparian should not negatively impact the existing as well as future rights of the lower riparian. It can be argued that the excessive politicisation of the issue could be avoided by the presence of a strong higher authority as well as the geographical distance minimised the impact of geopolitics and territorial traps (Agnew 2011) at the local and provincial levels.

### 3.3.3 Dispute over the Construction of the Bhakra Project

Even after the Anderson Committee guidelines, water disputes between Punjab and Sindh continued.

When the Government of India Act 1935 came into effect, Sindh was separated from the Bombay Presidency and made a separate province. The Government of India Act of 1935 made clear provisions regarding water disputes too. Water as a subject of legislation was put under the provincial list. In case of any inter-provincial disputes, the Governor-General was provided with powers to settle such disputes. In order to do that he could appoint committees of technical experts and other people deemed capable of handling the differences. This was provided in section 131 of the Government of India Act, 1935. The decision taken by the Governor-General on the basis of recommendations of the committee would be final. It was this provision that Sindh turned to. In 1939 it raised the water dispute with Punjab and asked for the appointment of a water dispute commission as provided in the Act of 1935. The Governor General appointed such a committee in 1941 which came to be called the Indus Commission. Justice B N Rau was appointed as its Chairman. P.F.B. Hickey and E.H. Chave, both Chief Engineers, were appointed as members of the Commission. The committee did an extensive study of international trends and conventions, especially the Geneva Convention, 1923. It also studied specific episodes such as cases decided earlier in America. Finally, the principles laid down by the Commission were:

> " (I) The most satisfactory settlement of disputes of this kind is by agreement, the parties adopting the same technical solution of each problem, as if they were a single community undivided by political or administrative frontiers. (Madrid Rules of 1911 and Geneva Convention, 1923, Articles 4 and 5).
>
> (2) If once there is such an agreement, that in itself furnishes the 'law' governing the rights of the several parties until a new agreement is concluded. (Judgment of the Permanent Court of International Justice, 1937, in the Meuse Dispute between Holland and Belgium).
>
> (3) If there is no such agreement, the rights of the several Provinces and States must be determined by applying the rule of 'equitable apportionment', each unit getting a fair share of the water of the common river (American decisions).
>
> (4) In the general interests of the entire community inhabiting dry, arid territories, priority may usually have to be given to an earlier irrigation project over a later one: 'Priority of appropriation gives superiority of right'.

(5) For purposes of priority, the date of a project is not the date when survey is first commenced, but the date when the project reaches finality and there is 'a fixed and definite purpose to take it up and carry it through.

(6) As between projects of different kinds for the use of water, a suitable order of precedence might be (i) use for domestic and sanitary purposes; (ii) use for navigation, and (iii) use for power and irrigation " (Venkatrammaiah, 2015)

These general principles were applied in the Sindh Punjab dispute. The Rau commission was of the opinion that Sindh's worries were justified. Diversion of water by Punjab for Bhakhra dam could cause "physical damage to the inundation canals of Sindh". Secondly, it recommends that Punjab would delay the construction of the proposed project for some time, giving Sind time to arrange alternatives. Punjab would also have to give monetary compensation to Sind. Unfortunately, the recommendations of the Commission were not accepted either by Punjab or by Sindh. On the eve of independence, provincial politics had become highly volatile. Water rights had gradually come to be seen as a territorial issue. Rather than being viewed as a resource management problem, it got linked to local political identity. Since the country was politically in big turmoil, no final solution could be reached rapidly. Thus, the Bhakhra Dam dispute remained alive even after independence. This dispute was a precursor to the Indus water dispute between India and Pakistan.

### 3.4 Partition: New geopolitical boundary across the Indus Basin

The partition of British India and the creation of the new sovereign states of India and Pakistan changed the whole dynamics of the dispute of water sharing. John Agnew, in the article "Waterpower" (2011), explains how territorial disputes can be understood to be playing out at several levels. Even issues like water, which seem highly embedded and local, are influenced by players at the three levels. The local, the provincial and the national. With the independence of India and Pakistan, the Indus water dispute escalated from provincial to international. The dispute now became international in character, increasing stakes for national pride and therefore larger hostilities. Things were further complicated as the political boundary was drawn without due consideration to the water canals. The nature of the boundary between

India and Pakistan was such that it was bound to create problems of water sharing. There was no geographical logic to the boundary drawn. It was based on the religious majorities. Thus, it often created problems with water sharing. Often, while the diversion structure was on the Indian side of the boundary, the distribution networks went to the other side of the boundary. Two such examples are the Upper Bari Doab and the Satluj Valley Canal System. For both of them, the canal head works lay on the Indian side. But the land being irrigated went to the Pakistani side. Thus, due to the very nature of geographical boundaries, disputes on water sharing became even more complicated and indeed inevitable.

This section will be discussing the development of the water dispute after 1947 and its apparent resolution in the IWT. The partition of British India divided the Indus River canal systems. Out of 6these canal systems, 133 went to Pakistan and 12 remained in India (Biswas 1992). The Upper Bari Doab Canal was particularly affected as partition lines were drawn right through them. However, the main diversion head works for most of the canals fell to India. Following is a chronological account of the main events that finally ended in the formulation of the Indus Waters Treaty.

### 3.5 The Standstill Agreement, 1947

After partition, Sir Cyrill Radcliffe proposed setting up a joint control of the canal systems in the Doab. When Sir Cyril Radcliffe proposed something like this, both Nehru and Jinnah reacted strongly against the idea and accused him of playing politics (Heines 2017, Gilmartin 2015). As a result, a committee took up the task of dividing the canals. But the committee set up to divide the canals could not reach any solution. Finally, a temporary solution was adopted. The two Chief Engineers of West and East Punjab set it into action. It was decided to maintain the pre-partition allocation on the Upper Bari Doab Canal till March 1948. This became the "Standstill Agreement". It was decided that water flow would continue in the pre-partition fashion till the date specified in this agreement. But in April 1948, India unilaterally discontinued the delivery of water to the UBDC without any prior warning to Pakistan (Biswas 1992, Gulhati 1973). This was a significant moment in the history of the water dispute in the Indus Basin. Michael, quoted in Biswas (1992), has proposed

probable reasons for this sudden behaviour of India. One possible cause suggested was to put pressure on Pakistan to withdraw its "volunteers" from Kashmir. He implied that India could be using its position as upper riparian to pressurise Pakistan geopolitically. Secondly, he alleges that a certain group of leadership within India were deeply motivated to sabotage the newly created state of Pakistan in the hope that they could bring it back to India. They believed the denial of irrigation water would be one of the ways to create pressure. Thirdly, it was at the same time, Pakistan had started imposing export duty on the raw jute which was processed in the mills on the Indian side. Michael alleges that the blocking of water by Indian side could be in retaliation to the same (Biswas 1992).

Thus, he seeks to explain India's behaviour as a continuation of the national and local political relationship developing between the two neighbouring countries. An issue not explored much is the question of why Pakistan failed to take any action despite the fixed deadline of the Standstill Agreement. Was it a deliberate action? It could be that the commotion of partition too much for the nascent state to handle and it came to rely too much on the goodwill of India. Thus, the motives for the inaction of Pakistan as well as the actions of India are crucial. The precise reasons are still debated among scholars. Since a large number of players were involved, it might be reasonable to assume that more than one factors were responsible. This has come to be a very good example of water politics at different scales. Disputes at the provincial level got more entangled with state securitisation and culminated in an international dispute. It is now known with evidence that the act was a local initiative, carried out by East Punjab engineers and provincial politicians, without the support or even awareness of the New Delhi. The stopping of water flows at the partition boundary was initiated not by the central Indian government under Prime Minister Nehru but by the new East Punjab government. In fact, it has been recorded that the incident infuriated Nehru. In an official communication, Nehru wrote: "To stop water for fields is supposed to be rather an inhuman act" (Haines 2017). In fact, Nehru always maintained an approach to deescalating the dispute[6]. The Indian Prime Minister Nehru intervened by the end

[6] "In late 1952, for example, Indian engineers shorted water supplies to Pakistan, breaking the terms of the 4 May agreement. Pakistani politicians protested. Nehru, convinced that the reductions had been deliberate, suspected that senior figures in the East Punjab government or the central Ministry of Irrigation and Power had given orders. He demanded that Irrigation Minister Gulzarilal Nanda find out who was responsible. After several frustrating months, Nehru concluded that the East Punjab engineers

of April and explicitly instructed the provincial government of East Punjab to resume the supply of water to Pakistan UBDC (Biswas 1992). However, he simultaneously defended India's legal right to stop water, both in the Indian Parliament and at international platforms. Naturally, the stopping of water took the West Punjab province by surprise. It was an unprecedented behaviour, without any prior information or warning. This action of India marked relations between the two countries for all future. The event made water division an urgent issue. Leaders of both the countries met at Delhi to work out future plan for division of water.

### 3.6 Delhi Agreement

India and Pakistan came to an agreement in 1948. This came to be called the Delhi Agreement. The key outcomes of this agreement were:

1. India would release water to West Punjab at pre-partition levels after payments by Pakistan. Later on, in accordance with this agreement, the West Punjab government deposited a sum of money with India, a "seigniorage" (Gulhati 1973, Biswas 1992)

2. Pakistan also recognized India's right to develop future irrigation projects that might influence the levels of water in Pakistani canals

3. India agreed not to suddenly withhold water flowing to Pakistans' canals in future, without any prior information. It agreed to give time to Pakistan to make alternate arrangements

4. At the same time, Pakistan recognized India's right to use and development of waters of the Indus for the development of West Punjab (Biswas 1992)

Within a year of the Delhi Agreement, Pakistan began to raise displeasure with the Agreement and refused to pay further. In fact, it was insisted that the terms had been agreed to under duress (Haines 2017). While the two sides were trying to renegotiate the water division, they were simultaneously developing water infrastructure unilaterally. The most important and insightful case was the Dipalpur Barrage of Pakistan and the retaliatory Harikke Barrage of India. In the events that unfolded, the water issue got firmly linked with the sovereignty of the state. Water management was becoming central to territoriality in the region and assertion of national identities.

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in charge of canal headworks had not had clear instructions about water deliveries to Pakistan, and so had supplied less than the agreed amounts." Haines 2017: 54

### 3.7 Dipalpur v/s Harrike

There was a very strong reaction to the stoppage of the Upper Bari Doab Canal and the ensuing Delhi Agreement in Pakistan. In fact, the government viewed the situation as a "national emergency" (Gilmartin 2015). Soon after the Delhi meeting, there was a rush on both sides to construct infrastructure and develop Indus waters falling in their lands. East Punjab engineers began work on several new projects for ensuring the water security of the state. New canals began to be built such as the Sutlej link-channel circling around the Ferozepore barrage to maintain access to Sutlej and the Bambanwala-Ravi-Bedian-Dipalpur. These canals were meant to ensure that Pakistan did not depend on India for its canal's water supply. The aim was to build self-sufficiency of the waters of Pakistan. The canal system would also be a defence barrier, a physical barrier running along the border between East and West Punjab, a physical manifestation of the political line of partition drawn by Radcliffe. It is observed that these constructions were not seen as mere canals for water management but as a national activity, securing Pakistan's water and its future development. Building canals was akin to building the nation. Gilmartin (2015) recounts an interesting episode where volunteers from Lahore, such as government Muhammadan Anglo-Oriental College students, and villagers along the canal route, were mobilized to complete canal sections. Such was the rhetoric and shock of 1948 water stopping that everyone willingly worked for a minimal wage, looking at canal building as an act of building the nation. The stopping of water in 1948 and the ensuing media reports had linked the Indus waters firmly to Pakistan's identity as a state. "Along with these canals, Pakistan's national identity was taking shape" (Gilmartin 2015).

The stoppage of the Upper Bari Doab Canal and the ensuing Delhi Agreement made Pakistani side acutely aware of its vulnerabilities and geographical disadvantages as a lower riparian state. Thus, a determined attempt was made to severe the dependency on water coming through Indian territory. The Sutlej provided a perfect opportunity. In Punjab, the meandering Satluj crossed the border several times back and forth from Indian territory i.e. East Punjab to Pakistani territory i.e. West Punjab. About eight miles upstream of the Firozpur headworks, both banks of the river ran through

Pakistani territory. Thus, engineers decided that it was possible to divert water from this point, above the first headwork on the Indian side at Firozpur, taking away India's advantage of being the upper riparian. Thus, the West Punjab government began work on a cut (artificial opening) in the riverbank that would divert water from an upstream portion of the Sutlej to the Dipalpur Canal, one of those that India's April closure had affected severely. It was possible for Pakistani engineers to make another cut further downstream, after the riverbed had crossed back into India, passed through the Firozpur weir, and returned permanently to Pakistani territory, in order to resupply the river with water. This would have circumvented the Firozpur headworks, keeping the bulk of the river's water in Pakistan. Working on the cut was one of the few ways that Pakistani authorities could make a show of proactively protecting Pakistani interests, short of declaring war themselves. Haines (2017) believes that the Dipalpur cut scheme was "defensive". However, the Dipalpur cut could not give this advantage to Pakistan for long. India had been in the process of constructing a new barrage on the Sutlej at Harikke, south of the confluence of Satluj and Beas. The Harikke Barrage eventually enabled India to divert Sutlej waters on a large scale long before the river crossed into Pakistan for the first time.

### 3.8 World Bank negotiations

For the first five years after the partition, India and Pakistan had been unable to resolve the problem of water sharing. In 1952, the World Bank got involved as a third party to resolve the issue. Working on the details for over eight years, the three parties finally agreed on a common treaty by 1960, when finally, the Indus Water Treaty came into being. The negotiation period can be seen in two distinct phases. In the first phase, negotiations that followed the bank's involvement were technical rather than political. During this period, they prioritised discussions between engineers keeping water sharing separate from the broader questions of bilateral relations. This period lasted for about four years. The general approach was technocratic, based on a depoliticised understanding of the water issue.

#### 3.8.1 World Bank negotiations: First phase (1952-1956)

In 1950, David Lilienthal, the supervisor and chief engineer of the Tennessee Valley Project in the USA was invited to India by the Indian government as Prime

Minister Jawaharlal Nehru was keen to seek his suggestions so as to make developments in Indian river valleys on the lines of Tennessee Valley Project. On returning back, in 1951, Lilienthal wrote an article titled 'Kashmir: Another "Korea" in the Making?'. This article highlighted the crucial role Indus dispute resolution could play in stabilising South Asia. He proposed collaborative efforts by the two countries to solve this dispute. Quoting from his historic article:

> "The starting point should be, then, to set to rest Pakistan's fears of deprivation and a return to desert. Her present use of water should be confirmed by India, provided she works together with India (as I believe she would) in a joint use of this truly international river basin on an engineering basis that would also (as the facts make clear it can) assure India's future use as well. The urgent problem is how to store up now wasted waters, so they can be fed down and distributed by engineering works and canals, and used by both countries, rather than permitted to flow to the sea unused. This is not a religious or political problem, but a feasible engineering and business problem for which there is plenty of precedents and relevant experience. This objective, however, cannot be achieved by the countries working separately; the river pays no attention to partition - the Indus, she `just keeps rolling along' through Kashmir and India and Pakistan. The whole Indus system must be developed as a unit - designed, built and operated as a unit, as is the seven-state TVA system back in the U.S. Jointly financed (perhaps with World Bank help) an Indus Engineering Corporation, with representation by technical men in India, Pakistan and the World Bank, can readily work out an operating scheme for storing water wherever dams can best store it, and for diverting and distributing water" (Lilienthal 1951: 52)

Lilienthal argued that a river basin is a natural unit over which artificial political boundaries had been drawn. But Daniel Haines (2013) points out two points of discrepancy in Lilienthal's argument: First, for his plans, only surface waters were considered, completely ignoring other interconnected links like the groundwater. Thus the "natural unit" was not being considered in its wholesomeness. This selective portrayal, he says, "privileged certain aspects of the basin's environment over others". Secondly, neglect of the other tributaries of Indus such as the Kabul river while making the plan is observed. The whole plan was concentrating on the left bank tributaries of Indus while proclaiming that planning should be basin aligned as it is a natural unit. This amounted to discounting the political realities and how they shaped

Indus basin management. These omissions led to a sort of oversimplification. The "discursive simplification' of a river basin's environment" (Haines 2017), has been explored at great details in works of Chris Sneddon and Coleen Fox. This article greatly influenced the President of the World Bank, Eugene Black. He wrote to the two heads of state in India and Pakistan, Prime Ministers, Jawaharlal Nehru and Liaquat Ali Khan. Black also reiterated the same ideas Lilienthal had proposed. He re-emphasised the suitability of a technical solution. For this, it would be suitable to keep the negotiations separate from other political issues between the countries. At first, an attempt was made to come up with a jointly conceived single plan. Meetings began in 1952. The chief representative and mediator from the World Banks' side was Raymond A. Wheeler. Wheeler was a senior World Bank engineer, tasked with heading the trilateral working party. The point of discussion for this group has been described by Biswas (1992) in the following words:

> "Determination of the total water supplies of the Indus Basin and their subdivision into such categories as either side requests. Determination of the water requirements of the cultivable irrigable areas in each country, such areas to be specifically shown on an index map, and the subdivision of these requirements into such categories as either side requests. Calculation of such derivative data and collection and compilation of such further basic data and making of such surveys and investigations as either side requests for working out a comprehensive plan. Preparation of a comprehensive plan. Preparation of cost estimates and determination of a construction schedule of new engineering works including in the comprehensive plan." (Biswas 1992: 206)

During the next two meetings in Karachi in November 1952 and in Delhi in January 1953, the two countries were unable to agree on a common approach to developing the waters of the Indus System. Reasons why no final solution could be reached are twofold. Firstly, engineers preferred to take a nationalist position rather than a technical one. This was unexpected by Lilienthal. Probably this was unavoidable, given the political tensions that had already built up around Indus waters. Both sides were trying to hedge against each other instead of trying to reach a common workable solution. This view has been put forward by several scholars. (Gilmartin 2015, Biswas 1992)

However, both parties entered the negotiations with very little hope or even intentions of reaching any solution that involved compromises. This could be a result of the bitter relations because of partition. There was not much goodwill across the negotiation table. State identity in both countries was in the formative phase. And was often built on the concept of "othering" the new neighbour. There was a sense of hostility against each other. Thus, bureaucrats and engineers on both sides were not keen on cooperation. There was a very high level of distrust. India and Pakistan's utter inability to find a middle ground struck at the heart of the agenda. None of the parties was willing to work for the development of a unified system that could be useful to both. Engineers acted in ways to appropriate the maximum advantage for their own countries, rather than thinking in purely regional and technical terms. The suggestions from each part were seen with great distrust by the other, making working together impossible. After the deadlock could not be resolved for over a year, the World Bank suggested that the two countries prepare their individual technical plans. These plans were submitted to the Bank in October 1953. Unfortunately, even after several meetings, no common grounds could be reached between the two groups of engineers from India and Pakistan. There were very few overlaps in the plan to make an overlapping plan.

Finally, the world bank proposed its own plan. The Bank proposal was as follows:

> "The entire flow of the Western rivers (Indus, Jhelum and Chenab) would be available for the exclusive use and benefit of Pakistan, except for the insignificant volume of Jhelum flow presently used in Kashmir. The entire flow of the Eastern rivers (Ravi, Beas and Sutlej) would be available for the exclusive use and benefit of India, and for development by India, except that for a specified transition period India would continue to supply from these rivers, in accordance with an agreed schedule, the historic withdrawals from these rivers in Pakistan.
>
> The transition period would be calculated on the basis of the time estimated to be required to complete the link canals needed in Pakistan to make transfers for the purpose of replacing supplies from India. A temporary cooperative administration would be needed to supervise the carrying out of the transitional arrangements. Each country would construct the works located on its own territories which are planned for the development of the supplies. The costs of such works would be borne by the country to be benefitted thereby. Although no works are planned for

> joint construction by the two countries, certain link canals in Pakistan will, as stated above, be needed to replace supplies from India. India would bear the costs of such works to the extent of the benefits to be received by her therefrom. An appropriate procedure would be established for adjudicating or arbitrating disputes concerning the allocation of costs under this principle." (Biswas 1992: 206).

As a solution to this impasse, the World Bank plan affirmed a 'territorial principle'. The waters would be divided territorially and each country would carry and the related constructions would be divided territorially. In early 1954, India accepted this proposal. Prime Minister Nehru told the Rajya Sabha that India had given in principal approval to the plan proposed by the World Bank as it desired a speedy resolution to the water sharing problem. Even though India was not in agreement with all aspects of the proposal it was moving ahead in the hope of a timely resolution to the problem. On the other hand, Pakistan had several reservations about the proposal.

The talks suffered from a severe and consistent mismatch between Indian and Pakistani priorities. Pakistan prioritised independence from Indian water flows. Whereas early Pakistani political rhetoric had emphasised West Punjab's right to water from the Sutlej, Beas and Ravi, the Pakistan government by the mid-1950s wanted to draw all of its water supplies from the western rivers. With memories of 1948 still sharp, Pakistani leaders did not trust the Indian authorities to let water flow even if there was a treaty. The Pakistani team also wanted any settlement to include major projects in Sindh—the new Kotri and Guddu barrages and canal systems, along with extensions to the command area of the existing Sukkur Barrage. Finally, Pakistani negotiators claimed that not enough water flowed regularly in the basin to satisfy both countries' requirements. India prioritised limiting cost, and getting work done quickly so that it could put development works it had been constructing during the 1950s, such as the Bhakra-Nangal project, to full use as soon as possible. Another major development was that in July 1954, India commissioned the Bhakra Canal. The tempo of negotiations, however, remained stagnant. By the end of the first phase, the bank plan therefore completely reversed Lilienthal's principle of developing the Indus river basin as a single unit.

### 3.8.2 World bank negotiations: second phase:1956-1960

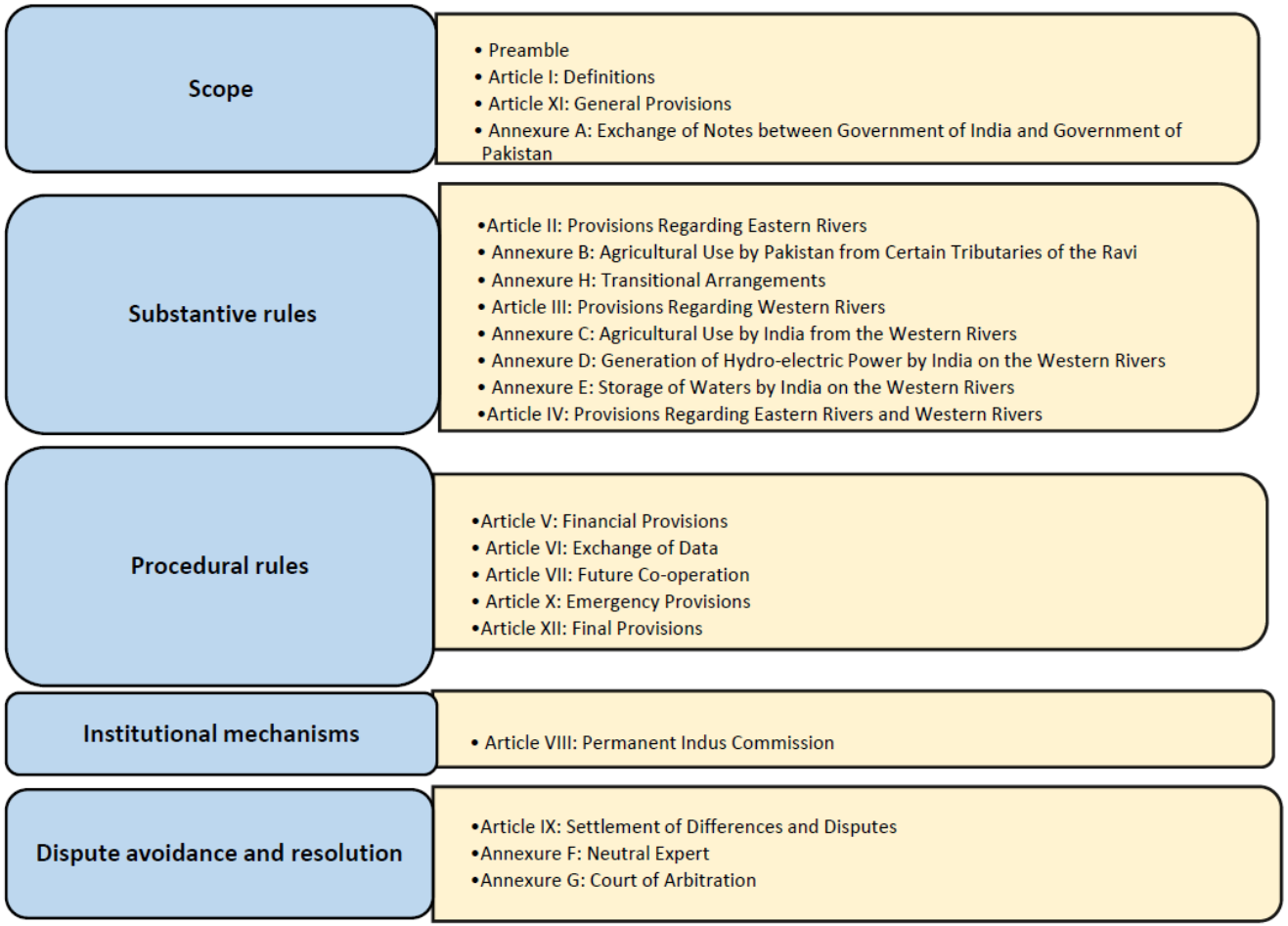
Developments from late 1954 established politics explicitly as the basis of the negotiations. In the initial vision of joint development of a unified canal system, it was expected that engineers will devise a method of water sharing for a single canal system. However, gradually it was realised that this was not possible. The problem was not so much technical as political. The determining factor was not technical know-how and disagreements, but lack of political will for cooperation between the two newly formed countries. The two countries, with the raw memories of a much-embittered partition, were not ready to cooperate to such a level. So gradually the importance of engineers in negotiation declined. The ball now moved firmly in the court of politics. The limits of technocratic internationalism were recognised, especially in the valley. It was acknowledged that political and diplomatic considerations would have a more direct bearing on the issue and the political leaders in both countries had the most seminal roles to play. The 1954 World Bank plan of dividing the river was thus a turning point in the development of Indus water negotiations. A crucial meeting happened in Rome in 1958 where two aspects were to be clarified. Pakistan wanted exclusive control over the three western rivers i.e. Indus, Jhelum and Chenab. This was seen as geo-strategically essential. It would prevent any control of India on the waters of these rivers and take away its upper riparian benefit. But the Indian government asserted rights to water usage which was going on historically. The second issue was that the Indian government was emphasising its right to withdraw waters from the Indus River System to feed Canals in Rajasthan. Pakistan objected as it claimed that Rajasthan was not a riparian territory within the Indus. Moreover, Pakistan and India were not seeing eye to eye on the replacement construction plan for Pakistan. As India was supposed to pay for it, it always minimised the budget while Pakistan always presented elaborate plans involving high expenses. In the same year, another meeting was held in London where Pakistan came up with a development plan. With a cost of over a billion dollars, Pakistan wanted to construct two new large storage dams at Mangla on the Jhelum and Tarabela on the Indus. This was an additional plan along with the new linking canals and several smaller dam that the country wanted to build to secure water for itself. As was the trend, India objected. No concrete developments took place in 1958 too.

A solution to the problem was finally devised by World Bank chairman Eugene Black. He suggested limiting India's liability to a fixed amount, irrespective of the final cost. He also proposed financial assistance to India by World Bank for the construction of the Beas Dam. Nehru agreed to this proposal. General Ayub Khan in Pakistan also agreed as the Tarabela and Mangla Dam were assured to him. Once the two leaders agreed, Black brought together a group of Westen countries to fund a corpus which was named as the Indus Basin Development Programme. This Consortium consisted of six countries. They committed to pay over $500 as grants for Pakistan. It was decided that India would pay $174 million to Pakistan for construction and loss due to partition. With this agreed to by all, the Indus treaty was finally signed in 1960 at Lahore by Prime Minister Jawaharlal Nehru of India and Field Marshal Mohammad Ayub Khan, President of Pakistan.

### 3.9 Analysis: Indus water disputes – A case of territoriality in water disputes

Over the course of the discussion, it emerges that territory has been central in the way India and Pakistan thought over water disputes. In the initial phase, policymakers were looking at it as a technical issue. Inspired by the idea which came generally came David Lilienthal imagined a jointly managed canal system over the Indus. The World Bank was bought into this idea. However, with time it was recognised that the problem was highly complex, impacted by several issues. Most important among these was the political division of the country. The Indian and Pakistani governments both enmeshed the idea of control over water with control over the territory. Access to water resources became a symbol of their sovereignty as independent nation-states. Moreover, water was crucial for the economic development of the countries. Canal building as a way of legitimising the government was evident in the region since the colonial period. Both the countries needed maximum control through irrigation projects and hydroelectric dams. The territory remained central to the way that the Indian and Pakistani governments thought about water development projects. Thus, few factors proved to be crucial in the signing of the treaty. The first was the involvement of the World Bank and the personal interest in the issue shown by chairman Eugene Black. He took a special interest in the case, visiting India and Pakistan and personally convincing the leadership of both countries. His efforts were

**Figure 3.1: Summary of the 1960 Indus Waters Treaty through the legal analytical framework. Based on Sarfaraz (2013:207)**



supported by a series of aligned events. One was the strategic priorities of America. It was in the American interest to solve the Kashmir issue and prevent India's leaning toward the communist block. And a solution to the Indus water distribution was seen as the first step in that direction. This idea was very well explained in Lilienthal's initial paper on India-Pakistan relations. In it, Lilienthal argued that the United States was losing influence in Asia. If no intervention was made in the South Asia, it would be outside the American sphere of influence just as the opportunity was missed with China. The Kashmir conflict, he wrote, derailed progress in South Asia, acting as the block between the subcontinent's development potential and its troubled reality. Solving the Indus waters problem, he thought, was a necessary first step on the way to a Kashmir settlement. The financial muscle for the deal was provided by the consortium of six western countries. was the cold war climate of the world. Their primary concern was the cold war. Increasing instability in South Asia was seen as having the potential to increase the influence of Communist China or the USSR in the region. Gilmartin has detailed how diplomats from the Consortium countries were present during negotiations. And finally, strong central leadership was present in both states at the time which ensured that the deal could go through and not face much political resistance domestically. Haines (2017) has presented a clear analysis of why it was most suitable for Ayub Khan as well as Nehru to seal the deal. Firstly, Ayub's early regime, strengthened by military rule and weak opponents, did not need anti-Indian rhetoric to increase its popularity at home. He also benefited from the One Unit scheme, which in 1955 had amalgamated the provinces of Punjab, Sindh, Baluchistan and North-West Frontier Province under one West Pakistan provincial government. Sindh–Punjab tensions had previously posed a problem during Indus talks. Thus, the political importance of the local Sindhi politicians declined to minimise local opposition to the deal. Moreover, the IWT provide legitimacy to him. Securing an Indus settlement would establish him as a benevolent monarch who cared for the ordinary public and did not rule by brute army power. Similarly, the deal was beneficial for India too. India's second five-year plan was not going as expected and any financial assistance was much needed. Nehru needed foreign assistance to make the remainder of the second plan, and the coming third plan, work. Pressure from China and distressing signs in US foreign policy perhaps also made Nehru more interested in reaching peace with Pakistan. Reputation was another motivating factor. Nehru's foreign policy showed him determined to project himself internationally as

the representative of subjugated countries that could settle disputes amicably. Moreover, Nehru himself was seventy years old by 1960 (he died in 1964). Other Indian and Pakistani leaders worried during the late 1950s that the chance of an Indus settlement could well die with the Prime Minister. Indian leaders during the late 1960s more broadly sought to rebuff foreign intervention into South Asian affairs. India's and Pakistan's experiences have implications for how we see sovereignty and decolonisation more broadly.

Hydraulic infrastructures as national integrators continued to be relevant after the signing of the treaty as well. This came into light every time a major dam was constructed in the region. Post-colonial state formation through infrastructure projects is a theme clearly visible in the Indus valley too. One major example is the Tarabela Dam on the main channel of Indus in Pakistan. Scholars have carried out a historical analysis of the changes that were ongoing in the spatial and ideological spheres along with the development of the infrastructures. On the one hand, the 'central state elites' tried to build the image of a unitary and homogenised state through a centrally nodal infrastructure project. The Tarabela Dam was a part of a centralised "One Unit" plan. However, the plan was opposed by East Pakistan (which was numerically stronger) as well as the smaller provinces apart from West Pakistan. Tarabela was imagined as vital to the flourishing of agriculture in the Indus Valley and therefore strengthening of the nation-state. In fact, it was seen as the key to controlling the waters of the entire Indus System by building a centralised and integrated irrigation system for the whole valley. However, as Majid Akhter observes, it is ironic to observe that while internationally the Tarabela was projected as a national and unifying hydraulic project, domestically it generated rifts between Sind and Punjab, further adding to the regionalism already existing. "Interaction between infrastructure and capitalist state always has a specific historical-geographical context. Even while river infrastructure seemed to integrate different regions into a unified homogenous space of irrigation under centralised technocratic control, in the absence of a hegemonic nationalist ideology, it also catalysed regionalist sentiments that fragmented the production of Pakistan state space" (Akhter 2015:867). Thus, the politics of water infrastructure based on the Indus Water Treaty is contested and controversial, internationally as well as within the two countries.

### 3.10 The Indus Water Treaty: Recent Developments

Over seven decades have now passed since the signing of the Indus Water treaty. Many scholars and politicians proclaim it to be a rare example of a successful treaty of water sharing in the region (Yakoob 2006). Indeed, it is one of the few treaties to have continued for such a long period, even when there were wars going on between India and Pakistan, the treaty was never abrogated. Such an example is indeed rare in the region. Yet, there are other scholars that contest the posturing of the IWT as a complete success and an example of cooperation. First, to begin with, the treaty does not distribute the volume of water to be shared. Instead, it makes a geographical demarcation regarding which country can appropriate waters from which tributaries. The very nature of this division of water was a compromise rather than an act of active cooperation. This has been discussed in some detail in an earlier section of this chapter. Secondly, it is also seen that over time tensions and disagreements over the IWT are going on increasing. Though the treaty was never completely abrogated, raising objections to any new projects has become the norm within the IWT. Moreover, the nature of disagreements has also been escalating as similar problems which were earlier resolved through the office of the Indus Water Commission are now requiring third part mediations, such as in the case of Baglihar and Kishanganga. While Baglihar was registered as a "difference' within Annexure VIII of the Treaty and called for the appointment of a Neutral Expert, the Kishanganga Dispute was even more serious. It was escalated to the highest level and labelled as a "dispute". This is the highest point of disagreement for which provision has been made within IWT. For Kishanganga, a five-member Court of Arbitration had to be appointed to resolve the "dispute". Even after the resolution of the Kishanganga, similar complaints kept coming up between the two countries. For example, Pakistan took the Kishanganga and the Ratle Project by India to the World Bank requesting for a Court of Arbitration while India requested a Neutral Expert for the same. However, the World Bank put a temporary halt to the process. Since December 2016 it declared a temporary pause on its involvement in the matters regarding the Indus Water Treaty in order to protect the Indus Water Treaty. A media document released by the World Bank reads as follows:

> "We are announcing this pause to protect the Indus Waters Treaty and to help India and Pakistan consider alternative approaches to resolving conflicting interests under the Treaty and its application to two hydroelectric powerplants," said World Bank Group President Jim Yong Kim, "This is an opportunity for the two countries to begin to resolve the issue in an amicable manner and in line with the spirit of the treaty rather than pursuing concurrent processes that could make the treaty unworkable over time. I would hope that the two countries will come to an agreement by the end of January" (World Bank 2016).

The reason provided was the contradictory nature of the two requests made by India and Pakistan. For the same disagreements on Ratle and Kishanganga dam, Pakistan wanted a Court of Arbitration. India on the other hand requested the appointment of a Neutral Expert. The treaty does not describe any provisions through which World Bank could give preference to one over the other. Both processes initiated by India and Pakistan were advancing simultaneously, which the World Bank thought would put the whole treaty at risk as there is the possibility of contradictory results.

Though the matter was not escalated further, it indicates the missing elements in the Treaty and the willingness of the two countries to cooperate. When the Indian Prime Minister inaugurated the Kishanganga Hydelpower Plant in 2018, Pakistan sent a high-level commission to World Bank to reconsider its involvement in the Indus Water Treaty. The delegation led by Attorney General, Ashtar Ausaf Ali, met Kristalina Georgieva, from the World Bank. They discussed procedural options which could lead to a more amicable reinterpretation of the treaty. However, they could not reach any conclusions (World Bank 2018). It also said that its role was "procedural and limited" as far as the Indus Water Treaty is concerned.

Things escalated even further after the Pulwama terror attacks in Jammu and Kashmir state in 2019. After the terror attacks on the Indian military camps, Indian Prime Minister Modi declared that "blood and water cannot flow together". His indication was that Pakistan must stop the import of terror to India or else India might retaliate by stopping the waters of the Indus (Bagchi and Mohan 2019). A media report in the Times of India reported on the event in the following terms: "India announced a series of actions on the IWT, seen as "incredibly generous to Pakistan", which would substantially increase its usage of the three rivers — Indus, Jhelum and Chenab — which feed Pakistan. Although India is entitled to use 20% of the three

rivers, it has not availed of the provision so far, much to the comfort of Pakistan, which is critically dependent on the western rivers of the Indus system. A move by India to use its share will hurt Pakistan, reeling from worsening water scarcity, but without attracting the charge of violation of the treaty." (Bagchi and Mohan 2019)

Indeed, the biannual meetings of the Indus Water Commission remained suspended between 2019 and 2022, for three years after that as the Indian side refused to participate. The meetings were finally resumed in March 2022. At the meeting of the Indus Water Commission in New Delhi, technical discussions were made regarding the hydropower projects which are still under construction. Three such projects are the Pakal Dul,Kiru and Lower Kalnai. The commission also discussed the information on the exchange of hydrological and flood data. Thirdly, the discussion was regarding the issue of the Fazilka drain. Pakistan ensured regarding the free flow of the waters from Fazilka drain to Satluj (MEA 2022).

Another recent development is the resuming of World Bank activities in April 2022. After several high-level meetings and discussions for over five years between 2016 and 2022, no amicable solution could be reached. This led to the decision of the World Bank to reinitiate the IWT process. It will now appoint both a Neutral Expert and a Court of Arbitration for Kishanganga and Ratle power projects. (World Bank, 2022). This development really puts the treaty to risk and opens the gates for further conflict.

### 3.11 Conclusion

This chapter explores how the treaty came into being, locating it in the context of Cold War-era international finance, American strategic priorities, and a moment of political opportunity in South Asia that saw relatively stable, strong administrations coinciding in India and Pakistan for the first time. One question that resurfaces time and again is whether the Indus Treaty should be revisited. While some political groups from India have been making claims to abrogate the treaty, a lot of discussions are also happening on whether the treaty should be modified or renegotiated.

# CHAPTER 4

# THE BAGLIHAR DISAGREEMENT

The Baglihar Disagreement between India and Pakistan is based on the Baglihar Power Plant constructed by India on the Chenab. It was a unique event as it led to involvement of a third party in the form of an expert engineer, the Neutral Expert. It was also the first time that environmental concerns were addressed within the IWT. This chapter begins with a description of the Baglihar Power Project, and then discusses the points of difference raised by Pakistan. In this chapter, a summary of the verdict of the Neutral Expert is made and the decision is analysed.

## 4.1 The Chenab Valley

Baglihar river project is located in the Chenab Valley. Chenab is one of the five major tributaries of the river Indus. In its flow from southeast to northwest, Chenab captures the drainage of various sub-basins. Its right bank tributaries are Koraole Nalla, Jowartha Nalla and Tonali Nalla while the left bank tributaries are Akri Nalla, Chakwa Nalla, Nashn Nalla, Peera Nalla, Sauni Nalla, Kalapani Nalla, Balaut Khad. All these streams capture their head waters and then join the river Chenab. As discussed earlier, the Chenab River is an antecedent river in relation to the regional geological setting of the Kashmir Himalya (Wadia, 1975). In its middle course, the area under study, the Chenab is in its youthful stage and washes more than 70% of the area. Its course being affected by the Murree and the Panjal Thrust, it is classified into a longitudinal river between Ramban and Dhanshal, and transverse between Dhansal and Jathi. A notable characteristic of the drainage system is the presence of tributaries branching in all directions and joining the main streams at angles between 0-90 degree. Some of the valleys with usually steep slopes develop a pinnate drainage; a variety of the dendritic drainage. It is a feather like pattern with smaller sub-parallel tributaries joining the master stream at acute angles. Nature of slopes appears to have affected the drainage system of the area, and the developments of slopes appear to be controlled by litho-tectonic changes. In general, the area displays dendritic and radial drainage patterns, but parallel pattern is also noticed

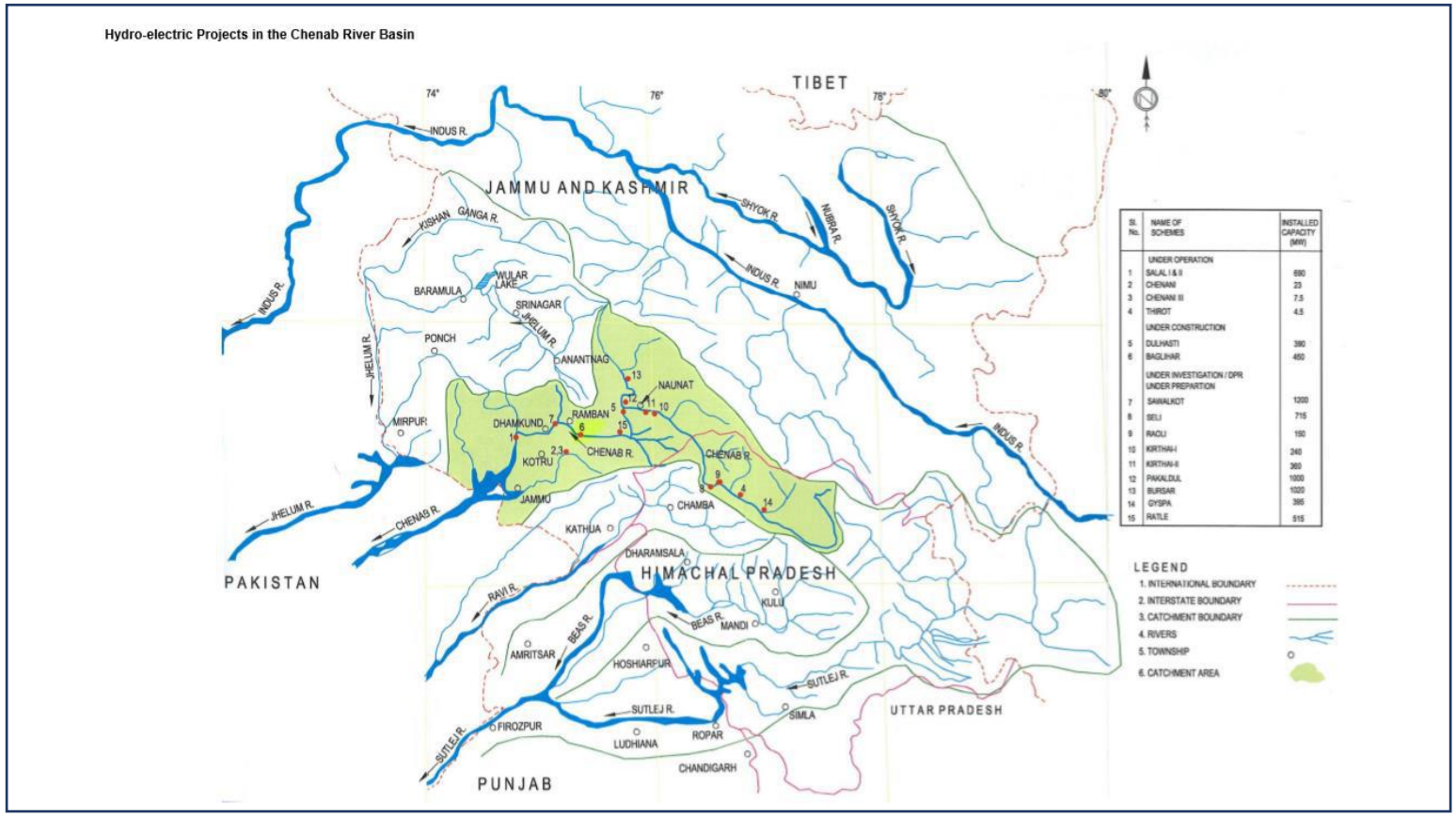
between Chakwa Nala and Thapal water divides. The precipitation initially follows the hill slope and later gets guided and diverted by undulations and depressions irrespective of lithologies, reflecting well marked drainage

lines etched on the surface forming parallel tributaries. The steeply inclined Murree Thrust with marked vertical displacement is distinctly observed in Chakwa Nalla, and in the tributaries of Peera Nalla, Sauni Nalla, Kalapani and Balaut Khad Nallas.This thrust with pronounced effects of crushing allowed the river to flow through such structurally weak zones of the Murree Sandstone and Great Limestone formations. With enough energy for erosion and transportation, the streams carry with them most of the crushed material and cause the formation of Chakwa Nalla and other mentioned tributeries. Transverse relationship of Murree Thrust with Nashri, Peera, Sauni, Kalapani and Balaut Khad Nallas, and that of Panjal Thrust with Jawahar Nallas and the south eastern part of the Chenab River suggest that they are antecedent to the formation of the Murree and the Panjal Thrusts. These streams were affected by thrusting only in the modification of the course of their tributaries (Ali 2013).

The Chenab River valley of the Indus River System has a total hydropower potential of more than eleven thousand Mega Watt (FAO 2016). Within the limits of the Indus Water Treaty, over 15 hydel power plants have been planned over the river. The first hydel project constructed was the Salal Hydel Project I and II with combined capacity of 690MW. The construction of the first stage of the Baglihar hydropower plant, designed as a run-of-river plant started in 2002. The project is located in the Ramban district of Jammu and Kashmir. Stage-I of the project was commissioned in 2008. The second plant with the capacity of 450 MW, under Stage II was commissioned in (“PM dedicates 450 MW Baglihar power project to nation”, 2015).

### 4.2 The Baglihar Hydel Power Project

Located very close to the National Highway No. NH l-A j, near Batoc township, Baglihar hydel project was designed to generate 900 M W of power in two stages of 450 MW each. A 144.5 m high concrete gravity dam, located about 2 km down stream of Baglihar village, diverts 430 cumecs of water through a 2089 m long

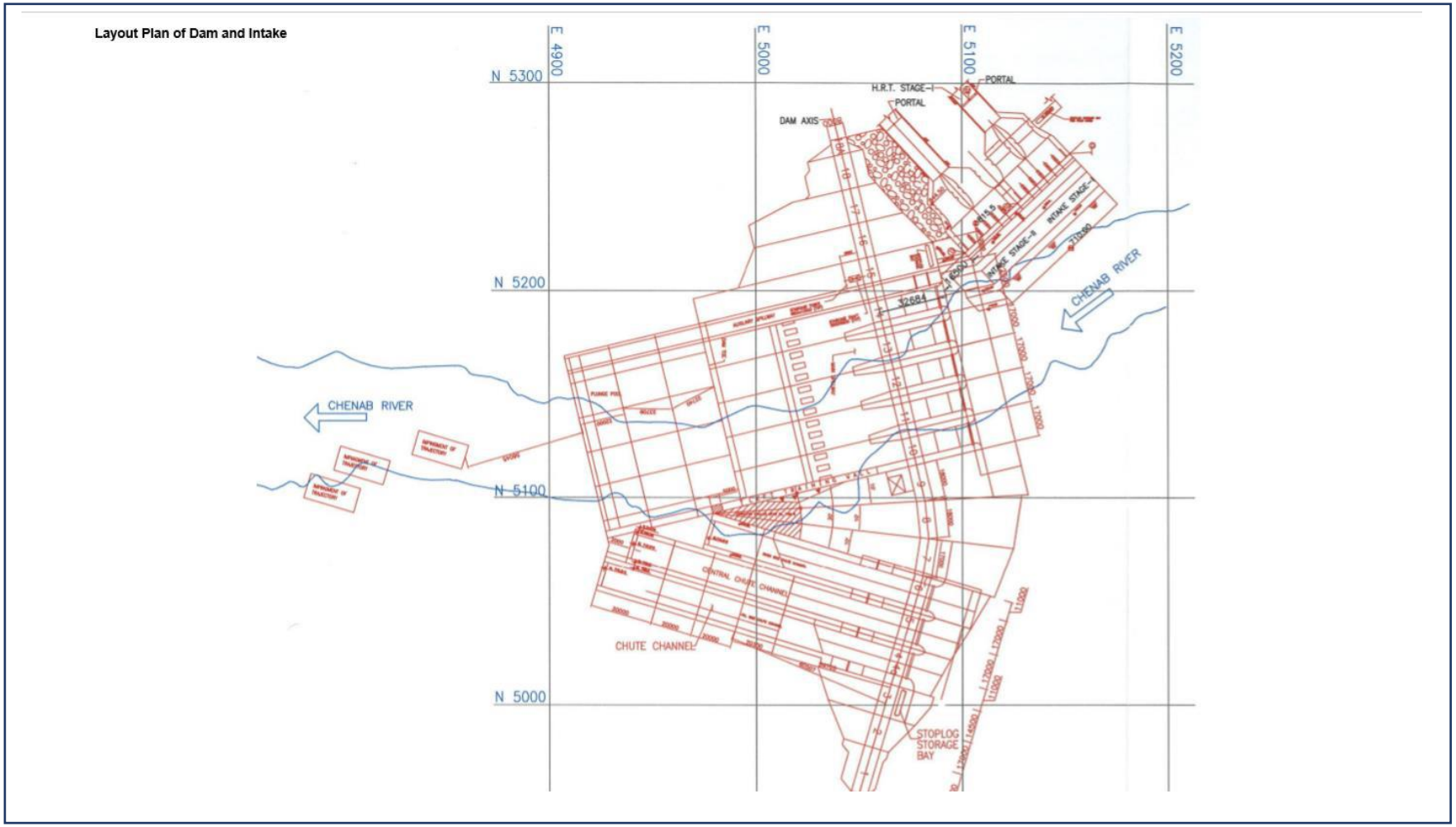



**Map 4.1: Drainage map of the valley showing location of Salal, Tulbul and Baghlihar dams. Source: World Bank (2007).**

10.15 m dia-circular. The head race funnel to generate 450 M W power in an under-ground power house on the right bank and release the water back into the Chenab River through a 135 m long Tail Race Tunnel. The power house complex includes construction of a 25 m dia. 80m high surge shaft, machine hall and collection gallery. The diversion agreement to the construction of dam is made through 1 1 m dia. horse shoe shaped tunnels with a flat invert, diversion tunnel (D T-1) and diversion tunnel (D T-2), of 398 m and 54 1 m lengths, respectively located on the right bank. The tunnels are designed to discharge over 5.000 cumecs of water with a peak velocity of 27 m/sec.

### 4.3 Origin of dispute

As per the terms of the Indus Water Treaty, details of any proposed construction on western rivers by India was to be conveyed to Pakistan. Accordingly, in 1992, the proposal to construct the Baglihar Dam on Chenab was conveyed to Pakistan. Pakistan objected within the span of three months specified in the IWT to the design of the Baglihar Hydroelectric Project. The two Commissioners continued to exchange correspondence and to debate the process for the resolution of Pakistan's opposition without success until the year 2000 (for 8 years). India began construction in 2000 when talks were still going on. Diplomatic initiatives continued. There were secretary level meetings but the matter could not be resolved. In the meanwhile, construction was on going. By 2005, more than fifty percent of construction of the dam was finished. Pakistan eventually exercised the Disputes Resolution clause. It requested the World Bank to assign a Neutral Expert. Consequently in 2005, Pakistan requested the World Bank to assign a Neutral Expert (NE) claiming that, under Article IX (2) referring to the Baglihar Scheme, a 'difference' had emerged between India and Pakistan. Following consultation with the both countries, the Bank named Mr Raymond Lafitte, Professor at the Federal Institute of Technology in Lausanne, Switzerland, as the Neutral Expert in May 2005.




**Map 4.2: Map of Baglihar project plan, Source (World Bank 2007)**

### 4.3.1 The Difference:

Pakistan raised three points of difference within the ambit of the IWT to the construction design of the Baglihar Power Plant.

| Pakistan's objections | India's Position |
|---|---|
| "The design of the Baglihar Plant on Chenab Main does not conform to criteria (e) and (a) specified in Paragraph 8 of Annexure D to The Indus Waters Treaty 1960 and that the Plant design is not based on correct, rational and realistic estimates of maximum flood discharge at the site." | "The Indian side does not agree with Pakistan's position." |
| "The Pondage of 37.722 MCM exceeds twice the Pondage required for Firm Power in contravention of Paragraph 8 (c) of Annexure D to the Treaty." | "The Indian side does not agree with Pakistan's position." |
| "The intake for the turbines for the Plant is not located at the highest level consistent with satisfactory and economical construction and operation of the Plant as a Run-of-River Plant and is in contravention of Paragraph 8 (f) of Annexure D to the Treaty." | "The Indian side does not agree with Pakistan's position." |

Source: World bank 2007

### 4.3.2 Neutral Expert

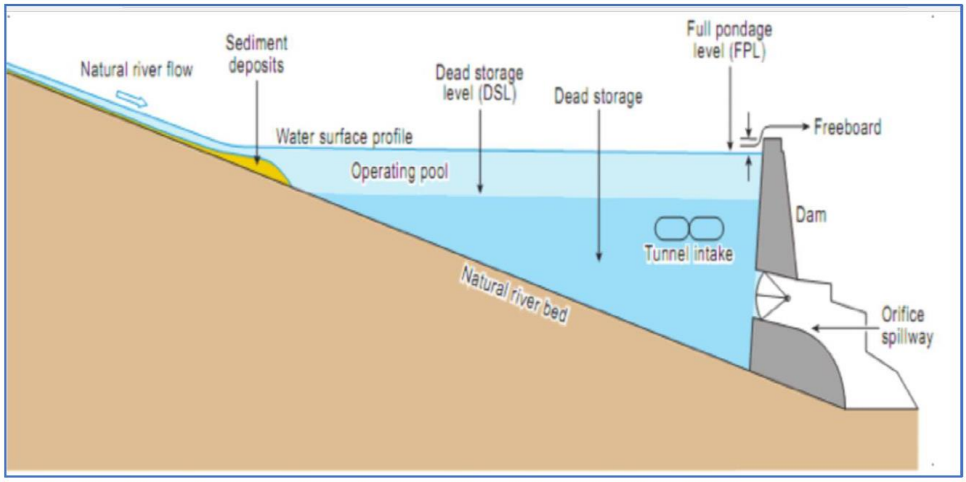
NE has firstly defined those principles which have guided the decision-making process. He refers to the 1969 Vienna Convention on laws of treaties. A treaty should be interpreted in "good faith" and taking the "ordinary meaning of words" (Article 32). When the meanings of the terms are unclear, recourse might be taken to the background discussions held while signing of the treaty (Article 33). These are the two principles that have guided the NE. Moreover, they have to follow the "principle

of integration" and the "principle of effectiveness" (Ahmad 2014). These are the two major aspects from the Vienna Treaty that the NE has adopted while resolving the Baglihar Dispute. The first principle means that the treaty must be adopted as a whole, making a balance between different aspects of the document. No part of the Treaty can be given more weightage than the other parts. The entire text of the IWT, including the Articles and the Annexures, has been given equal weightage while making any interpretations. Secondly, the overall attempt should be to reach a functioning outcome that is within the ambit of the treaty. Although it needs to be noted that India is not a part of the Vienna convention 1960. Pakistan has signed the treaty but not ratified it. Yet NE has taken that treaty into account as it is the most acceptable treaty internationally.

### 4.4 Key Points and Summary

Overall, three points of difference were raised and consequently resolved by the neutral expert. Following is a summary of all the differences. Figure 4.3 presents a schematic presentation of a typical run of river hydropower dam for a clearer understanding of the differences raised and the NE's verdict. A typical hydropower plant consists of blocking the flow of natural water through a concrete barrier, the dam. This creates water storage behind the dam-consisting of dead storage and the operating pool. Spillways are provided at the dam to drain out excess water. The full pondage capacity is the maximum water that can be stored.

**Figure 4.1: A generic schematic showing the side view of a typical dam with low-level outlets. Source: (Permanent Court of Arbitration, 2013)**



The verdict of the NE for the differences raised between India and Pakistan:

| |
|---|
| ***"Determination D 1: Relating to the maximum design flood***<br>*In view of all the uncertainties of flood analysis, the NE has decided to retain the value of 16,500 m3/s. Climate change, with the possible associated increase in floods, also encourages a prudent approach." (p.89)* |
| ***"Determination D 2: Relating to the issue of gated or ungated spillway***<br>*The NE considers, in conformity with the state of the art, that the conditions at the site of Baglihar plant require a gated spillway. An analysis done by the NE on 13,000 existing spillways in the world shows that 89% of these structures, having a design discharge higher than 14,000 m3/s, are gated. This decision is consistent with the provisions of the Treaty requiring a sound and economical design, and satisfactory construction and operation of the works. It is also in accordance with the Preamble of the Treaty." (p.91)* |
| ***"Determination D 3: Relating to the level of the spillway gates***<br>*The NE considers that the gated chute spillway on the left wing, planned in India's design, which has its sill located at el. 821 m asl, is at the highest level consistent with sound and economical design and satisfactory construction and operation of the works. The NE considers that the sluice spillway, planned in India's design and composed of five outlets, has two functions: sediment control of the reservoir and evacuation of a large part of the design flood. In conformity with international practice and the state of the art, he considers that the proposed outlets (five gates of 105 m2) should be of the minimum size and located at the highest level (808 m asl), consistent with a sound and economical design and satisfactory construction and operation of the works. But to ensure protection against flood of Pul Doda, the outlets should preferably be located 8 m lower, at about el. 800.0 m asl. Sound operation of the outlets will necessitate carrying out maintenance of the reservoir with drawdown sluicing each year during the monsoon season. The reservoir level should be drawn down to a level of about 818 m asl, that is to say 17 m below that of the Dead Storage Level." (p.100)* |

***"Determination D 4: Relating to artificial raising of the water level***

*The NE considers that the dam crest elevation should be set at the lowest elevation compatible with a sound and safe design based on the state of the art. The dam crest elevation of the Baglihar dam, fixed in the design submitted by India at el. 844.5 m asl, resulting from a freeboard above the Full Pondage Level of 4.50 m is not at the lowest elevation. The Determination of the NE is that the freeboard should be of 3 m above the Full Pondage Level leading to a dam crest elevation at 843.0 m asl. This is possible if the design of the chute spillway is optimised by minor shape adjustments in order to increase its capacity." (p.102)*

***"Determination D 5: Relating to the pondage***

*Applying the provisions of the Treaty and based on the state of the art, the NE considers that the first objective of pondage is to regulate the flow of the river to meet consumer demand. He considers also that the values for maximum pondage stipulated by India as well as by Pakistan are not in conformity with the criteria laid down in the Treaty. The Determination of the NE is that the maximum pondage should be fixed at 32.56 M.m3, and the corresponding Dead Storage Level is at el. 836 m asl which is one meter higher than the level of the Indian design" (p.105)*

***"Determination D 6: Relating to the level of the power intake***

*The NE considers that the elevation of the intake stipulated by India is not at the highest level, as required by the criteria laid down in the Treaty. The determination of the NE is that the intake level should be raised by 3 m and fixed at el. 821.0 m asl. The required minimum submergence depth depends on the discharge and the inflow approach conditions. The location of the intake structure proposed by India leads to asymmetrical approach conditions. A different arrangement, with more symmetrical approach conditions, could reduce the required minimum submergence depth." (p.107)*

*Source: (World Bank 2007)*

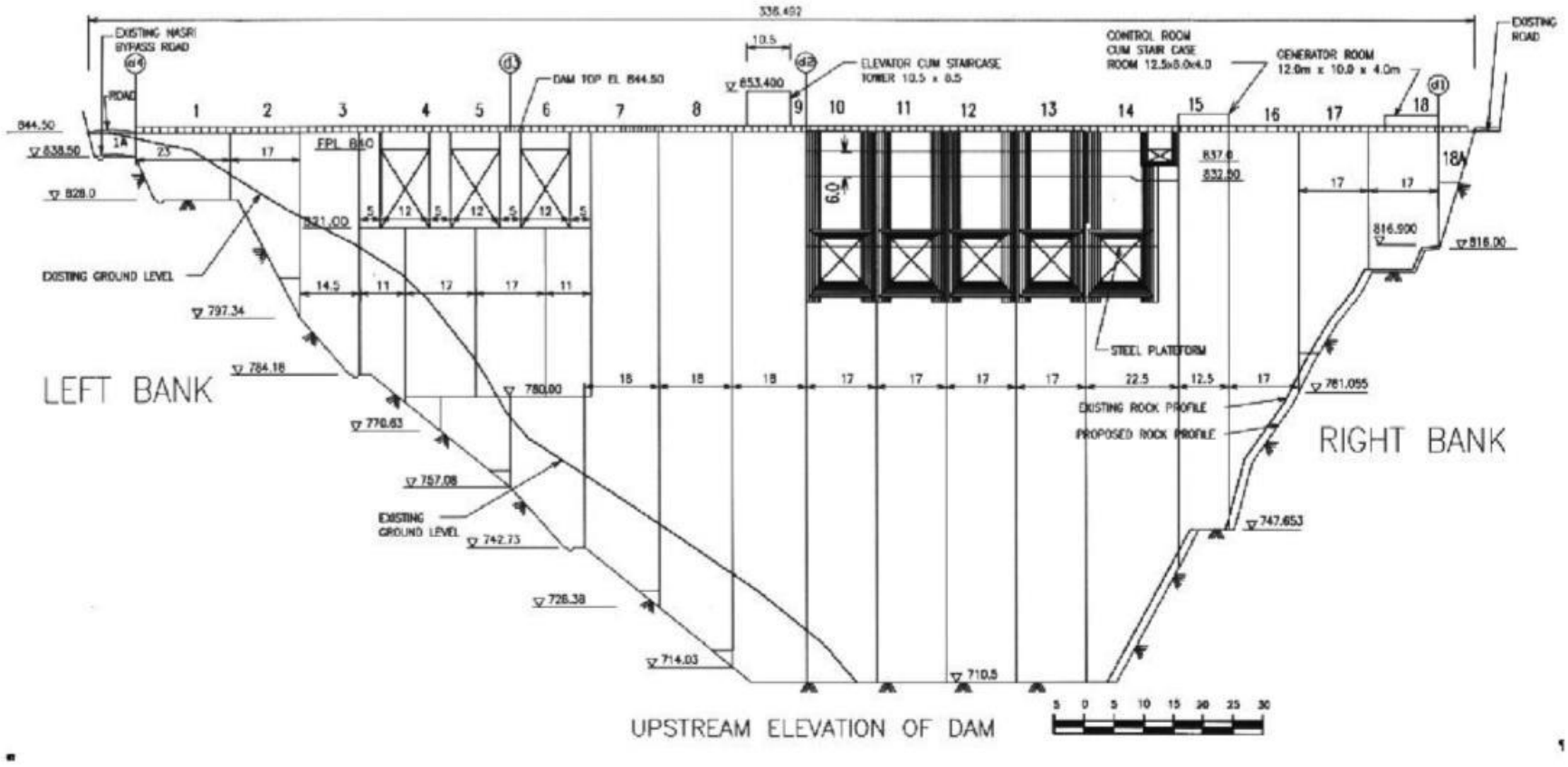



**Figure 4.2: India's submission of design of Baglihar dam Source World Bank 2007**

### 4.4.1 Difference 1:

The first point of difference raised by Pakistan brings up two sub-issues. The first is regarding the design flood of the Baglihar Project. The second one is regarding the issues of gated v/s ungated spillways along with the number and size of such spillways.

#### 4.4.1.1 Maximum Design Flood

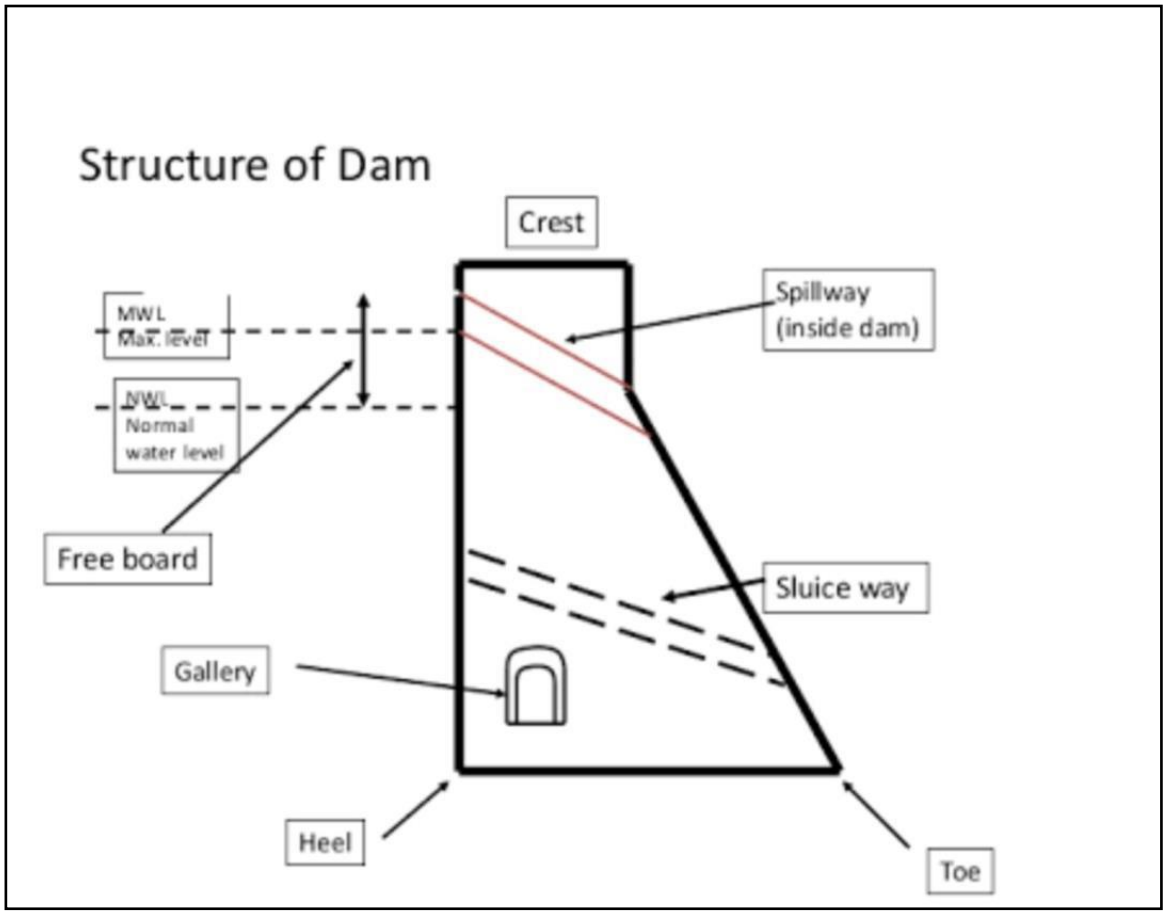
A design flood[7] is the peak expected amount of water that the water storage can hold. Design floods are primarily adopted for the safety of dam structures and the prevention of damage due to overflooding. They minimise the chances of failure of structures due to overtopping. It follows logically that by preventing floods, they provide safety to downstream areas. The general criterion for the selection of the design flood is to reduce the risk to the minimum possible. According to India's approach, the Probable Maximum Flood is used as the design flood. The analysis done by the Indian side resulted in a value of 16,500 m3/s ae design flood and that of Pakistan resulted in a lesser limit of 14,900 m3/s (World Bank 2007). The Neutral Expert concluded that the method of probable maximum flood used by India to calculate the design flood was suitable. He thus decided to go with the value suggested by India. Notably, mention is also made of climate change while choosing a more suitable flood design value. This is the first time that climate change is discussed in the regard to IWT. Climate change was also taken into account while reaching this decision.

[7] The design flood is a major part of any dam design. "A design flood is a hypothetical flood (peak discharge or hydrograph) adopted as the basis in the engineering design of project components. Some of the common purposes are 1) Design floods adopted for the safety of structures against failure by overtopping, etc. during floods. For example, the design flood adopted for dams to decide the spillway capacity. ii) Design floods adopted for flood control and drainage works to provide safety to downstream areas against flooding. Since the design flood adopted often marks the difference between safety and disaster, utmost attention has been given the world over to select and estimate the design flood that is most appropriate for a given case. Economic, social, and other non-hydrologic considerations influence the philosophy of protection, and hence the selection and are followed unless there are compelling local factors for deviation in the particular case." (Jain and Singh 2003:555)

#### 4.4.1.2 Gated Spillways

Another issue that was raised is that of the spillways design of the dam. The first point of difference is regarding the spillways. While India proposed gated spillways Pakistan wanted ungated ones. The size and level of gates were also a point of difference between the two countries.

**Figure 4.3: Schematic diagram showing the structure of a gravity dam showing spillways**




The NE based his decision on building a general geographical understanding of the Chenab valley. These include taking into account various aspects of the valley such as its "general conditions of the site, ie. hydrology and sediment yield, topography, geology and seismicity" (World Bank 2007). The NE concluded that these favour use of gated spillways. Secondly, a statistical analysis was carried out for use of gated

spillways globally using International Centre for Integrated Mountain Development (ICIMOD) data on large dams. It was concluded that the most common practice globally was to use gated spillways. Thirdly, it was pointed out through calculations that ungated spillways are not economical as they would require a higher dam allowing for free discharge of flood water. Compared to the price of gated spillway, this was calculated to be significantly more expensive. Thus, from an economic efficiency point of view, gated spillways were more suitable. Fourthly, due to the very large size of the dam, the routing caused by ungated spillways would be much more significant and cause more damage due to the discharge of a higher volume of water at one time. Gated spillways would reduce the discharge volume of water. Fifthly, a historical survey of gated dams was carried out. The review shows that this practice became increasingly common after the nineteen seventies with improvements in technologies. Sixthly, regarding sedimentation in the dam, the NE has concluded that the "removal processes of deposited sediment by flushing and dredging, and the routing by sluicing and venting" (World Bank 2007) were not very common in 1960 when the treaty was first formulated. However, they have established practices now. There is a reasonable basis to adopt them in the Baglihar Hydro Project. Seventhly, the NE has then cleared the meaning of the term "operation" for the purpose of the treaty to mean the generation of power. Finally, the NE has observed that the treaty is not explicit about the problem of sediment transport. This is related to the level of the spillway. The treaty prohibits the creation of outlets below dead storage, "unless necessary for sediment control". (Indus Water Treaty 1960). The "definition of the Dead Storage given in Points 10 and 17 states that it cannot be used for operational purposes, i.e. for power generation. This is precisely the purpose of the Live storage. However, the capacity of the Live Storage should be protected against sedimentation. This is an essential matter of sustainability. To meet this objective, maintenance of the Dead Storage should be carried out this is not excluded by the Treaty in accordance with the various known processes of sedimentation control, and in particular, drawdown sluicing and flushing" (World Bank 2007). Due to the high sediment load of the Chenab River, and the need to comply with the Treaty, the construction of Baglihar is not simple. The NE considers that "a safe design for the spillway, bottom outlet and power intake, based on simple and accepted standards and with a variety of protection arising from complexities in this area of reservoir sedimentation, where expertise is not completely achieved is necessary" (World Bank 2007), before any

elaborate calculations are carried out. NE noted that India used both the mathematical approach and the deterministic approach to settle on the dam's ultimate design flood level. Pakistan's resistance and proposed reforms, however, are not as detailed in their strategy. Lastly, Pakistan’s point is conceded when NE asked India to bring down the dam crest to a few meters above the full bondage level from 844.50 m. The final verdict was that it should not exceed 840.84m as was initially argued by Pakistan. The freeboard is a safety measure built into the dam that protects against overtopping. In case of malfunctioning of any of the gates, it can be of use and thus protects against a malfunctioning gate.

### 4.4.2 Difference 2:

The key aspects of the second difference were related to Pondage capacity. The second point of differentiation posed by Pakistan relates to the dam pondage. In an integrated grid, the use of electrical energy by industrial or residential customers varies over the year, and even throughout the day. On the other hand, the level of water in the river fluctuates throughout the day and also has -significant differences in season. So, there is an imbalance between the need for electricity and the energy that a river with its natural flow will produce. It is necessary to strike a balance, with production being tailored to satisfy market demand. Water storage is one of the key ways of achieving this; this is the most effective method for vast amounts of electricity. This can be achieved through a seasonal reservoir or, with regular or weekly reservoirs, by run-of-river treaties. This is known as “pondage”. Some plants are constructed without any storage facility and are known as run-of-river plants. There is no provision of water storage in such hydel power plants and water keeps flowing naturally through the channels across the diversion channel of the river rivers over which such plants are constructed.

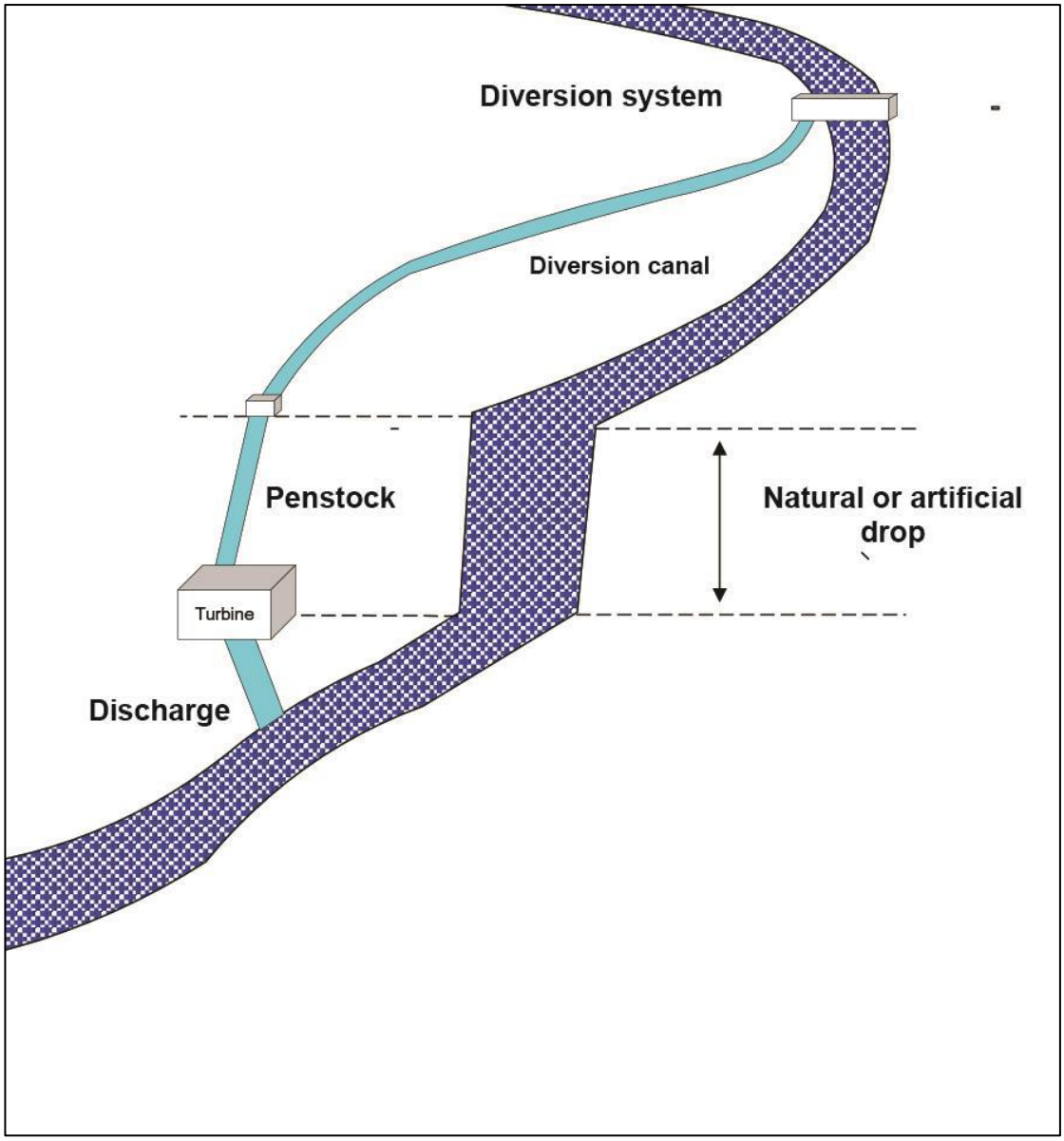



**Figure 4.4: Run of river dams structure diagram**

Pakistan demanded a substantial decrease in the amount of pondage capacity of the Baglihar project. However, in the implementation of the terms of the treaty and on the account of the latest technological developments, the NE did not find merit in this objection. He reiterates that pondage capacity is crucial for managing variations in the flow of the river so that a steady flow can be maintained. Certain minimum operational volume is needed at the plant site to generate steady power relating to the lowest mean discharge. The formula for measuring the minimum average discharge has been clearly outlined in the IWT. There is no conflict in the calculation of this

value between the two countries. The pondage volume is calculated on the basis of such minimum average discharge. Pakistan's pondage measurement is conducted with the assumption of the plant functioning at the constant strength by maintaining a stable annual river flow. This method of pondage calculation is inefficient when compared with the method adopted by Indian side to calculate the pondage volume. India's pondage measurement is calculated with the intention of running the plant with a steady inflow of rivers, thus monitoring the power variations. The NE concurs with the premise, but not with the hypothesis that the estimates must be based on peak load times, which is not precisely justified.

### 4.3.3 Difference 3:

The third and final point of difference that Pakistan raised with context to the Baglihar Dispute was regarding the height of the turbines within the power plant. Pakistan argued that the designed level of water falls on the turbines, i.e. the power intake was not usual of a typical design of a run of river plant. It was claimed that this design is also uneconomic. Regarding the third difference, the NE observed that "recourse to anti-vortex devices at the design stage is not common practice, and should be limited to particular cases where other measures cannot be undertaken to provide protection against the development of vortices……. the application of semi-empirical formulae for determination of the minimum required submersion depth is adequate." (World Bank 2007). Thus, the verdict required India to increase the intake level by 3 m.

## 4.5: Critical assessment of the Baglihar dispute and verdict

The Baglihar difference and the verdict of the Neutral Expert are unique in several respects.

### 4.5.1 The first 'difference' under IWT

Since the signing of the IWT in 1960, all disagreements had been resolved between the two parties by themselves. It was for the first time in 2010, that the Baglihar became "a point of difference" as defined within the treaty (Indus Water Treaty 1960) and a third-party involvement was sought. Such an occasion had arisen

for the first time since the signing of the treaty. It is imminent to find out how and why the water sharing pattern changed over the period of five decades, between 1960 and 2010. Clearly, there is a pattern-declining agreement and increasing instances of disagreements. But raising points of disagreement had been used as stalling tactics since the very beginning. More crucially, there emerges a pattern of disinclination to resolve, and in fact, escalate the dispute. Several simultaneous developments in the political field can help understand these state behaviours. The general geopolitical situation in South India had changed a lot between these four decades. With time, hydro-politics in Pakistan has become an even more effective political tool. Simultaneously, India is also becoming more aggressive in its use of the Indus waters.

The Baglihar Dam is a very relevant case study to understand this pattern of behaviour of the states. Discussions between the two permanent Indus water commissions had begun soon after India informed Pakistan about its plan to construct the dam which went up to Secretary-level talks by 2008. This diplomatic exchange took a time of more than eighteen years. India had started the construction in 2010 despite ongoing talks and objections registered by Pakistan. By 2010, more than half of the project had been completed. It was then that Pakistan invoked the clause on Differences Settlement and approached the World Bank for the appointment of a Neutral Expert. This whole episode highlights a lack of trust and cooperative spirit between the two countries. There has never been a proposal from India's side to which Pakistan did not raise an objection. So even in this case, Pakistan used the provision of raising objections to stall the construction at best and bide more time at worst. There seems merit in this allegation made by India. At the same time, India also did not abide by the IWT in spirit. India started construction in 2008 even though discussions had not concluded. This was also a violation of the spirit of cooperation in which the treaty was signed. Avoiding such unilateral initiation of constructions can have many dividends, including saving time and avoiding economic losses. The lack of trust and hostile political climate made both the parties play out a losing game. In the absence of a prefixed deadline for the resolution of objections, the treaty lost much of its strength and became dependent on the political climate at the time. One big problem with the whole episode is the lack of transparency. The details of the minutes of the meeting of the IWT commission on Baglihar it is not in the public domain. In addition, the submissions by both countries to the Neutral Expert are also not in the

public domain. Both these reduce transparency and create situations for conflict escalation in a situation so filled with political mistrust already.

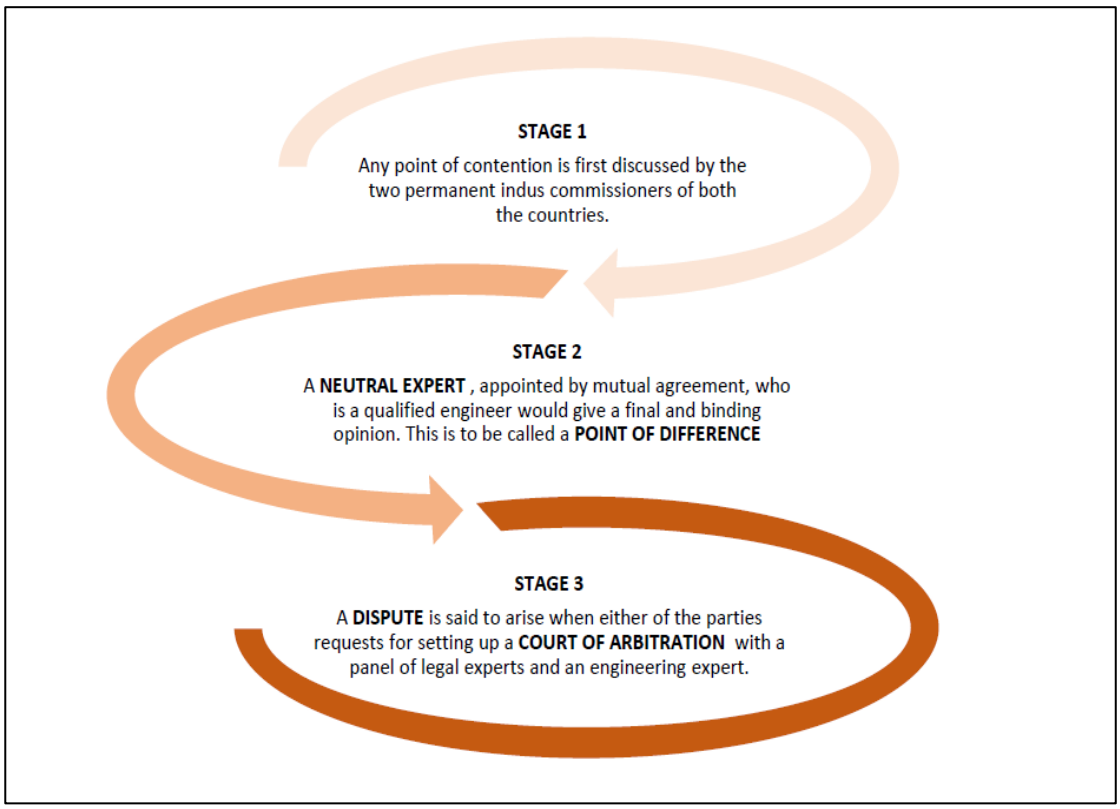



**Figure 4.5: Dispute Resolution Mechanism within the Indus Water Treaty**

### 4.5.2 Choice of Neutral Expert

Under Annex F of the IWT, the neutral expert to settle a difference between the two countries should be a technical expert i.e. an engineer. There is no mention of a legal expert. This was an effort from the creators of the treaty to anticipate and curb the politicisation of the Indus Waters. It was outlined that a 'difference' in essence has to be a point of difference in opinion regarding details of the project, not a matter of overall validity or legality of the project in question. This is an indicator of the flexibility of the treaty to accommodate differences without unnecessarily politicising it. It was expected that an engineer acting as a Neutral Expert would ensure hydraulic viability within the ambit of the treaty, using sound engineering solutions. So as per

the wordings of the treaty, the difference was only a matter of technical non-agreement. However, that is not how both the countries treated the Baglihar Disagreement. In fact, the composition of the delegation of both the parties to the Neutral Expert shows their perceptions and apprehensions on the issue at hand. Members of the delegation from Pakistan included legal experts. This indicates that Pakistan seemed to be looking for a legal interpretation of the treaty. On the other hand, the Indian team had more technical experts, indicating India seemed to have viewed the difference mainly as an engineering one, regarding hydropower plants (World Bank, 2007). In terms of international procedures, the appointment of the NE set up a good precedent for timely resolution through mediation. Drawing from practices of ICSID, UNCITRAL and WTO dispute settlement rules, a fair process for appointment of the Neutral Expert was adopted. It can be followed in future when new differences arise too.

### 4.5.3 The Vienna Convention

NE has firstly defined those principles which have guided the decision-making process. He specifically mentions the 1969 Vienna Convention on laws of treaties. A treaty should be interpreted in "good faith" and taking the "ordinary meaning of words" (Article 32). When the meanings of the terms are unclear, recourse might be taken to the background discussions held while signing of the treaty (Article 33). These are the two principles that have guided the NE. Moreover, they have to follow the "principle of integration" and the "principle of effectiveness" (Ahmad 2014). These are the two major aspects from the Vienna Treaty that the NE has adopted while resolving the Baglihar Dispute. The first principle means that the treaty must be adopted as a whole, making a balance between different aspects of the document. No part of the Treaty can be given more weightage than the other parts. The entire text of the IWT, including the Articles and the Annexures, has been given equal weightage while making any interpretations. Secondly, the overall attempt should be to reach a functioning outcome that is within the ambit of the treaty. India is not a signatory of this treaty. Pakistan has signed it but not ratified it. Yet it is the most accepted treaty internationally. It is been used in good faith. The interpretation should be true to the spirit of the treaty and not get caught up in word interpretations. While none are party

to the Vienna Convention, Pakistan is a signatory of the ICSID Convention. But neither of the parties raised concerns about the invocation of the rules of the Vienna Convention on the Law of Treaties in connection with the interpretation of the Indus Waters Treaty. The signing of the treaty by both the countries could give even further weightage to the Indus Water Treaty and provide a concrete framework within which the third party must interpret it.

### 4.5.4 New problems not mentioned in the treaty

The most significant aspect of the Baglihar verdict was Neutral Expert's opinion on state of art technology. The Baglihar difference raised several issues related to new technologies that were not explicitly present in the 1960 treaty. Keeping the Vienna Convention in mind, he opined that the IWT in spirit provides that it should be read in light of the latest technical norms and standards. Thus, all the developments in hydropower technology since the signing of the treaty in 1960 to the origin of the dispute in 2010 would have to be taken into consideration. This verdict thus set a very important precedent for the Indus Water Treaty,1960 and indeed other water-sharing treaties of the region. This is expected to influence all future interpretations of the Indus River Treaty.

*Sediment load* – NE has observed that the treaty is not very explicit about sediment management. While deciding on the design flood, NE has agreed with India's approach calling it the "more scientific" of the two proposals. Environmental concerns were totally at discount here. Instead of deciding on the most rational method, NE has chosen the better one among the two options provided.

*Climate change* - NE has taken into consideration the possible effects of climate change while interpreting the treaty. This is a danger that was not envisaged during the formation of the treaty. He is moving with time. He is setting a precedent that climate concerns are an issue larger than water division between two nations. It has precedence and must be taken into accord while deciding on any aspect. In the interpretation of different aspects of the treaty, this has come up several times, most particularly in deciding the height of the maximum design flood.

### 4.5.5. Issues not contested by Pakistan

Two aspects not brought up by Pakistan, but highlighted by the NE are related to the technicalities of engineering. NE has pointed out two aspects of the design which he called as" arbitrary and exaggerated". Neither of these were pointed out by Pakistan in its list of grievances. Though in both the incidences the NE agreed with India's position, he still marked out some problems with the actual design. The measurement of the pondage by India is based on managing the fluctuations in the flow of the river annually However the theory of period of the peak load cycle seems arbitrary for which no rationale is provided by the Indian side. The needed minimum submersion depth could be decreased by another arrangement with much more symmetrical approach conditions.

## 4.6 Conclusion

The Baglihar difference was unique in several ways, more so in both the party's response to the verdict. The official response from both sides for the Neutral Expert's verdict was positive. Both India and Pakistan claimed vindication of their position, by highlighting those aspects of the verdict which validated their positions. Secondly, new technologies were interpreted in the light of a much older treaty. It was for the first time in 2010, that the Baglihar became "a point of difference" as defined within the treaty (Indus Water Treaty 1960) and a third-party involvement was sought. In terms of international procedures, the appointment of the NE set up a good precedent for timely resolution through mediation. But neither of the parties raised concerns about the invocation of the rules of the Vienna Convention on the Law of Treaties in connection with the interpretation of the Indus Waters Treaty. The signing of the treaty by both the countries could give even further weightage to the Indus Water Treaty and provide a concrete framework within which the third party must interpret it. The Baglihar difference raised several issues related to new technologies that were not explicitly present in the 1960 treaty such as climate change and sediment load. The question of water quality and new technologies not clearly mentioned in the IWT came to the forefront with this difference.

# CHAPTER 5

# THE KISHANGANGA DISPUTE

The Kishanganga Dispute between India and Pakistan is based on the Kishanganga Hydropower Plant constructed by India on the Kishanganga River. It was a unique event as it led to involvement of a third party in the form of a Permanent Court of Arbitration. This chapter is a detailed study of the Kishanganga dispute between India and Pakistan and the verdict of the Court of Arbitration. It also includes a qualitative content analysis of the verdict documents as well as academic and media reporting on the dispute to see which aspects are highlighted and which are missing.

## 5.1 Kishanganga river basin and hydropower generation power plant

The Kishanganga is a tributary of the Chenab that originates near the Gurais city in the vicinity of Sonmarg in Kashmir, and falls into the Chenab near Muzaffarabad. In Pakistan, the river is known by the name Neelum. It is fed by several tributaries along the way. The river runs for over 250kms before draining into the Chenab. The flow of the river varies seasonally as it is mostly fed by snow. As such the river is in its peak flow during the seasons of May to August.

The power plant built by India on the Kishanganga came to be known as the Kishanganga Hydroelectric Power Plant (KHEP). The KHEP is located near Bandipur. It has a power generation capacity of 330 MW. The total approximate expenditure on the project was 800 million dollars. Water is diverted from the Kishanganga river and channelised through tunnels to the KHEP near Bandipur. I't then drains into the Jhelum. The construction for the project started in 2007. By 2018 three units of 110MW were commissioned. The project was formally inaugurated in May 2018 by the Indian Prime Minister, Narendra Modi.

## 5.2 Origin of the Kishanganga Hydroelectric Power Plant Dispute

Construction on the project began in 2007 and was expected to be complete in 2016. However, it got broiled in a dispute between India and Pakistan. Under the IWT,

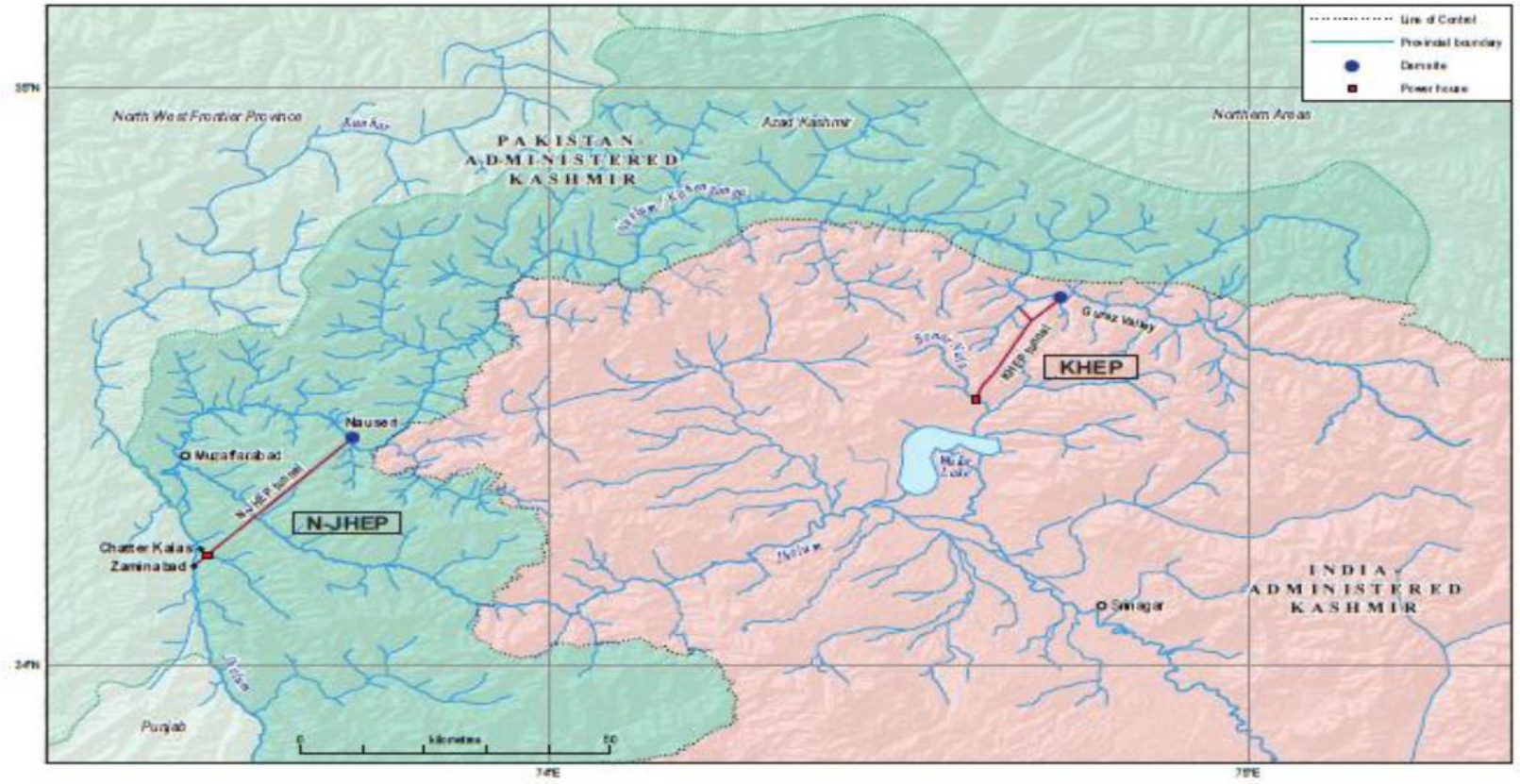
Pakistan protested against the impact on the flow of the Kishanganga river. As such, construction was halted in 2011, while the Permanent Court of Arbitration, The Hague looked at the matter. After one and a half years, the Court gave its verdict. India was allowed to divert water for the power plant but it had to maintain a minimum flow of 9 cumecs ($m^3/s$) downstream to Pakistan-administered Kashmir.

This was an unprecedented event. Ever since the signing of the IWT in 1960, this was the first situation when a court of arbitration had to be set up. Discussion between the two countries had been ongoing for a long time, which finally reached the court of arbitration in 2010. The whole process of discussion, culminating in the court verdict can be divided into three phases- 1) the pre-arbitration phase, and 2) developments in the Court of Arbitration since 2010.

### 5.2.1 The pre-arbitration phase: 1988 to 2010

The first objection was raised by Pakistan in 1998, registering their complaint against the project with the Permanent Indus Commission. India was requested to stop all construction work at the site. The reason provided was that it would have a negative impact on the agriculture and future hydroelectric projects in the lower riparian state. In response, the Indian Commissioner asked the Pakistani Commissioner to provide India with detailed information on all such hydroelectric and agricultural uses. A reply to this was provided by the Pakistan Indus Commissioner in March 1990. Firstly, Annex E to the Treaty did not allow the intended diversion. Secondly, contrary to Paragraph 10 of Annex E to the Treaty, this would adversely affect Pakistan's agricultural and hydroelectric uses of the Kishanganga / Neelum dam. Finally, it was claimed that the design of KHEP did not adhere to the design requirements set out in Annex E to the Treaty, Paragraph 11. Contrary to this, the Permanent Indian Commissioner for Indus confirmed that the KHEP was lying within the ambit of the IWT. Run of river plant was allowed within Annex E to the treaty, provided that it did not have an impact on any pre-existing activities in agriculture and power generation in Pakistan. In 1991 and 1996, the Indian side conducted inspection tours of the Neelam valley twice. Based on these visits to the location and also on the information given by Pakistan, the Indian Commissioner presented his argument against Pakistan’s objection. He argued that Pakistan’s Neelum-Jhelum hydroelectric

**Map 5.1 The Kishanganga Basin**




**Source: Permanent Court of Arbitration (2013: 53)**

powerplant was conceived after India's KHEP. It could therefore not be included in the list of existing water utilisation projects. As things got stagnant and no solution seemed visible, the Pakistan administration decided to escalate the situation. Thus, in February 2006, the Pakistani Commissioner formally requested that in his opinion a conflict, as defined in Article IX of the IWT, had arisen with respect to KHEP. Pakistan raised two main points of dispute which have been presented in the table below along with India's official response, as discussed in the Partial Verdict (2013):

| Points of dispute raised by Pakistan | India's Stand |
|---|---|
| First dispute:<br><br>"Whether India's proposed diversion of the river Kishanganga (Neelum) into another Tributary, i.e. the Bonar-Madmati Nallah, being one central element of the Kishanganga Project, breaches India's legal obligations owed to Pakistan under the Treaty, as interpreted and applied in accordance with international law, including India's obligations under Article III (2) (let flow all the waters of the Western rivers and not permit any interference with those waters) and Article IV (6) (maintenance of natural channels)" | "The Indian side does not agree with Pakistan's position." |
| Second dispute:<br><br>"Whether under the Treaty, India may deplete or bring the reservoir level of a run-of-river Plant below Dead Storage Level (DSL) in any circumstances except in the case of an unforeseen emergency?" | "The Indian side does not agree with Pakistan's position." |

Source: Permanent Court of Arbitration (2013: 2)

As is stated in the table, the first dispute is related to the construction of KHEP by India and how it trespasses Pakistan's rights to the western tributaries. But the second dispute was of a more fundamental nature and would impact all future constructions by India. India's right to develop hydroelectric projects based on the technique of drawdown flushing was debated under the second objection. Without the use of drawdown, run of river plants become ineffective and economically unviable for power generation. As such, the second dispute was more fundamental in nature. On the one hand, in India's opinion, the technology of drawn-down flushing is crucial to its right to use waters of the western rivers for hydropower generation. At the same time, according to Pakistan, drawdown flushing[8] at Indian power plants would negatively impact the development activities as well as the quality of river water. This made the second dispute of great significance.

### 5.2.2 Court of Arbitration

In October 2010, the Secretary General of the United Nations appointed a Court of Arbitration (CoA) to look into the Kishanganga Dispute as provided under Annexure G of the Indus Water Treaty. Judge Stephen M. Schwebel was appointed as the Chairman of the Court which would look into this dispute. Apart from the Chairperson, the court consisted of seven members. They were Judge Stephen M. Schwebel (Chairman), Sir Franklin Berman KCMG QC, Professor Howard S. Wheater FREng, Professor Lucius Caflisch, Professor Jan Paulsson, and Judge Bruno Simma, H.E. Judge Peter Tomka. The Permanent Court of Arbitration (PCA) at Hague functioned as the secretariat for the Court of Arbitration. The court deliberated over the issue for three years, hearing the arguments of both sides and conducting site visits. It came up with a final verdict in February 2013 which was binding for both the parties as per IWT. Table 5.1 is a timeline of the key events in the process of arbitration which lasted from May 2010 to December 2013.

[8] Draw down flushing is a method of sediment management in dams. "The flushing process by flow is defined as the process of the sediment removal by scouring sediment deposits (i.e. previous sediment accumulations) or passing incoming sediment-laden flow through a reservoir. The flushing process takes place when the desilting outlet such as sluice gate is opened to release sediment and water from the reservoir." (Lai and Shen 1996: 239)

**Table 5.1: Timeline of dispute resolution**

| Date | Event |
|---|---|
| 17 May 2010 | The request for arbitration by Pakistan. Pakistan stated that the Parties had failed to resolve the "Dispute" concerning the Kishanganga Hydro-Electric Project by agreement pursuant to Article IX(4) of the Treaty |
| 17 December 2010 | A Court of Arbitration was constituted with Judge Stephen M. Schwebel as the Chairman. |
| May 2011 to May 2012 | The Parties made written submissions to the Court |
| June 15 2011 to June 20 2011 | Court conducted a site visit to the pertinent facilities and locations of the KHEP as well as to the Neelum Valley and Pakistan's Neelum-Jhelum Hydro-Electric Project |
| 25 to 27 August 2011 | The Court held a hearing on interim measures at the Peace Palace in The Hague |
| 23 September 2011 | The Court issued its *Order on the Interim Measures* |
| 3 to 6 February 2012 | The second site visa the Neelum Valley was conducted. |
| 20 to 31 August 2012 | The Court held a two-week hearing in The Hague |
| 18 February 2013 | The Court issued its *Partial Award* |
| 20 May 2013 | India submitted to the Court a Request for Clarification or Interpretation, pursuant to paragraph 27 of Annexure G to the Treaty, in which it requested "clarification or interpretation with respect to paragraph B.1 of the Court's Decision" in the Partial Award |
| 19 July 2013 | Pakistan presented a Submission in Response to India's Request for Interpretation or Clarification. |
| 2 September 2013 | India submitted a Reply to the Request for Clarification or Interpretation. |
| 20 December 2013 | The Court issued its Decision on India's Request for Clarification or Interpretation and gave the final award |

**Source: Permanent Court of Arbitration (2013)**

#### 5.2.2.1 Interim Measures

Right after its constitution, the CoA took some interim measures. For the duration of the proceedings, India was prohibited from carrying out any permanent constructions at KHEP site that might have an impact on the natural flow of the Kishanganga Waters. When the arbitration started, construction of diversion canal at KHEP had already been completed. The Court allowed India to use this temporary canal.

#### 5.2.2.2 Partial Award

The process of arbitration continued for 3 years. However, India registered the request for expedition due to the huge economic loss it was incurring due to the stalled power project. As such, the Court of arbitration gave a Partial Award in February 2013. In the partial award, India was allowed to proceed with the construction of KHEP. However, it was required to maintain a minimum downstream flow in the Kishanganga so as to preserve a minimum water quality. Secondly, India was prohibited from using the drawdown flushing technique for managing sedimentation at the pondage, both at KHEP and any future run of river plant that it builds on the western rivers.

#### 5.2.2.3 Final Award

In December 2013, the final verdict of the CoA was out. India was put under the obligation to maintain a minimum flow at Kishanganga of 9 cubic meters per second for seven years from the date of the verdict, i.e. till 2020. After the period of 7 years, the verdict was open to challenge regarding the value of minimum flow, either through the permanent court of arbitration or under Annex IX of IWT. India was prohibited from reducing the level of water below the dead storage level in all run of the river plants, including the Kishanganga plant.

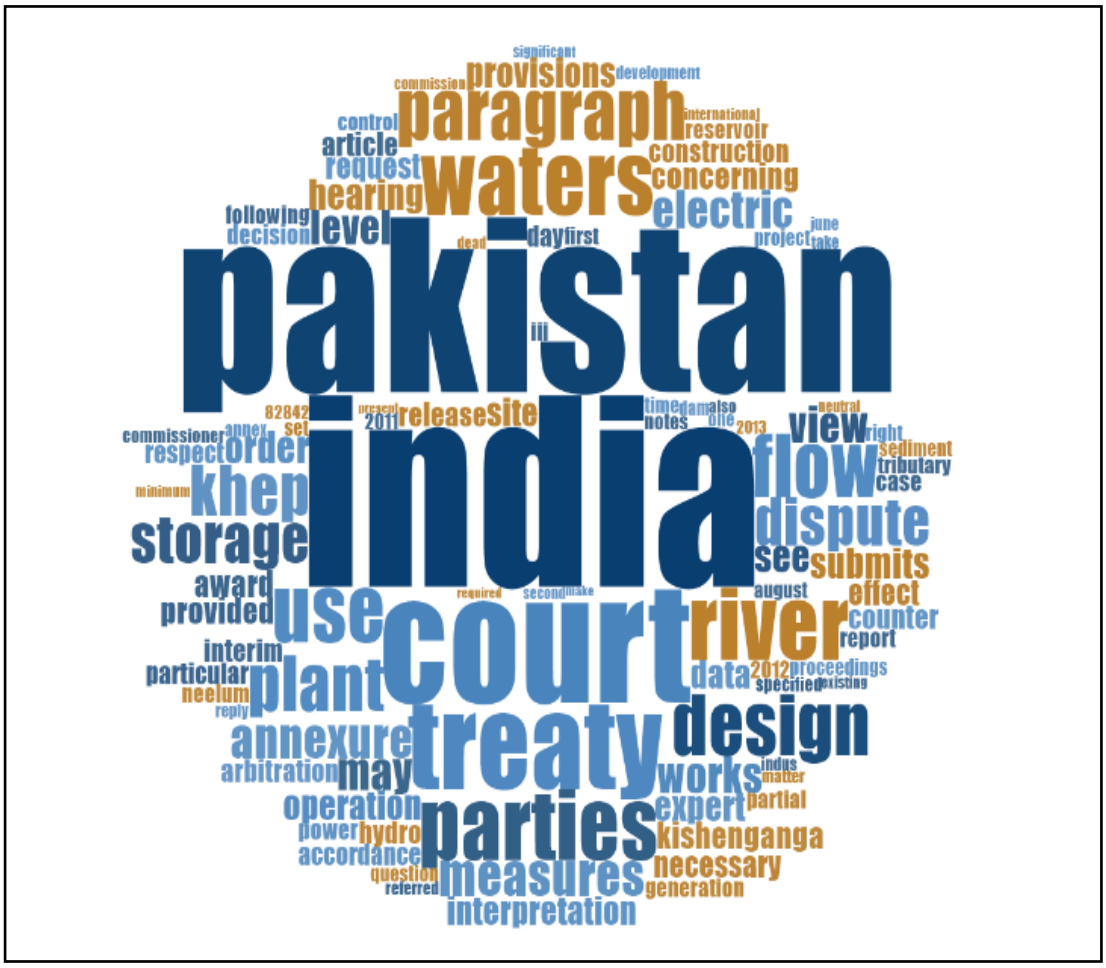
### 5.3 Qualitative Content Analysis for the Kishanganga Dispute

Through qualitative content analysis using the software Nvivo, this section looks at the dominant narratives on the water in the case study of the Kishanganga dispute. Sources of data are- the Kishanganga Arbitration Award, Permanent Court of Arbitration, The Hague 2013; review of academic writing on Kishanganga between 20010 and 2020, and; media coverage in Times of India and the Dawn between 2013 and 2014.

### 5.3.1 The Kishanganga arbitration award

The first document taken for analysis is the F*inal Award in First Arbitration under the Indus Waters Treaty 1960 (*Permanent Court of Arbitration 2013).

**Fig 5.1: Word Cloud based on most commonly appearing words in the final verdict on the Kishanganga Dispute**




In the matter of the Kishanganga Dispute between India and Pakistan under the Indus Water Treaty, at the Permanent Court of Arbitration at The Hague, in the Netherlands, a Court of Arbitration was set up in 2011 to adjudicate the matter. It was a seven-member court headed by Judge Stephen M. Schwebel. The Court gave its award on the India Pakistan dispute in February 2013. The 52-page document was coded to identify key themes and the state's perspective on water. Word frequency was run on

these coded sections. The top five recurring words in the document are “India”, “Pakistan”, “Courts”, “Treaty” and “rivers”.

**Table 5.2: Most frequently occurring words in the document**

| Word | Length | Count | Weighted Percentage (%) | Similar Words (Stems) |
|---|---|---|---|---|
| India | 5 | 2472 | 2.46 | India |
| Pakistan | 8 | 2261 | 2.25 | Pakistan |
| courts | 6 | 1487 | 1.48 | court, courts |
| treaty | 6 | 1039 | 1.03 | treaties, treaty |
| rivers | 6 | 959 | 0.95 | river, river’, rivers, rivers’ |

It is clear that the document takes a state-centric approach to water conflict. The most commonly occurring words in the award are ‘India’ and ‘Pakistan’, both over more than 2500 times, followed by the ‘court’. Thus, the overarching paradigm is neo-institutionalism, showing faith in national and international institutions to resolve all water conflicts.

The main themes of discussion in the document were identified are 1) environmental flow and minimum flow; 2) other environmental concerns; 3) Availability and sharing of data; 4) Power generation and economics of KHEP; 5) Indus Water Treaty and details on the arbitration procedure; 6) agricultural uses in the Neelum valley; 7) KHEP structure; 8) international law; 9) joint action measures. The verdict is unique as it brought in the environmental concerns within the ambit of a decades-old treaty. However, the verdict is very measured and narrowly focused to be able to address the water conflict issue comprehensively. Thus, while environmental concerns are brought into picture, it is overarchingly seen from the perspective of the state.

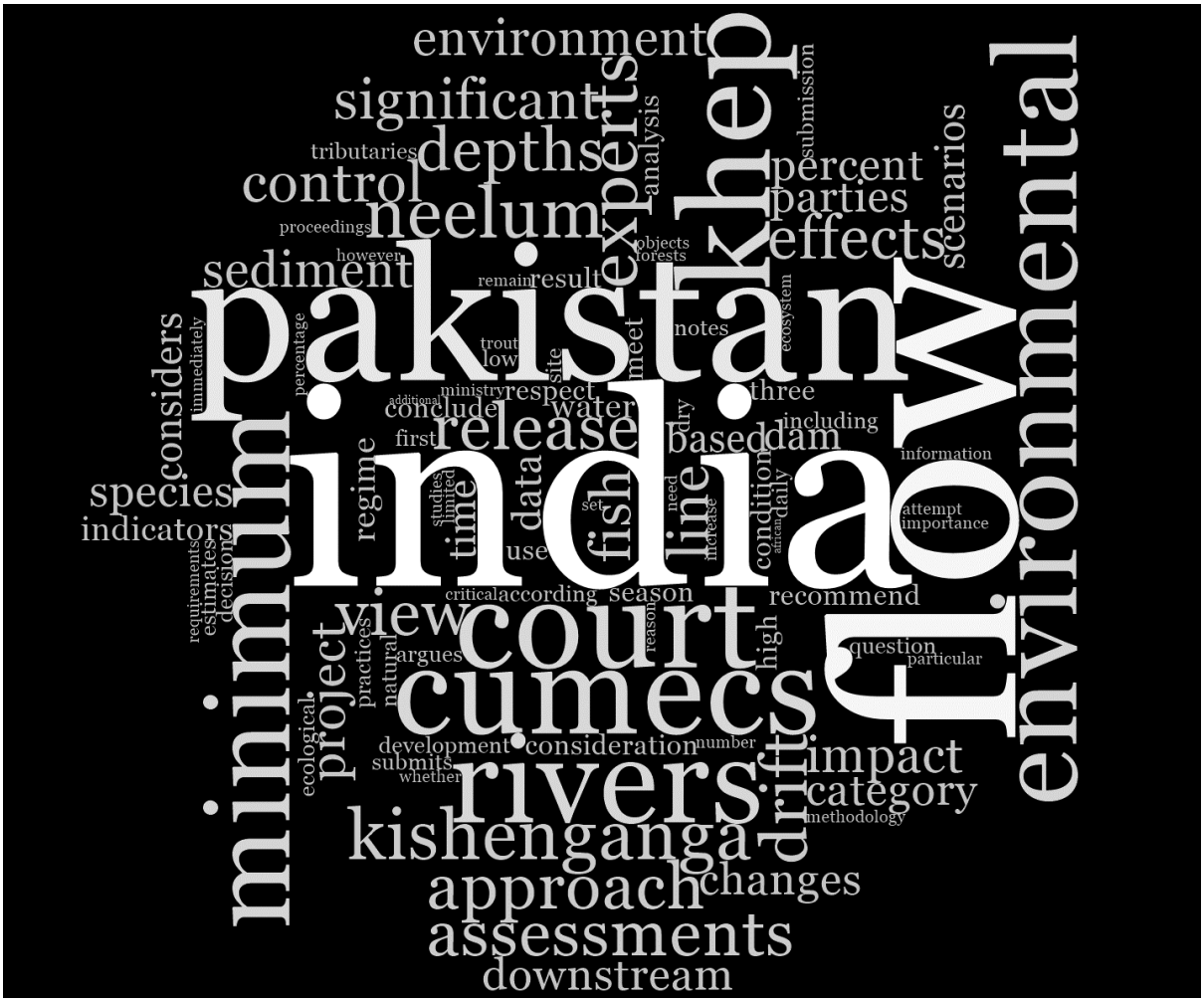
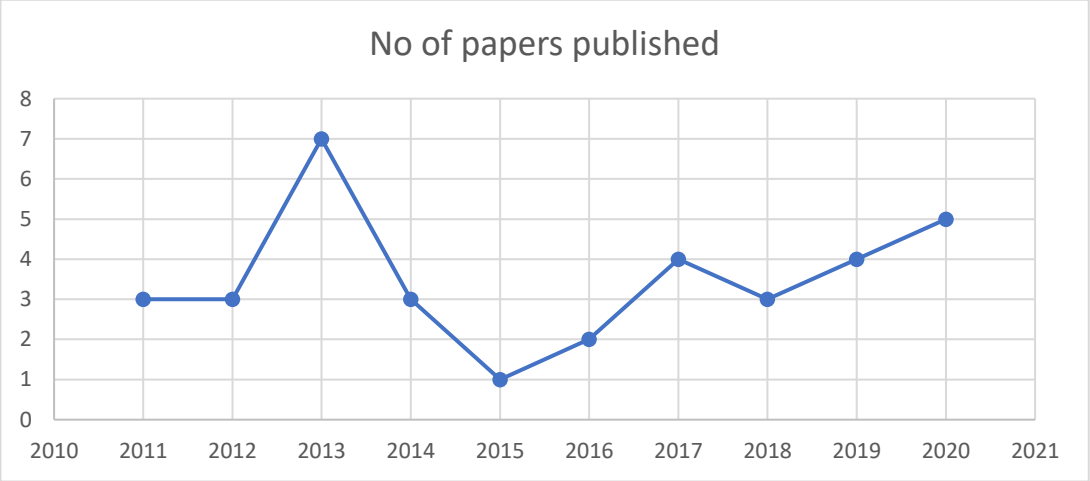



**Fig 5.2: Environmental flow and minimum flow are important considerations within the verdict document**

### 5.3.2 Academic writing on the Kishanganga dispute

The second set of documents reviewed is academic writing on the Kishanganga Dispute. The keywords “Kishanganga” and “KHEP” were searched on Google Scholar for the time period between 2011 and 2020. Articles published in peer-reviewed journals, with discussion on the KHEP were included. A total of 36 articles were included for the review and coded. The following figure shows the trend of publication:

**Fig 5.3: Trend of academic publications on Kishanganga dispute**




This section tries to identify the various conceptual outlooks and theories adopted by scholars writing on transboundary waters in South Asia, especially the KHEP. The key conceptual approaches identified through a review of literature are 1) Water resources management, 2) (neo-)institutionalism, 3) hydro hegemony 4) water wars 5) local concerns-economic and environmental 6) hydro-social discourse analysis, and 7) nexus approach. The most common theoretical perspective is that of water as a resource. Within this category, I have included articles focusing on technical aspects as well as Integrated Water Resource Management. For proponents of IWRM, cooperative watershed management is the only way to "incorporate all of the physical, political, and economic characteristics for a river basin" (Rahman & Varis 2005:17). The second most common perspective is hydro hegemony. The hydro hegemony theoretical perspective highlights water as a security issue, focuses on the role of power, and takes a state-centric approach. Authors analyse the tactics used by states to achieve or counter hydro-hegemony, including coercion, pressure, treaties, and knowledge construction, among others (Zeitoun & Warner 2005). (Neo-)Institutionalism is the third most common theoretical perspective among the authors. This is a water-rational approach based on the liberal theory which argues that the interests of the states lie in mutually beneficial outcomes (Dinar 2011).

**Fig 5.4: Weightage to various discourses and conceptual frameworks in academic publications**

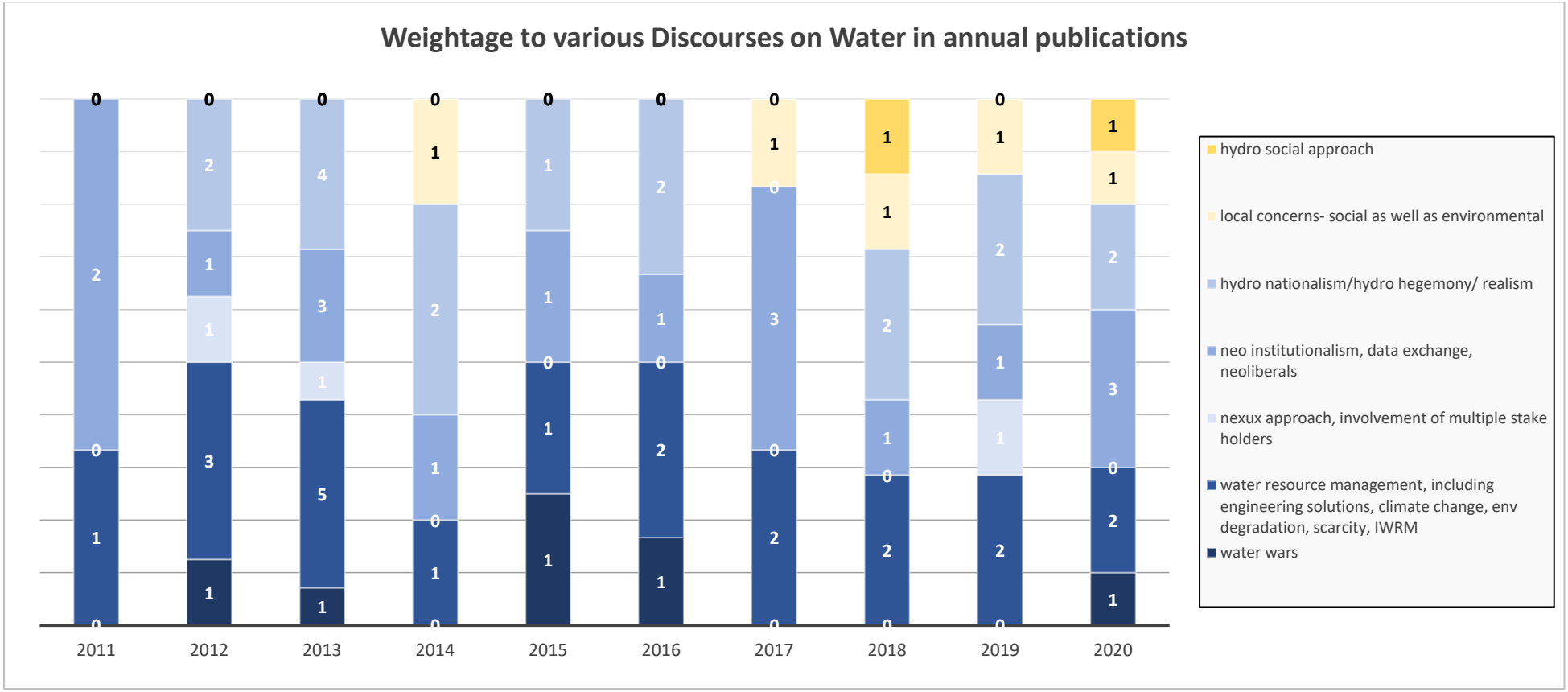


**Figure 5.5: Matrix of articles and the theoretical conceptualisation of transboundary water.**

| | | | Water framework | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Article no. | Year | Authors, Article title | Water as security | Water as resource | Water as a nexus | Neo institutionalism | Hydro-hegemony | Water as a local concern | Socio-hydrology |
| 1 | 2020 | Aijazi, O. (2020) 'Which Kashmir ? Pakistan wala ya India ? Konsa Kashmir ? Pakistan ' s or India's ?' | | | | | | 1 | 1 |
| 2 | 2020 | Bhatti, M. N. (2020) 'Implementation of the Indus Waters Treaty : The Six Decades Perspective ' | | | | 1 | 1 | | |
| 3 | 2020 | Doeffinger, T. *et al.* (2020) 'A diagnostic dashboard to evaluate country water security' | | 1 | | | | | |
| 4 | 2020 | Hussain, T., Javed, M. N. and Shahwar, D. (2020) 'The Reflection of River Warfare in Pakistani and Indian Press: Dispute, Management and Strategies' | 1 | | | | | | |
| 5 | 2020 | Ranjan, A. (2020) 'India-Pakistan hydroelectricity issues: "questions" "differences" and "disputes" | | | | 1 | | | |
| 6 | 2020 | Sehgal, I. (2020) 'Politicisation of Water Resources-II' | | 1 | | 1 | 1 | | |
| 7 | 2019 | Ahmed, Z. (2019) 'Pakistan's Water Crisis and Indus River System: Revisiting National Security' | | 1 | | | 1 | | |
| 8 | 2019 | Akhtar, S. (2019) 'Water sharing conflicts and management in the Indus River Basin' | | | | 1 | 1 | | |
| 9 | 2019 | Escurra Aguirre, J. J. and Jones, C. A. (2019) 'Water Use Efficiency and Storage Capacity in South Asia by 2050' | | 1 | | | | | |
| 10 | 2019 | haq 2019 | | | 1 | | | 1 | |

| Article no. | Year | Authors, Article title | Water as security | Water as resource | Water as a nexus | Neo institutionalism | Hydro-hegemony | Water as a local concern | Socio-hydrology |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 2018 | Adnan, M. (2018) 'Hydro Politics: A Conflict between Pakistan and India' | | 1 | | | 1 | | |
| 12 | 2018 | Zawahri, N. and Michel, D. (2018) 'Assessing the Indus Waters Treaty from a comparative perspective' | | 1 | | 1 | 1 | | |
| 13 | 2018 | Bhan 2018 | | | | | | 1 | 1 |
| 14 | 2017 | Ahmad, M., Yousaf, N. and Zubair, M. (2017) 'Indus Water Treaty: Threats of Abrogation, Plans for Revision and Prospects of Survivability' | | 1 | | 1 | | | |
| 15 | 2017 | Amin, N., Khan, S. and Mir, M. F. (2017) 'Effect of impoundment on fish abundance and distribution in Kishanganga River ( J & K )' | | | | | | 1 | |
| 16 | 2017 | Maqbool, A. (2017) 'The Indus Waters Treaty: Pakistan's Case for a Revision' | | 1 | | 1 | | | |
| 17 | 2017 | Qureshi, W. A. (2017) 'The Indus Waters Treaty And The Role Of World Bank As Mediator' | | | | 1 | | | |
| 18 | 2016 | Khan, M. N. (2016) 'Geopolitics of Water in South Asia' | 1 | 1 | | 1 | 1 | | |
| 19 | 2016 | Khawaja, S. A. (2016) 'Water Dispute between India and Pakistan and its Implications on the Political Relations between both the States' | | 1 | | | 1 | | |
| 20 | 2015 | Riffat, F. and Iftikhar, A. (2015) 'Water issues and its implications over India-Pakistan relations' | 1 | 1 | | 1 | 1 | | |

| Article no. | Year | Authors, Article title | Water as security | Water as resource | Water as a nexus | Neo institutionalism | Hydro-hegemony | Water as a local concern | Socio-hydrology |
|---|---|---|---|---|---|---|---|---|---|
| 21 | 2014 | Bhan, M. (2014) 'Morality And Martyrdom: Dams, Dharma, And The Cultural Politics Of Work In Indian-Occupied Kashmir' | | | | | 1 | 1 | 1 |
| 22 | 2014 | Fakhr-ul-Islam, Shah, G. A. and Baloch, F. (2014) 'Operationalizing the Indus waters treaty: case study of upper riparian' | | 1 | | 1 | 1 | | |
| 23 | 2014 | Vick, M. J. (2014) 'Steps towards an Afghanistan-Pakistan water-sharing agreement' | | | | | | | |
| 24 | 2013 | Bansal, A. (2013) 'Indus Water Treaty: Problems of Perception' | 0 | 1 | | 1 | | | |
| 25 | 2013 | Hill, D. P. (2013) 'Trans-boundary water resources and uneven development: Crisis within and beyond contemporary India' | | | 1 | | 1 | | |
| 26 | 2013 | Malik, M. A. and Tahir, Muhammad Aslam; Bhatti, A. Z. (2013) 'Indus Basin Transboundary water issues in past and present perspective' | | 1 | | 1 | | | |
| 27 | 2013 | Naz, F. (2013) 'Water: A cause of power politics in South Asia' | | 1 | | | 1 | | |
| 28 | 2013 | Qadir, A. *et al.* (2013) 'Potential effects of human and climate change on freshwater resources in Pakistan' | | 1 | | 1 | | | |
| 29 | 2013 | Singh, M. (2013) 'Pakistan-occupied Kashmir-A buffer state in the making? | | | | | 1 | | |
| 30 | 2013 | Wirsing, R. G. (2013) 'Melting the Geopolitical Ice in South Asia' | 1 | 1 | | | 1 | | |

| Article no. | Year | Authors, Article title | Water as security | Water as resource | Water as a nexus | Neo institutionalism | Hydro-hegemony | Water as a local concern | Socio-hydrology |
|---|---|---|---|---|---|---|---|---|---|
| 31 | 2012 | Katoch, D. C. (2012) 'Indus Waters and Pakistan : Seeds of Future Conflict ?' | 1 | 1 | | | 1 | | |
| 32 | 2012 | Vaid, M. and Maini, & T. S. (2012) 'Indo-Pak Water Disputes: Time for Fresh Approaches' | | 1 | 1 | | | 1 | |
| 33 | 2012 | nosheen begum 2012 | | 1 | | 1 | 1 | | |
| 34 | 2011 | Ahmad, A. (2011) 'Indus Waters Treaty A Dispassionate Analysis' | | | | | | | |
| 35 | 2011 | Zawahri, N. A. (2011) 'Using freshwater resources to rehabilitate refugees and build transboundary cooperation | | | | 1 | | | |
| 36 | 2011 | Uprety, K. and Salman, S. M. A. (2011) 'Legal aspects of IWT" | | 1 | | 1 | | | |

The authors focus on explaining how institutions facilitate or hamper water cooperation. There is also much inquiry into the design of institutions and their impact on water conflicts (Saravanan 2015). The water wars and water scarcity framework is the fourth most commonly adopted framework by authors. These water war predictions were based on the concept of water as a scarce and limited natural resource. Overall increasing human population, economic growth, water pollution, as well as climate change are cumulatively going to create situations of water stress for several regions of the world and might lead to water wars (Postel 2000). In recent years there has been an increasing trend of publication on local concerns and hydro-social approaches although it is still a small percentage of the total. For several articles, there was an overlap of more than one framework. This has been shown in the matrix.

### 5.3.3 Media narratives on Kishanganga Dispute and Award

In order to make a case study of media reporting on the Kishanganga dispute, online archives of The Times of India and The Dawn were searched for the keywords "Kishan Ganga" and "Indus Water Treaty" for two years. The years chosen were 2013 and 2014 as the verdict of the Court of Arbitration came out in December 2013. Overall, 33 articles were collected, 9 from the Times of India and 24 from The Dawn. It is seen that the issue got greater and more negative coverage in Pakistan for the selected paper.

#### 5.3.3.4 Sentiment analysis of articles

The newspaper reporting in both countries is often sensationalised, one-sided and underinformed (Nicole and Nair 2020). In order to identify the trends of reporting, sentiment analysis was done for the articles based on positive and negative word use frequency.

**Table 5.3: Sentiment Analysis for articles from the Times of India**

| Article Heading | A : Very negative | B : Moderately negative | C : Moderately positive | D : Very positive |
|---|---|---|---|---|
| Court of Arbitration upholds India's position on Kishenganga | 0 | 4 | 4 | 2 |
| Hague court upholds India's right on Kishanganga project in Kashmir | 0 | 1 | 1 | 1 |
| India allowed to go ahead with J&K's Kishanganga project | 0 | 1 | 2 | 1 |
| Indo-Pak talks on river water issues to begin on Sunday | 3 | 0 | 2 | 1 |
| Indus water treaty talks begin today | 1 | 1 | 1 | 1 |
| Pakistan accuses India of violating Indus Water Treaty Agreement | 2 | 3 | 0 | 1 |
| Pakistan may ask India to review Indus Waters Treaty | 2 | 5 | 2 | 1 |
| Pakistan objects to 4 Indian projects on Chenab River | 0 | 3 | 1 | 1 |

**Table 5.4 : Sentiment Analysis of articles from the Dawn**

| Article Heading | A : Very negative | B : Moderately negative | C : Moderately positive | D : Very positive |
|---|---|---|---|---|
| 'Consensus must on dams' | 8 | 7 | 5 | 1 |
| 'Tarbela desilting to be costlier than new dam' | 6 | 4 | 7 | 0 |
| 'The Waters of Lahore' | 6 | 1 | 11 | 3 |
| 'World Bank needs to revisit Indus waters treaty' | 12 | 12 | 6 | 0 |
| Aziz's statement on Siachen | 6 | 2 | 4 | 0 |
| Beyond the IWT - | 10 | 3 | 9 | 0 |
| Call for planning to cope with effects of climate change | 4 | 4 | 3 | 1 |
| India assuming aggressive posture | 6 | 6 | 8 | 1 |
| Costly international litigations | 6 | 14 | 8 | 0 |
| Death of rationality | 11 | 14 | 8 | 2 |
| Importance of Kalabagh Dam | 7 | 4 | 3 | 0 |
| India asked to change design of Kishanganga project - Pakistan | 5 | 3 | 4 | 0 |
| India can divert only minimum water from Kishanganga: Tribunal | 5 | 7 | 13 | 0 |
| India told to ensure water flow for Neelum-Jhelum project | 7 | 3 | 8 | 0 |
| India_ water wars | 7 | 4 | 3 | 0 |
| Issues in Kishanganga hydropower project | 10 | 10 | 10 | 0 |
| Kishanganga verdict a tilt in India's favour | 6 | 7 | 7 | 3 |
| No water, no food | 12 | 8 | 11 | 3 |
| Objections to four more Indian projects raised | 6 | 7 | 3 | 2 |
| Pakistan, India lawmakers back sustained dialogue | 6 | 3 | 4 | 2 |
| Ravi and Chenab_ demons and lovers | 14 | 14 | 18 | 3 |
| Sold down the river | 10 | 8 | 6 | 0 |
| Water wars_ implications for Pakistan | 7 | 1 | 3 | 1 |
| Water woes_ Inequitable sharing | 7 | 3 | 3 | 0 |

### 5.3.3.5 Major themes identified

Hydro nationalism seems to be the most common theme in the articles under study. The major themes in Dawn were 1) India's hegemonic behaviour, 2) the need to revise the IWT, 3) water shortage in Pakistan. On the other hand, the major themes identified in The Times of India are 1) a report of Pakistan's blaming and 2) vindication of India's stand at the Court of Arbitration. Interestingly, both the newspapers presented the verdict as a victory for the positions of their respective countries.

Overall, the conceptualisation of water in all three platforms is typically 'modern'. Water is most commonly envisioned as a scarce resource, and the major claimants of this resource are the nation-states, both of which try to maximise their hold on the scarce resource. It can be argued that approaching shared waters from a state security perspective is inherently ridden with contradictions and pushes countries towards a zero-sum game. Over the decades, such an attitude has fuelled the sentiments of hydro-nationalism within the region. This is reflected in the Kishanganga dispute as well. On the one hand, the state of Pakistan raised concerns about the environmental flow, while being lax on this front domestically. Similarly, the Indian government paid little heed to local sentiments and needs while going ahead with KHEP despite protests from the locals of Gurez Valley. States on either side are politicising water conflicts as it is a populist tool. The media is adding to the confusion, due to sensationalised reporting, which is often under-researched and event-specific, unable to present the complexity of water reporting. Within academia too, though there is a diversity of water worldviews, the most popular approaches are of looking at water as an abstract resource that could be appropriated through power(hydro-hegemony) or through institutional arrangements (neo-institutionalism). Some scholars still talk of water-related conflicts and wars between the countries. Thus, it is difficult to reach a sustainable resolution to the problem, as the view is fundamentally incomplete and sometimes clashing. These developments have implications for all future constructions. Even as the Kishanganga dispute was being adjudicated, India and Pakistan were already in disagreement over the Ratle hydropower plant (850 MW) being built over the Chenab. In 2013 India and Pakistan started discussions over four upcoming dams on Chenab in Jammu Kashmir over the Chenab- the Pakal Dul, the

Mujar, the Ratle and the lower Kalani on Chenab. Meanwhile, construction at Ratle has already begun (Mustafa 2014) despite Pakistan's initial objections.

Taking a socio hydrological approach to the problem can be a way toward resolution. In all the three spheres of state, media and academia, the social aspect of the shared waters is not given due importance. For instance, three vital aspects missing in the dominant discourse on this water dispute, and other disputes in South Asia, in general, are gender, environment and grassroots narratives. Without taking these aspects into consideration, merely focussing on the state-centric hydro-engineering approach narrows down the scope of reaching a mutually acceptable solution. Especially in a region like South Asia, where a history of water securitisation is now established over the last half-decade, involving a large number of stakeholders is the only way to reach a more sustainable solution (Barua 2018). In fact, hydro diplomacy can be a uniting force in the region due to its geographical connectivity. And for that, there is a need to view water in a fundamentally different way. Water as an organic part of the local milieu is the first scale of observation to tackle any water security issue. Following are examples of some major aspects missing in the general discourse across platforms:

*Environment and climate change*

In the current times, any discussion on water sharing without considering the impacts of climate change is a doomed exercise. Climate change concerns were present in academic deliberation, however, no article was found correlating its impact on shared waters and dams. Even though environmental concerns were addressed in the CoA Verdict (PCA 2013), the approach is very tokenistic. The calculation of e-flow levels in the Kishanganga dispute has been ad hoc. It was based on determining a minimum flow level rather than an environmental flow level (Thakkar 2014). This is a simplistic method assuming that if certain minimum levels of water flow are maintained in the river its environment will not be damaged. The academic literature, as well as newspaper articles, devote very little space to this.

*Transboundary aquifers*

Transboundary aquifers present a real challenge to the political appropriation of water by nation-states. While it is a deep concern of the locals, discussions on transboundary waters were completely missing in the current database.

*Gender*

The gender perspective is completely missing in all the studied documents. Not only are women numerically underrepresented as authors, diplomats and reports. On the other hand, there is very little discussion on traditionally feminine values such as care and cooperation while emphasising masculine values of power and aggression. Within the research-based literature, with the sole exception of one article, (Bhan 2018) there is no discussion on the gendered nature of transboundary waters or their differentiated impact on women. It has been established that gender diversity at the diplomatic levels generally correlates with greater success (Sehring 2020). However, there is a complete absence of female representation in the arbitration process with two exceptions- Dr Alka Upadhyay DHI (India) Ltd., Technical Advisor for India and Dr Jackie King River Ecology & Environmental Flow Specialist Southern Waters as an expert witness for Pakistan. Similarly, there were no female reporters or special female-centric issues covered in the newspaper articles.

These are just three examples highlighting how a more comprehensive approach to transboundary waters can be adopted. The first step is to begin to think about water differently. Politicians, reporters, academicians across disciplines, particularly social sciences which have been traditionally ignored) and many other stakeholders need to exchange views and ideas for a realistic conceptualisation as well as a solution to the problem of water security.

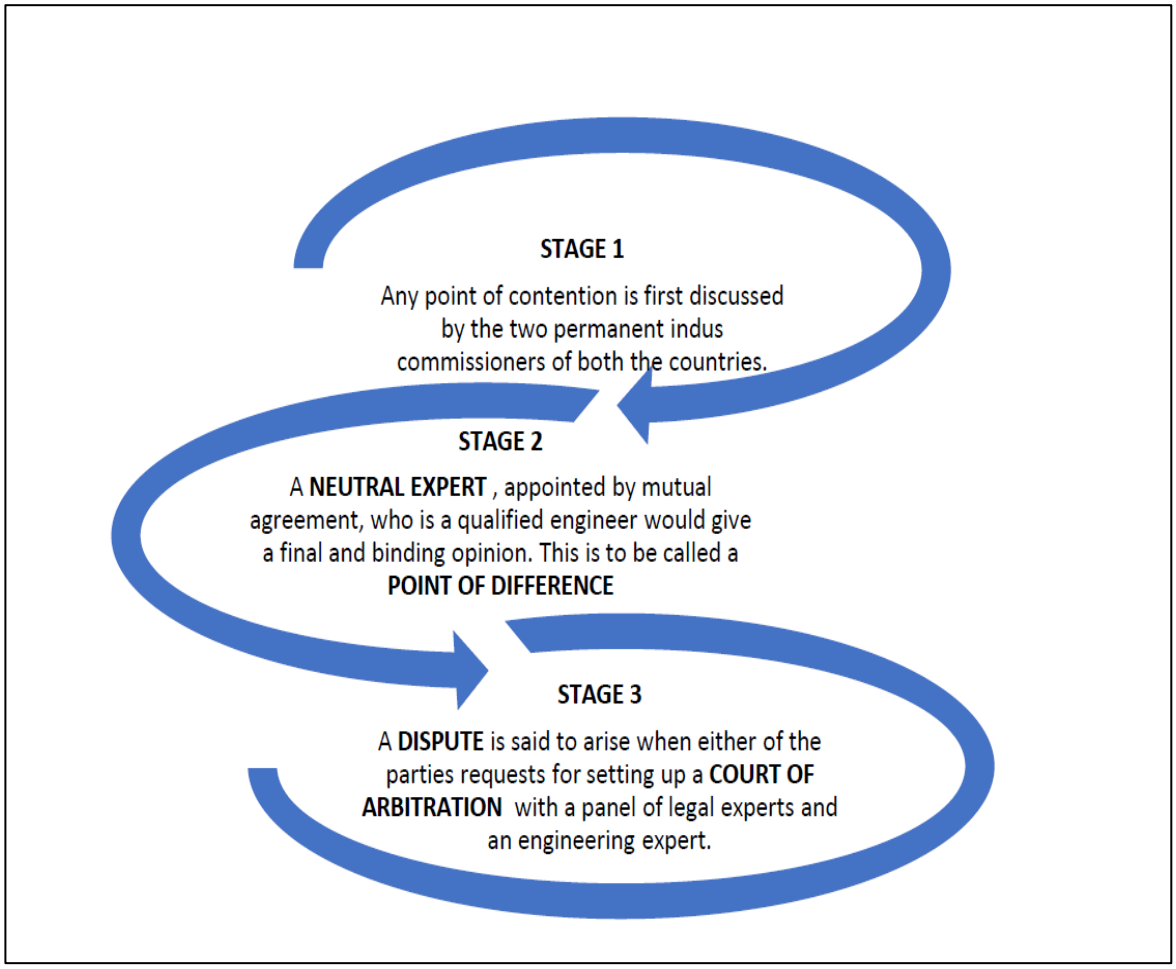
## 5.4 Critical Assessment

On critical analysis of the whole dispute and the verdict given by CoA, several issues arise. They have been discussed topic-wise in the following paragraphs:

### 5.4.1 Difference V/S Dispute

Within the IWT, the resolution of disputes has been outlined in detail in annexure G. It is visualised as three levels of escalation.

**Figure 5.6: Dispute Resolution Mechanism within the Indus Water Treaty**



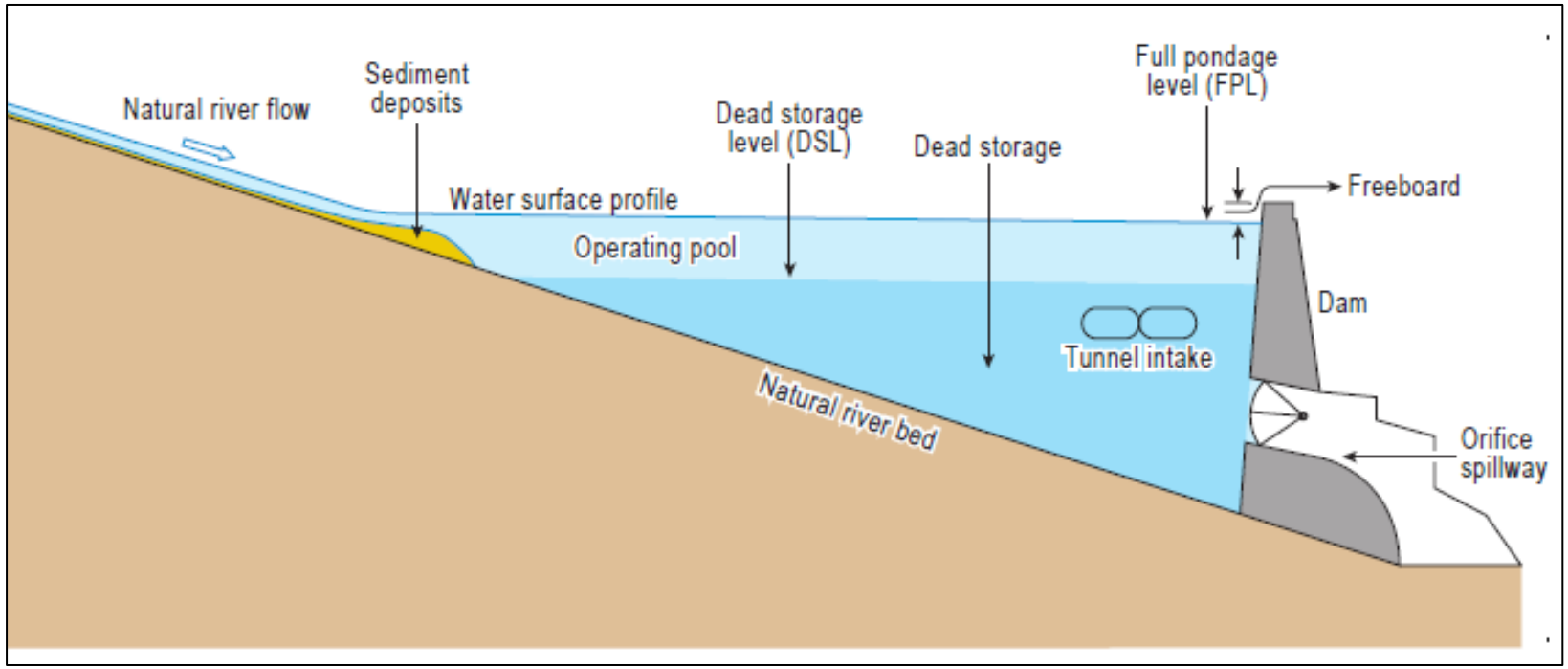

One question that begs inquiry is the escalation of this issue from a difference to a dispute. How did the need for a court of arbitration come up? Pakistan had made up its mind to escalate it into a dispute and not just a difference (which just requires an engineer as a neutral expert) but a whole court. In the process of arbitration, the Indian side questioned the very need for an arbitration court. It was argued by the Indian side that the questions raised by Pakistan were technical in nature and could be resolved by a neutral expert only. Secondly, India argued that Pakistan demanded a court of the arbitration without going for the neutral expert first. Thus, it did not follow the steps prescribed in the treaty for dispute resolution. All this has been discussed in detail in the partial and final verdict of the court. Especially in the context of the second dispute, India raised the following argument:

> "First, India submits that, except when the Commissioners are in agreement to pursue an alternative course, the Treaty requires a neutral expert to make the

> initial determination of whether a matter arising between the Parties is a technical difference to be referred to a neutral expert or a dispute to be referred to a court of arbitration, and that Pakistan did not request the appointment of such a neutral expert in this instance. Second, India submits that the subject matter of the Second Dispute is objectively among the questions consigned to a neutral expert by the list in Annexure F and, moreover, that Pakistan has itself expressed the intention to submit the same issue to a neutral expert. The Court will examine each objection to the admissibility of the Second Dispute in turn." (Permanent Court of Arbitration (2013), Paragraph 475)

However, the Court of Arbitration concluded that Pakistan was well within its rights to call for arbitration. In order to reach this conclusion, it used the following arguments. Firstly, it dismissed India's first objection which mentioned that the raised concerns could be addressed by a Neutral Expert itself. India did not raise this point right in the beginning of the dispute. Neither the Pakistan Commissioner nor his Indian counterpart raised this concern right at the start of the dispute. Thus, since India did not raise this point before the starting of the proceedings of the CoA, the Court dismissed this claim by India. As far as the technical aspect of the treaty is concerned, the court said that nothing in the Treaty specifies the specific conditions for appointment of NE or CoA. Secondly, the CoA constituted for the Kishanganga Arbitration was technically competent. Under Annexure F, it was mandatory to have a technical expert as one of its members. Thus, it was capable of addressing a technical question. The third issue raised by India was India's assertion that Pakistan has committed itself to submit the Second Dispute to a neutral expert. For this, the country cited a letter by Pakistan Indus commission dated 11 March, 2009. The CoA believes that only a formal complaint is to be considered, without going into any discussion of what happened before. It says that Pakistan's objection is not merely technical. Instead, Pakistan is making a broader claim that draw down flushing has been prohibited in the IWT. Thus, it is a legal question, not merely a technical one.

**Figure 5.7: Schematic diagram of a dam with orifice spillway**




**Source: Permanent Court of Arbitration (2013: 95)**

It served two purposes for Pakistan. On the one hand, it delayed the construction work. Discussions had been going on for the longest time before India actually started constructing the dam. Since 1988 the two countries had been discussing the issue without much avail. For twelve years they could not reach an amicable resolution and then had to move for arbitration ultimately. This could be seen as an example of obstructive hydro-nationalism. On the other hand, it brought more international visibility to the issue highlighting that water is a crucial resource and a major point of contention between the two countries. Being located in Kashmir made the dam more strategic. A trend that began with Tulbul and escalated in the Baglihar disagreement found its culmination in the Kishanganga dispute. It was attempted to link the Kishanganga issue with the larger question of territoriality. To a large extent, this aim was achieved. Setting up arbitration ensured that a lot of international bodies were involved such as the Permanent Court of Arbitration, The United Nations as well as The World Bank. It escalated the issue to the international platform in a larger way than a Neutral Expert would not have. The national posturing by both the countries regarding the issue built the discourse as such. It was seen not merely as an issue of the division of water for use, but set within the larger context of the nationality and territoriality. This is obvious from the media coverage that the issue got in both countries. The media highlighted it in both countries as an issue situated within larger geopolitics of the region. Areas which would not be directly affected by the issue were involved with this hydro nationalism.

However, the Permanent Court of arbitration put aside the question of territoriality and based its verdict only on the use of the Indus waters. The partial verdict reads, "The Treaty focuses on the right of each Party to the use of some of the waters of the Indus system of rivers without going into the question of sovereignty over the territory of Jammu and Kashmir through which some of those river's transit." (Permanent Court of Arbitration 2013: Paragraph 360). Further, it is stated more explicitly in Paragraph 362 of the Partial Verdict (2013): "this Partial Award does not—and cannot—have any bearing on the rights or claims that either Party may maintain to sovereignty over the territory of Jammu and Kashmir. Nor are such putative rights or claims relevant to the resolution of the disputes placed before this Court. The Court thus finds it unnecessary to set out in detail the arguments put forth by the Parties on the status of Jammu and Kashmir". Thus, to an extent, the territorial

dispute between India and Pakistan was consciously kept out of the preview of the arbitration. Focusing only on water use and water quality. Thirdly, while 'difference' mere means a technical disagreement between the parties, a "dispute" signals that there are larger substantive disagreements within the IWT. Thus, the issue gets escalated from an engineering-based technical one to a legal one. A legal issue is a more comprehensive and basic one. It buttresses Pakistan's claims to the disputed territory of Jammu and Kashmir.

### 5.4.2 Confidentiality of the proceedings and data

Paragraph 19 of Annexure G provides the provisions regarding confidentiality. The discussions of the Court could be made public after obtaining the consent of both the parties. India stated its agreement to make the submissions public in July, 2012. It also indicated its approval for an open hearing and making the final award public. However, Pakistan expressed reservations against a public hearing and wanted to keep the proceedings confidential. It however consented to public sharing of the final award. Even for the site visit by the court, the same position was maintained by the two countries. Pakistan wanted that the field visit should remain confidential. While India said that a mutually agreed press statement should be released at the end of the visit it finally remained confidential as both parties had not agreed. There is merit in this decision considering the hype that had built up around the issue. In order to avoid further politicisation of the arbitration it was thought best to keep the submissions and data of both the parties private. But very limited information was released even after the final verdict was reached. There was also an expectation that the Permanent Court of Arbitration would put all the submissions of both parties in the public domain. However, this did not come about. This was mainly because of Pakistan's objection. According to the provisions of the IWT, no information could be put in the public domain without the agreement of both parties. Incomplete information could influence the process strategically, non-strategically, or in both ways. In many situations, all parties to a negotiation share uncertainty about many features of the world in which the negotiation takes place. Because all the information was not put in the public domain, there is no way to know what was shared and what was withheld by both the countries in the process of negotiations.

### 5.4.3 Environmental flow v/s Minimum flow

Between India and Pakistan, it is the environment which emerges as the looser. The ecological and economic consequences of hydropower generation have been recognised with the increase in environmental understanding. This new understanding led scientists during the 1970s to search for ways to change dam activities in order to preserve some fish species. The initial emphasis was to decide the minimum flow needed for the protection in a river of an individual species, usually the most representative, such as trout. Environmental flows have evolved from ideas such as "minimum flows." By the 1990s, researchers started to understand that river-supported biological and social processes are too difficult to be summarised by a simple minimum flow criterion. Since then, growing support has been achieved by restoring and sustaining more systematic environmental flows. Around the same time, the capacity of scientists and engineers to identify these flows has expanded and preserved the maximum variety of riverine animals, systems and facilities. It is in this context that the verdict is important. The IWT mentions briefly maintaining the quality of water in the rivers but does not delve into the details. The treaty was signed in 1960, an era when the ecological understanding of water was in its nascent stage. However, the Permanent Court of Arbitration has emphasised this aspect a lot. It argues that India's duty to ensure that a minimum flow reaches Pakistan also stems from the Treaty's interpretation in light of customary international law. However, the Permanent Court of Arbitration has emphasised this aspect a lot. It argues that it also falls within the customary international law for India to make sure that the flow of water to Pakistan is maintained. Annexure G if the IWT also clearly mentions this. The Trail Smelter Arbitration had established this as a fundamental principal of the international customary laws. Principal twenty one of the 1972 Stockholm Declaration also makes it a duty of a sovereign state to limit any environmental harm caused across the political border. A state must "ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." (Permanent Court of Arbitration 2013: Paragraph 448). To summarise, the Court asserted that it has a right to comment on the ecological responsibilities of both parties. Even though IWT is not explicit about the water quality issue, international understanding has developed around environmental issues. The court gives several examples such as the 1972 Stockholm

Declaration, the trail smelter arbitration, Pulp Mills on the River Uruguay 2010 etc. Based on these trends and also the fact that both India and Pakistan have agreed on maintaining a minimum level of river flow within the Kishanganga river system. As India is the upper riparian, it has a duty towards all lower riparian states. In Para 103-5 the Award concludes "as the release falls below 12 cumecs, the lowest flows at the Line of Control progressively become the norm for a significant part of the dry season… The Court provisionally concludes that an approach that takes exclusive account of environmental considerations—assessed in the absence of other considerations—would suggest an environmental flow of some 12 cumecs… And if Pakistan's hydroelectric uses alone were to be taken into account, moderating the KHEP's effect on the NJHEP 125 might entail even higher releases." (Permanent Court of Arbitration 2013, Paragraph 103).

First and foremost, the language of the verdict is such that it creates a false dichotomy. It is as if the environmental concern is just one of the many concerns, which are mutually exclusive. This is a very narrow approach. In fact, the very concept of e-flow is built around the organic concept of water management. Eventually, all the elements are interlinked. The environment will have an economic impact and a social impact too in long run. Moreover, the Permanent Court of Arbitration's analysis as to how it reaches this conclusion is not very convincing. Firstly, the court has calculated a minimum flow instead of an environmental flow encompassing seasonal variations in the flow of water. Secondly, even this minimum flow is not adhered to and is arbitrarily reduced (Thakkar 2013). Following is a detailed discussion of these two aspects. The verdict only protects the minimum flows. This approach has become outdated internationally. This approach in fact contradicts the various cases and covenants quoted by the Permanent Court of Arbitration to establish its capability to judge on this matter. The minimum flow concept has been generally replaced by the environmental flow concept. It will take a variety of flows to look at the river as an ecosystem. For a seasonal river like Kishanganga, this is extremely significant. Although KHEP can pass occasional surpluses above 9 cumecs E-flow releases beyond what it cannot divert, given the storage capacity of 1118.35 million cubic metres of the 35.48 m high dam and 58.4 cumecs diversion tunnel with a length of 23.7 km, only the minimum flow specified by the Permanent Court will be the volume of release in many of these months in all

years but almost all months in bad years The decision does not, however, entirely fulfil its goal of protecting the environment. There is also no conformity to the minimum flow of 12 cumecs measured by CoA. The Permanent Court of arbitration lowers the minimum flow threshold to 9 cumecs without providing any logically consistent explanation.

> "More unconvincingly, Permanent Court of arbitration does not adhere to its own conclusions It is even more disturbing that Permanent Court of arbitration decides not to adhere to even this 12 cumecs flow. Its reasoning for the same is equally unconvincing when it says that India has the right to set up KHEP and also ensure it works effectively. This has already been concluded, but as the Permanent Court of arbitration has itself stated, this right is not absolute and is subject to environmental flow requirements. How can this right change the environment flow requirement remain an unanswered question? The second reason given by the Permanent Court of arbitration for not adhering to this E-flow requirement is that according to Indus Treaty, considerations of customary international environmental norms and practices are secondary to the treaty. But that is not at dispute here, how can that again come in the way of determination of environment flow again remains unanswered." (Thakkar 2013)

The court of arbitrations method of calculating the minimum flow is not scientific or even logically consistent. The calculation is based on the concept that the minimum release should be more than half the minimum monthly release of the river regime which is 49.1% of average dry season flow in the driest month of January. Based on this calculation, the court reaches the value of 12 cumecs. Even this value is then reduced to 9 cumecs giving the two reasons discussed before. This assumption itself is arbitrary and unjustified. The court has no data to justify that the KHEP would become unviable if the minimum flow is higher than 9 cumecs. "In this scenario, just assuming that monthly flows should not be less than 50% due to environmental flows is clearly arbitrary, unscientific and unacceptable." (Thakkar 2013). There is no scientific reason provided in the Permanent Court of Arbitration award for arriving at the conclusion that why 9 cumecs E-flow would be sufficient. In Para 113 the Award says, "The most severe winter in the 34-year record used by both India and Pakistan to assess impacts was 1974- 75. The Court notes that, based on India's data, a minimum flow criterion of 9 cumecs at KHEP is a relatively severe criterion with respect to environmental flow, but would nevertheless be sufficient to maintain the natural flows through the December, January, and February period of that winter." In

other places, the court has said that this minimum flow will not be able to protect 16 per cent of the time. Moreover, Thakkar (2013) has pointed out "Preserving a minimum flow of 9 cumecs would result in a monthly reduction in energy generation at the KHEP of, on average, 19.5 GWh from October to March… On an annual basis, the average reduction in energy generation at the KHEP would be 5.7 per cent…The Court's figures for the net and percentage reduction in energy generation are calculated against the 4.25-cumec minimum flow ordered by the Indian Ministry of Environment & Forests, which the Court takes as the baseline for its determination and for the purposes of this Award." (Permanent Court of Arbitration 2013: Paragraph 114, footnote 165). Thus, the court's arguments are at a fault both from the point of view of environmental ethics and scientifically too.

### 5.4.4 Abrogation/modification of the treaty

The IWT does not provide provisions for the abrogation of the treaty. When the treaty was signed, both countries had an incentive to continue with it. But with the passing of decades and increasing water scarcity and the development of hydro-nationalistic politics, the incentives to continue with the treaty have declined. Indeed, the Indian side had a high-level meeting in 2018 to decide the future of its course of action on the Indus. For the time, it has continued to respect the treaty but pursue its rights more aggressively. Thus, the tensions are expected to rise further. "If beginning seven years after the diversion of the Kishanganga/Neelum through the KHEP, either Party considers that reconsideration of the Court's determination of the minimum flow is necessary, it will be entitled to seek such reconsideration through the Permanent Indus Commission and the mechanisms of the Treaty." (Permanent Court of Arbitration 2013: Paragraph 119).

### 5.4.5 Impacts of Climate Change

Climate change is the biggest crisis that the human community is expected to encounter in the coming decades. It will no doubt have a negative impact on water availability. "Uncertainty is also present in attempts to predict future flow conditions, and the Court is cognizant that flows in the Kishanganga/Neelum may come to differ,

perhaps significantly, from the historical record as a result of factors beyond the control of either Party, including climate change." (Permanent Court of Arbitration 2013: para 117). The issue of climate change has also been briefly mentioned by the CoA. It is to be taken as an indication of increasing concerns for the climate which will come up more and more in all water-sharing negotiations in future. However, it is mentioned just in passing in the Kishanganga verdict without any serious implications. The relevant portion reads "Uncertainty is also present in attempts to predict future flow conditions, and the Court is cognizant that flows in the Kishanganga/Neelum may come to differ, perhaps significantly, from the historical record as a result of factors beyond the control of either Party, including climate change." (Permanent Court of Arbitration 2013: Paragraph 117)

### 5.4.6. Review of the Verdict

Bureaucrats from both sides across the border have been calling for a review of the treaty, highlighting how it's unfair to their respective countries. A need for re-evaluation of the treaty has been brought up by academia too. With reference to the Kishanganga verdict, India has serious reservations against banning all projects with gated spillways. The verdict opens for appeal in 2021. However, none of the countries has made any appeal till now.

"If beginning seven years after the diversion of the Kishanganga/Neelum through the KHEP, either Party considers that reconsideration of the Court's determination of the minimum flow is necessary, it will be entitled to seek such reconsideration through the Permanent Indus Commission and the mechanisms of the Treaty." (Permanent Court of Arbitration 2013: Para 119).

## 5.5 Conclusion

The Kishanganga dispute and the resultant verdict continue to be a major development in water sharing across state borders. It caught global attention and was widely discussed. Overall, it is most relevant as it firmly underlines that any modern understanding between states cannot be oblivious of the larger environmental concern within which they lie.

The Permanent Court of Arbitration put aside the question of territoriality and based its verdict only on the use of the Indus waters. However, without taking in consideration the local situation and impact on local population, the verdict remains inadequate in this context. Secondly, limited data has been shared regarding the whole dispute. There is merit in this decision considering the hype that had built up around the issue. In order to avoid further politicisation of the arbitration it was thought best to keep the submissions and data of both the parties private. But very limited information was released even after the final verdict was reached. Most importantly, there is no scientific reason provided in the Permanent Court of Arbitration award for arriving at the conclusion that why 9 cumecs E-flow would be sufficient. The issue of climate change has also been briefly mentioned by the CoA. It is to be taken as an indication of increasing concerns for the climate which will come up more and more in all water-sharing negotiations in future. However, it is mentioned just in passing in the Kishanganga verdict without any serious implications. Bureaucrats from both sides across the border have been calling for a review of the treaty, highlighting how it's unfair to their respective countries. A need for re-evaluation of the treaty has been brought up by academia too.

All these issues remained unresolved even after the verdict came out. Similar complaints kept coming up between the two countries. For example, Pakistan took the Kishanganga and the Ratle Project by India to the World Bank requesting for a Court of Arbitration while India requested a Neutral Expert for the same. However, the World Bank put a temporary halt to the process. Since December 2016 it declared a temporary pause on its involvement in the matters regarding the Indus Water Treaty in order to protect the Indus Water Treaty. The reason provided was the contradictory nature of the two requests made by India and Pakistan. For the same disagreements on Ratle and Kishanganga dam, Pakistan wanted a Court of Arbitration. India on the other hand requested the appointment of a Neutral Expert. The treaty does not describe any provisions through which World Bank could give preference to one over the other. Both processes initiated by India and Pakistan were advancing simultaneously, which the World Bank thought would put the whole treaty at risk as there is the possibility of contradictory results.

The ban was lifted in April 2022. After several high-level meetings and discussions for over five years between 2016 and 2022, no amicable solution could be reached. This led to the decision of the World Bank to reinitiate the IWT process. It will now appoint both a Neutral Expert and a Court of Arbitration for Kishanganga and Ratle power projects. (World Bank, 2022). This development really puts the treaty to risk and opens the gates for further conflict.

# CHAPTER 6

# EMERGING TECHNOLOGIES AND ENVIRONMENTAL-FLOW CONCERNS

The twentieth century has been the era of "hydrological missions" (Molle et al. 2009). Beginning with the construction of the Tennessee Valley Project in the United States, big hydropower plants were seen as symbols of modernity and a step toward harnessing nature for the social and economic development of societies. Across the world, big dams began to be constructed to harness the rivers and generate electricity. Even in India, Prime Minister Jawaharlal Nehru called the hydropower power plants symbols of growth. While inaugurating India's largest hydropower plant at Bhakra Nangal in Punjab, he called these big dams "the new temples of modern India". This era where dams were seen as symbols of modernity and panacea for all development problems lasted for the entire twentieth century. They established a mode of discourse where governments investing huge resources to build these projects were seen as progressive and pro-economic growth. The control of water channels and manipulating them for human welfare became an established way of garnering popular support and votes in the elections too. At international levels also, several treaties came up between countries to harness and share the benefits of regulating water flow. The Indus Water Treaty was also one of these. The tributaries were geographically divided among the countries. While the western tributaries were allotted to Pakistan. Yet India was allowed to use its waters for power generation. This was in recognition of the hydropower benefits to which the Indian side was proclaimed to have a right.

## 6.1 Impact of hydrological interventions on riverine ecology

With the passage of time, it was realised that the era of hydrological missions had its own problems. On the one hand, big dams were playing havoc with the ecological balance, on the other hand, they were not even profitable in a purely economic sense. This was established through several studies and became a widely accepted fact among experts. For example, taking several data points, Baijal and

Singh (2009) explain how dams, particularly large ones are not always the best choice for water management, taking examples from India. They say, “Dams and particularly large dams, are required to meet the increasing demand for water, food grains, flood control, supply of power, particularly peaking power, and supply of carbon-free energy. However, there are apprehensions about the effects of hydel projects, especially large dams on ecology and society, and the displacement of people. We need to balance current needs with long-term sustainable development” (Baijal and Singh 2009:1659). However, in the popular image, the benefits of these mega projects had been deeply established. Particularly in South Asia, in public image, dams are still associated with development. It is only where there is contention in sharing water resources, that the issue of water quality and ecological balance is often brought up. This is very true in the case of the Kishanganga and the Baglihar Power Projects too.

Hydropower and hydro-engineering have been aggressively pursued across South Asia since the mid-twentieth century putting freshwater diversity and freshwater ecosystems in serious jeopardy (Dudgeon 2005). Dams have emerged as major barriers to biodiversity maintenance across Asia. Rivers in the monsoon region have high seasonal variability of flow. With the construction of flow barriers like dams several problems have emerged, like unusually low dry season flows, and excessive river bed erosion due to increased silt load. They have an impact on biodiversity due to habitat destruction or modification. The problems become more complicated when the rivers run across international boundaries like the Indus, the Ganga and Mekong. The actions of upper riparian states have consequences for lower riparian states. A major aspect that is still in a nascent stage in Asia is the determination of environmental flows. Very little effort has been made to address this issue in India or in China. No standard method of determining e-flows at the global level exists.

Secondly, if a dam is built on the rivers, it allows the sediments in the reservoir to settle. The original storage of the reservoir will then decline and have detrimental effects on the activity of the reservoir. Considering the seriousness of this issue, various approaches for sedimentation management and dam protection are used. These approaches include- maintenance of watersheds, dredging, venting of current density and flushing. In flushing techniques, by releasing the drains, the soil previously collected will be drained from the reservoir. After carrying out several

experimental tests, researchers agreed that the flushed sediment increased with the water level of the reservoir declining and with the discharge from the outlet increasing. Similarly, as the size of sediment shifted from coarse sediment to fine sediment, the flushed sediment rose under the same conditions (Emamgholizadeh et al. 2006). Thus, while the flushing method is useful for the functioning of the dam, it simultaneously has negative environmental impacts on the lower riparian ecosystem due to the sudden, unnatural influx of sediments which had accumulated at the reservoir bottom.

The impact of these new technologies related to dams is best reflected in the health of the river, which is generally referred to as environmental flow or e-flow. It is argued that any kind of construction and intervention on the river should not impact the natural flow of the river.

### 6.2 Defining environmental flow

It is universally agreed that while developing hydropower and water harvesting are necessary for human needs, the overall health of the river should be maintained. The quality of water and flow patterns in a close to pristine condition, completely without any human intervention or minimal human intervention, is generally referred to as the natural flow of the river. This is referred to as the natural flow of the river, the healthiest condition for a river to be in. However, it is practically impossible to maintain the natural flow when river water is harnessed. The amount of water that can be allocated to the river flow based on considerations of environmental, social and economic assessment is often lesser and is known as environmental flow or e-flow. Experts believe that some percentage of the natural flow of a river can be withdrawn while still maintaining a healthy e-flow. However, the percentage of withdrawal for healthy rivers is dynamic and subjective and there is no consensus on a universal percentage of withdrawal. According to Arthington (2018)

> "The Brisbane Declaration (2007) provided evidence of the global dimensions of freshwater ecosystem degradation and its links to human water security. It highlighted the vital importance of environmentally sustainable water resources management and provided a widely recognized definition of environmental flows (sometimes termed e-flows) as "the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human

> livelihoods and well- being that depend on these ecosystems." (Arthington 2018: 2)

Overall, the aim of environmental flow is to maintain the quality, quantity and seasonal flow for maintaining the health of the rivers and the associated aquatic lifeforms. At the same time, there has to be made adequate scope for human societies to be able to use the water required by them. Taking in all these factors makes calculating e-flow difficult. It is clear from the above definition that it is a highly subjective exercise dependent on societal judgements. Thus, there are bound to be great variations across regions and countries in reaching such a figure. Ultimately that would depend on the values of the society and their paradigm towards the water. Ideally, an e-flow regime would try to balance out the ecological needs and associated aquatic health with the economic and social needs such as irrigation, hydropower generation, potable water as well as cultural uses and recreation. There will always be multiple stakeholders with different interests that must be reconciled to determine the e-flow. Thus, in essence, the process of setting an e-flow limit is a question of values, and thus a socio-political one. Thus, "Identifying and making trade-offs are at the heart of setting and implementing environmental flows" (Dyson et al. 2008: 21).

A healthy river not only has adequate e-flow but also no pollution and controlled activities like hydropower generation, navigation etc. Strictly focusing on e-flows out of context may be a cause of conflict among communities. Therefore, along with being subjective, e-flow is also a very dynamic concept. As pointed out in the International Union for Conservation of Nature report 'Flow' (IUCN 210), the need of the hour is adaptive management.

> "As new information will become available regularly and river conditions will change, scientists and water managers will need to periodically adapt their environmental flow practices to the new conditions. Therefore, the adequacy of an environmental flow should be assessed on a regular basis using the best available information. As responses of plants, animals, resources and people to the flows are monitored and evaluated, environmental flows may need to be amended. This process is known as adaptive management, and forms an essential part of dealing with the trade-offs environmental flow setting and management entail." (Dyson et al 2008: 22).

### 6.3 Methods of calculation of e-flow

The concept of e-flow has been developing since the late twentieth century with increasing consciousness of the ecological aspects of water. A range of methods and frameworks for the estimation of appropriate e-flow have been developed across regions over the past three decades. Tharme (2003) identified more than 200 ways of calculating the environmental flows that had been found in academic literature. It is clear that there can be no one universally valid and applicable method or framework that can be used as a blanket measure. While deciding on the most appropriate method different factors have to be kept in mind and prioritised as per needs such as the type of issue (i.e. abstraction, dam, run-of-river scheme), expertise, time and money available, as well as the legislative framework within which the flows must be set.

Broadly, all the various methods can be grouped into four categories depending on the level of experts' involvement as well as site-based v/s whole river basin approach to determining the adequate flow. Following Dyson et al. (2008) these four methods are look-up tables, desk top analysis, functional analysis, and habitat modelling.

#### 6.3.1. Look-up tables

One of the earliest methods for e-flow calculation is the look-up tables which have been in use since the nineteen seventies. It is a very simple method in which water quality is determined based on certain hydrological indices set in a look-up table. Water managers use the selected hydrological indices, such as mean flow and per cent of flow duration curve, to define water management rules and to set compensation flows below reservoirs and weirs. Two well-known examples of this method are The French Freshwater Fishing Law of 1984 and the Q95 Index of the UK. Another method following the look-up tables is the Tennant Method 15, developed in the USA based on aggregated data of several mid-western rivers.

#### 6.3.2. Desktop analysis

As the name suggests, desktop analysis is based on mathematical calculations made on basis of simulated data and projected data. It is based on projection of hydrological data of a river basin on the basis of actual data collected for some time span. It is an approximate measure. The benefit of this method is that it is cheap and quick to

calculate. The Global Environmental Flow Calculator developed by International Water Management Institute is based on desktop analysis.

### 6.3.3. Functional analysis

The functional analysis method of environmental flow calculations broadly takes into account the hydrological as well as biological aspects of the ecosystem to reach an appropriate level of e flow. The functional interlinkages between the water body and the biological life associated with it are taken into consideration while trying to reach the optimum levels of required flow in the river. This is a highly technical method needing the inputs from several experts. Earth science experts including hydrologists, hydro-geologists and geomorphologists work together with biologists and zoologists to determine adequate flow for the entire ecosystem including the rivers and life systems dependent on it. It is a very technology heavy method. It is more time taking and expensive compared to look up tables and desk top analysis. However, the estimates developed by this method are more accurate and appropriate for sustainable river ecology.

### 6.3.4. Habitat modelling

Habitat modelling is the most comprehensive method of environmental flow calculation. This method is frequently used in riverine ecosystems to determine the e-flow on the basis of aquatic habitat modelling. It uses "environmental flow assessments as a means of defining the empirical relationship between environmental variables, and usable habitat for selected target species, life stages or aquatic communities." (Maddock 2016:1). Historical, present as well as future habitat scenarios for the aquatic flora and fauna of the river system are modelled so as to determine the sustainable e-flow levels. Habitat modelling also brings in the factor of time in the estimation of e-flows. This methodology was first developed through Instream Flow Incremental Methodology (IFIM) and the Physical Habitat Simulation (PHABSIM) system (Maddock 2016).

## 6.4 Holistic approach

It is now generally acknowledged that the best method is the holistic method. More and more methods are including the whole ecosystem, including the wetlands,

groundwater and estuaries while building up scenarios, along with the sensitive aquatic life such as invertebrates. Apart from this another principle commonly acceded is the need to maintain seasonal variability of the natural flow of the river system.

In order to come up with numbers that are inclusive of all these concerns, generally, experts from different fields have to come to work together and build up a consensus. It also requires non-expert stakeholders such as members of civil society etc. An ideal holistic method would cover the whole hydrological-ecological-stakeholder system. This could include both experts as well as non-experts who bring in local nuances and cultural value sets regarding the water. But involving so many people and experts makes it a lengthy and expensive exercise compared to others. The unavailability of relevant data is another obstacle to be overcome in using the holistic method.

### 6.4.1 Frameworks for flow assessment

Based on these different methods, three different frameworks have emerged to look at e-flows. These are - the In-stream Incremental Methodology (IFIM) framework, the Downstream Response to Imposed Flow Transformation (DRIFT) framework and the Resource Assessment and Management (RAM) framework. The IFIM framework addresses the impacts of changing river flow regimes. The DRIFT framework, developed first in South Africa, is more comprehensive, addressing all aspects of a river ecosystem. It is a “scenario-based framework”, creating several possible e-flow regimes for different desired outcomes and their ecological, social and economic impacts. Within DRIFT there are four separate modules to determine the number of scenarios. The third comprehensive framework, RAM was developed by the UK Environment Agency to balance out the needs of the fisheries industry and ecological services provided by the river catchment. Its characteristic aspect is looking for responses from all interested groups and the formation of catchment stakeholder groups.

## 6.5 Legislations and e-flow

As the e-flow is a consensus-building exercise, a lot of stakeholders are involved in determining what an e-flow should be. The process of building a legal consensus has

been ongoing for several decades. Significant development happened in 2007 with the building up of the Brisbane Declaration and Global Action Agenda. After a decade, the Brisbane declaration was revisited and a new document was built up, "The Brisbane Declaration and Global Action Agenda on Environmental Flows (2018)". This document represents the current frontier of knowledge in the field of e-flow.

### 6.5.1 The Brisbane Declaration and Global Action Agenda on Environmental Flows (2018)

Arthington et. al. (2018) identifies six main key aspects of the 2018 Brisbane Declaration on Environmental Flows.

> "1) Environmental flows are essential to protect and restore freshwater-dependent aquatic ecosystems, and to deliver important and wide-ranging ecological services that, in turn, support cultures, economies, sustainable livelihoods, and well-being.
>
> 2) Environmental flows have been compromised or are at risk in most aquatic systems around the world, and the cumulative global impacts on biodiversity, aquatic ecosystem health, ecological services, and society are severe (Dudgeon et al., 2006; Vörösmarty et al., 2015; Bunn, 2016).
>
> 3) However, judicious use of water to better balance human and ecological needs can support biodiversity, resilient ecosystems, and socially-valued ecological services, including those provided by modified and novel aquatic ecosystems (Acreman et al., 2014b; Poff et al., 2016). There is ample evidence that concerted efforts to provide environmental flows can lead to societal and ecological outcomes that are socially acceptable and economically beneficial (e.g., King and Brown, 2010; Hermoso et al., 2012; Chen and Olden, 2017; Harwood et al., 2017).
>
> 4) Implementation of environmental flows requires a complementary suite of policy, legislative, regulatory, financial, scientific, and cultural norms and values that ensure effective delivery and beneficial ecological and societal outcomes (Hart, 2016 a,b; Harwood et al., 2017; Horne et al., 2017c). The full and equal participation of people of all cultures, and respect for their rights, responsibilities and systems of governance in environmental water decisions can strengthen sustainable outcomes, and these social and cultural dimensions of e-flow

management warrant far more attention (Richter et al., 2010; Johnston, 2012; Vörösmarty et al., 2013; Taylor et al., 2016).

5) Challenges to environmental flows science and practice are emerging as societal perspectives shift due to increased uncertainty about water availability under growing human demand and climate change (Milly et al., 2008; Poff and Matthews, 2013; Capon et al., in review). It is anticipated that more variable water regimes and changing patterns of human use will increase the risk of aquatic ecosystem degradation, and intensify the urgency for action to implement optimal water management solutions from human and environmental perspectives (Humphries and Winemiller, 2009; Rockström et al., 2014; Bunn, 2016).

6) To address these issues comprehensively and globally requires more recognition, effort, innovation, commitment, and above all concerted implementation actions, to achieve beneficial outcomes from environmental flows and wise freshwater management for people, biodiversity and ecosystems." (Arthington et al 2018: 5,6)

Based on these general agreements, some actionable recommendations on e-flows were developed in Brisbane for all stakeholders including individuals, communities and governments. They are built around the three themes viz., leadership, management, and research. Under "Leadership and Governance", it is emphasised that representative bodies at all levels, right from international, national, provincial, and regional, to local should be involved in the development of laws and policies regarding river flow and health. Private sector members should also be brought in as stakeholders. Secondly, for the implementation of the flow regime, and management of an ecologically sustainable flow regime, several stakeholders should be involved, such as water under management, transboundary, national, and regional water agencies, basin organizations, large water users, NGOs, researchers, cultural groups, indigenous organizations, and other stakeholders. The third actionable aspect, "research" highlights the need for interdisciplinary studies on methods and frameworks of flow regimes, across the entire cycle of water management.

## 6.6 Environmental Flow regime in South Asia

There is a complete absence of a regionally built consensus on the e- flow regime at a regional level in South Asia. There have been country-level attempts to assess e-flow

for different rivers but it is all in a very nascent and underdeveloped approach. Talking about the Indus River in particular, very little effort has been made by countries on either side to have a mechanism to determine the best levels of e-flow for the western rivers allocated to Pakistan. Following the holistic method, integrating inputs from experts, local communities and governments at different scales can reduce the hydro nationalism that has come to be associated with the water allocation in the region. This is a nascent area for work in the academic development of the region. One significant development is the development of the Global Environmental Flow Calculator (GEFC) by the International Water Management Institute (IWMI), Sri Lanka (Smakhtin. and Eriyagama 2008). The method uses monthly flow data and is built around a flow duration curve, which ensures that elements of natural flow variability are preserved in the estimated environmental flow time series. The curve is calculated for several categories of aquatic ecosystem protection from 'largely natural' to 'severely modified'. The analyses can be carried out either using default (simulated) global flow data, with a spatial resolution of 0.5 degree, or a user-defined file. The package is seen as a training tool for water practitioners, policymakers and students, and as a tool for rapid preliminary environmental flow assessment. There have been certain scholarly papers in academia that are in the public domain. Prakasam and Saravanan (2021) use a different method based on the wetted perimeter method and GIS application for the calculation of e-flow in the Binwan Basin in Himachal Pradesh. Similarly, Suwal et al. (2020) use the GEFC to calculate e-flow in the Kaligandaki basin in Nepal.

### 6.6.1 Need for an institutionalised e-flow regime in Indus

There is very little development of and indeed even recognition of the need for environmental flows development in the Indus Basin. However, there is an urgent need to work on this aspect and develop bilaterally agreed holistic methods for various tributaries of the Indus. Particularly for the western tributaries, a mutually agreed flow regime can put an end to the disputes that originate with each new power plant that India plans and Pakistan invariably, yet understandably, objects to. The institutionalisation of an e-flow regime calculation and maintenance can minimise this conflict to a very large degree. For the Indus River system, there has been a lot of

concern from environmentalists, particularly in Pakistan, regarding the degrading water situation in the valley. Salik, K. M. et al. (2016) in an article 'Environmental flow requirements and impacts of climate change-induced river flow changes on the ecology of the Indus Delta, Pakistan', for Regional Studies in Marine Science look at different e-flow scenarios in the Indus Valley Delta and its impact on climate change. However, regarding the Kishanganga and the Baglihar, there has been very little development. Even PCA did not give details of the methodology followed to calculate the e-flow for the verdict. It is simply based on the minimum flow-based calculations which are not environmentally sustainable at all. Looking at the Kishanganga and Baglihar disputes, in particular, it is apparent that having an institutionalised system for e-flow determination is the only way that such disputes in future can be avoided.

### 6.6.2 Estimation of various e-flow regimes for Kishanganga

This section makes an attempt to identify levels of e-flow for the Kishanganga at the site of KHEP under various scenarios. The analysis is made using the desktop analysis method as used in the GEFC. The Global Environmental Flow Calculator (GEFC) by the International Water Management Institute (IWMI), Sri Lanka (Smakhtin and Eriyagama 2008) is a software that simulates e-flow classes for various river systems. The methodology is described as under:

> "The method uses monthly flow data and is built around a flow duration curve, which ensures that elements of natural flow variability are preserved in the estimated environmental flow time series. The curve is calculated for several categories of aquatic ecosystem protection from 'largely natural' to 'severely modified'. The analyses can be carried out either using default (simulated) global flow data, with a spatial resolution of 0.5 degrees, or a user-defined file. The corresponding environmental flows progressively reduce with the decreasing level of ecosystem protection. A non-linear data transformation procedure subsequently converts the calculated environmental flow duration curve into a continuous time series of environmental flow." (Smakhtin and Eriyagama 2008: 1396).

The hydrological characteristic calculated include the monthly and annual time series, the monthly flow distributions, and a few other statistics.

**Figure 6.1: The illustration of progressive zooming in the Global Environmental Flow Calculator from the main screen to the individual river basins and data cells seen at a higher zoom level using IWMI E-Flow Calculator**

**Figure 6.2: Monthly and annual time series simulated for the Kishanganga Dam location (34.6degree North and 74.75 degrees East) using IWMI global environmental flow calculator**

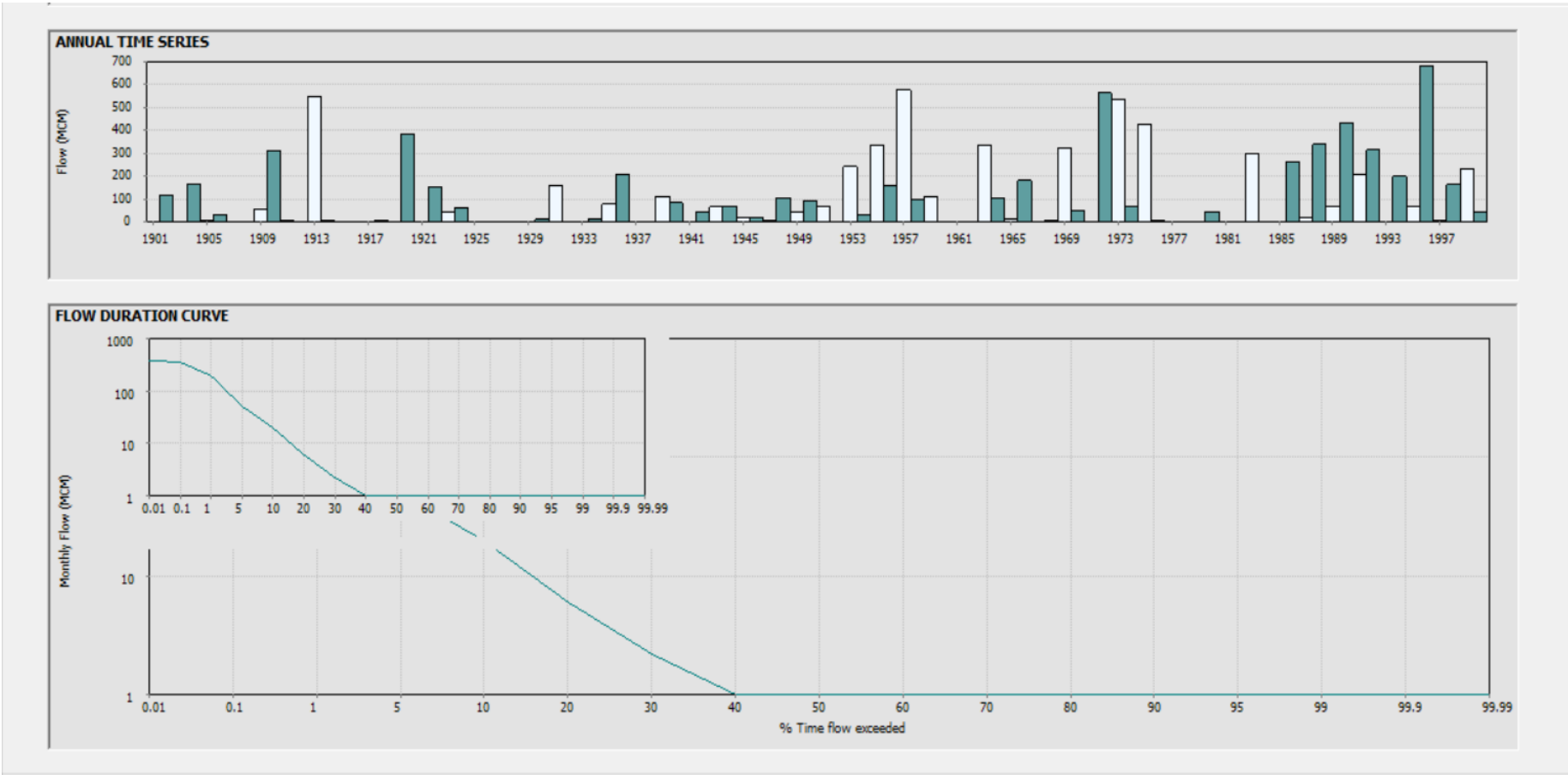


**Figure 6.3: Monthly and annual time series simulated for the Kishanganga Dam location (34.6 degree North and 74.75 degrees East) using IWMI global environmental flow calculator**

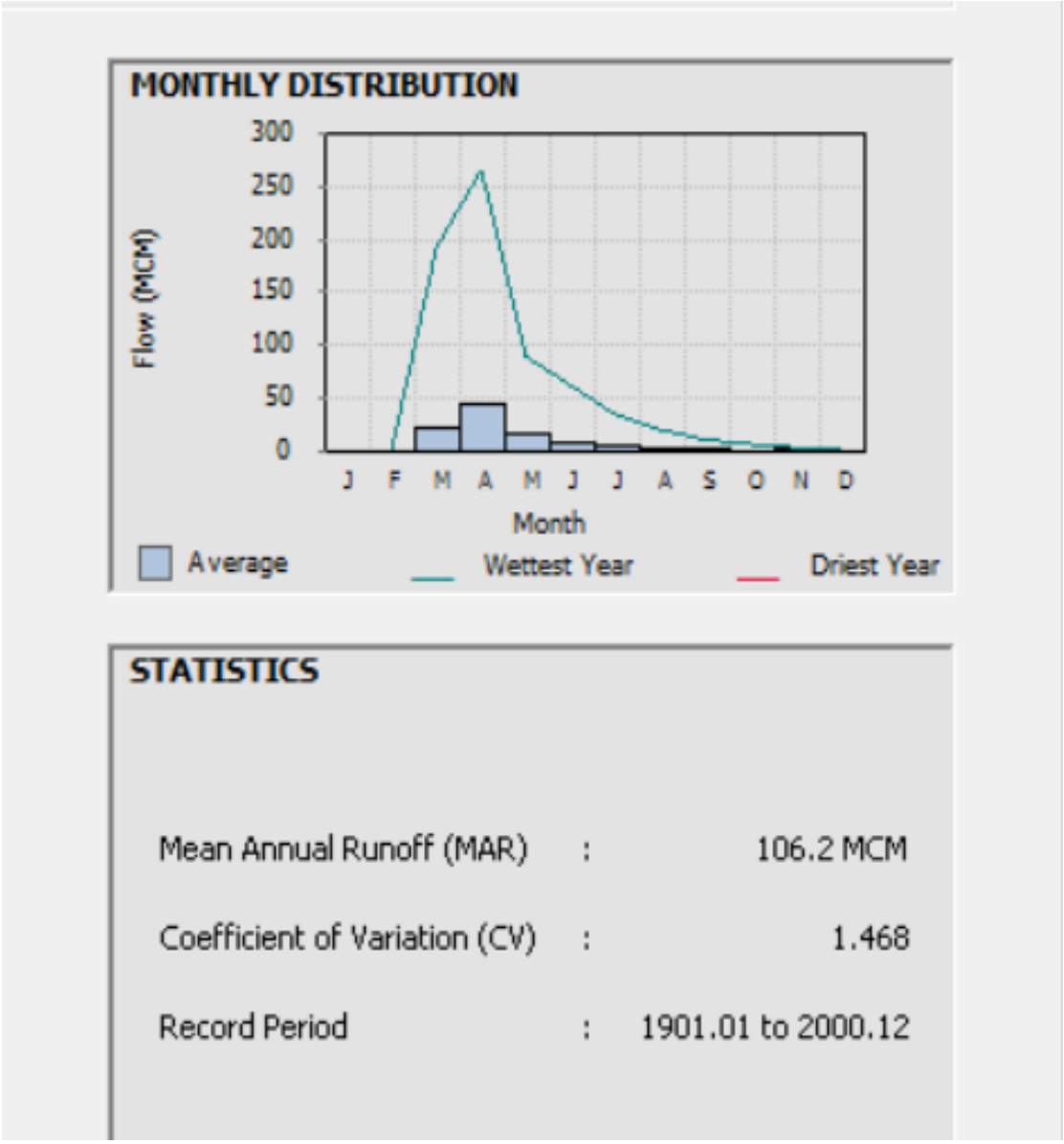


**Figure 6.4: E-flow and natural reference flow scenario simulated for the Kishanganga Dam location (34.6degree North and 74.75 degrees East) using IWMI global environmental flow calculator**

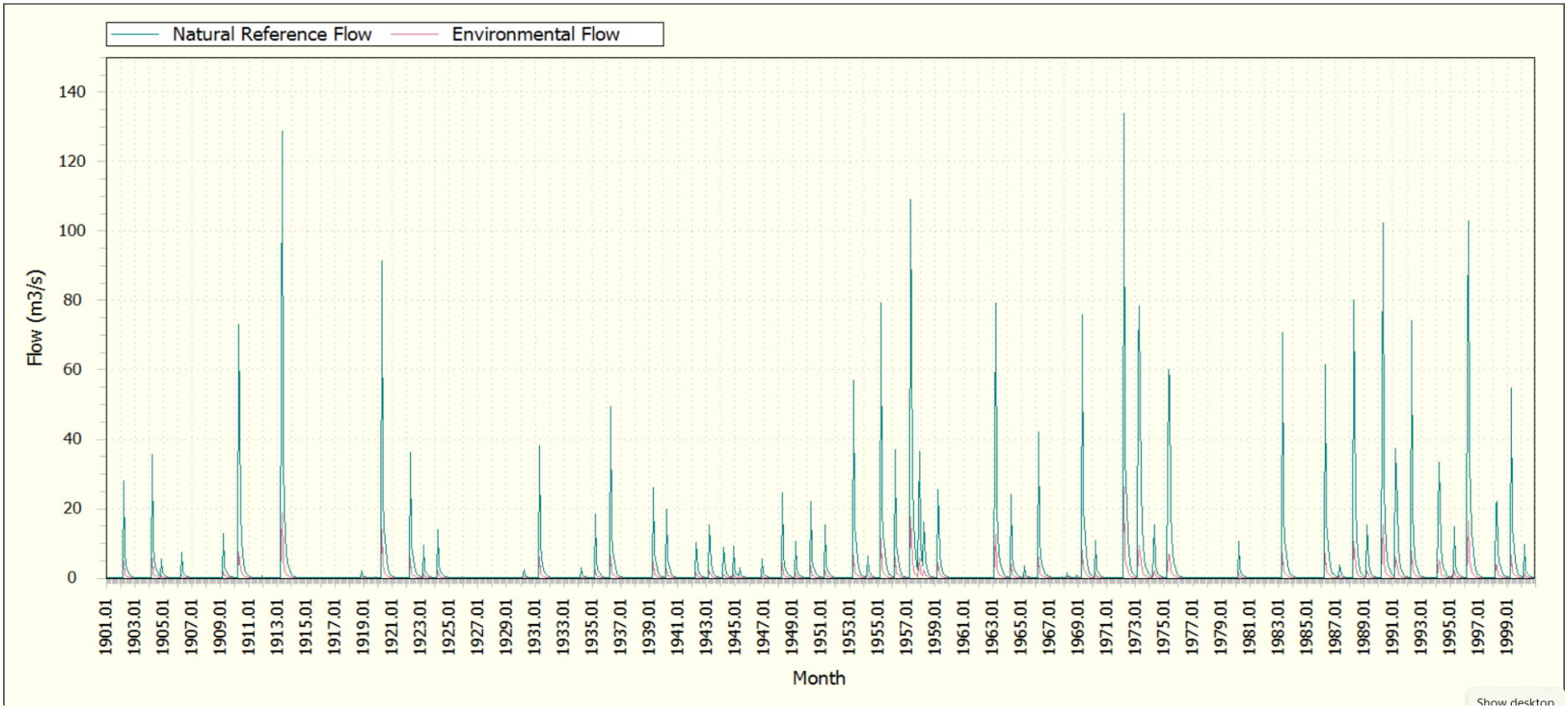


**Figure 6.5: Various e-flow scenarios simulated for the Kishanganga Dam location (34.6degree North and 74.75degree East) using IWMI global environmental flow calculator.**

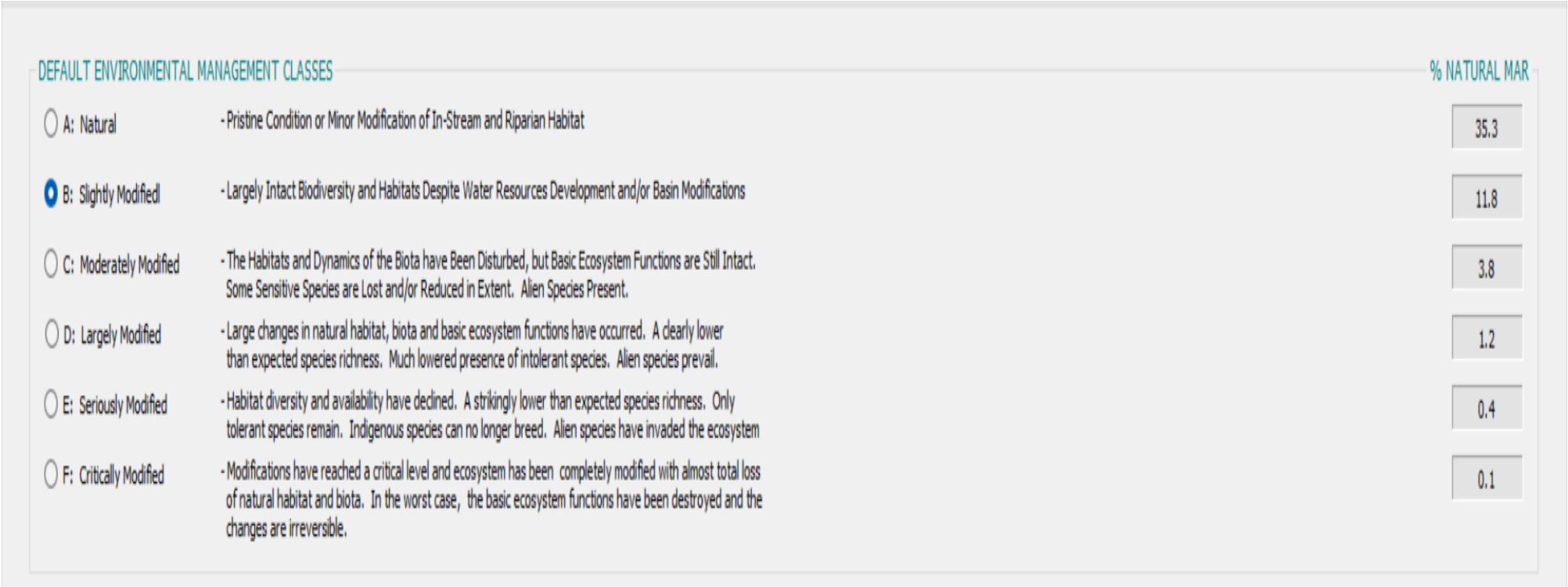
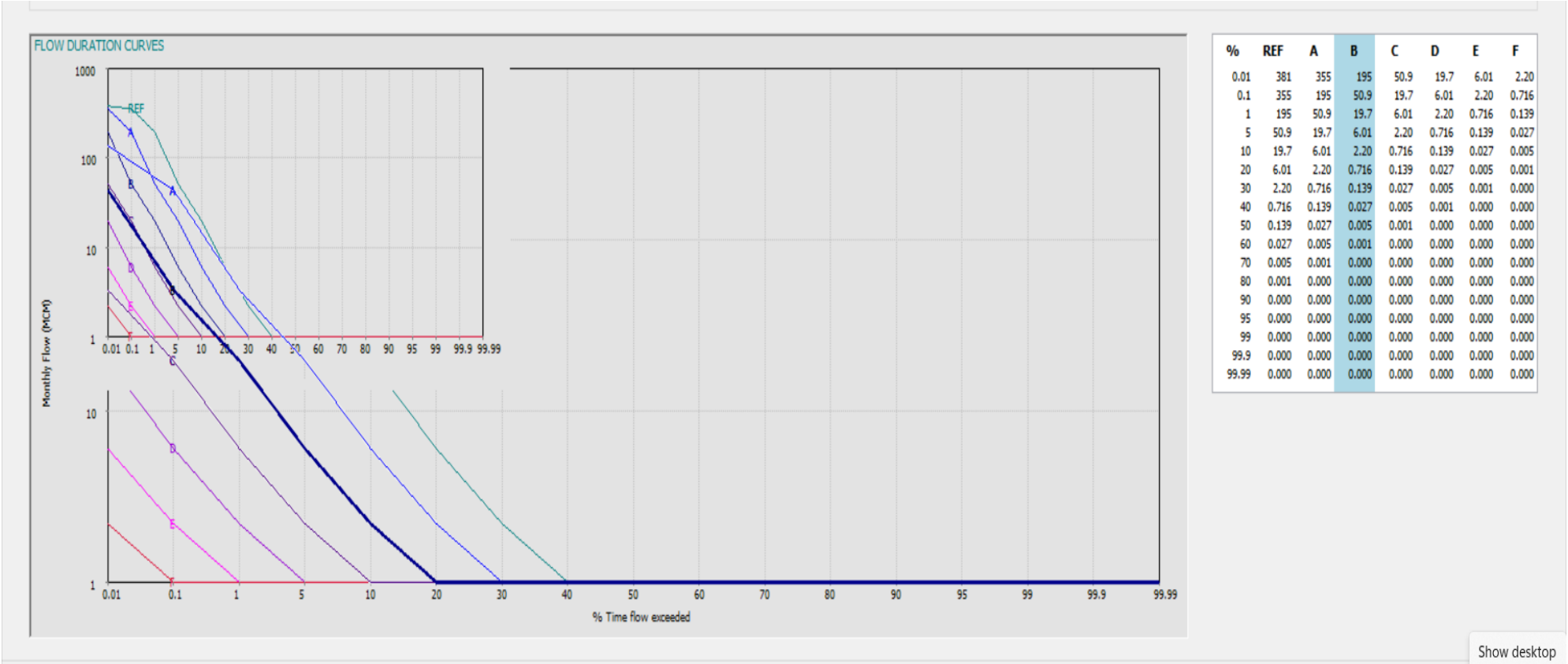


**Figure 6.6: Various e-flow scenarios simulated for the Kishanganga Dam location (34.6 degrees North and 74.75 degrees East) using IWMI global environmental flow calculator. The dark purple line is the flow duration curve for the class B (slightly modified) scenario.**




| % | REF | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| 0.01 | 381 | 355 | 195 | 50.9 | 19.7 | 6.01 | 2.20 |
| 0.1 | 355 | 195 | 50.9 | 19.7 | 6.01 | 2.20 | 0.716 |
| 1 | 195 | 50.9 | 19.7 | 6.01 | 2.20 | 0.716 | 0.139 |
| 5 | 50.9 | 19.7 | 6.01 | 2.20 | 0.716 | 0.139 | 0.027 |
| 10 | 19.7 | 6.01 | 2.20 | 0.716 | 0.139 | 0.027 | 0.005 |
| 20 | 6.01 | 2.20 | 0.716 | 0.139 | 0.027 | 0.005 | 0.001 |
| 30 | 2.20 | 0.716 | 0.139 | 0.027 | 0.005 | 0.001 | 0.000 |
| 40 | 0.716 | 0.139 | 0.027 | 0.005 | 0.001 | 0.000 | 0.000 |
| 50 | 0.139 | 0.027 | 0.005 | 0.001 | 0.000 | 0.000 | 0.000 |
| 60 | 0.027 | 0.005 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| 70 | 0.005 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 80 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 90 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 95 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 99 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 99.9 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 99.99 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

### 6.6.3 Procedure of estimation of E-flow classes

*Software package used:* The Global Environmental Flow Calculator (GEFC), created by International Water Management Institute (IWMI), Sri Lanka. It is a software package for desktop assessment of environmental flow scenarios. The calculations are made on the basis of an inbuilt global database of simulated flow time series.

The following steps were taken to calculate e-flow values for the Kishanganga beyond KEHP:

*Step 1: Selection of data source*

The "Global Flow database" built inside the software provides simulated data for river flows across the globe. As the first step, the coordinates for the Kishanganga Hydroelectric project were located in the interactive map by progressive zooming till the exact coordinates were located. The exact latitude and longitude coordinates are taken are that of the Kishanganga Dam location (34.6 degree North and 74.75 degrees East).

*Step 2: Generation of hydrological data charts*

A time series of discharges for the selected cell values (34.6 degree North and 74.75 degrees East) was generated. Main hydrological characteristics are automatically simulated by the software. The values calculated include original monthly time series, annual time series, monthly flow distributions, a period-of-record FDC and some basic flow statistics. These have been displayed in Figures 6.1 to 6.6 .

*Step 3: Calculation of e-flow management classes*

The e-flow values are calculated for five different scenarios based on. We get six different classes of e-flow management as indicated in the Table 6.1.

The calculated values for the selected coordinates are summarised as follows:

**Table 6.1: Environmental flow classes calculated through desk top method for KHEP**

| Default Environmental Management Classes | Description | Estimates of long-term e-flow volumes * |
|---|---|---|
| Class A – Natural | Pristine condition or minor modification of in-stream or riparian habitat | 35.3 |
| Class B- Slightly Modified | Largely intact biodiversity and habitat despite water resource development | 11.8 |
| Class C- Moderately Modified | Basic ecosystem functions intact but the habitat of some biota disturbed | 3.8 |
| Class D- Largely Modified | Large changes in habitat, biota and basic ecosystem | 1.2 |
| Class E- Seriously Modified | Habitat availability and diversity have declined | 0.4 |
| Class F- Critically Modified | Modifications have reached a critical level and ecosystems have been completely modified. | 0.1 |

*(expressed as % of natural Mean Annual Runoff (MAR)

**Source: Calculated with the GEFC (Smakhtin and Eriyagama 2008)**

For Natural e-Flow, classified as Class A, where there is the pristine condition of the stream or minor modification of in-stream or riparian habitat the estimated value is 35.3 per cent of natural Mean Annual Runoff (MAR). For Class B called a Slightly Modified Environmental flow class, the e- flow volume is 11.8 per cent of natural MAR. It has largely intact biodiversity and habitat despite water resource development. For Class C, i.e., moderately modified e-flow regime, the basic ecosystem functions are intact but the habitat of some biota is disturbed. The estimated value for class C is 3.8 per cent of natural MAR. For Class D i.e., largely modified e-flow management class, with large changes in habitat, biota and basic ecosystem, the value is 1.2 per cent of natural MAR. Lastly, for Class E, i.e. Seriously Modified Environmental Management Classes, where habitat availability and

diversity have declined, the Estimates of long-term E-Flow volumes is 0.4 per cent of natural MAR. In the last class of environmental management, Class F, with critically modified habitat, where modifications have reached a critical level and ecosystems have been completely modified, estimates of long-term EF volumes is 0.1 per cent of natural MAR.

## 6.7 Conclusion

This chapter begins with a description of the development of major hydrological projects across the globe in the nineteenth century, generally called the hydrological mission. It then discusses the negative impacts such developments had on the health of the rivers. The development of the concept of environmental flows is discussed, followed by various methods of calculations of e-flow. Then various e-flow management classes are described and a desktop method calculation is done for the KHEP site e-flow values. This chapter also identies levels of e-flow for the Kishanganga at the site of KHEP under various scenarios. The analysis is made using the desktop analysis method as used in the GEFC. The development of a regional e-flow estimation mechanism and building up of regional institutions around it can help find a technical solution to the problem of water quality across transboundary rivers. A model suitable to the local geo-climatic conditions of the South Asian region.

# CHAPTER 7

# CONCLUSION

There is an inherent contradiction in the modern approach to water. From a socio-hydrologic perspective, there is "the need to consider the two-way feedbacks between human and water systems in order to explain puzzles, paradoxes, and unintended consequences that arise in the context of water management, and to suggest ways to avoid or overcome these challenges" (Pande and Sivapalan 2017). Rather than being separate entities, water and society are interconnected. Water is always situated in the socio-cultural context, taking into account socioeconomics, technology, norms, and values associated with it. In other words, the human agency is "endogenous to water systems" (Sivapalan et al. 2011:5). From this perspective, water becomes a "process", "saturated with the ideas, meanings, values, and potentials that we have conferred upon it" (Linton 2010:19). Adding to this abstraction of water, John Agnew (2010) presents the idea of "Water Power". He questions the over-emphasis on the "physical side of access" to water at the cost of ignoring the political and social factors in determining the availability of water. Such a deterministic approach, driven by narratives of surplus and scarcity creates a false water paradigm.
The 'reductive' understanding of water as a scarce resource is evident in all spheres, including transboundary waters. Von Lossow (2015) points out three characteristics of approaches to transboundary water, in particular within academia. Firstly, it deals with issues of conflict, confrontation and warfare that are associated traditionally with masculine ideas of virtue and power. Secondly, state-centric models based on national interest dominate both research and policymaking for transboundary water. Thirdly, water management is usually seen in terms of hydro-engineering and the building of large-scale water infrastructure (Von Lossow 2015:107).

International and interstate water agreements have historically been based on water resource distribution in terms of water allocation, often through the medium of infrastructure such as dams. Very little attention was paid to water quality and environmental concerns in general. It is only in the late twentieth century that environmental concerns began to be addressed in water-sharing treaties. Especially in Europe and North America, we have examples of riparian treaties that address the problems of water quality. Since the last decade of the twentieth century, more than

one third of articles have mentioned environmental concerns in one form or another. (Giordano et al. 2014)

However, in the region of South Asia addressing environmental concerns is still not a common practice. Still, disputes between countries are raising environmental issues. The Kishanganga and the Baglihar disputes are examples of these. The nature of these environmentally driven disputes over fresh water and the interpretations and verdicts made on these disputes on the basis of a decades-old treaty is the central theme of this work. This study began with four key questions - What is the geographical factors and non-geographical factors (such as political relations between two states) in the success of a water treaty? Why are there no multilateral treaties for water sharing in South Asia? and finally, What were the limitations of the Neutral Expert's verdict in the Baglihar dispute (2009) and Permanent Court of Arbitration the Kishanganga dispute? Can the old treaties address emerging issues of technology and environment in Kishenganga and Baglihar verdicts? After analysis of the Baglihar and Kishanganga Dispute, it can be said that environmental concerns are still secondary to political concerns in the region. In fact, the answer to all these questions is at heart related to the water paradigm that is most popular in the region. International discourse on water sharing in South Asia is marred by politics. Hydro-nationalism is the most common lens used by governments and bureaucrats to solve the water-sharing problem. In the dilemma of ensuring the national interests, the biggest disadvantage is often done to the environment. Overall, the study supports the hypothesis that politics, rather than any physical water scarcity can explain state behaviour in South Asia.

In context of the Indus River Treaty, technologies of water harvesting, as well as their repercussions on the environment have an impact on politics of water sharing and the scientific concept of environment flow is interpreted politically by the conflicting parties in the Indus Water Treaty. Limited cooperation and hydro politics characterise all interstate water-related interactions in South Asia. This is evident from a study of state behaviour around water cooperation and conflict in South Asia. This is the main theme of chapter 2 of this work. The primary conclusion is that water is often used as a tool of political play, as seen in the case of the states of South Asia. Various factors are found to be relevant in determining state behaviour in relation to shared waters in the region. The most important of these are geographical location, water scarcity and perceptions of scarcity, economic and welfare power that is

exercised by respective countries as well as the strength of the democratic institutions. The imbalance in geographical size of countries, with India being of much larger proportions and also the only country sharing boundaries with all other member countries of the region. This has led to a sense of insecurity among the countries. Cooperation in the region is marred due to fears of "big brother-little brother" syndrome. This becomes evident by the fact that the region does not even have a multilateral treaty to deal with water resources although good cases have been made for a joint effort. Water also often becomes a victim of political rhetoric. The entire issue is very often perceived from a purely national perspective rather than a regional basis ensuring the equity of all parties, or a local perspective, bringing in more and more stakeholders. Thus, each negotiating party tries to extract the maximum it can, at the cost of the other party. At home, these victories on the negotiation table are projected in a way to gain maximum political mileage. Such situations fan the nationalist sentiments but are often not the optimum solutions and further add to the securitization of water and fuel hydro politics in South Asia. One exception always cited as an example of successful cooperation in the region is the Indus Water Treaty 1960. Indeed, the treaty has continued to be in effect for the last six decades. Even at times when there was increased political tension between India and Pakistan, the treaty was never abrogated. It is relevant to trace the origin and developments of the treaty. Over the course of analysis, it emerges that territory has been central in the way India and Pakistan thought over water disputes. In the initial phase, policymakers were looking at water distribution as a technical issue. It was in this high tide of technocratic internationalism, that Lilienthal envisioned the joint development of the canal system. The World Bank bought into this idea. However, local perception of the issue was much more complex, impacted by several issues. Most important among these was the political division of the country. The Indian and Pakistani governments both enmeshed the idea of water and territoriality. The development of water resources and canal systems came to be seen as assertion of states sovereignty. It also became a tool of obtaining legitimacy. This pattern of governance was evident in the region since the colonial period. Both the countries needed maximum control through irrigation projects and hydroelectric dams. The territory remained central to the way that the Indian and Pakistani governments thought about water development projects. Thus, few factors proved to be crucial in the signing of the treaty. It is because of these difficulties that no plan of shared water cooperation could be reached for almost

a decade. Finally, a compromise was reached by geographically demarcating separate water use rather than sharing. All the water from the three western tributaries was allotted to Pakistan with India having qualified rights of use, while the three eastern tributaries were allotted to India. This agreement was finalised in a legally binding treaty- The Indus Water Treaty 1960. Many key factors can be identified that led to the successful signing of the treaty. The first was the presence of a third party i.e. the world bank led by Chairman Eugene Black. He took a special interest in the case, visiting India and Pakistan and personally convincing the leadership of both countries. His efforts were supported by a series of aligned events. One was the strategic priorities of America. It was in the American interest to solve the Kashmir issue and prevent India's leaning toward the communist bloc. And a solution to the Indus water distribution was seen as the first step in that direction. This idea was very well explained in Lilienthal's initial paper on India-Pakistan relations. In it, Lilienthal argued that the Kashmir conflict was an issue that was causing instability in South Asia region. It had the potential to lead India into an alignment with the Soviet Russia. Political tension in Kashmir acted as the block between the subcontinent's development potential and its troubled reality. Solving the Indus waters problem, he thought, was a necessary first step on the way to a Kashmir settlement. The financial muscle for the deal was provided by the consortium of six western countries. During the cold war climate of the world, their primary concern was the cold war. Increasing instability in South Asia was seen as having the potential to increase the influence of Communist China or the USSR in the region. Gilmartin (2015) has detailed how diplomats from the Consortium countries were present during negotiations. And finally, strong central leadership was present in both states at the time which ensured that the deal could go through and not face much political resistance domestically. Haines (2018) has presented a clear analysis of why it was most suitable for Ayub Khan as well as Nehru to seal the deal. Firstly, General Ayub Khan enjoyed popular support at home during his early regime and was not highly dependent on the anti-India rhetoric. Secondly, the One-Unit Scheme of 1955 merged the provinces of Punjab, Sind, North-West Frontier Province into a single province named West Pakistan. This led to minimising the Sindh- Punjab rivalries which were creating a hindrance to the success of any treaty with India. Moreover, the treaty would provide legitimacy to him establishing him as a "benevolent monarch" ensuring the welfare of the general public. Similarly, the deal was beneficial for India too. Due to the poor

performance of the Second Five Year Plan, there was a need for foreign financial assistance to make the plans work. Increasing pressure from China on the Eastern border could also have been one factor pushing Nehru to settle the dispute with Pakistan. Resolving the dispute and signing a peace treaty based on cooperation would also be beneficial for Nehru's reputation internationally.

The Indus Water Treaty anticipates future conflicts. It is designed with one complete Annexure dealing with any possible disagreements between the parties in future provided in Annexure IX. These provisions were made use of time and again, such as during the Tulbul Barrage dispute, called Wular barrage by Pakistan. After objections were raised by Pakistan, India unilaterally stopped construction in 1984. More recently there have been two major disagreements under the IWT i.e. the Baglihar and the Kishanganga disputes. India proposed the Baglihar hydro project on Chenab in 1992. However, objections were raised by Pakistan and the two countries could not mutually come to an agreement. Meanwhile, India unilaterally started construction in the year 2000. Pakistan eventually exercised the Disputes Resolution clause under Article IX. A neutral expert was appointed to resolve the 'difference' within IWT regarding the construction design of the Baglihar Power Plant which was subsequently resolved by the Neutral Expert. The first point of difference raised by Pakistan brought up two sub-issues. The first was regarding the design flood of the Baglihar Project. The second one was regarding the issues of gated v/s ungated spillways along with the number and size of such spillways. In its verdict, the NE allowed for use of gated spillways. Secondly, Pakistan demanded a substantial decrease in the amount of pondage capacity of the Baglihar project. However, this objection was rejected as it did not align with the latest technological developments. The final point of difference raised by Pakistan was regarding the levels of power intake for the turbines. The NE gave the verdict that India should decrease the design height of the power intake.

The Baglihar Disagreement of 2003 was an exceptional event as it led to invocation of provision for appointment of a Neutral Expert. It was for the first time since the inception of the treaty that the demand for appointment of a neutral expert had been made. The need to escalate the issue and involve a third party is a sign of the decreasing trust in the institution of the Indus Water Commission. While India believes Pakistan blindly opposes all projects just to stall the development of the region, Pakistan blames India for violating the treaty by starting unilateral

construction. With increasing water scarcity in the region and hostile political climate, cooperation over the treaty is set to face serious challenges. It was also the first dispute in which the environmental impacts of infrastructure construction within the ambit of the IWT were discussed. As pointed out in the verdict of the Neutral Expert, the treaty does not go into the details of sediment disposal of dams. However, this was one of the main concerns of Pakistan. Secondly, the NE brought the question of climate change into its consideration while giving the verdict. On the one hand this can be seen as a progressive step, bringing in imminent environmental concerns within the verdict. However, the limited space given to climate change concerns in the verdict makes it very tokenistic. The reaction of both the countries to the NE's verdict was also symbolic of the excessive politics around this issue. Ironically, the official response from both sides to the Neutral Expert's verdict was positive. Both India and Pakistan claimed vindication of their position, by highlighting those aspects of the verdict which validated their positions.

The lack of mutual understanding became even more evident during the Kishanganga dispute. This was an unprecedented event. Ever since the signing of the IWT in 1960, this was the first situation when an arbitration had to be set up. India started construction of the Kishanganga Hydroelectric Project in the Gurez Valley in 2007. However, since the Kishanganga is a sub tributary of the western rivers allotted to Pakistan under the IWT, Pakistan raised a dispute under Annexure IX of the treaty. In 2010 a court of Arbitration was set up to look into this matter with an office at the Permanent Court of Arbitration, The Hague. As an interim measure, the court asked India to stop all construction at KHEP. The first dispute was related to the construction of KHEP by India and how it trespasses Pakistan's rights to the western tributaries. But the second dispute was of a more fundamental nature and would impact all future constructions by India. It involved the use of draw down technology for de-sedimentation of run of river rivers.

The process of arbitration continued for 3 years. However, India registered the request for expedition due to the huge economic loss it was incurring due to the stalled power project. As such, the Court of arbitration gave a Partial Award in February 2013. In the partial award, India was allowed to proceed with the construction of KHEP. However, it was required to maintain a minimum downstream flow in the Kishanganga so as to preserve a minimum water quality. Secondly, India was prohibited from using the drawdown flushing technique for managing

sedimentation at the pondage, both at KHEP and any future run of river plant that it builds on the western rivers. In December 2013, the final verdict of the CoA was out. India was put under the obligation to maintain a minimum flow at Kishanganga of 9 cubic meters per second for seven years from the date of the verdict, i.e. till 2020. After the period of 7 years, the verdict was open to challenge regarding the value of minimum flow, either through the permanent court of arbitration or under Annex IX of IWT. India was prohibited from reducing the level of water below the dead storage level in all run of the river plants, including the Kishanganga plant.

A qualitative content analysis of the verdict documents as well as, academic and media reporting on the dispute was carried out to see which aspects are highlighted and which are missing. The purpose is to highlight the dominant discourse as well as bring out the missing discourses. The first document taken for analysis is the F*inal Award in First Arbitration under the Indus Waters Treaty 1960 (*Permanent Court of Arbitration 2013). It is clear that the document takes a state-centric approach to water conflict. The most commonly occurring words in the award are 'India' and 'Pakistan', both over more than 2500 times, followed by the 'court'. Thus, the overarching paradigm is neo- institutionalism, showing faith in national and international institutions to resolve all water conflicts. The second set of documents reviewed is academic writing on the Kishenganga Dispute. The keywords "Kishenganga" and "KHEP" were searched on Google Scholar for the time period between 2011 and 2020. Articles published in peer- reviewed journals, with discussion on the KHEP were included. A total of 36 articles were included for the review and coded. The most common theoretical perspective is that of water as a resource. Within this category, I have included articles focusing on technical aspects as well as Integrated Water Resource Management. The second most common perspective is hydro hegemony. The hydro hegemony theoretical perspective highlights water as a security issue, focuses on the role of power, and takes a state-centric approach. In order to make a case study of media reporting on the Kishenganga dispute, online archives of The Times of India and The Dawn were searched for the keywords "Kishan Ganga" and "Indus Water Treaty" for two years. The years chosen were 2013 and 2014 as the verdict of the Court of Arbitration came out in December 2013. Overall, 33 articles were collected, 9 from the Times of India and 24 from The Dawn. Hydro nationalism seems to be the most common theme in the articles under study. The major themes in Dawn were 1) India's hegemonic

behaviour, 2) the need to revise the IWT, and 3) water shortage in Pakistan. On the other hand, the major themes identified in The Times of India are 1) a report of Pakistan's blaming and 2) vindication of India's stand at the Court of Arbitration. Interestingly, both the newspapers presented the verdict as a victory for the positions of their respective countries. It can be argued that approaching shared waters from a state security perspective is inherently ridden with contradictions and pushes countries towards a zero-sum game. Over the decades, such an attitude has fuelled the sentiments of hydro-nationalism within the region. This is reflected in the Kishenganga dispute as well. On the one hand, the state of Pakistan raised concerns about the environmental flow, while being lax on this front domestically. Similarly, the Indian government paid little heed to local sentiments and needs while going ahead with KHEP despite protests from the locals of Gurez Valley. States on either side are politicising water conflicts as it is a populist tool. The media is adding to the confusion, due to sensationalised reporting, which is often under-researched and event-specific, unable to present the complexity of water reporting. Within academia too, though there is a diversity of water worldviews, the most popular approaches are of looking at water as an abstract resource that could be appropriated through power(hydro-hegemony) or through institutional arrangements (neo-institutionalism). Some scholars still talk of water-related conflicts and wars between the countries. Thus, it is difficult to reach a sustainable resolution to the problem, as the view is fundamentally incomplete and sometimes clashing. These developments have implications for all future constructions.

Thus, between the Baglihar verdict and the Kishenganga verdict, new interpretations were made on the basis of the Indus Water Treaty (Burgess et al 2013, Hill 2013). For the first time, the concept of environmental flow has been discussed in the context of the Indus Water Treaty. However, the calculation of e-flow levels in the Kishenganga dispute has been ad hoc. It was based on determining a minimum flow level rather than an environmental flow level (Thakkar 2014). This is a simplistic method assuming that if certain minimum levels of water flow are maintained in the river its environment will not be damaged. It is important to evolve a rational methodology based on a holistic approach for the region of South Asia.

There is an urgent need to institutionalise an e-flow regime for South Asia. There is a complete absence of a regionally built consensus on the e- flow regime at a regional level in South Asia. There have been country-level attempts to assess e-flow

for different rivers but it is all in a very nascent and underdeveloped approach. Talking about the Indus River in particular, very little effort has been made by countries on either side to have a mechanism to determine the best levels of e-flow for the western rivers allocated to Pakistan. Following the holistic method, integrating inputs from experts, local communities and governments at different scales can reduce the hydro nationalism that has come to be associated with the water allocation in the region. This is a nascent area for work in the academic development of the region. There is very little development of and indeed even recognition of the need for environmental flows development in the Indus Basin. However, there is an urgent need to work on this side and develop bilaterally agreed holistic methods for various tributaries of the Indus. Particularly for the western tributaries, a mutually agreed flow regime can put an end to the disputes that originate with each new power plant that India plans and Pakistan invariably, yet understandably, objects to. The institutionalisation of an e-flow regime calculation and maintenance can minimise this conflict to a very large degree. This section makes an attempt to identify levels of e-flow for the Kishanganga at the site of KHEP under various scenarios. The analysis is made using the desktop analysis method as used in the GEFC. The Global Environmental Flow Calculator (GEFC) by the International Water Management Institute (IWMI), Sri Lanka (Smakhtin. and Eriyagama, 2008) is a software that simulates e-flow classes for various river systems. The e-flow values are calculated for five different scenarios based on. We get six different classes of e-flow management ranging from “Pristine” conditions (Class A) to “Seriously Modified” conditions, indicated by Class E (Smakhtin and Eriyagama 2008). Based on these calculations, the minimum flow value decided by the Court of Arbitration for KHEP falls in the third category of Class C i.e., moderately modified e-flow regime.

These developments have implications for all future constructions. Even as the Kishenganga dispute was being adjudicated, India and Pakistan were already in disagreement over the Ratle Hydropower plant (850 MW) being built over the Chenab. In 2013 India and Pakistan started discussions over four upcoming dams on Chenab in Jammu Kashmir over the Chenab- the Pakal Dul, the Mujar, the Ratle and the lower Kalani on Chenab. Meanwhile, construction at Ratle has already begun (Mustafa 2014). Another recent development is the resuming of World Bank activities in April 2022. After several high-level meetings and discussions for over five years between 2016 and 2022, no amicable solution could be reached. This led to the

decision of the World Bank to reinitiate the IWT process. It will now appoint both a Neutral Expert and a Court of Arbitration for Kishanganga and Ratle power projects. (World Bank, 2022). This development really puts the treaty to risk and opens the gates for further conflict. The technological and environmental factors brought in by the Baglihar and Kishenganga verdict will shape all future negotiations.

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## ANNEXURE I

Press Release by Permanent Court of Arbitration dated December 21, 2013

**INDUS WATERS KISHENGANGA ARBITRATION**
**(PAKISTAN V. INDIA)**

**Court of Arbitration Renders its Final Award**
**in the First Arbitration under the Indus Waters Treaty 1960**

**THE HAGUE, December 21, 2013.**

The Court of Arbitration constituted in the matter of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* yesterday rendered its Final Award in respect of the dispute between Pakistan and India under the Indus Waters Treaty involving the Kishenganga Hydro-Electric Project (the "KHEP") located on the Kishenganga/Neelum River.

On February 18, 2013, the Court had issued a Partial Award, in which it unanimously decided that the KHEP is a Run-of-River Plant within the meaning of the Indus Waters Treaty and that India may accordingly divert water from the Kishenganga/Neelum River for power generation. However, the Court also decided that India is under an obligation to construct and operate the KHEP in such a way as to maintain a minimum flow of water in the Kishenganga/Neelum River, at a rate to be determined subsequently. Also in its Partial Award, the Court decided a second dispute relating to the permissibility of reducing the water level in the reservoirs of Indian Run-of-River Plants on certain tributaries of the Indus for the purpose of flushing sediment accumulated in the reservoir.

In its Final Award dated December 20, 2013, which is binding upon the Parties and without appeal, the Court of Arbitration unanimously decided the question of the minimum flow that was left unresolved by the Partial Award. The Court decided that India shall release a minimum flow of 9 cumecs into the Kishenganga/Neelum River below the KHEP at all times. However, the Court also decided that either India or Pakistan may seek reconsideration of this decision through the Permanent Indus Commission and the mechanisms of the Indus Waters Treaty after a period of seven years from the first diversion of water from the Kishenganga/Neelum River.

* * *

The Indus Waters Treaty is an international agreement signed by India and Pakistan in 1960 that regulates the use by the two States of the waters of the Indus system of rivers. Pakistan instituted arbitral proceedings against India in 2010, requesting that a court of arbitration determine the permissibility under the Treaty of the KHEP—currently under construction by India—on the Kishenganga/Neelum River, a tributary of the Jhelum River. The KHEP is designed to generate power by diverting water from a dam site on the Kishenganga/Neelum (within the Gurez valley, an area of higher elevation) to the Bonar Nallah, another tributary of the Jhelum (lower in elevation and closely located to Wular Lake) through a system of tunnels, with the water powering turbines having a capacity of 330 megawatts. In commencing this arbitration, Pakistan challenged, in particular, the permissibility of the planned diversion by the KHEP of the waters of the Kishenganga/Neelum into the Bonar Nallah and the effect that this diversion would have on Pakistan's Neelum-Jhelum Hydro-Electric Project (the "NJHEP"), also currently under construction on the Kishenganga/Neelum downstream of the KHEP.

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In its Partial Award of February 18, 2013, the Court of Arbitration decided that India's right to divert the waters of the Kishenganga/Neelum is protected by the Treaty. However, the Court also decided that India's right to divert the Kishenganga/Neelum is not absolute—it is subject to the constraints specified in the Treaty and the relevant principles of customary international law, and both India and Pakistan's entitlements under the Treaty must be made effective so far as possible. The Court thus found that Pakistan retains the right to receive a minimum flow of water from India in the Kishenganga/Neelum riverbed at all times.

The Court further observed that the data provided by the Parties up to that point were insufficient to allow the Court to decide the precise amount of flow to be preserved. The Court therefore deferred its determination of the minimum flow to a Final Award and requested the Parties to provide additional data.

In two rounds of simultaneous submissions made in June and August 2013, each Party provided data on the flow in the river at various locations along the Kishenganga/Neelum. Each Party then used this data to evaluate the potential impact of a range of minimum flows on the environment, agriculture and power generation at the KHEP and NJHEP.

* * *

## THE FINAL AWARD

At the outset, the Court defined its task and addressed the Parties' differences regarding hydrological data. The Court then proceeded to assess the effects the KHEP is likely to have on ongoing agricultural and hydro-electric uses by Pakistan and on the downstream environment and, taking into account these effects, to determine the minimum flow. Finally, the Court described a review mechanism for revisiting its minimum flow determination and allocated the costs of arbitration.

### 1. The Court's Task

Recalling the matters already decided in the Partial Award, the Court noted its finding that India had "coupled intent with action" in the planning and construction of the KHEP before Pakistan achieved the same with respect to the NJHEP, and that the KHEP had acquired priority in right as a result. The Court also recalled that in the Partial Award it had nevertheless found that Pakistan's downstream agricultural and hydro-electric uses remain relevant on an ongoing basis throughout the operation of India's hydro-electric plant.

Accordingly, the Court characterized the task before it as follows: "to determine a minimum flow that will mitigate adverse effects to Pakistan's agricultural and hydro-electric uses throughout the operation of the KHEP, while preserving India's right to operate the KHEP and maintaining the priority it acquired from having crystallized prior to the KHEP." The Court noted that, at the same time, it would have to give due regard to "the customary international law requirements of avoiding or mitigating trans-boundary harm and of reconciling economic development with the protection of the environment."

### 2. The Parties' Differences Regarding Hydrological Data

The Parties had presented extensive evidence regarding the hydrological data to indicate with accuracy the level and patterns of flow in the Kishenganga/Neelum River; the Court observed that the differences between the Parties' data were actually small. Accordingly, the Court emphasized that the choice of data sets between those presented by the Parties had no effect on its decision with respect to the minimum flow.

At the same time, the Court commended to the Parties the practice of undertaking quality assurance on hydrological data and of subsequently sharing such quality-assured data through the mechanisms of the Permanent Indus Commission.

### 3. The Downstream Effects of the KHEP

The Court examined the anticipated effects of the KHEP on downstream agriculture and hydro-electric uses by Pakistan and on the environment.

With respect to agricultural uses, the Court noted that, although Pakistan had described plans to increase the use of lift irrigation in the Neelum Valley, it had been unable to provide a quantitative estimate of the likely scale of such development. In the absence of concrete evidence, the Court found itself unable to take account of agricultural uses, but noted its view that the minimum flow ultimately adopted would ensure adequate water for development in the valley.

With respect to Pakistani hydro-electric uses, and in particular the NJHEP, the Court noted that the diversion of water by the KHEP would have a direct effect and would somewhat reduce the downstream generation of hydro-electric power under almost any minimum flow regime.

Finally, with respect to the environmental impact of the KHEP, the Court noted the differences in the environmental assessments provided by the Parties. Pakistan had provided the Court with a holistic assessment of the interaction of a range of environmental indicators and attempted to capture the complexity of interactions within the river ecosystem. In contrast, India had submitted a simpler assessment, drawing its conclusions from more limited data regarding the habitat for fish species. While noting that there is no single "correct" approach to environmental assessments, the Court expressed the view that Pakistan's in-depth assessment, while not perfect, was more appropriate for a project of the magnitude of the KHEP. The Court acknowledged, however, that Pakistan's approach in these proceedings does not match its own historical practices. The Court therefore encouraged both Parties to continue or expand their attention to environmental concerns at all their hydro-electric projects.

Examining the Parties' hydrological tables and the anticipated effects of various flow scenarios, the Court provisionally concluded that taking exclusive account of environmental considerations would suggest an environmental flow of 12 cumecs. The Court noted that below this level, the lowest flows recorded at the Line of Control increasingly become the norm during parts of the winter dry season.

## 4. The Minimum Flow Determination

Having assessed the effects of the KHEP, the Court emphasized that this was only the first step of its analysis and that two additional factors had to be considered in fixing the minimum flow.

First, in considering the use of a minimum flow to mitigate the ongoing effects of the KHEP on power generation at the NJHEP, the Court emphasized that it was bound to recognize the priority accorded to the KHEP in the Partial Award. To preserve such priority, the Court decided that, on the basis of the evidence currently available to it, India should have access to at least half of the average flow at the KHEP site during the driest months of the year.

Second, with respect to the environment, the Court concluded that although customary international law requires the provision of a minimum flow, the Indus Waters Treaty limits the use of customary law to the extent necessary for the interpretation and application of the Treaty. Accordingly, the Court did not consider that the Treaty permitted it to apply customary law to such an extent as to negate rights expressly granted in the Treaty. Instead, the Court considered its authority to be limited to mitigating significant harm.

Examining the hydrological data, the Court concluded that a flow of 9 cumecs at the KHEP would be sufficient to maintain the natural flows throughout the dry months of December, January, and February, even in the driest winter of the 34-year flow data record presented by the Parties. Although the Court considered this approach to be somewhat severe in environmental terms, the Court concluded that, in light of the right of India to develop hydro-electric power, and the associated right to operate the KHEP effectively, such an approach represents an appropriate balance between the needs of the environment and India's right to power generation.

Reviewing the effects of a 9 cumec minimum flow, the Court noted that such a flow would accord India 51.9 percent of the flow at the KHEP dam site during the month of January and a higher proportion in other months. On average, the minimum flow would reduce electricity generation at the KHEP by 19.5 GWh per month from October to March but would result in an annual reduction of only 5.7 percent. On the evidence before it, the Court concluded that such a reduction in output would not render the KHEP economically unviable.

## 5. Review Mechanism

Noting the uncertainty inherent in any attempt to predict environmental responses to changing conditions and the potential for climatic change, the Court decided that its determination of the minimum flow would be open to reconsideration. Specifically, if, beginning seven years after the diversion of the Kishenganga/Neelum through the KHEP, either Party considers that reconsideration of the Court's determination of the minimum flow is necessary, it will be entitled to seek such reconsideration through the Permanent Indus Commission and the mechanisms of the Treaty.

* * *

The seven-member Court of Arbitration is chaired by Judge Stephen M. Schwebel (United States), former President of the International Court of Justice. The other members of the Court are Sir Franklin Berman KCMG QC (United Kingdom), Professor Howard S. Wheater FREng (United Kingdom), Professor Lucius Caflisch (Switzerland), Professor Jan Paulsson (Sweden), Judge Bruno Simma (Germany), and H.E. Judge Peter Tomka (Slovakia). The Permanent Court of Arbitration in The Hague acts as Secretariat to the Court of Arbitration.

In June 2011, the Court of Arbitration conducted a site visit to the Neelum/Jhelum and Kishenganga hydro-electric projects and surrounding areas located on the Kishenganga/Neelum river. In February 2012, a delegation of the Court conducted a second site visit to the Neelum river valley.

From August 20 to 31, 2012, the Court of Arbitration conducted a two-week hearing on the merits of the dispute between the Parties. On February 18, 2013, the Court issued a Partial Award, which is available at: http://www.pca-cpa.org/showpage.asp?pag_id=1392

On December 20, 2013, the Court issued its Decision on India's Request for Clarification or Interpretation, which is available at: http://www.pca-cpa.org/showpage.asp?pag_id=1392

Other press releases and information relating to this arbitration are available at: http://www.pca-cpa.org/showpage.asp?pag_id=1392

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## ANNEXURE 2

Permanent Court of Arbitration press release dated February 19, 2013

**PCA PRESS RELEASE**

**INDUS WATERS KISHENGANGA ARBITRATION**
**(PAKISTAN V. INDIA)**

**Court of Arbitration Issues Partial Award**
**in First Arbitration under the Indus Waters Treaty 1960**

**THE HAGUE, February 19, 2013.**

The Court of Arbitration constituted in the matter of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* has rendered a Partial Award in respect of the dispute between Pakistan and India under the Indus Waters Treaty concerning (1) the legality of the construction and operation of an Indian hydro-electric project located in India-administered Jammu and Kashmir; and (2) the permissibility under the Treaty of the depletion of the reservoirs of certain Indian hydro-electric plants below "Dead Storage Level."[1]

In its Partial Award, which is final with respect to the matters decided therein, without appeal and binding on the Parties, the Court of Arbitration unanimously decided:

1. that the Kishenganga Hydro-Electric Project (KHEP) constitutes a Run-of-River Plant under the Treaty, and India may accordingly divert water from the Kishenganga/Neelum River for power generation by the KHEP in the manner envisaged.

   However, when operating the KHEP, India is under an obligation to maintain a minimum flow of water in the Kishenganga/Neelum River, at a rate to be determined by the Court in a Final Award.

2. Except in the case of an unforeseen emergency, the Treaty does not permit India's reduction below "Dead Storage Level" of the water level in the reservoirs of Run-of-River Plants located on the rivers allocated to Pakistan under the Treaty. This ruling does not apply to Plants already in operation or under construction (whose designs have been communicated by India and not objected to by Pakistan)

The Court expects to be able to render its Final Award determining the minimum flow of water India would be required to release in the Kishenganga/Neelum River by the end of 2013.

* * *

The Indus Waters Treaty is an international agreement signed by India and Pakistan in 1960 that regulates the use by the two States of the waters of the Indus system of rivers. Pakistan instituted arbitral proceedings against India in 2010, requesting that a court of arbitration determine the permissibility under the Treaty of a hydro-electric project (the Kishenganga Hydro-Electric Project, or KHEP) currently under construction by India on the Kishenganga/Neelum River, a tributary of the Jhelum River. The KHEP is designed to generate power by diverting water from a dam site on the Kishenganga/Neelum (within the Gurez valley, an area of higher elevation) to the Bonar Nallah, another tributary of the Jhelum (lower in elevation and closely located to Wular Lake) through a system of tunnels, with the water powering turbines having a capacity of 330 megawatts.

Pakistan challenges, in particular, the permissibility of the planned diversion by the KHEP of the waters of the Kishenganga/Neelum into the Bonar Nallah, arguing that this inter-tributary transfer will adversely affect the operation of a hydro-electric project—the Neelum-Jhelum Hydro-Electric Project or NJHEP—being built by Pakistan on the Kishenganga/Neelum downstream of the KHEP (the "First Dispute"). The transfer of water contemplated by India may be represented graphically as in the attached diagram (Annex A). Pakistan has also requested that the Court determine whether the Treaty permits India to deplete or bring the reservoir level of "run-of-river" hydro-electric plants below a level identified as "Dead Storage Level" in the Treaty (the "Second Dispute"). Pakistan submits that that such reservoir depletion would give India impermissibly broad control over the flow of the river waters allocated to Pakistan under the Treaty. For its part, India had stated its intent to use such reservoir depletion to flush sediment out of the KHEP's reservoir. India maintains that both the design and planned mode of operation of the KHEP are fully in conformity with the Treaty.

* * *

In its analysis, the Court emphasized at the outset that its Partial Award, just as the Indus Waters Treaty itself, does not have any bearing on any territorial claims or rights of the Parties over Jammu and Kashmir. The Court's findings pertain solely to the Parties' rights and obligations with respect to the *use* of the waters of the Indus system of rivers, including with respect to the use of the waters of those portions of the rivers that flow through disputed territory.

THE FIRST DISPUTE

**1. The Permissibility of Inter-Tributary Transfers under the Treaty**

In the First Dispute, the Court was called upon to determine whether India is permitted under the Treaty to deliver the waters of the Kishenganga/Neelum River into the Bonar Nallah in the course of the operation of the KHEP.

As an initial matter, the Court observed that the Treaty expressly permits the transfer of water by India from one tributary of the Jhelum to another for the purpose of generating hydro-electric power, subject to certain conditions. The Court first found that this right is not circumscribed by the Treaty's restriction of Indian uses on the Western Rivers (which include the Kishenganga/Neelum as a tributary of the Jhelum) to the drainage basin of those rivers. This restriction relates to where water may be used, and is not violated by the use outside of the drainage basin of electricity generated from the water. The Court then examined the Treaty provision requiring the Parties to maintain the natural channels of the rivers and its effect on inter-tributary transfers. The Court found that this obligation involves maintaining the river channels' physical capacity to carry water, and does not require maintaining the timing or volume of the flow in the river. Accordingly, this obligation does not limit India's right to transfer water for the purpose of generating hydro-electricity.

Having established that India's right to inter-tributary transfer is not prohibited by other provisions of the Treaty, the Court considered whether the KHEP meets the express conditions on such transfer. The Court noted that for transfer to be permissible, the KHEP must (1) be a "Run-of-River Plant"; (2) be located on a tributary of the Jhelum; and (3) conform to Paragraph 15(iii) of the Treaty Annexure governing hydro-electric power generation. The Court observed that a "Run-of-River Plant" is a term of art defined by the Treaty and that the KHEP is a Run-of-River Plant within that definition. The Court further decided that on the facts of the case the KHEP should be regarded as located on the Kishenganga/Neelum notwithstanding that the KHEP's power house is situated at a distance of 23 kilometres from that river. The Court also found that, by releasing water into the Bonar Nallah after it has passed through the power house, the KHEP complies with the requirement that the "water released below the Plant" be delivered "into another Tributary." Finally, the Court found that the KHEP's inter-tributary transfer is "necessary," as required by the Treaty, for the generation of hydro-electric power, as power can be generated on the scale contemplated by India in this location only by

using the 665 metre difference in elevation between the dam site on the Kishenganga/Neelum and the place where the water is released into the Bonar Nallah.

## 2 The Interpretation of the Treaty with Respect to "then existing Agricultural Use or hydro-electric use by Pakistan"

In addition to the requirements described above, the Court recognized that Paragraph 15(iii) requires that "then existing Agricultural Use or hydro-electric use by Pakistan" on the downstream reaches of the Kishenganga/Neelum not be adversely affected by the KHEP's inter-tributary transfer. Pakistan argued that "then existing" uses are to be determined on an ongoing basis, whenever water is transferred from one tributary to another. India, in contrast, argued that such uses must be determined at a fixed point during the design of its hydro-electric project.

In seeking to establish when a "then existing" agricultural or hydro-electric use is to be determined, the Court was guided in the interpretation of the Treaty by Article 31(1) of the Vienna Convention on the Law of Treaties: "[a] treaty shall be interpreted in good faith and in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in light of its object and purpose." The Court first examined the text of Paragraph 15(iii), noting the provision's focus on the operation of hydro-electric plants and the implication that the determination of "then existing" uses should take place on an ongoing basis throughout the operational life of a plant. The Court then considered the context of Paragraph 15(iii) and noted that the provision falls within a continuum of design, construction and operation. The Court observed that the provisions of the Treaty must be interpreted in a mutually reinforcing fashion, as it would make little sense for the Treaty to permit a plant to be designed and built in a certain manner, but then to prohibit the operation of that plant in the very manner for which it was designed. Finally, the Court examined the object and purpose of the Treaty and found that the Treaty both gives Pakistan priority in the use of the waters of the Western Rivers (including the Kishenganga/Neelum) and India a right to generate hydro-electric power on the Western Rivers.

Turning to the application of the Treaty to the KHEP, the Court first considered the implications of the approaches advocated by the Parties. The Court observed that under the "ambulatory" approach advocated by Pakistan, a project's design could be cleared for construction as being consistent with the design specifications of the Treaty, but then be prevented from operating by new uses by Pakistan. In the Court's view, the uncertainty created by this approach, and the potential for wastage, would have a chilling effect on the undertaking of any hydro-electric projects by India on the Western Rivers. With respect to the approach advocated by India, under which Pakistan's uses would be determined at the moment that India communicates a "firm intention" to proceed with a project, the Court observed that identifying a critical date will often be difficult, but that it may be possible to identify a "critical period" in which design, tenders, financing, public consultations, environmental assessments, governmental approvals and construction come together to indicate a firm intention to proceed with a project. Nevertheless, the Court noted that a solely "critical period" approach could result in a "race" in which each Party would seek to create uses that would freeze out future uses by the other, an outcome the Court rejected.

Having considered the approaches advocated by the Parties, the Court concluded that neither the ambulatory nor the critical period approach were fully satisfactory and that the proper interpretation of the Treaty combines elements of both. The Court considered that it must first establish for each of the KHEP and the NJHEP the critical period in which the Parties not only planned the projects, but took concrete steps toward their realization. Reviewing the evidence provided by the Parties, the Court concluded that the KHEP reached this period in 2004–2006. In contrast, the Court found that Pakistan demonstrated a comparable commitment to the NJHEP in 2007 and 2008. Given this timing, the Court decided that India's right to divert the waters of the Kishenganga/Neelum by the KHEP is protected by the Treaty.

However, the Court also decided that India's right to divert the Kishenganga/Neelum is not absolute—it is subject to the constraints specified in the Treaty and, in addition, by the relevant principles of customary international law. Paragraph 15(iii) gives rise to India's right to construct and operate hydro-electric projects involving inter-tributary transfers, but also obliges India to operate those projects in such a way as to avoid adversely affecting Pakistan's then existing agricultural and hydro-electric uses. Both Parties' entitlements under the Treaty must be made effective so far as possible. The Court therefore found that Pakistan retains the right to receive a minimum flow of water from India in the Kishenganga/Neelum riverbed at all times. The Court noted that this right also stems from customary international environmental law, and that it considered that the Treaty must be applied in light of contemporary international environmental law principles.

In this context, the Court recalled the commitment made by India's Agent in the course of the hearing that India would ensure a minimum environmental flow downstream of the KHEP at all times.

### 3. The Court's Request for Further Data

Having concluded that the Treaty requires the preservation of a minimum flow of water downstream of the KHEP, the Court determined that the data provided by the Parties are insufficient to allow it to decide the precise amount of flow to be preserved.

The Court therefore deferred its determination of the appropriate minimum flow to a Final Award, and requested the Parties to provide additional data concerning the impacts of a range of minimum flows at the KHEP dam on, (for India), (a) power generation at the KHEP; and (b) environmental concerns from the dam site at Gurez to the Line of Control; and, (for Pakistan), (a) power generation at the NJHEP; (b) agricultural uses of water downstream of the Line of Control to Nauseri; and (c) environmental concerns at and downstream of the Line of Control to Nauseri.

## THE SECOND DISPUTE

### 1. The Admissibility of the Dispute over the Depletion of Reservoirs below "Dead Storage Level"

Insofar as India had raised two objections to the admissibility of the Second Dispute, the Court considered, first, whether Pakistan had followed the Treaty procedure for the submission of disputes to the Court; and second, whether the Second Dispute, given its subject-matter, could properly be heard by the Court. With respect to the first question, the Court observed that the Treaty provides for disagreements between the Parties to be resolved either by a seven-member court of arbitration or by a single, highly-qualified engineer, acting as a neutral expert. The Court concluded that the neutral expert process is given priority only if one or the other Party has in fact requested the appointment of a neutral expert. In the present case, neither Party made such a request and the Court was therefore not precluded from hearing the Second Dispute. With respect to the second question, the Court found that although the Treaty specifies the technical matters that may be referred to a neutral expert, it does not give the neutral expert exclusive competence over these listed matters. Once constituted, a court of arbitration is empowered to consider any question arising out of the Treaty, including technical questions. Having rejected both objections, the Court found that the Second Dispute is admissible.

### 2. The Permissibility of the Depletion of Reservoirs for Drawdown Flushing

In approaching the merits of the second dispute, the Court observed that the question of reservoir depletion is linked in the Parties' disagreement with the permissibility of controlling sediment through the procedure of drawing down the reservoir and flushing accumulated sediment downstream. The Court briefly reviewed the process of sedimentation in the reservoirs of hydro-electric plants and the various techniques available for sediment control, including drawdown flushing.

The Court then examined three aspects of the context of the Treaty with respect to drawdown flushing. First, the Court observed that one of the primary objectives of the Treaty was to limit the storage of water by India on the Western Rivers and that the Treaty includes strict restrictions on the volume of storage permitted to India. The Court noted that in contrast, the volume of Dead Storage is not controlled, suggesting that such storage was not intended to be subject to manipulation. Second, the Court noted that the Treaty includes design restrictions on the low-level outlets that would be required to deplete a reservoir and that these restrictions make sense only if depletion is also restricted. Third, the Court recalled that the Treaty drafters intended for India to have the right to generate hydro-electric power on the Western Rivers, and noted that this right must be given effect by allowing India's hydro-electric development to be sustainable.

Reading the provisions of the Treaty in light of these contextual aspects, the Court concluded that the Treaty prohibits depletion below Dead Storage Level of the reservoirs of Run-of River Plants (and, correspondingly, drawdown flushing) through reference to a provision of the Treaty Annexure dedicated to storage works, which states that "the Dead Storage shall not be depleted except in an unforeseen emergency." The Court also noted that the Treaty includes restrictions on the permissible variation in the volume of flow in a river above and below a hydro-electric plant, and that these restrictions may also be incompatible with drawdown flushing in certain reservoirs and in certain flow conditions.

To complete its analysis, the Court examined whether the sustainable generation of hydro-electric power on the Western Rivers is possible without drawdown flushing. After reviewing the technical documentation submitted by the Parties and the testimony of the experts presented by them, the Court observed that drawdown flushing is only one means of sediment control and concluded that hydro-electricity may be generated without flushing.

Finally, insofar as certain hydro-electric plants are under construction or have been completed by India, the Court stated that its decision on the Second Dispute may not be so interpreted as to cast doubt retrospectively on any Run-of-River Plants already in operation on the Western Rivers, nor as to affect retrospectively any such Plant already under construction the design of which (having already been duly communicated by India under the relevant provisions of the Treaty) has not been objected to by Pakistan as provided for in the Treaty.

* * *

The seven-member Court of Arbitration is chaired by Judge Stephen M. Schwebel (United States), former President of the International Court of Justice. The other members of the Court are Sir Franklin Berman KCMG QC (United Kingdom), Professor Howard S. Wheater FREng (United Kingdom), Professor Lucius Caflisch (Switzerland), Professor Jan Paulsson (Sweden), Judge Bruno Simma (Germany), and H.E. Judge Peter Tomka (Slovakia). The Permanent Court of Arbitration in The Hague acts as Secretariat to the Court of Arbitration.

In June 2011, the Court of Arbitration conducted a site visit to the Neelum/Jhelum and Kishenganga hydro-electric projects and surrounding areas located on the Kishenganga/Neelum river. In February 2012, a delegation of the Court conducted a second site visit to the Neelum river valley. The Parties have also submitted written pleadings. From August 20 to 31, 2012, the Court of Arbitration conducted a two-week hearing on the merits of the dispute between the Parties.

On September 23, 2011, the Court of Arbitration issued an Order on Interim Measures, which is available on the website of the PCA at http://www.pca-cpa.org/showpage.asp?pag_id=1392.

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Contact: Permanent Court of Arbitration
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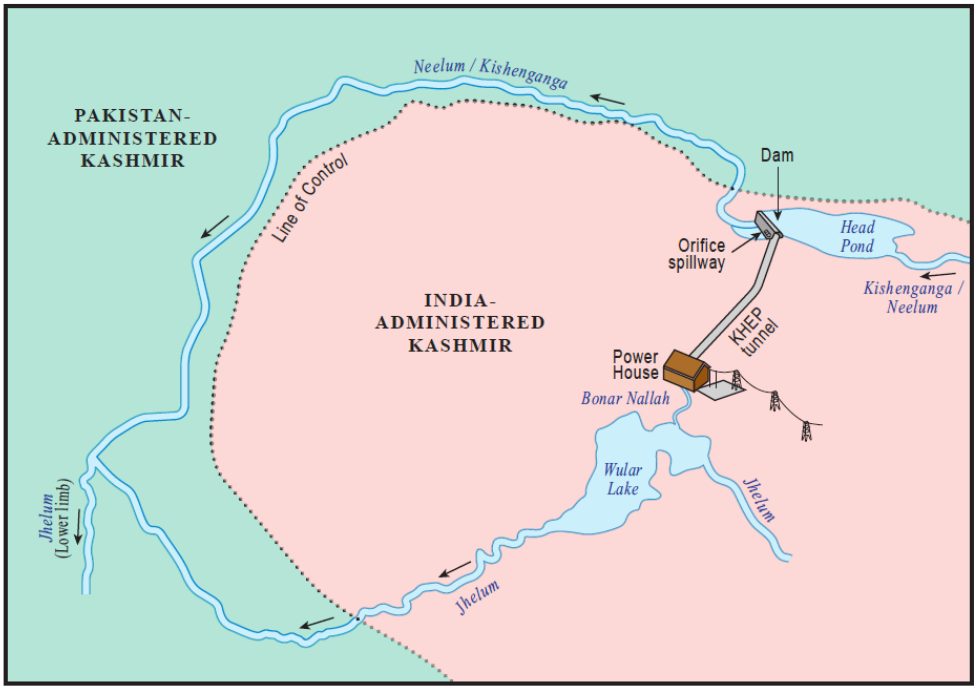
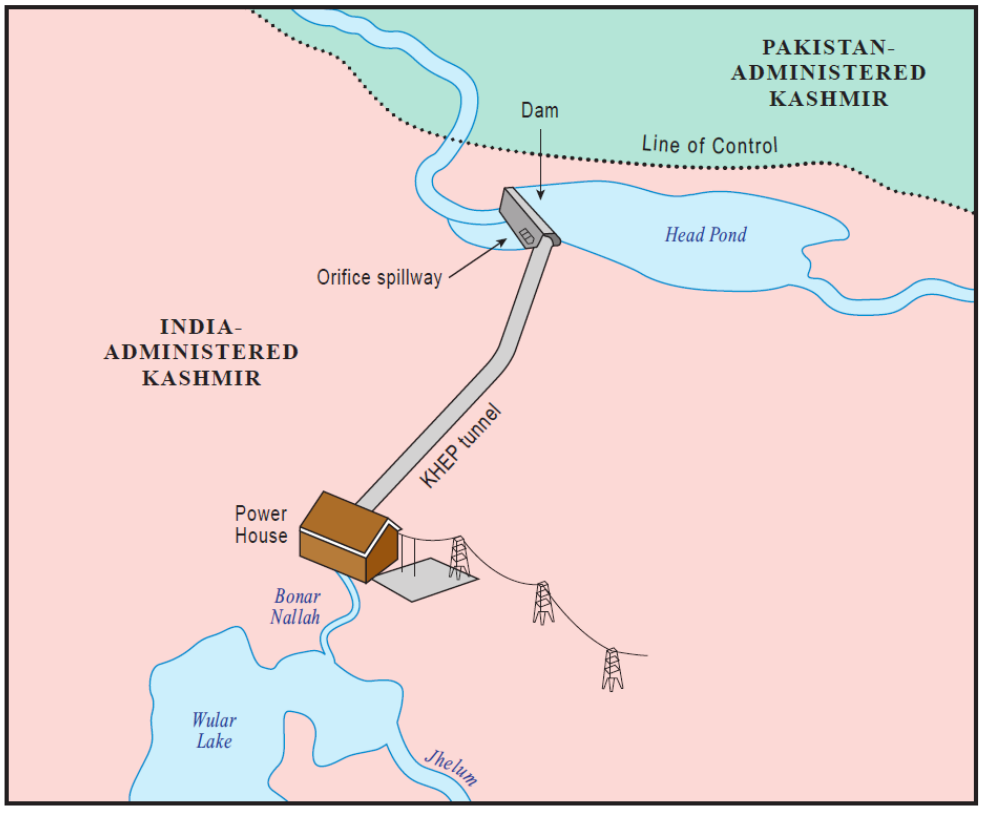
**Annex A: Schematic representation of the KHEP**




Source: Partial Award, page. 51, reproduced from Pakistan's Memorial.

## ANNEXURE 3

Permanent Court of Arbitration, press release dated September 1, 2012

**PCA PRESS RELEASE**

**INDUS WATERS KISHENGANGA ARBITRATION**
**(PAKISTAN V. INDIA)**

**Court of Arbitration Concludes Hearing on the Merits**

**THE HAGUE, September 1, 2012.**

The Court of Arbitration constituted in the matter of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* has concluded a two-week hearing on the merits at the Peace Palace in The Hague.

Pakistan initiated this arbitration with India under Article IX and Annexure G of the Indus Waters Treaty, an international agreement concluded by India and Pakistan in 1960 which regulates the use by the two States of the Indus system of rivers.

In these proceedings, Pakistan places two matters for determination by the Court of Arbitration:

> 1. Whether India's proposed diversion of the river Kishenganga (Neelum) into another Tributary, i.e. the Bonar Madmati Nallah, being one central element of the Kishenganga Project, breaches India's legal obligations owed to Pakistan under the Treaty, as interpreted and applied in accordance with international law, including India's obligations under Article III(2) (let flow all the waters of the Western rivers and not permit any interference with those waters) and Article IV(6) (maintenance of natural channels)? [the "First Dispute"]
>
> 2. Whether under the Treaty, India may deplete or bring the reservoir level of a run-of-river Plant below Dead Storage Level (DSL) in any circumstances except in the case of an unforeseen emergency? [the "Second Dispute"]

The primary subject of the arbitration is the Kishenganga Hydro-Electric Project (the "KHEP") currently under construction by India on the Kishenganga/Neelum River, a tributary of the Jhelum River. The KHEP is designed to generate power by diverting water from a dam site on the Kishenganga/Neelum (within the Gurez valley, an area of higher elevation) to the Bonar Madmati Nallah, another tributary of the Jhelum (lower in elevation and closely located to Wular Lake) through a system of tunnels, with the moving water powering turbines having a capacity of 330 megawatts. For the management of sedimentation in the reservoir, India intends to employ drawdown flushing, a technique requiring the depletion of the level in the KHEP reservoir below Dead Storage Level (the Treaty's definition of this term is reproduced in the annex to this press release). Pakistan contends that the KHEP's planned diversion of the waters of the Kishenganga/Neelum, as well as the use of the drawdown flushing technique, both at the KHEP or at other Indian hydro-electric projects that the Treaty regulates, are impermissible under the Indus Waters Treaty. India maintains that both the design and planned mode of operation of the KHEP are fully in conformity with the Treaty.

* * *

Judge Stephen M. Schwebel, Chairman of the Court of Arbitration, opened the hearing on August 20, 2012 by noting on the historic importance of the *Indus Waters Kishenganga Arbitration* for inter-State arbitration and the Permanent Court of Arbitration and observing that "the Indus Waters Treaty was a great achievement of Pakistan and India and of the World Bank, and it remains so; . . . and these proceedings are an illustration of its continuing vitality."

*Opening Statements*

The Agent of Pakistan, Mr. Kamal Majidulla (Special Assistant to the Prime Minister for Water Resources and Agriculture), spoke first on behalf of Pakistan. Mr. Majidulla recalled the "existential importance" of the waters of the Indus system of rivers to the people and agriculture of the Indus valley. He described the "Solomonic solution" adopted by India and Pakistan in the Indus Waters Treaty – the apportionment of the rivers of the Indus system between the two States. Mr. Majidulla emphasized the fundamental principle of the Treaty in Pakistan's view: that India should not interfere with the flow of the waters of the "Western Rivers" allocated to Pakistan, including the Jhelum River and its tributaries. Pakistan maintained that India's plan to construct the KHEP on the Kishenganga/Neelum River, which includes the diversion of its waters, is in breach of India's obligations under the Treaty. After Mr. Majidulla's address, Professor James Crawford introduced Pakistan's legal arguments.

The Agent of India, Mr. Dhruv Vijay Singh (Secretary to the Government of India, Ministry of Water Resources), made opening remarks on behalf of India. Mr. Singh stressed the crucial role of hydro-electric projects such as the KHEP in alleviating poverty and improving quality of life across India. He emphasized that under the Indus Waters Treaty both Pakistan and India have rights to the use of all the rivers of the Indus system for certain purposes, even when particular rivers are in principle allocated to the other State. These rights, Mr. Singh maintained, include India's right to hydro-electric uses on the Kishenganga/Neelum River. Mr. Singh also argued that the Treaty's negotiating history shows that hydro-electric power generation was in the Parties' minds from the beginning of the World Bank's involvement in the negotiations, and that the Treaty authorizes certain inter-tributary transfers by India for the purpose of generating hydro-electric power, including, in India's view, the KHEP. Mr. Fali S. Nariman spoke next, introducing India's legal arguments.

*Hearing of Expert Witnesses*

Following the opening statements, the Chairman called upon the Parties to present their expert witnesses. The experts were cross-examined on matters within their scientific and technical expertise.

Pakistan first presented Mr. Syed Muhammad Mehr Ali Shah for cross-examination regarding the potential hydrological impact of the KHEP on the reach of the Kishenganga/Neelum River downstream, as well as the anticipated impact of the KHEP on the production of electricity by the Neelum-Jhelum Hydro-Electric Project (the "N-JHEP") Pakistan is constructing downstream on the same river. Pakistan then presented Dr. Jackie King and Mr. Vaqar Zakaria for cross-examination with respect to the expected environmental impact downstream of the KHEP. Finally, Pakistan presented Dr. Gregory Morris for cross-examination on sediment management in relation to hydro-electric plants, including the KHEP.

India then presented its experts. Mr. Jesper Goodley Dannisøe and Dr. Niels Jepsen were called to testify with respect to the potential environmental impact of the KHEP. Dr. K.G. Rangaraju was presented for cross-examination regarding sediment control in response to Dr. Morris' views.

The expert examinations concluded mid-day on August 22, 2012.

*The Parties' Oral Arguments*

Counsel for both Parties next delivered two rounds of oral arguments. Ms. Shamila Mahmood, Professor James Crawford, Professor Vaughan Lowe, and Mr. Samuel Wordsworth argued on behalf of Pakistan. Dr. Neeru Chadha, Mr. Fali Nariman, Professor Stephen McCaffrey, Mr. RKP Shankardass, Mr. Rodman Bundy, and Professor Daniel Magraw argued on behalf of India. Over the course of pleading, the Members of the Court of Arbitration asked questions and sought clarifications from counsel.

*Pakistan's Arguments*

Pakistan maintains that the planned diversion of the waters of the Kishenganga/Neelum River by the KHEP is prohibited by the Indus Waters Treaty.

During the hearing, Pakistan first recalled the ten-year history of painstaking negotiations between the Parties, facilitated through the good offices of the World Bank, which resulted in the conclusion of the Treaty in September 1960. According to Pakistan, the Treaty, drafted at a time when cooperation between the Parties for the joint development of the Indus river system did not seem possible, was written so as to allow each Party to develop water resources in an independent manner. To this end, Pakistan argued that the Treaty apportions the rivers of the Indus river system between the Parties, strictly fixing and delimiting the Parties' rights and obligations with regard to these rivers. Noting the Treaty's careful and nuanced drafting, Pakistan argued that the Treaty terms should be interpreted according to their ordinary meaning and in case of doubt in such a way as to reinforce the Treaty's precise delimitation of the Parties' respective rights.

Pakistan emphasized India's obligation under Article III of the Treaty (see the annex) to "let flow" and "not permit any interference with" the waters of the Western Rivers (the Indus, the Chenab, the Jhelum and their tributaries, including the Kishenganga/Neelum) before they flow into Pakistan. According to Pakistan, this obligation constitutes an essential element of the compromise reached by the Parties in the Treaty, serving to prevent India from "manipulating" the flow of the waters of the Western Rivers to Pakistan's detriment.

Pakistan recognized that, as a matter of exception, Article III(2) of the Treaty allows India to make use of the waters of the Western Rivers on their upstream stretches for certain purposes, including the generation of hydro-electricity through "run-of-river" plants. However, Pakistan pointed out that the Treaty strictly regulates India's rights on the Western Rivers, for instance through Annexure D, which sets forth the restrictions on Indian hydro-electric power generation.

In particular, Pakistan argued that the Treaty does not establish a general right for India to deliver water from one Western River tributary into another for the generation of hydro-electric power. Such inter-tributary transfers are contrary both to India's general obligation to "let flow" the waters of the Western Rivers under Article III as well as India's specific obligation spelled out in the chapeau of Paragraph 15 of Annexure D (see the annex) to deliver into the river below the hydro-electric plant the same volume of water that is received in the river above the plant within any given 24-hour period.

Pakistan argued that Paragraph 15(iii) of Annexure D to the Treaty is an operational provision that allows, in specific cases, for the waters of a tributary of the Jhelum (such as the Kishenganga/Neelum) to be delivered into another tributary. However, Pakistan argued that the KHEP's planned diversion cannot be justified by reference to this exception. In Pakistan's view, the Treaty does not allow India to permanently divert all of the waters of one tributary of the Jhelum into another in order to create a potential for the generation of hydro-electric power that does not naturally arise from the flow of the river within its course, as India proposes to do with the KHEP. Pakistan argued that the Treaty solely permits a diversion of the waters of a tributary of the Jhelum when "necessary" – that is, diversion can only be done from time to time as an "emergency exit."

Further, in Pakistan's view, the Treaty gives Pakistan's downstream agricultural and hydro-electric uses on the tributaries of the Jhelum priority, requiring India to adjust its uses so as not to affect Pakistan's uses either now or as they develop in the future. Pakistan contended that selecting a cut-off date at which Pakistan's uses would be evaluated once and for all by India would "freeze" Pakistani development and undermine the bargain struck by the Parties in dividing the Indus system of rivers between them. Pakistan argued that the Treaty protects Pakistan's downstream uses as they exist from time-to-time, at the moment of delivery of the diverted waters.

Pakistan further argued that as a matter of fact, its agricultural and hydro-electric uses will be adversely affected by the KHEP. Specifically, Pakistan argued that the KHEP, under its planned mode of operation, would divert the entirety of the waters of the Kishenganga/Neelum during the lean season and up to its design capacity of 58.4 $m^3/s$ during the high flow season. This would result in a significant loss in power generation and revenue for the downstream N-JHEP and any other hydro-electric projects Pakistan may choose to construct on the Kishenganga/Neelum in the future. Pakistan maintained that it informed India of the anticipated adverse impact on its downstream uses over two decades before construction of the KHEP was commenced. With regard to the N-JHEP, Pakistan asserted that it has continuously reaffirmed its commitment to the project since 1989.

In addition, Pakistan argued that there arises out of Article IV(6) of the Treaty (reproduced in annex) an obligation for India to carry out a good faith assessment of the environmental downstream impacts of the KHEP. This, in Pakistan's submission, India did not do. Relying on its own expert reports, Pakistan argued that a reduced flow in the Kishenganga/Neelum would have an adverse environmental impact on its downstream reaches.

With regard to the Second Dispute, Pakistan submitted that drawdown flushing, the technique India proposes to use for the management of sedimentation in the KHEP reservoir, is prohibited by the provisions of the Treaty. Drawdown flushing consists of drawing down the level of the water in the reservoir close to the river bed by releasing it through low level outlets in the dam, in order to expel sediments from the reservoir. Pakistan argued that the use of drawdown flushing would give India an impermissible control over the timing and volume of the flow of water downstream of the dam, as well as have adverse environmental impact downstream. Pakistan argued that India is obligated to employ alternative sediment management methods.

*India's Arguments*

India contends that the planned diversion of the waters of the Kishenganga/Neelum by the KHEP is in compliance with the Indus Waters Treaty.

During the hearing, India submitted that all the provisions of the Treaty must be interpreted in light of its object and purpose as it is set forth in the Treaty's preamble. In India's view, the preamble spells out the Parties' desire in signing the Treaty to "attain the most complete and satisfactory utilisation of the waters of the Indus system of rivers." According to India, this object will be served by the planned diversion of the Kishenganga/Neelum waters, as this design will allow India to realize the full power generating potential of the upstream stretch of the Kishenganga/Neelum River, while also benefitting Pakistan's hydro-electric uses (albeit further downstream of the N-JHEP).

India stressed that while the rivers of the Indus system were divided between India and Pakistan, the Treaty also gave each State significant rights in the rivers that were allocated to the other. In particular, India pointed to Article III(2) of the Treaty, which expressly stipulates India's right to use the waters of the Western Rivers to generate hydro-electric power (subject to the provisions of Annexure D to the Treaty) as an exception to India's obligation to "let flow" the waters of these rivers. India argued that the KHEP falls within this exception.

India maintained that it has a right to transfer water between the tributaries of the Jhelum River for the purpose of hydro-electric power generation. Such a right is evident, India argued, given that prior to the Treaty's signature, India was already contemplating the construction of a hydro-electric project at the current location of the KHEP that would include an inter-tributary transfer. In this context, India submitted that it would not have consented to any Treaty provision that would preclude the realization of such a project.

With regard to the stipulation at Paragraph 15(iii) of Annexure D to the Treaty that water from one tributary of the Jhelum may be delivered into another tributary only "if necessary," India submitted

that the Treaty allows India to judge what is necessary for the generation of hydro-electric power. In the present case, the KHEP's planned diversion is necessary, being, in light of the area's topography, the only option for significant power generation in the region.

India further recalled that Paragraph 15(iii) of Annexure D to the Treaty only protects Pakistan's "then existing" downstream agricultural and hydro-electric uses, of which, India contends, there are none on the Kishenganga/Neelum. India interpreted "then existing" to mean that India must take into account Pakistan's downstream uses only up to a critical cut-off date, at which point India's hydro-electric design can be finalized. India argued that an interpretation of this provision requiring India to continuously adjust its hydro-electric operations on the Kishenganga/Neelum to Pakistan's downstream uses as they develop would negate India's express right to use the waters of the Western Rivers to generate hydro-electricity, and result in the waste of the vast amount of resources invested in the KHEP.

India submitted that between 1989, when Pakistan was first apprised of the KHEP, and 2006, when the final design of the KHEP was notified to Pakistan, India repeatedly indicated its willingness to take into account Pakistan's downstream uses, urging Pakistan to document them. However, in India's view, Pakistan consistently failed to substantiate its uses within the Neelum valley with verifiable data. With respect to the N-JHEP, for example, India argued that Pakistan relied solely on verbal assurances that the project was "in hand" and "under construction" without demonstrating its commitment to its realization. India also asserted that the agricultural uses of the residents of the Neelum valley are not dependent on the waters of the Kishenganga/Neelum River.

India argued that even if the N-JHEP were a "then existing" use, it would not be adversely affected by the KHEP. India emphasized that the KHEP will divert less than 1% of the total volume of waters of the Western Rivers. Thus, despite operation of the KHEP, during the high flow season the N-JHEP would receive a volume of water in excess of its maximum discharge capacity. During the lean season, the N-JHEP could be operated by using the water from the numerous tributaries that flow into the Kishenganga/Neelum River between the KHEP and N-JHEP dam sites; in fact, during this period of the year the N-JHEP would receive more water than the KHEP itself.

India added that any adverse effect to hydro-electric power generation by the N-JHEP would be mitigated by the release of water during the lean season from the storage work which Pakistan intends to construct on the Kishenganga/Neelum River at Dudhnial between the KHEP and the N-JHEP. Any adverse effects to the N-JHEP would also be set off, in India's view, by the benefits Pakistan's projected Kohala hydro-electric plant would derive from increased flow in the Jhelum River resulting from the diversion of the Kishenganga/Neelum's waters by the KHEP.

India argued that the provisions of the Treaty, including its Article IV(6), provide no basis for incorporating any international environmental obligations into the Treaty; the alleged breach of such obligations is therefore not a proper subject for determination by the Court of Arbitration. In any event, India submitted that it has complied with Article IV(6) of the Treaty, domestic Indian environmental regulations, any environmental customary international law obligations India may have, and the international standards applicable to engineers in the design and operation of hydro-electric projects. India argued that it had commissioned a comprehensive environmental impact assessment in 2000 which has shown that the KHEP will not have any significant adverse environmental impact on the Kishenganga/Neelum. India maintains that a minimum "environmental flow" of at least 3.9 $m^3/s$ will be released at all times below the KHEP dam.

With regard to the Second Dispute, at the outset, India disputed its admissibility for determination by the Court of Arbitration, arguing that it should have been referred by Pakistan to a Neutral Expert appointed pursuant to the Treaty. India then urged the Court to follow the decision of the Neutral Expert in the Baglihar case (a proceeding under the Indus Waters Treaty concerning India's Baglihar hydro-electric project), which found that drawdown flushing is permissible under the Treaty. India argued that sediment management is essential to the sustainability of hydro-electric plants and can

only be effectively achieved at the KHEP by lowering the water level in the reservoir below Dead Storage Level – *i.e.* by drawdown flushing. Given that the re-filling of the KHEP reservoir after its depletion is only permitted under the Treaty during a short period in the high flow season, and in light of the relatively small storage capacity of the KHEP, India submitted that the operation will have minimal effect on Pakistan.

*Closing Arguments*

On August 31, 2012, the Parties gave their closing arguments. Mr. Kamal Majidulla (Agent) and Professor James Crawford (Counsel) completed Pakistan's submissions. On the part of India, Mr. D.V. Singh (Agent) and Mr. Fali Nariman (Counsel) completed India's submissions.

* * *

Under the Court of Arbitration's Rules of Procedure, "[t]he Court shall endeavour to render its Award within 6 months of the close of the hearings."

* * *

The seven-member Court of Arbitration is chaired by Judge Stephen M. Schwebel (United States), former President of the International Court of Justice. The other members of the Court are Sir Franklin Berman KCMG QC (United Kingdom), Professor Howard S. Wheater FREng (United Kingdom), Professor Lucius Caflisch (Switzerland), Professor Jan Paulsson (Sweden), Judge Bruno Simma (Germany), and H.E. Judge Peter Tomka (Slovakia). The Permanent Court of Arbitration in The Hague acts as Secretariat to the Court of Arbitration.

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## Annex: Select Provisions of the Indus Waters Treaty

**Article III**

(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 (6)**

(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.

**Paragraph 15 (iii) of Annexure D**

15. Subject to the provisions of Paragraph 17, the works connected with a Plant shall be so operated that (*a*) the volume of water received in the river upstream of the Plant, during any period of seven consecutive days, shall be delivered into the river below the Plant during the same seven-day period, and (*b*) in any one period of 24 hours within that seven-day period, the volume delivered into the river below the Plant shall be not less than 30%, and not more than 130%, of the volume received in the river above the Plant during the same 24-hour period : Provided however that :

[…]

(iii) where a Plant is located on a Tributary of The Jhelum on which Pakistan has any Agricultural use or hydro-electric use, the water released below the Plant may be delivered, if necessary, into another Tributary but only to the extent that the then existing Agricultural Use or hydro-electric use by Pakistan on the former Tributary would not be adversely affected.

**Paragraph 2(a) of Annexure D**

"Dead Storage" means that portion of the storage which is not used for operational purposes and "Dead Storage Level" means the level corresponding to Dead Storage.

**ANNEXURE 4**

**World Bank Brief Dated June 11, 2018**

[online: web] Accessed 5 April 2019, URLhttps://www.worldbank.org/en/region/sar/brief/fact-sheet-the-indus-waters-treaty-1960-and-the-world-bank

FACT SHEET: THE INDUS WATERS TREATY 1960 AND THE ROLE OF THE WORLD BANK

Origins of the Treaty:

The Indus Waters Treaty was signed in 1960 after nine years of negotiations between India and Pakistan with the help of the World Bank, which is also a signatory. The negotiations were the initiative of former World Bank President Eugene Black. Seen as one of the most successful international treaties, it has survived frequent tensions, including conflict, and has provided a framework for irrigation and hydropower development for more than half a century. Former U.S.President Dwight Eisenhower described it as "one bright spot ... in a very depressing world picture that we see so often."

The Treaty allocates the Western Rivers (Indus, Jhelum, Chenab) to Pakistan and the Eastern Rivers(Ravi, Beas, Sutlej) to India. At the same time, the Treaty allows each country certain uses on the rivers allocated to the other.

How the Treaty works:

The Treaty sets out a mechanism for cooperation and information exchange between the two countries regarding their use of the rivers, known as the Permanent Indus Commission, which hasa Commissioner from each country. The Treaty also sets forth distinct procedures to handle issues which may arise: “questions” are handled by the Commission; “differences” are to be resolved by a Neutral Expert; and “disputes” are to be referred to a seven-member arbitral tribunal called the “Court of Arbitration.”

As a signatory to the Treaty, the World Bank’s role is limited and procedural. In particular, its role in relation to “differences” and “disputes” is limited to the designation of individuals to fulfil certain roles in the context of Neutral Expert or Court of Arbitration proceedings when requested by either or both of the Parties.

Disagreement over two hydroelectric power plants:

The disagreement between India and Pakistan concerns the design features of the Kishenganga(330 megawatts) and Ratle (850 megawatts) hydroelectric power plants. The former was inaugurated in 2018 while the latter is under construction. The World Bank is not financing either project.

The two countries disagree over whether the technical design features of these two hydroelectric plants contravene the Treaty. The plants are located in India on tributaries of the Jhelum and the Chenab Rivers, respectively. The Treaty designates

these two rivers, as well as the Indus, as the "Western Rivers" to which Pakistan has unrestricted use with some exceptions. Under the Treaty, India is permitted to construct hydroelectric power facilities on these rivers, subject to constraints specified in Annexures to the Treaty.

Different Treaty mechanisms sought by India and Pakistan:

In 2016, Pakistan asked the World Bank to facilitate the setting up of a Court of Arbitration to look into its concerns about the designs of the two hydroelectric power projects. India asked for the appointment of a Neutral Expert for the same purpose. These requests came after the Permanent Indus Commission had been engaged in discussions on the matter for a while.

The World Bank sought to fulfill its procedural obligations with respect to both the Court of Arbitration and the Neutral Expert. The Treaty does not empower the World Bank to decide whether one procedure should take precedence over the other; rather it vests the determination of jurisdictional competence on each of the two mechanisms. At the same time, the World Bank actively encouraged both countries to agree amicably on a mechanism to address the issues.

Working with India and Pakistan:

On December 12, 2016, World Bank Group President Jim Yong Kim announced that the World Bank would pause before taking further steps in each of the two processes requested by the Parties. The announcement by the Bank was taken to protect the Treaty in the interests of both countries.

Since then, the World Bank has worked to seek an amicable resolution. Multiple high-level meetings have been convened and a variety of proposals have been discussed. However, five years of joint efforts have not yielded a solution. On March 31, 2022, the World Bank, therefore, decided to resume the process of appointing a Neutral Expert and a Chairman for the Court of Arbitration.

The World Bank continues to share the concerns of the Parties that carrying out the two appointments concurrently may pose practical and legal risks. However, the lack of success in finding an acceptable solution, despite the best of efforts by all Parties involved, is also a risk to the Treaty itself.

The World Bank remains committed to act in good faith and with complete impartiality and transparency while continuing to assist the countries and fulfilling its responsibilities under the Treaty.

**ANNEXURE 5**

**News from ICSID (**International Centre For Settlement Of Investment Disputes) Volume 23, No. 2 2006

[online: web] Accessed 4 January,2018, URL https://icsid.worldbank.org/sites/default/files/publications/2006%20Winter%20Volume%2023%20%28No.%202%29%20%E2%80%93%20Download.pdf

# THE INDUS WATERS TREATY, THE BAGLIHAR DIFFERENCE AND ICSID ADMINISTRATION OF THE PROCEEDINGS

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Over the years, ICSID has developed a recognized expertise in administering proceedings involving States. In addition to the administration of cases under the ICSID Convention and Additional Facility Rules, ICSID has also administered a number of cases under the UNCITRAL Arbitration Rules and an inter-states dispute. This was the Southern Bluefin Tuna case — Australia and New Zealand v. Japan, for which ICSID administered the jurisdiction hearing. ICSID was recently involved in the expert determination process carried out under the provisions of the Indus Waters Treaty. The Indus Waters Treaty concluded between India and Pakistan in 1960 has a number of unique features. First, it is the only international water treaty co-signed by a third party. This third party is the World Bank, which mediated the original dispute over the Indus basin and assisted the two parties in reaching the agreement. That process took almost nine years of intensive negotiations and mediation. The result has been a lengthy instrument addressing the various pertinent issues in a general way in the main part of the Treaty, and in a very detailed manner in its eight annexures. A second unique feature of the Treaty is that it divided the six rivers comprising the Indus River system between the two parties, with India getting the Eastern rivers (the Sutlej, the Beas and the Ravi), and Pakistan getting the Western rivers (the Indus, the Jhelum and the Chenab). Despite this specific allocation, each country has been allowed certain uses in the rivers allocated to the other. Those uses were detailed in separate annexures to the Treaty The World Bank co-signed the Treaty specifically for the purposes of Articles V and X and Annexures F, G and H. Most of the Bank's undertakings under the Treaty were completed long ago. However, the Bank's commitments under Annexures F and G on the settlement of differences and disputes remain applicable. The Treaty provides for several processes for the settlement of issues that may arise between the two parties. Any question regarding the interpretation or application of the Treaty is to be first examined by the Permanent Indus Commission (Commission) established under the Treaty, with one commissioner from each country. If the Commission is unable to resolve such a question, then the question becomes a difference, which shall be dealt with by a Neutral Expert, to be appointed by agreement of the two parties. If the parties can not agree on a Neutral Expert, or on a third party to appoint a Neutral Expert, then,

according to the provisions of the Treaty, the Neutral Expert shall be appointed by the World Bank. Detailed provisions on the Neutral Expert are laid down in Annexure F to the Treaty. If the Neutral Expert determines that the difference does not fall under his mandate as prescribed by the Treaty, then the difference becomes a dispute and would be dealt with by a Court of Arbitration. The Commission itself could also deem a difference as a dispute which would be settled by a Court of Arbitration. Although the Treaty states that the decision of the Neutral Expert is final and binding, it also states that if any question which is not within the competence of the Neutral Expert should arise out of his decision, such a question should be settled in accordance with procedures that could involve the Court of Arbitration. The Court of Arbitration consists of seven arbitrators, two of whom would be appointed by each party. The remaining three (called umpires) would be appointed through a complex process that could also involve the World Bank. Pakistan approached the World Bank on January 15, 2005, stating that a difference has arisen with India with regard to the Baglihar Hydropower plant which India is constructing on the Chenab river. Although the Chenab river has been allocated by the Treaty to Pakistan, India has been allowed certain uses of the river, including run-of-river hydropower plants, subject to certain conditions specified in great details under the Treaty. India claimed that the Baglihar plant is in conformity with those conditions, while Pakistan challenged that claim. This was the first time since the Treaty was concluded in 1960 that the Bank has been called upon by one of the parties to exercise its responsibilities under the Treaty with regard to the settlement of a difference or a dispute. The Bank studied the extensive briefings provided by the two parties and concluded that it was required under the Treaty to appoint a Neutral Expert. After consultations with the two parties, the Bank appointed on May 10, 2005, Mr. Raymond Lafitte, a Swiss national and professor at the Swiss Federal Institute of Technology as a Neutral Expert. Annexure F of the Treaty provides that the Neutral Expert determines the procedure, provided that he affords to each party an adequate hearing. In this context, the Neutral Expert requested ICSID to undertake the coordination of the process and one ICSID staff was designated as Coordinator. The parties welcomed this role for ICSID. As allowed by the Treaty, the Neutral Expert also used the services of Mr. Laurent Mouvet, civil engineer, as an assistant, and of Professor Laurence Boisson de Chazournes, as a legal adviser. Similar to the way ICSID proceedings are handled, the Coordinator was designated as the channel for written communications among the parties and the Neutral Expert. Instruments and documents introduced by one party in the process were copied to the other party, with ICSID arranging for the proper distribution of copies. The Coordinator also provided logistical support and helped organize five meetings. The first meeting was held in Paris, at the World Bank Office, on June 9–10, 2005. The purpose of this meeting, such as first sessions under ICSID proceedings, was to ascertain the parties' views regarding issues of procedure and to help the Neutral Expert to ensure the fair and equitable treatment of the parties, and an orderly administration of the process of carrying out his task. At this meeting, a schedule for the filings of written instruments was agreed by the parties and the Neutral Expert, as well as dates for the visits of the site and its model and the holding of further meetings. According to the agreed schedule, India filed further documents. This was followed by a first exchange of pleadings, Pakistan's memorial and India's

counter-memorial. The sequence of the written procedure was inspired by ICSID practice which provides for two possible rounds of exchange. Before the second round of pleadings, the parties, the Neutral Expert, his assistant and ICSID staff visited the Baglihar site and its model in Roorkee. A second meeting was held in Geneva on October 19–21, 2005 at the World Meteorological Organization. This meeting was dedicated to the parties' answers to questions raised by the Neutral Expert following the visit of the project. Further to the filing of Pakistan's Reply and India's Rejoinder, a third meeting was held on May 25-29, 2006, in London, at the International Dispute Resolution Centre Ltd. The meeting was devoted to oral presentations of the parties. This process is also based on ICSID proceedings which usually comprise two distinct phases: a written procedure followed by an oral one. The Neutral Expert presented his draft decision to the parties in Paris, at the World Bank Office, on October 2–4, 2006. Such practice is uncommon in international arbitration but does exist in other fields. A similar feature can be found in the Understanding on Rules and Procedures Governing the Settlement of Disputes of the World Trade Organization. This feature is called "Interim Review Stage." After the presentation of the draft decision, the parties were given the opportunity to file written comments on the draft decision and further presented these comments orally at the fifth meeting which took place at the World Bank Headquarters in Washington, DC, on November 7–9, 2006. Subsequent to that meeting, the parties filed additional comments on their respective presentations. The Neutral Expert issued his decision on February 12, 2007, two years after Pakistan approached the World Bank. The decision dealt with the six contested issues: (i) maximum design flood, (ii) spillway, ungated or gated, (iii) spillway, level of the gates, (iv) artificial raising of the water level, (v) pondage, and (vi) level of the power intake. In interpreting the Treaty, the Neutral Expert relied on the rules of the Vienna Convention on the Law of Treaties. He considered that the rights and obligations of the Treaty should be read in light of new technical norms and new standards. He also stated that the interpretation of the Treaty should be guided by the principle of integration and the principle of effectiveness and concluded that the annexure relevant to the issues at hand should be interpreted in view of the objects and purposes indicated in the Preamble of the Treaty. The first issue on the maximum design flood related to the calculation of the maximum amount of water which can arrive at the dam. In view of many uncertainties of flood analysis, the Neutral Expert retained the value proposed by India of 16,500 m3/s. With regard to the second issue of a gated or ungated spillway, Pakistan considered that a gated spillway is not necessary. The Neutral Expert determined that the conditions of the site require a gated spillway, indicating that an ungated spillway might create the risk of flooding the upstream shores, and that an elevation of the dam crest, which would prevent such a risk, would be costly. On the issue of the level of the spillway gates, Pakistan stated that even if it could be assumed (without conceding) that a gated spillway is necessary, the orifice spillway proposed by India is not located at the highest level consistent with the provisions of the Treaty. The Neutral Expert determined that the gated chute spillway on the left wing planned in India's design is at the highest level consistent with the Treaty. Moreover, the Neutral Expert considered that the outlets composing the sluice spillway, proposed by India, are of the minimum size and located at the highest level, in conformity with international practice and are state of the art, as consistent with the

Treaty. However, the Neutral Expert determined that the outlets should preferably be located 8 m lower to ensure protection against upstream flooding. On the fourth issue of the artificial raising of the water level, Pakistan considered that the dam crest elevation proposed by India is exaggerated and could be lower. The Neutral Expert determined that the dam crest elevation should be slightly lower than that proposed by India. With regard to the volume of the maximum pondage, Pakistan argued that the value of the maximum pondage proposed by India is too high. The Neutral Expert agreed with India that the main objective of pondage is to regulate the flow of the river to meet the consumer demand as opposed to producing constant power, as defined by Pakistan. However, the Neutral Expert determined that the value proposed by India was not in compliance with the Treaty and fixed a lower value. On the sixth point relating to the level of the power intake, Pakistan considered that the power intake is not located at the highest level as required by the Treaty. The Neutral Expert agreed with this consideration and determined that the intake level should be raised by 3 m. The Neutral Expert considered his decision as not being rendered against one or the other party. According to the provisions of the Treaty, the decision of the Neutral Expert is final and binding. The Neutral Expert, his legal adviser and his assistant were financed by a Trust Fund established under the Treaty in 1960, and to which both parties contributed in equal amounts, such as in ICSID proceedings. The Neutral Expert had the mandate of deciding which of the two parties should bear the cost of the process. In this case, he directed that the parties share the cost equally. The parties agreed that the decision of the Neutral Expert would only be disseminated in accordance with their own rules, however they allowed the Neutral Expert and Coordinator to disseminate the Executive summary of the decision. The text of the Executive Summary can be found on the World Bank Indus Waters Treaty webpage.