IDSA Task Force Report

WATER SECURITY FOR INDIA: THE EXTERNAL DYNAMICS

Institute for Defence Studies and Analyses
New Delhi

Cover Illustrations Courtesy: Front - River Indus - Jamie Sinz in India.
Back - River Brahmaputra - Wonder Travel Tourism Info.
Maps drawn are not to scale.

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PREFACE

Water is a fundamental human need and a critical national asset. It is the key to socio-economic development and quality of life. As the pressures of population and economic activities converge on water requirement, the water sector will increasingly face the challenge of bridging the demand-supply gap.

India is facing a serious water resource problem and as trends suggest, it is expected to become 'water stressed' by 2025 and 'water scarce' by 2050. Premised on this, the IDSA Report raises fundamental questions about the forces driving water demand and the political dynamics of riparian relations, both in terms of hindrances and opportunities, amongst states in the subcontinent.

Rivers, a crucial source of water resources, physically link upstream and downstream users. While their flows offer ample opportunity for water harnessing, equally, they create barriers. The management of rivers does not take place in a vacuum but rather in a complex political and economic framework.

Riparian issues ultimately have a political connotation. Politics is about power, influence, resource allocation and policy implementation. But politics is also about managing relationships between states and trade-offs. The implementation of river policies, even when purely design-related to the linking of rivers or constructions of dams and barrages, are undertaken within a political context. Riparian states differ in their views of what cooperation entails for them and not surprisingly, a power game ensues. Rivers, in effect, can no longer be viewed as a soft component of a country's foreign policy. Rather they are intricately linked to developmental goals and domestic needs and thus impact bilateral relations.

In the backdrop of water challenges in the region, while it is important to adopt sensible riparian policies and 'healthy rivers' schemes it is equally important not to ignore the political realities. Many of the existing treaties may have to be evaluated afresh and new treaties based on current hydrological knowledge will need to be framed. The geographical contours of India as upper, middle and lower riparian is likely to develop into the epicentre of riparian politics. As an active regional player, riparian issues for India, will be crucial for settling many of the water-induced conflicts in the region. It will thus have to balance its growing water needs and larger security concerns with effective 'hydro-diplomacy'.

The structure of this Task Force Report is thematic. It begins with a discussion on what water security means for India and examines the relevance of water in the larger national security context. In examining the water management conundrum, the report takes stock of the water situation in India and critiques some aspects of its water management policies. The thrust, however, is on the external riparian dynamics. A regional riparian evaluation follows thereafter with focused analyses of India's water related issues with Pakistan, China, Bangladesh, Nepal and Bhutan. The report ends with some reasoned recommendations.

I would like to convey my appreciation to all who contributed to this report: Arvind Gupta, Uttam Kumar Sinha, Sreeradha Dutta, Nihar Nayak, Medha Bisht, PK Gautam, Sunil Chauhan and M. Mahtab Alam Rizvi. Other members of the task force: Satish Chandra, Rajiv Sikri, D K Mehta, SK Chaudhary, Maj Gen (Retd) Vijay Agha, Professor K. Warikoo, DV Thareja and Luther Rangreji added valuable insights based on their experience and first-hand knowledge and I would like to offer my grateful thanks to them.

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New Delhi

N. S. Sisodia
Director General, IDSA

List of Abbreviations

BOD	Biochemical Oxygen Demand
BCM	Billion Cubic Metres
DPR	Joint Detailed Project Report
GBM	Ganges-Brahmaputra-Meghna
GMS	Greater Mekong Sub-region
GOI	Government of India
ICWR	India-Nepal Joint Committee on Water Resources
IWT	Indus Water Treaty
JCWR	Joint Committee on Water Resources
JCE	Joint Committee of Experts
JGE	Joint Group of Experts
JRC	Joint Rivers Commission
LOC	Line of Control
MTA	Mid-Term Appraisal
MAF	Million Acre Feet
NCIWRD	National Commission for Integrated Water Resource Development
NAPCC	National Action Plan of Climate Change
NE	Neutral Expert
NHPC	National Hydro Power Corporation
PIC	Permanent Indus Commission
POK	Pakistan Occupied Kashmir
ROR	Run-of-River Projects
SCIP	Standing Committee on Inundation Problems
SYL	Sutlej-Yamuna Link
TOR	Terms of Reference
UN	United Nations

EXECUTIVE SUMMARY

- Water security implies affordable access to clean water for agricultural, industrial and household usage and is thus an important part of human security. Water along with food and energy forms a critical part of the 'new security agenda' and redefines the understanding of security as a basis for policy-response and long-term planning.

- Water security for India implies effective responses to changing water conditions in terms of quality, quantity and uneven distribution. Unheeded it can affect relationships at the inter-state level and equally contribute to tensions at the intra-provincial level.

- The Union Ministry of Water Resources has estimated the countries water requirements to be around 1093 BCM for the year 2025 and 1447 BCM for the year 2050. With projected population growth of 1.4 billion by 2050, the total available water resources would barely match the total water requirement of the country. In 1951, the annual per capita availability of water was 5177 m^3, which reduced to 1342 m^3 by 2000. The facts indicate that India is expected to become 'water stressed' by 2025 and 'water scarce' by 2050. The National Commission for Integrated water Resource Development (NCIWRD) has estimated that against a total annual availability of 1953 BCM (inclusive of 432 BCM of ground water and 1521 BCM of surface water) only 1123 BCM (433 BCM ground water and 690 BCM surface water) can be put to use, i.e., only 55.6 per cent. The high-level of pollution further restricts the utilisable water thus posing a serious threat to its availability and use.

- The subcontinent has large river systems. Prominent are the Indus basin in the west and the Ganga-Brahamaputra-Meghna basin in the east. A number of bilateral treaties exist but are often hostage to the prevailing political animosity. Resource nationalism will increasingly dominate the hydrological contours of South Asia and will largely define regional politics. The treatment of rivers as a good in the subcontinent will primarily be interpreted within the regional asymmetry/symmetry power configuration. The upstream-downstream supply disputes will commonly feature in the riparian politics.

- The hydrological contours of India, both as an upper riparian and a lower riparian, will be at the epicentre of new riparian politics and diplomacy over transboundary rivers. The friction in bilateral relations will increase if mutually acceptable bilateral or multilateral framework for cooperation to deal with integrated development of water resources is not effectively reworked. In such situations, many of the existing treaties will have to be evaluated afresh and many treaties need to be framed based on new hydrological knowledge. India's riparian relation with its neighbours will become progressively fragile with Pakistan, Bangladesh and Nepal continuously raising concerns over regulating and sharing of river waters.

- China's aggressive south-to-north water diversion projects on the rivers that originate from the Tibet region, particularly on the Yarlung-Tsangpo, is opening up a new front of uncertainty in Sino-Indian relations as well as the overall hydrological dynamics in South Asia.

- China's proposed dams on the Yarlung-Tsangpo are a matter of concern. The proposed dams on the Yarlung, almost 28 in number, some of which are already underway, has the full support of the state-run

hydro-power industry. It would have a capacity of 38 gigawatt of power, almost twice the capacity of the Three Gorges Dam.

- It is important for India to create global awareness about the water resources in Tibet and build regional pressure. Tibet's water is for humanity, not for China alone. Almost 2 billion people in South and Southeast Asia dependent on the water resources of Tibet. Tibetans need to be also sensitised to the water resources and the extensive ecological damage that China's water diversion plans can cause.

- International laws on allocating water within river-basin are difficult to implement and often contradictory. The UN Convention on the Non-Navigational Uses of International Watercourses approved in 1997 by a vote of 104-3 (but not yet ratified) requires watercourse nations (Article 5) to participate in the use, development, and protection of an international watercourse in an equitable and reasonable manner. In spite of the UN Convention, riparian nations pitch their respective claims and counterclaims based on their interest and interpretation. This raises fundamental questions on whether formal arrangements on long lasting peaceful sharing of river waters can be achieved particularly in regions where the political climate is hostile to cooperative endeavours.

- With Pakistan and China water issues will be far more political and strategic. Water as an instrument and tool of bargain and trade-off will assume predominance because the political stakes are high. Water issues between Pakistan and China have the potential to become catalysts for conflict. Though the importance of politics cannot be discounted in India's water relations with Nepal and Bangladesh, there is however far more scope to overcome and break political deadlocks through sensible water sharing arrangements and resource development. With Bhutan hydro-relations has been extremely beneficial. Sharing the benefits of river cooperation has given substance to the relationship. The growing confidence has led to a recent agreement between the two countries to develop 10 more hydropower projects with a total capacity of 11,576 MW by 2020 in Bhutan.

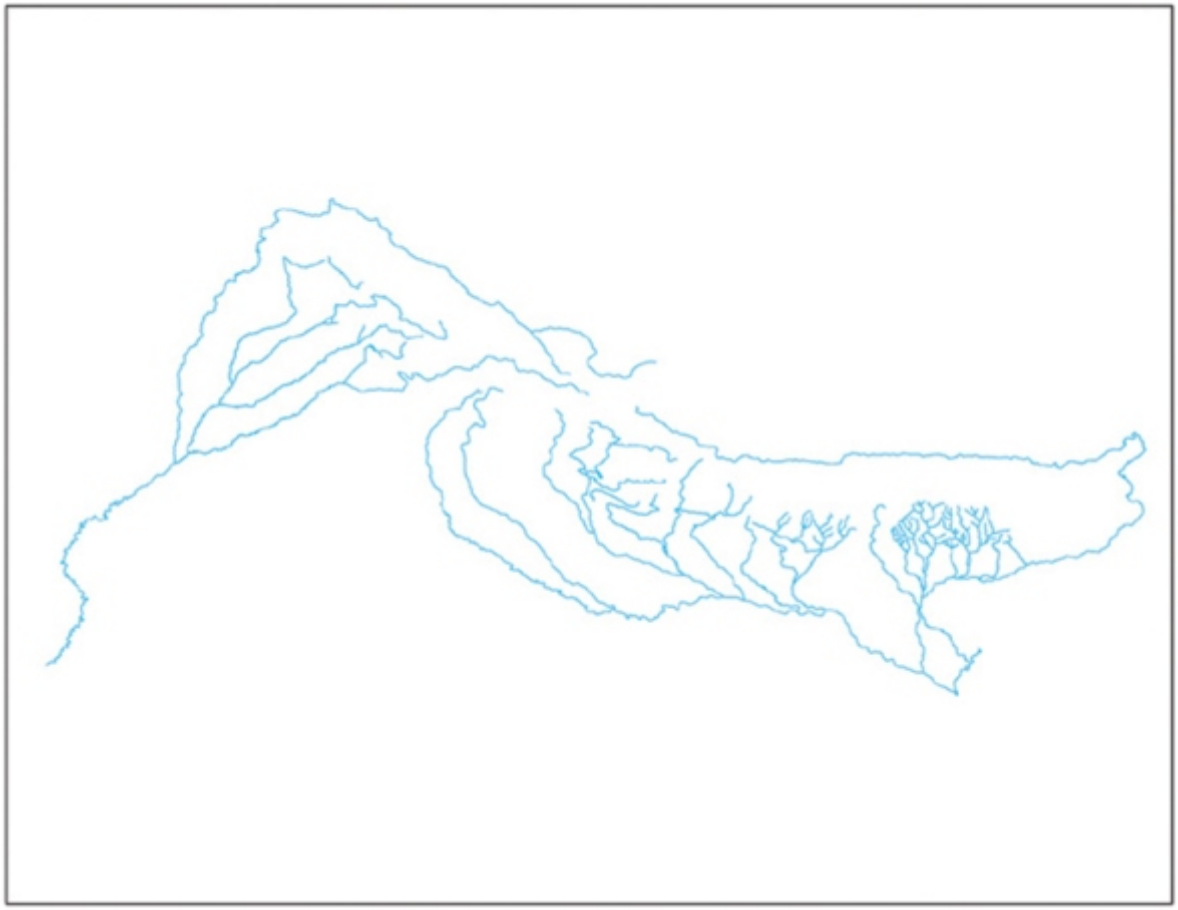
- With Pakistan, given some stringent provisions in the Indus Water Treaty that thwart India's plans of developing projects on the western rivers, a 'modification' of the provisions of the treaty should be called for. Whether it is done through renegotiations or through establishing an Indus II Treaty, modifications of the provisions are crucial in case of the western rivers.

- Under the draft provisions of the International Law Commission 'Responsibility of States for Internationally Wrongful Acts, 2001', India can consider the abrogation of the treaty so long as it is proportionate to infringement by the other side. It is well established that Pakistan aids and abets terrorist actions from its soil. India should quantify the damage it has sustained over the decades because of Pakistani support to terrorism and seek as a first step suitable compensation. If Pakistan does not comply, India can possibly threaten to walk out of various bilateral agreements including the IWT.

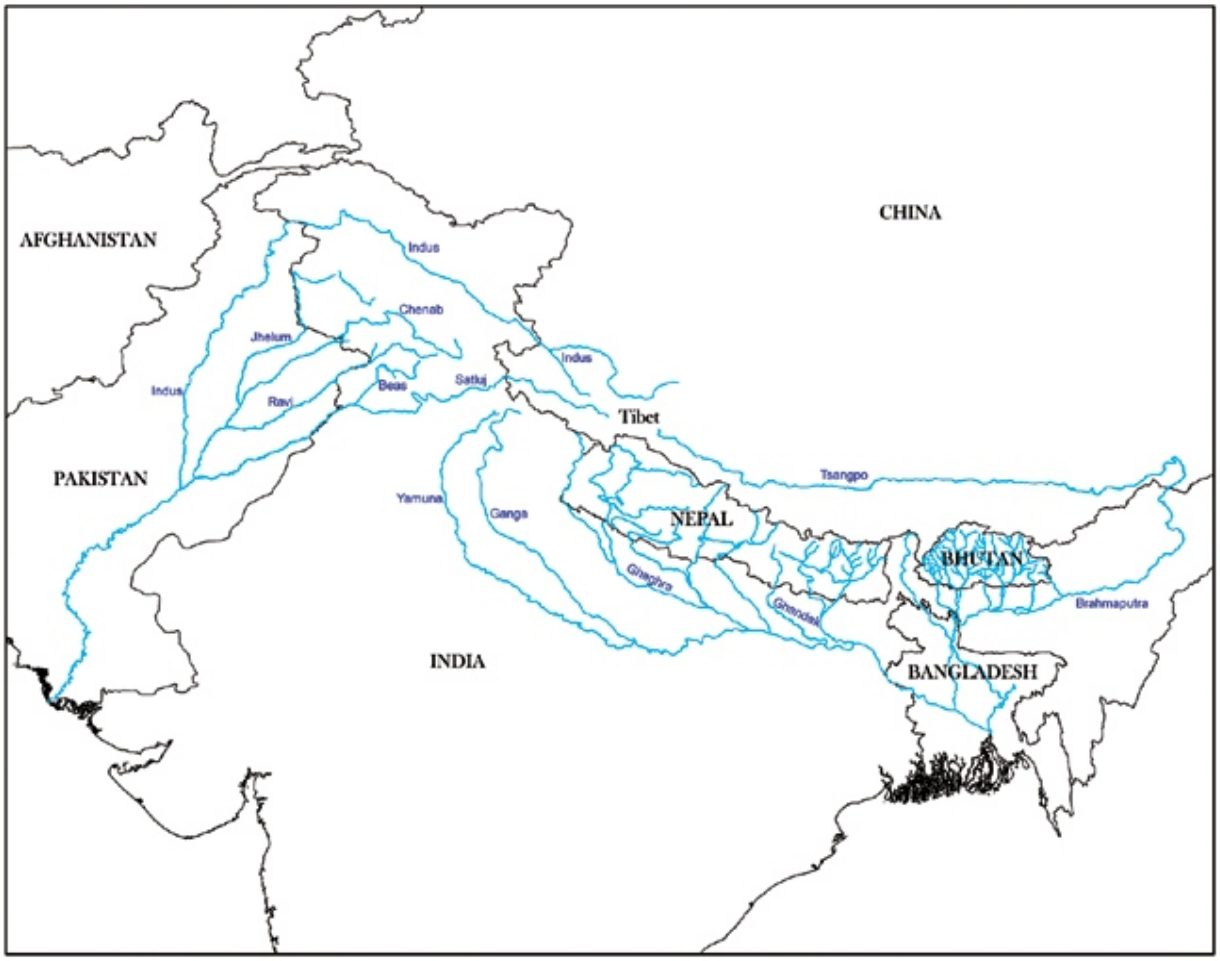
- With Nepal, India needs to bring about a turn around in the overall dysfunctional relationship and invest in long-term political linkages. Considering the sensitivity of water relationship and the benefits that can come about, India should invest in Nepal's water infrastructure particularly irrigation and flood control. Identification and feasibility studies on small and medium projects should be undertaken. Small run-of-river projects should be started to build in political confidence.

- With Bangladesh, India's approach should be to deal with water issues in the overall political and security context. While the Ganges Treaty is well established, concerns over the sharing of the Teesta and India's construction of the Tipaimukh dam is opening up new fronts in water relations between the two countries. While it is important to continue dialogue with Bangladesh on joint river basins, India needs to look after its own interest as well. Bangladesh also needs to be sensitized on China's long distance transfer of waters of the Brahmaputra.

Rivers without Political Boundaries



Rivers with Political Boundaries



CHAPTER 1
WATER SECURITY IN INDIAN CONTEXT

Introduction

Water covers most of the planet but only 3 per cent of it is fresh water and of which 2 per cent is frozen in ice caps and glaciers. A mere 1 per cent in the form of lakes, ponds, rivers, streams, swamps, marshes and bogs, is readily accessible and relied on for human consumption. It is this amount that truly matters when sizing up the water challenge. In the last century the world population tripled and the use of water grew six times. It is estimated that by 2030 the demand for water will be 40 per cent more than it is currently and 50 per cent higher in the most rapidly developing countries that include India and China.[1] According to UN 2004 estimates, by 2030 the world population is projected to reach 7.5 billion (low estimate) and 9 billion (medium estimate) by 2050 from the current level of 6.7 billion people. The bulk of the population increase will be in countries already experiencing water shortages. The ever expanding gap between demand (in terms of the growing population and economy) and supply (in terms of availability) will potentially make water a serious issue in the coming decades particularly in densely populated countries.

The water demand projection for India is a matter of concern. The World Bank in its 1999 report indicates that the overall water demand will increase from 552 BCM (Billion Cubic Metres) to 1050 BCM by 2025, which will require the use of all available water resources in the country. The per capita water availability according to the report has dropped from over 5,000 cubic metres per year in 1947 to less than 2,000 cubic metres per year in 1997 and by 2025, this figure will further drop to 1,500 cubic metres per year, which is well below the level at which water stress is considered to occur.[2] The report also lists six of India's 20 major river basins below the water scarcity threshold of 1,000 cubic metres per year. *The Mckinsey Report* (2009) suggests that by 2030, water demand in India will grow to almost 1.5 trillion m3, principally driven by population growth and the domestic need for rice, wheat and sugar. According to the Report, the current water supply is approximately 740 billion m3. Clearly, the drivers of future water challenge are essentially tied to development and economic growth with the agriculture sector as the largest withdrawer of water. The interplay of food, energy and water (FEW) within the complex context of population increase, rising standards of living and resource constraints poses interlocking challenges to sustainable environmental policies.

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1. *Mckinsey Report*, 'Charting our Water Future', November 2009. http://www.mckinsey.com /App_Media/Reports/Water/Charting_Our_Water_Future_Exec%20Summary_001.pdf
2. 'Water stress', according to the Falkenmark index, which this report uses, indicates water availability between 1000 to 1700 cubic meters per person per year. 'Water scarcity', indicates water availability between 500 to 1000 cubic meters per person per year. Also see International Water Management Institute website, *World Water Demand and Supply, 1990-2025: Scenario and Issues*. Research Report 19

A growing need to synchronise internal water management measures with external riparian policies is thus critical. Although India has low per capita water consumption, it lags in the efficient use of water across sectors. Continued population growth and the impact of global warming along with inadequate conservation and huge wastage are putting enormous pressure on water resources. With no proportional increase in water availability and an ever increasing demand, a water crisis seems imminent.

Water security for India is emerging as an issue of extreme urgency. Broadly defined, water concerns are multi-dimensional in nature combining the sufficient need of quality water for socio-economic uses as well as adequate water to sustain ecosystem functions. Water security for India implies effective responses to changing water conditions in terms of quality, quantity and uneven distribution. Unheeded it can impact relationships at the inter-state level and equally contribute to tensions at the intra-provincial level. Indian policymakers need to be sensitised to the challenges of dealing with such complexities.

The Task Force strongly recommends a policy revamp which moves away from a narrowly understood framework of 'water management' to a broad-based and wide-reaching 'water resource management'.[3] This would require treating river systems, particularly the Ganges-Brahamaputra-Meghna (GBM) and the Indus, in a holistic way and reorienting hydrodiplomacy on a multilateral basis than just a bilateral format.[4] This would entail a shift from 'sharing waters' to 'sharing benefits'.

Table 1
Water resources potential of the Indus and GBM River basins in India

S. No	River basin	Catchment area in1000 Square km.	Average annual potential in the river (in BCM)	Est. Utilisable flow excluding ground water (in BCM)
1.	Indus (up to border)	321	73.31	46
2.	Ganges-Brahmaputra-Meghna	1097	1110.62	274
	a) Ganges	861	525.02	250
	b) Brahmaputra	194	537.20	24
	c) Barak (Meghna)	42	48.40	

Source: Central Water Commission. See:
http://www.cwc.nic.in/main/downloads/waterrelated2007/chapter1pdf/TABLE%201.07FINAL.pdf

3. 'Water management' has traditionally been understood as manipulation of water for specific uses leading to independent legal regimes and the development of isolated water-based projects. The concept of 'water resources management' includes the comprehensive protection, development and utilisation of the whole of a given body of water, surface and underground, constituting one single hydrologic unit. Water resource management is viewed as being 'rational' and 'integrated'. It embraces the 'conjunctive use' of surface and underground water resources, the control of their quality and harmful effects; their sustainable development for multi-purpose beneficial utilisation and the administration of corresponding use rights. See, Bernard J Wohlwend, *Equitable Utilisation and the Allocation of Water Rights to Shared Water Resources.* http://www.aida-waterlaw.org/PDF/EQUITABLE.pdf
4. See, Jayanta Bandyopadhyay and Nilanjan Ghosh, "Holistic Engineering and Hydro-Diplomacy in the Ganges-Brahmaputra-Meghna Basin", *EPW*, Vol.44, No.45, Nov 7-13, 2009 pp.50-60

Table 2
Basin-wise flow and storage capacity of the Indus and GBM River basins in India (Up to the Ninth Plan)

S.No	Name of the river	Length of the river (in km)	Basin-wise avg. annual flow (in BCM)	Storage capacity (in BCM)
1	Indus	1114 (2880)	73.31	16.67
2	Ganges	2525	525.02	60.66
3	Brahmaputra	916 (2900)	537.20	11.68 (incl. Barak)

Figures in bracket include the total river basin in neighbouring countries

Source: *Water Data Complete Complete Book*, Central Water Commission. See: http://www.cwc.nic.in/main/downloads/Water_Data_Complete_Book_2005.pdf

Table 3
Details of GBM region

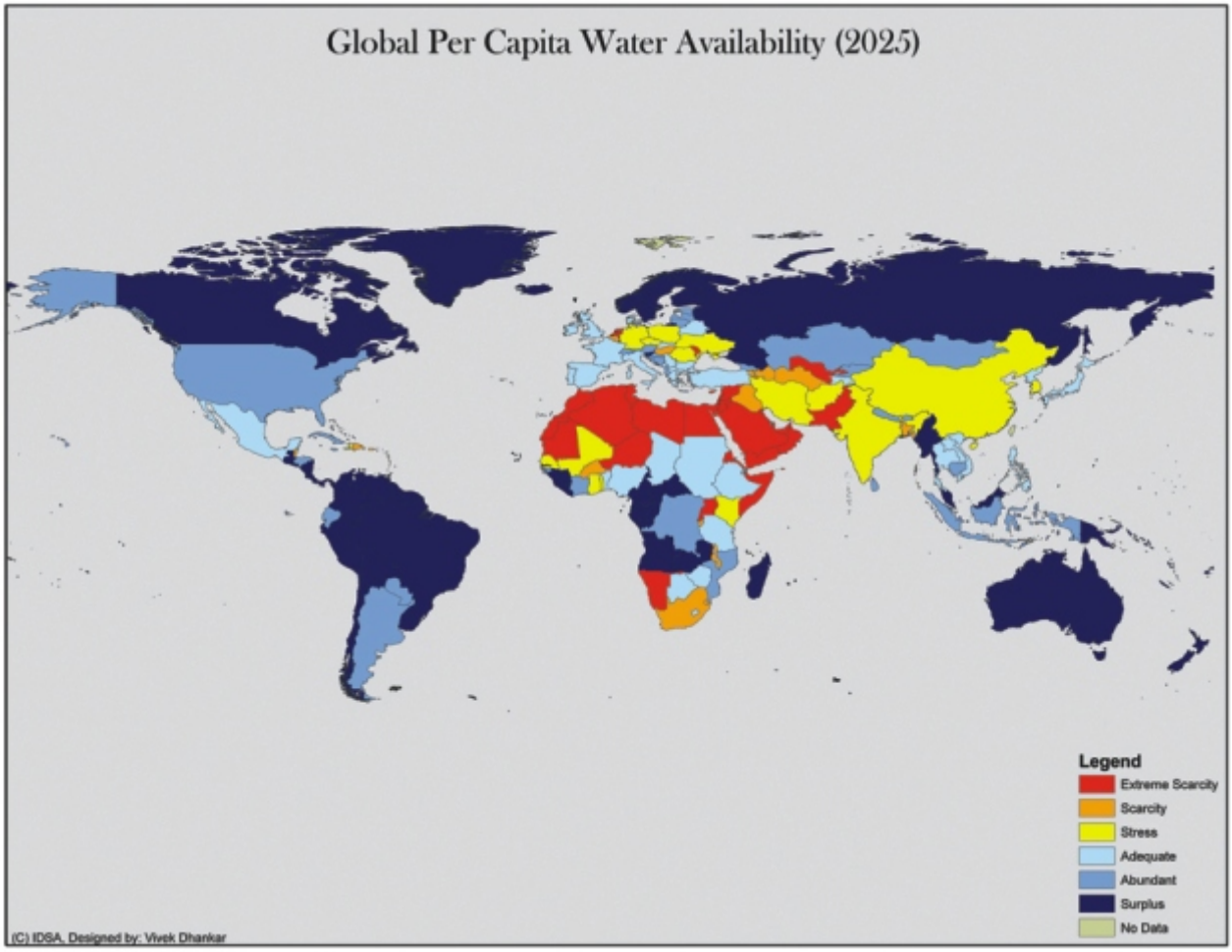
Parameter	Nepal	India	Bangladesh	Bhutan	TAR of China	Total
Drainage area in 1000 sq. km	140.0	1105.0	129.0	45.0	326	1745.0
Arable area in million ha.	2.6	67.2	9.1	0.2	Neg	79.1
Est. population in millions(2005)	26.0	452.0	137.0	2.0	3	620

Source: R. Rangachari and BG Verghese in Q.K.Ahmed, Asit K Biswas, R.Rangachari and M.M.Sainju (eds), *Ganges-Brahmaputra-Meghna Region: A Framework for Sustainable Development,* University Press Limited, Dhaka, 2001, p. 83.

Table 4
Details of the Indus basin within India

S.No	River/tributary/ sub-basin	River length in Km	Basin area in 1000 Sq.km	Mean annual flow BCM
1	Indus main	1114	168.4	110.4
2	Jhelum	402	34.8	27.9
3	Chenab	398	26.2	29.0
4	Ravi	370	14.4	7.9
5	Beas	460	20.3	15.7
6	Sutlej	1078*	-	16.8
Total for the basin in India			321.3	207.7

* including the reach in Tibet
Source: Records of Indus Water Commission



The GBM and Indus basins account for two-thirds of India's water potential. Further, any water outlook will necessitate interdisciplinary approaches linking together natural sciences, politics and policy. The challenge for India will be to imbibe hydrodiplomacy in its over all regional diplomacy; not an easy task as India's diplomacy has traditionally been bilateral rather than multilateral.

Water and National Security

In the changing security agenda of the 21st century, 'security' as a concept has acquired multiple connotations. It is increasingly being perceived as issue-based rather than as an overarching idea. Security is no longer thought of in extreme terms or couched merely in threat dynamics with use of force as the best defence mechanism. With water becoming an increasingly challenged resource, its salience in contemporary discourse on national security has become significant. Water security implies affordable access to clean water for agricultural, industrial and household usage and is thus an important component of human security. Water along with food and energy forms a critical part of the 'new security agenda' and redefines the understanding of security as a basis for policy-response and long-term planning.

Today non-traditional threats are assuming greater importance in the security grid. The 'securitisation

move' of an existential issue such as water generates political attention, public awareness and policy-initiatives. There is, however, the risk that the issue can become vulnerable to political vested interests and linkage politics and solutions could be manipulated within the political context. The other disadvantage in securitising issues like water, or for that matter any other developmental issue, is that western countries begin to put unacceptable pressure on the developing countries. While one may have apprehensions about the securitisation of what is essentially a developmental issue, yet one cannot ignore the reality that several developmental issues have security dimensions *via* their link with human security. Human security, as various definitions suggest, is based on access to clean food; basic health care and education; environment and energy security. It is evident that access to clean water – whether from the perspective of food security or energy security or health related issues – forms a critical component of any human security formulation.

Water Issues: Conflict or Cooperation?

Freshwater is a *precious* commodity and is synonymous with life. Its *possession* bestows power. The 'preciousness' and 'possession' in geopolitical mechanics renders water a strategic commodity, and its role as a strategic asset or vulnerability (in terms of supply and demand) cannot be underestimated. In the geopolitical framework of resource security/insecurity, water is taken as a 'good' and conceptualised under the model of resource scarcity.[5] The 'geo-politicisation of water' is associated with the 'instrumentalisation of water' and therefore the common usage of the term "water wars".[6]

Water thus becomes a resource[7] of contention and conflict is generally reduced to the question of who has the 'good' and how much, who needs and how much (or how much is needed), and thus what the affordable cost of 'procurement' of such a 'good' would be in economic, political or military terms. From an inter-state perspective, an analysis of water security would essentially entail an investigation as to why and when states choose to cooperate over water or why and when states tend to use water as a 'bargaining tool' and an 'instrument of politics'.

Indeed, "Water in a Changing World"[8], will assume greater salience and as it does, the drivers impacting water resources, whether climate variability and security issues or electricity-generation and migration, will need to be factored in and solutions searched for. A considerable amount of technical and scientific knowledge developed in the recent years points towards the potential of water scarcity becoming a key driver of tension and conflict within societies and states. The possibility of inter-state wars arising from water-related issues have been much talked and

5. The scarcity-conflict model is fast becoming conventional wisdom in foreign policy, population and environment circles, structured by the likes of Stephan Libiszewski and Homer-Dixon and popularised and sensationalised by writers like Michael Renner, "Ending Violent Conflict", *Worldwatch Paper* 146, 1999 and Robert Kaplan, "The Coming Anarchy", *Atlantic Monthly*, February 1994, pp. 44-76. Kaplan proclaimed the environment as the most important national security issue of the 21st century.
6. Water wars are a much hyped alliteration. Prediction of water wars seems to be sensationalist and alarmist.
7. If water is seen as a 'source' (a source of life and without which nothing survives) then the entire perception changes from one of hostility over it to one of cooperation and sharing.
8. The theme was introduced in the World Water Forum in Istanbul, March 2009

written about.[9] One can dispute such an alarmist prognosis. History tells us that the only recorded water war was some 4,500 years ago, when the two Mesopotamian city-states, Lagash and Umma, went to war. History also shows that, between 805 AD till now, countries have signed more than 3,600 water-related treaties.[10] There thus seems to be more active cooperation over water than actual war.

Those concerned with the water crisis and its future are divided essentially into two schools. One school indicates that water, as a source of conflict, is more likely to be the case *within* countries than *between* them. It focuses on water as a source of cooperation and as an impetus for scientists and political leaders to use modern science and advanced technology to create new solutions and seek suitable alternatives.[11] The other school argues that water scarcity, as a source of conflict, will increasingly be inter-state in nature and examines water-induced conflicts. This school, however, makes it clear that "water resources have rarely been the sole cause of conflict" but should be viewed as a "function of the relationships among social, political, and economic factors, including economic development."[12] This school also evaluates the role of water as a tool and weapon (both political and military) in conflicts caused by other factors.

Security practitioners need to take water issues into account as part of their arsenal of tools, and explore two primary questions: What role do water issues play in stimulating international conflict and cooperation? Are conflicts over water sharing likely to be more 'within' (intra-state) or 'between' states (inter-state)? The divide in terms of scope and focus is of obvious policy importance, particularly since threats emanating from water scarcity feature regularly in policy reports.

Water Policies

In India water security has been high on the national agenda. Prime Minister Manmohan Singh's 2004 Independence Day speech highlighted the importance of water. He identified water as one of the *saat sutras* requiring special attention. The challenge outlined by him was one of managing water resources as well as ensuring people's participation in water management and conservation. The Prime Minister said:

9. In the early 1980s, Boutros-Boutros Ghali as Egyptian minister of state for foreign affairs said, "The next war in our region will be over the waters of the Nile." In 1991, a few months before being appointed as the Secretary General of the United Nations, he reiterated, "the next war in the Middle East will be fought over water, not politics." Thereon, 'water wars' as a dramatic alliteration was used in the article by Joyce Starr. In 1995, World Bank vice-president Ismail Serageldin made a much-quoted prediction about the future of war, "If the wars of this century were fought over oil, the wars of the next century will be fought over water."
10. *Transboundary Freshwater Dispute Database*, Oregon University. http://www.transboundarywaters.orst.edu/database/interfreshtreatdata.html
11. Aaron Wolf, "Conflict and Cooperation along International Waterways", *WaterPolicy*, 1(2), 1998, pp. 252-65; Alsom Sandra Postel and Aaron Wolf. "Dehydrating Conflict", *Foreign Policy*, September/October 2001, pp. 60-67.Wolf coordinates the Transboundary Freshwater Dispute Database, Oregon University, which includes a computer database of over 400 water-related treaties, negotiating notes and background material on 14 case-studies of conflict resolution, news files on cases of acute water-related conflict, and assessments of indigenous/traditional methods of water conflict resolution.
12. Peter Glieck, "Water and Conflict: Fresh Water Resources and International Security," *International Studies*, 1, 1993, p. 92. Also "Water, War and Peace in Middle East", *Environment*, 36, 1994. Glieck heads the Pacific Institute for Studies in Development, Environment and Security, Oakland, California. See http://www.pacinst.org/

> Water is a national resource, and we have to take an integrated view of our country's water resources, our needs and our policies and water utilisation practices. We need to ensure the equitable use of scarce water resources…I urge you and all our political leaders to take a national and holistic view of the challenge of managing our water resources.

Earlier, in his address to the nation on June 24, 2004, Manmohan Singh had observed:

> Water has emerged as a critical and contentious issue across the country…the government will reverse the neglect of public investment in irrigation, addressing the specific problems of each river basin, in an environment and people friendly manner.

India has a range of data reports on water. At the national level, a comprehensive document titled "Integrated Water Resource Development: A Plan for Action", published in 1999, by the Ministry of Water Resources, provided a comprehensive summary of data, problems and policies. This was followed by the National Water Policy 2002. The latest document on water is from the Prime Minister's Council on Climate Change, of June 2008, entitled, "National Action Plan of Climate Change (NAPCC)". It envisages eight national missions of which the National Water Mission is central to the action Plan. It states:

> A National Water Mission will be mounted to ensure integrated water resources management helping to conserve water, minimise wastage and ensure more equitable distribution both across and within states. The Mission will take into account the provisions of National Water Policy and develop a framework to optimize water uses and by increasing water use efficiency by 20 per cent through regulatory mechanisms and differential entitlements and pricing.

But formulating a policy is one thing, its implementation is another. The National Water Mission will encounter varied challenges in the light of rising population, changing expectations due to economic growth and climate change related impacts.

Soon after Independence, India accorded high priority to the harnessing of rivers. The first two Five Year Plans focused on multi-purpose river projects like the Bhakra Dam. These projects laid the foundation for India's economic growth and the first Green Revolution. However, the administrative and political understanding of their ecological impact was limited. Water management was approached as requiring an engineering solution and as supply-side management. Also the steep land gradient limited India's storage capacity. As a result there is only about 30 days of storage capacity in most of the river basins.[13] In order to overcome the geophysical challenges, major investments need to be made to increase capacity to store water, in both surface and ground water reservoirs, in small projects (such as local rain water harvesting) and big (such as large dams). However, it must be understood that storage projects should primarily be for improving the reliability of supplying existing demands and for meeting historically deprived environmental uses, and not for creating and serving new demands, which inevitably means curtailing existing downstream uses.[14]

13. Countries like the US and Australia, who are not constrained by the land gradient, have about 900-days of storage capacity on the Colorado and Murray-Darling rivers respectively.
14. Curtailing existing downstream uses would mean balancing the principle of 'prior appropriation' and 'equitable apportionment'.

Another challenge to India's water policies has been the weak legal regime. For example, legislation on ground water extraction is absent in many parts of the country. Under the present framework, which dates back several decades, the land owner is given the right to capture an unlimited amount of ground water without considering the needs and requirements of adjacent land owners. A major constraint in evolving a uniform water management policy is that water is a state subject, included in Entry 17 of the List II in the 7th Schedule of the Constitution. Water issues are politically sensitive with many unresolved issues between the provincial states. Though Entry 56 in the List I empowers the Centre to legislate on inter-state rivers, by and large the Centre has followed the 'wait and watch approach' and "political calculations tend to influence and distort policies and decisions that render rationality difficult".[15]

The Cauvery water dispute between Tamil Nadu and Karnataka is a case is point.[16] Likewise, the Sutlej-Yamuna Link (SYL) canal issue between Punjab and Haryana has been equally emotive and divisive resulting in violence. All these pose a serious challenge to the federal nature of the Indian polity and raise a debate about the control of resources. Taking advantage of the federal structure, states have overplayed the autonomy card and by constantly sniping at the Centre have resisted the idea of river basin organisations. The River Boards Act 1956 is for all purposes a dead letter.[17] As a result there has been unviable exploitation and short sighted management practices by both upper and lower riparian states resulting in irreversible ecological damage.

Water Stock: Demand and Availability

The National Commission for Integrated Water Resource Development (NCIWRD) has estimated that the total water requirement of India, in 2050, would be about 973 BCM on the lower side and about 1180 BCM on the higher side depending upon population growth. The Union Ministry of Water Resources, however, on the basis of other studies has estimated the country's water requirements to be around 1093 BCM for the year 2025 and 1447 BCM for the year 2050. With a projected population growth of 1.4 billion by 2050, the total available water resources would barely match the total water requirements of the country.

In 1951, the annual per capita availability of water was 5177 m^3, which reduced to 1342 m^3 by 2000. The facts indicate that India is expected to become 'water stressed' by 2025 and 'water scarce' by 2050 (See Table 5). According to the UNEP, 'water stress' occurs when the demand for water exceeds the available amount during a certain period 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.)

15. Ramaswamy Iyer, "The politicisation of water", www.infochangeindia.org/age, Accessed on February 21, 2006. His other writings include "Rivers of Discord", *The Times of India*, November 6, 2002
16. Words can have dramatic consequences as can be demonstrated by the statements of Tamil Nadu and Karnataka chief ministers. Reacting to the February 5 2007 Cauvery Water Disputes tribunal verdict, Karunanidhi said, "*Justice* has been done". While HD Kumaraswamy said "We will take further action… and I appeal to people to remain clam", Reported in *The Times of India*, February 5, 2007, p.1
17. Ramaswamy Iyer, N. 15

Malin Falkenmark Water Stress Index as explained in Table 5 is a useful measurement.[18] A country whose renewable fresh water availability, on an annual per capita basis, exceeds about 1,700 cubic metres will suffer only occasional or local water problems. Below this threshold countries begin to experience periodic or regular *water stress*. When fresh water availability falls below 1,000 cubic metres per person per year, countries experience chronic *water scarcity*, in which the lack of water begins to hamper economic development and human health and well being. When renewable fresh water supplies fall below 500 cubic metres per person, countries experience *absolute scarcity*.

Table 5
The Malin Falkenmark Water Stress Index
(in cubic metres per person per year)

Water Stress	Water Scarcity	Absolute Scarcity
1,000 to 1,700 cubic metres	500 to 1000 cubic metres	Below 500 cubic metres

Water Demand: Sector-wise

Table 6 gives the present extent of water utilisation by various sectors along with the projections.

The demand projection for water will also have to factor in rates of depletion and degradation and the uneven distribution. Such pressures will compound to water resources being a scarcity issue and a national security concern. Some studies indicate that the "21 million wells drilled are lowering the water tables in most part of the country".[19] In north Gujarat, "water table is falling by 6-mt annually". In Tamil Nadu "falling water tables have dried up more than 95 per cent of the wells".[20] Such depletion has led to loss of arable land by almost 50 per cent and an increasing dependent on rainfall. The rainfall pattern has been equally disturbing. Rains in 2009 have been 23 per cent below normal resulting in a drought that has been the worst since 1972. Satellite imagery indicates that northern India is pumping about 54 trillion litres of water out of the ground every day.[21] Water quality is equally deteriorating. Organic pollutants from industrial activities are a major

18. Malin Falkenmark index though a subjective evaluation is used by many organisations including the World Bank.
19. Fred Pearce, "Asian farmers sucking the land dry", *Newscientist.com*, August 28, 2004
20. Ibid
21. Virendra Tiwari from the National Geophysical Research Institute in Hyderabad, India, and colleagues used gravity data from the GRACE satellite to monitor the loss of continental mass around the world since 2002. Regions where water is being removed from the ground have less mass and therefore exert a smaller gravitational pull on the satellite. The data revealed that groundwater under northern India and its surroundings is being extracted exceptionally fast. Tiwari and colleagues calculate that between 2002 and 2008 an average of 54 cubic kilometres - enough to fill more than 21 million Olympic swimming pools - was lost every year. Boreholes in the region show the water table is dropping by around 10 centimetres a year. See, "India's thirst is making us all wet", *New Scientist*, issue no 2728, October 2009.

Table 6
Water Utilisation by Various Sectors- Present and Projected

Sector	Present Utilisation (BCM)	Projected Demand (BCM)					
		Standing Sub-Committee of MoWR			NCIWRD		
		2010	2025	2050	2010	2025	2050
Irrigation	501	688	910	1072	557	611	807
Domestic	30	56	73	102	43	62	111
Industrial	20	12	23	63	37	67	81
Energy	20	5	15	130	19	33	70
Others	34	52	72	180	54	70	111
Total	**605**	**813**	**1093**	**1447**	**710**	**843**	**1180**

(Source: GoI, Eleventh Five Year Plan, Chapter 2- Water Management and Irrigation)

cause of degradation of water quality. Based on BOD levels (Biochemical Oxygen Demand), 14 per cent of total river length in India is severely polluted and 19 per cent moderately.[22] India is the third biggest emitter of organic water pollutants with 1,651,250 kg/day.[23] The Punjab government's draft water policy published in 2008 stated that much of the state's water resources were being polluted by industrial waste, sewage and excessive pesticide use in agriculture which is likely have a severe impact on the health of the populace. This suggests that there is a considerable need for resource planning, managing possible disputes owing to allocation of shared resources and 'adaptive governance'.[24] The National River Link Project that proposes to connect 30 big rivers and canals and is expected to generate 175 trillion litres of water. But the interlinking of rivers is a political issue and its status is being reviewed by the current government.

Water is intricately connected to food security. Over-pumping of water from underground reservoirs by farmers trying to meet the nation's

22. *Water : The India Story*, A Report by Grail Research, p. 24
23. *World Resources 2002-2004*, World Resource Institute, Washington, DC, 2003, pp. 141-143
24. While 'adaptive management' is an approach to the conservation and utilization of natural resources (like water); it seeks, through experimentation, to maintain ecologically sustainable levels of use. 'Adaptive governance' involves political choices, i.e., specification of policy objectives, allocation of revenue, imposition of regulatory controls, and the allocation of gains and losses necessary to achieve political equlibrium regarding levels of water quantity and quality, whether these are ecological sustainable or not. See, Lawrence Suuskind, "Adaptive Governance", in John T Scholz and Bruce Stiftel (eds), *Adaptive Governance and Water Conflict*, Washington, RFF Press, 2005, p. 142.

food requirement is depleting the water stock. Recent research shows that in the six years ending in 2008, more than 26 cubic miles or 109 cubic kilometres of underground water was depleted. This is double the capacity of India's largest reservoir and three times the capacity of the largest reservoir in the US. The replenishment each year is 30 per cent less than the withdrawals. Drought is making matters even more difficult. Nearly 300 of India's 600 administrative districts are dealing with drought. With less rain, farmers pump more water than expected. It is an age-old cycle of human need and activity – the need for irrigation to produce food.

Dealing with water issues is highly complex and often controversial. Water disputes need to be seen within the wider political, social, economic and cultural and environmental context. They can lead to acute tension, conflict, social disharmony and even violence. Moreover, the political, legal, scientific and technical framework concerning water issues is not robust and sometimes lacks legitimacy. The response of the federal structure to deal with these issues has been inadequate. Most of the solutions suggested are essentially supply-side solutions, for example, building of dams, canals, etc. It does not factor in water management and the efficient use of water resources. The UN's WWDR-3 report sends a strong message that decision-makers need to break free from the "water box dilemma" and link water with sustainable development. The report says:[25]

> The 'water box' dilemma must be resolved. Leaders in the water sector in – water supply and sanitation, hydropower, irrigation and flood control – have long been aware that water is essential to sustainable development, but they do not make the decisions on development objectives and the allocation of human and financial resources to meet them. These decisions are made or influenced by leaders in government, the private sector and civil society, who must learn to recognize water's role in obtaining their objectives.

Water Availability

The NCIWRD has estimated that against a total annual availability of 1953 BCM (inclusive of 432 BCM of ground water and 1521 BCM of surface water)[26] only 1123 BCM (433 BCM ground water and 690 BCM surface water)[27] can be put to use, i.e. only 55.6 per cent. The high-level of pollution further restricts the quantity of utilisable water thus posing a serious threat to its availability and use.

Surface Water Resources

India has an average annual rainfall of 1170 mm. Though a healthy amount, regional and temporal variations considerably reduce its net value. Some areas have an abundance resulting in floods and some parts have acute scarcity resulting in drought. While the average annual rainfall in western Rajasthan is 100 mm; in the north eastern region it is 1100 mm. More than 50 per cent of precipitation takes place in less than 100 hours during the four months from June to September. The rainy days may be about 5 in the desert areas and about 150 in the north east. Due to this peculiar rainfall pattern,

25. http://webworld.unesco.org/water/wwap/wwdr/wwdr3/pdf/10_WWDR3_ch_1.pdf accessed on 21.03. 2009
26. GoI, *Integrated Water Resource Development*: A Plan for Action. Report of the National Commission for Integrated Water Resource Development, Vol 1, Government of India (GoI), Sept 1999
27. GoI Report, *Ground Water Management and Ownership*, Sept 2007

about 40 million hectare (mha) of agricultural area is flood-prone, and about 108 mha is drought-prone. 80 per cent of the run-off in the Himalayan rivers and 90 per cent of run-off in the peninsular rivers occurs during from June to September. The depletion of forests has aggravated the problem. Reduced infiltration results in smaller dry weather flows. Heavy silt concentration has resulted in deposition of silt in the flood plains, as shrinking river channels cannot transport excessive silt loads. This has reduced valley storage capacity resulting in higher flood peaks. The inhabitation of flood plains and increased development and cultivation has augmented flood damage. The impact of droughts is even more severe than that of floods and leaves a permanent imprint on the economy and morale of the people. Even those who live in areas of high rainfall often face drought because the landscapes have been denuded as in Cherapunji in Meghalaya. Because of heavy seasonal rainfall and the nature of topography, much of the run-off cannot be retained. The region now suffers from excessive flooding for three to four months and frequent droughts during the rest of the year.

Ground Water Resources

Over the last two decades, 84 per cent of total addition to net irrigated area came from ground water, and only 16 per cent from canals. At present the net area irrigated by private tube wells is about double the area irrigated by canals.[28]

The overall stage of ground water development in the country is 58 per cent. Over exploitation has led to increase in pumping depths, reduction in yields in wells/tube wells and rise in cost of pumping ground water. This in turn has caused widespread scarcity of ground water forcing farmers to dig deeper. Another major fall out of ground water exploitation has been contamination of ground water, resulting in increasing arsenic, fluoride and iron content. Since 85 per cent of rural water supply programmes depend upon ground water as a source, its effect on the health of rural population is a matter of grave concern.[29] In addition to affecting human health startling changes in the environment have also been observed as the human society continues its exploitation of the ground water ecosystem. These are extinction of fauna, decrease in soil fertility and land subsidence, acid rains and ecosystem damage.[30]

The Planning Commission of India has admitted that the extent of extraction has increased significantly over the years, as indicated by the growth in the number of tube wells served by ground water. It is estimated that there are currently 21 million tube wells in the country, out of which 16 million are in use and are drawing about 231 BCM of water: 213 BCM for irrigation and 18 BCM for domestic and industrial use out of net annual ground water availability of 399 BCM.

The Mid-Term Appraisal (MTA) of the Tenth Five-Year Plan states that the rising demand for ground water from agriculture is the prime cause of the overexploitation of water. Decisions on cropping patterns and cropping intensity are taken independent of the status of ground water availability. Water intensive crops, perceived to be

28. World Bank Report, *India's Water Economy: Bracing for a Turbulent Future*, 2005
29. GoI, *Ground Water Management And Ownership*, Report of the Export Group Government of India, Planning Commission, 2007
30. Prashant Gupta, "Underground Water Development in India- Trends, Crops", 2005, p.8. Available at http://www.gopio.net/india_development/Water_Study_NU_2005.pdf. Accessed 25 Mar 09

more remunerative, are grown even when there is scarcity of ground water. The problem is aggravated by the availability of cheap and subsidised power. The legal or regulatory regime governing ground water is not geared to address scarcity or demand management. As per the current legal position ground water belongs to the owner of the land whether it is a corporate or an individual.

Water security for India: external dynamics

The subcontinent has large river systems. Prominent are the Indus in the west and the Ganges-Brahmaputra-Meghna in the east. While the rivers link countries together they also bitterly divide them. With population pressures and the need to achieve developmental goals, disputes and grievances arise over the use of and control over the rivers. Structures like dams and barrages create upper-lower riparian tensions that can be potential causes of conflict. Numerous bilateral treaties exist but are often hostage to the prevailing political animosity. Resource nationalism will increasingly dominate the hydrological contours of South Asia and will largely define regional politics. Many of the existing riparian treaties will come under pressure over the sharing and harnessing of river waters. India's riparian relation with its neighbours will become progressively fragile with Pakistan, Bangladesh and Nepal continuously raising concerns over the regulation and sharing of river waters. China's aggressive south-to-north water diversion projects on the rivers that originate from the Tibet region, particularly on the Yarlung-Tsangpo, are opening up a new front of uncertainty in Sino-Indian relations.[31] The friction in bilateral relations will increase if mutually acceptable bilateral or multilateral frameworks for cooperation to deal with integrated development of water resources are not effectively reworked. Other externalities like the development of satellite technology that will enhance the ability of states to chart flow volumes and give real-time data on water uses will result in heightened public awareness and contribute significantly to enforcing river water allocation. In such situations, many of the existing treaties will have to be evaluated afresh and many new treaties based on new hydrological knowledge will need to be framed. The geographical contours of India both as an upper riparian and a lower riparian will become the epicentre of new riparian politics.

The crux of the problem over trans-boundary rivers, as has been noted, is that this resource is neither seen exclusively as a public good or a private good.[32] With no agreed definitional demarcation, trans-boundary rivers are often viewed as 'collective goods' or 'common pool resources'. But to expect countries to accept that sovereignty has to be exercised collectively, particularly in respect to the 'commons', is wishful thinking. The treatment of rivers as a 'good' in the subcontinent will primarily be interpreted within the regional asymmetric/symmetric power configuration. The upstream-downstream supply disputes will be a common feature of riparian politics. Moreover, international laws on allocating water within river basins are difficult to implement and often contradictory. The UN Convention on

31. The Yarlung-Tsangpo becomes the Siang in Arunachal Pradesh. This in turn joins the Luhit, Dibang and Noa Dihing near Sadiya to form the Brahamaputra.
32. Jaroslav Tir and John T Ackerman, "Politics of Formalised River Cooperation", *Journal of Peace Research*, vol.46, no.5, September 2009, p.623

the Non-Navigational Uses of International Watercourses approved in 1997 by a vote of 104-3 (but not yet ratified) requires watercourse nations (Article 5) to participate in the use, development, and protection of an international watercourse in an equitable and reasonable manner.[33] In spite of the UN Convention, riparian nations pitch their respective claims and counterclaims based on their interest and interpretation. Burundi, China and Turkey (upper riparians) voted against the Convention. India (middle riparian) abstained.[34] While Bangladesh (lower riparian) voted for the Convention, Pakistan abstained. Of the other South Asian states, Nepal voted for and Bhutan was absent. This raises fundamental questions on whether formal arrangements on long lasting peaceful sharing of river waters can be achieved, particularly in regions where the political climate is hostile to cooperative endeavours.

Rivers have many uses. Some are consumptive in nature and some non-consumptive. The non-consumptive uses such as navigation and hydroelectricity generation are less problem generating than non-consumptive uses such as drinking water and water for irrigation. Because the river uses are so intricately linked, riparian treaties are seldom specific about the ultimate use of the rivers.

In spite the complexities and potential deadlocks of river water sharing, riparian treaties are a common feature. It underlines an important element of river discourse that while there are factors that hinder formalised river cooperation; there are equally countervailing factors that enable peaceful sharing. India in its difficult neighbourhood will have to live with transboundary rivers arrangement but also critically consider the scarcity problem based on strategic rationality, hydrological effectiveness and economic viability in order to reshape the existing treaties. For India, an active regional player, water management will be crucial to conflict management. Water-being international, indispensable, and emotional can serve as a cornerstone for confidence building and a potential entry point for peace. India will thus have to balance its growing water needs and larger security concerns with effective hydro-diplomacy. The issues can be summarised as follows:

33. The document requires ratification by 35 countries to enter force. As of 2008 only 16 countries had ratified the convention. Article 7 of the Convention entitled "Obligation not to cause significant harm"is particularly controversial. It would require states, "in utilizing an international watercourse in their territories...take all appropriate measures to prevent the causing of significant harm to other watercourse states and compensate sharing states from any such harm." Legal experts argue that a confliction is imminent since a state may have legitimate uses for a watercourse in its nation that can negatively impact other nations.

34. Prakash Shah, India's representative, expressed regret that the Convention had not been adopted by consensus. While a Framework Convention should provide general principles, the present Convention had deviated from that approach. Specifically, he had reservations regarding its articles 3, 5, 32, and 33. Article 3 had not adequately reflected a State's autonomy to conclude agreements without being fettered by the Convention. Article 5 had not been drafted clearly and would be difficult to implement. The Convention had superimposed the principle of "sustainable utilization" over the principle of utilization without appropriately defining the term "sustainable". India abstained in the voting on draft articles 5, 6 and 7 in the working group. Article 32 presupposed regional integration and hence did not merit inclusion, he went on to say. Article 33, on dispute settlement, contained an element of compulsion. Any procedure for peaceful settlement of disputes should leave the procedure to the parties. Any mandatory third-party dispute procedure was inappropriate and should not be included in a framework convention. See Press Release, http://waterwiki.net/index.php/General_Assembly_adopts_Convention_on_the_Law_of_Non-Navigational_Uses_of_International_Watercourses

1. The Indus Water Treaty (1960) is regarded as a success story of India-Pakistan relations. There are, however, apprehensions that water could be a major source of conflict between India and Pakistan in the future.

2. Water has been a major issue in India-Bangladesh relations. Nearly 50 rivers flow from India into Bangladesh. The two countries signed the Ganges Water Treaty in 1996. While the treaty has helped them to arrive at a mutually acceptable solution on the sharing of the water of the Ganges; Bangladesh remains apprehensive about India's intentions with regard to several other water-related issues such as the sharing of the Teesta river waters, India's plans for the interlinking of the rivers and the construction of the Tipaimukh dam in the northeast.

3. Water is a sensitive issue in the relationship between India and Nepal. The two countries have a long history of water cooperation and have signed several water sharing treaties like the Gandak (1957), Kosi (1962), and the Mahakali (1997). The Mahakali Treaty (1997), a comprehensive document on water cooperation, however, remains merely a paper document. The breach of the Kosi embankment and the devastating floods it caused in India in 2008 has only highlighted the importance of rivers in India-Nepal relations. On going political development in Nepal make implementation of agreed cooperation difficult.

4. The Himalayas are called the "water tower" of South Asia. Most of India's northern rivers originate in Tibet. China annexed Tibet in 1950 and thereby gained control over the Himalayan glaciers of the region where some of the world's largest rivers originate and flow to South and Southeast Asia. China has strengthened its political and economic control over Tibet where India and China have a complex, unresolved boundary dispute. Thus, water has assumed higher priority in Sino-Indian relations in recent years. There are widespread fears in India that China's diversion of waters of the Yarlung-Tsangpo, to meet high demand in its arid north, will cause hydrological imbalance in the northeast part of India and shortage in Bangladesh, which in turn will impact riparian relations.

India's riparian relations

The Report hereon will explore sub-continental hydropolitics and examine areas of conflict and cooperation in India's riparian relations with its neighbours: Pakistan, China, Bangladesh, Nepal and Bhutan. India is an upper riparian with respect to Pakistan and Bangladesh and a lower riparian with respect to Nepal, Bhutan and China. This makes India's hydrodiplomacy unique and complex. Climate change also poses a unique challenge as well as an opportunity to India's hydrodiplomacy. The impact of climate change on water resources, in terms of utilisation and management needs to be factored into India's regional diplomacy. The focus on climate change in the 15th SAARC Summit held in April 2010 in Thimpu was a welcome development.

With Pakistan and China water issues will be far more political and strategic. Water as an instrument and tool of bargain and trade-off will assume predominance because the political stakes are high vis-à-vis Pakistan and China. The two countries are high priority also in terms of strategic orientation and politico-military investment. Water issues between Pakistan and China have the potential to become catalysts for conflict. Though the importance of politics cannot be discounted in

India's water relations with Nepal and Bangladesh, there is however far more scope to overcome and break political deadlocks through sensible water sharing arrangements and resource development. Water here can be regarded as a catalyst for cooperation. With Bhutan the relationship is unique, a win-win for both. India has funded the construction of three mega-hydroelectricity projects in Bhutan. The surplus power from the hydropower projects is for export to India, earning revenue for Bhutan to fulfil their goal of self-reliance.

The subsequent chapters will examine the stresses and strains as well as the cooperative mechanism in India's trans-boundary relations with its neighbours and explain the centrality of rivers in the overall political relations. ■

CHAPTER 2
WATER ISSUES IN INDIA-PAKISTAN RELATIONS

Background

The political partition of India took place in 1947. The political boundary between India and Pakistan was drawn across the Indus Basin without regard to the physical or hydrological features leaving India as an upper riparian. The bisection resulted in the break up of the intricate British-designed canal system, regarded as the foundation of the region's economy, into separate networks. Pakistan got most of the canals and the irrigated land but the partition left all of the headwaters' tributaries in India.[35] The Indus Water Treaty (1960) effectively partitioned the Indus system of rivers between the two countries. The treaty assigned Ravi, Beas and Sutlej (the eastern rivers) to India for its exclusive use, which represented about one-fifth (mean flow of 33 MAF) of the total flow in the six rivers. The treaty gave the flow of the Indus proper and the other two rivers, Chenab and Jhelum (the western rivers) mostly to Pakistan for its use, which was four-fifth (mean flow of 136 MAF) of the system.[36] The treaty fixes and delimits the rights and obligations of India and Pakistan in relation to each other on the use of the waters of the Indus system. The question often asked is whether the treaty has worked effectively? The question gains credence in the overall political context of India and Pakistan. In so far as settling the water-sharing dispute and having survived three wars, the treaty can be regarded as a success. However, in terms of water allocation- both the countries interpret it differently and regard it as being unfair. Some critics also regard the treaty as being prompted by the US.[37] While others, view the treaty as the result of a political push by Jawaharlal Nehru and Ayub Khan to break the deadlock. Ayub was concerned about the possible economic threat that India could pose to Pakistan (agriculture and food) since it had control over the headworks post-partition. The US, sensing a regional imbalance and the growing influence of the Soviets was keen to gain a foothold in the

35. See Niranjan D Gulhati, *Indus Waters Treaty: An Exercise in International Mediation*, Bombay: Allied Publishers, 1973, pp. 18-30
36. MAF (million acre feet/year) is a measure of flow from a defined passing point. The Indus River System consists of Indus and its five tributaries: Chenab, Jhelum, Sutlej, Beas, and Ravi. All the 6 rivers flow through India into Pakistan. The Chenab is the key tributary, as it carries the waters of the other four rivers into the Indus. Negotiations were carried out between the two countries through the offices of the World Bank. An agreement was signed between India and Pakistan in September 1960. The treaty also guaranteed ten years of uninterrupted water supply. During this period Pakistan was to build huge dams, financed partly by long-term World Bank loans and compensation money from India. Three multipurpose dams, Warsak, Mangla and Tarbela were built. A system of eight link canals was also built, and the remodelling of existing canals was carried out. Five barrages and a gated siphon were also constructed under this treaty. See Asit Biswas, "Indus Water Treaty: The Negotiating Process", *Water International*, vol. 17, no. 4, 1992.
37. David Lilienthal, former Chairman of the Tennessee Valley Authority after consultation with Dean Acheson, Secretary of State, went to Pakistan in February 1951 and suggested that "India and Pakistan work out a programme jointly to develop and jointly operate the Indus River Basin System…" Read, JN Dixit, *India-Pakistan: In War and Peace*, Routledge: London, pp.134-135. He then suggested that the World Bank with US as the facilitator would bring together India and Pakistan to negotiate a treaty.

region. The IWT served as an important entry point for the US in the region. Ayub's political considerations and Nehru's peace agenda and statesmanship, often regarded as generosity, resulted in the treaty being signed in Karachi on September 19, 1960 and being ratified in January 1961.[38]

Another question frequently asked on the division of the rivers, is why India allowed the western rivers (Indus, Jhelum and Chenab) to go exclusively to Pakistan except for certain nominal and specified uses by India? The answer is quite simple. India needed exclusive rights over the eastern rivers (Ravi, Beas, Sutlej). The construction of the Bhakra Nangal dam and the Rajasthan Canal were projects that were crucial to India's development programmes and if it did not have exclusive rights on the eastern rivers then Pakistan would have raised lower riparian restrictions and thwarted India's plans. Ramaswamy Iyer, former secretary to the government of India in the Ministry of Water Resources, says:

> In a sense, one might say that the allocations of the eastern rivers to India under the Indus Treaty removed Pakistan from the picture in relations to these rivers, and facilitated the implementation of the Bhakra Nangal and Rajasthan Canal Projects. The price paid for this was a substantial sacrifice of rights over the western rivers. The difficulties that this would lead to in due course, and the discontent that this would cause in Jammu & Kashmir, were perhaps not anticipated. [39]

The 'historical use' of waters for Pakistan, a post-partition argument, remains sensitive even today. In fact it has created a fear-factor typical of a lower riparian. Soon after the partition, when the monsoon flows receded in the fall of 1947, the chief engineers of Pakistan and India met and agreed to a "Standstill Agreement," which froze water allocations at two points on the river until March 31, 1948, allowing discharges from head works in India to continue to flow into Pakistan. On April 1, 1948, the day that the "Standstill Agreement" expired and in the absence of a new agreement, India discontinued the delivery of water to the Dipalpur Canal and the main branches of the Upper Bari Doab Canal. Automatic continuance of flows could have established a Pakistani 'right'. While several motives can be attributed to India's action – ranging from establishing an upper riparian's sovereign right over water and pressurising Pakistan on the Kashmir issue to demonstrating to Pakistan its dependency and forcing reconciliation on other issues – for Pakistan it was a wake-up call on its geographical vulnerability vis-à-vis India. On April 30, 1948 when negotiations resumed, India agreed to the resumption of flow, but maintained that Pakistan could not claim any share of those waters as a matter of right.[40] Thereon the waters of the Indus system were apportioned by the Inter-Dominion Accord of May 4, 1948. This accord required India to release sufficient waters to the Pakistani basin areas in return for annual payments from the government of Pakistan. The accord also specified the need for a more permanent solution.

For Pakistan, its concerns over long-term supply were critical to agreeing to any proposals that altered the existing supply network. Its effort to secure unhindered supply of water was based on its historical right to the waters of all the Indus tributaries. The Indian side argued that the previous distribution of waters should not form the basis of future allocation. In an effort to break the deadlock, the World Bank proposed a new basis of distribution, with the waters of the

38. WAB Illif, vice-president of the World Bank, G Mueen-ud-Din from Pakistan and ND Gulati from India made the agreement possible.

39. See Ramaswamy Iyer, India's Water Relations With Her Neighbours, Stimson Centre, Washington DC, October 27, 2008. http://www.stimson.org/rv/pdf/Ramaswamy_Iyer_Presentation.pdf, p.7

40. See Asit Biswas, "Indus Water Treaty: The Negotiating Process", *Water International*, vol. 17, no. 4, 1992.

western tributaries going to Pakistan and the eastern tributaries to India. For Pakistan this was unacceptable as it did not take into account its historical usage of the Indus basin, or the fact that west Punjab's eastern districts (as it is argued even today) could turn into desert. India, on the other hand, was firm on a new system of post-partition allocation. In spite Pakistan's resistance, it was in no position to walk out of the talks. Likewise, India was also eager to settle the issues since many of its development projects were on hold because of the lack of any final settlement of the Indus waters.

The last barrier before the treaty was finally signed was an agreement concerning financing for the construction of canals and storage facilities that would transfer water from the eastern Indian rivers to Pakistan. This transfer was necessary to make up for the water Pakistan was giving up by ceding its rights to the eastern tributaries. The World Bank initially proposed that India pay for these constructions, which it refused. To ensure that a treaty came about, the World Bank then organised external financing mainly from the US and the UK. One can argue whether the treaty was more of a political compulsion than a functional arrangement.

The 1960 IWT was supposed to have settled the lifeline issue and allay Pakistan's fears as a lower riparian. However, the lifeline issue continues to find active mention in Pakistani politics and its linkage to the Kashmir issue implies that any future settlement between India would have to once again revisit the issue of the distribution of the Indus system of rivers.

What the Treaty means for India

The IWT allows India to use the waters of the western rivers for domestic use, non-consumptive use, agricultural use and certain non-consumptive purposes including generation of hydroelectric power albeit with a number of restrictions. It even allows India to build storage facilities to the tune of

3.6 MAF on the western rivers within specified parameters.[41] This is in addition to the storage that already existed on these rivers before the coming into force of the treaty. Essentially, India is required to convince Pakistan that it is not violating the provisions of the IWT each time it plans a project on the western rivers.

The provisions stipulate for India to furnish detailed hydrological, hydraulic and engineering data to Pakistan. India has scrupulously followed this practice by sharing the relevant data on all the projects undertaken on the western rivers. This has given Pakistan a certain veto over the usage of the waters of the western rivers by India. For instance, Pakistan raised serious objections on the design of the Salal dam on Chenab in the late seventies. This not only delayed the project but also forced India to make certain design changes which over time has resulted in silting of its reservoir and jeopardising its intended performance. Pakistan also objected to India constructing the Tulbul navigation project (Pakistan calls it the Wullar Barrage) on the Jhelum in order to improve navigation in the Wullar Lake.[42] Despite the fact that the project would have provided regulated releases of naturally stored flood waters in Wullar Lake to Pakistan in lean season. Controlled release of waters from this project would have benefited all the downstream power projects, particularly the Mangla dam in Pakistan, besides making available the much needed regulated waters for irrigation in Pakistan during the lean months with incidental benefits to the ecology. Pakistan objected to the project. The project remains suspended since 1987. Initially, the work at the project was only temporarily suspended by India, for a few months, as a goodwill gesture to resolve the differences but in spite of numerous meetings between the two governments, the differences remain unresolved. The Tulbul is now part of the Composite Dialogue Process providing Pakistan with further flexibility to delay a meaningful resolution of issues or possibly link it with other issues.

More recently, Pakistan raised serious objections to India's design for the Baglihar dam project. Unconvinced with the Indian arguments on the design of the Baglihar, Pakistan, for the first time in the history of IWT, referred the matter to the World Bank asking for a third-party intervention. The "Neutral Expert" (NE), a professional engineer, after several rounds of discussions with both sides and numerous visits to the dam site gave a ruling which largely upheld India's design parameters. It recommended minor changes to the design which India unflinchingly adhered to.

Refuting Pakistan's view, the NE held that the present day advances in technology in dam design, unknown in the sixties, can be applied to deal with problems such as those posed by heavy sedimentation which shortens the effective life of a plant. The NE also observed that the designer of a spillway is not only faced with the problem of flood control but also with that of sediment control and cited the International Commission on Large Dams (ICOLD) on the existing

41. Article III, 'Provisions Regarding Western Rivers' of the Indus Water Treaty with details in Annexure C, D and E. Under agricultural use, the total area permitted to be irrigated by India is 1.34 million acres. Out of the 3.6 MAF, 1.25 is general storage, 1.6 is for generation of hydroelectricity and 0.75 for flood control. In terms of rivers, 0.4 MAF is permitted on the Indus, 1.5 on helum and 1.7 on Chenab.

42. The Tulbul project is a "navigation lock-cum-control structure" at the mouth of the Wullar Lake. It envisages regulated water release from the natural storage in the lake to maintain a minimum draught of 4.5 feet in the river up to Baramulla during the lean winter months. This is to ensure round-the year navigation from Anantnag to Srinagar to Baramulla, a distance of over 20 km. India views it as permissible under the IWT, while Pakistan maintains that the project is in violation. India says suspension of work is harming the interests of people of Jammu and Kashmir and also depriving the people of Pakistan of irrigation and power benefits that may accrue from regulated water releases. See The Hindu, 'Talks on Tulbul Project Inconclusive', June 29, 2005. http://www.hindu.com/2005/06/29/stories/2005062903471400.htm

technologies today. Accordingly, a sluice spillway at Baglihar with five large bottom outlets conforming to state-of the-art the international practice was agreed upon as appropriate and permissible under the treaty for sediment control of the reservoir and evacuation of a large part of the design flood. The NE concluded that in 1960, the phenomenon of reservoir sedimentation was not on the radar of dam designers and it was only in 1980 that the concept of integrated reservoir sedimentation came to be recognised and accepted.

The NE further stated that the concept of 'state-of-the-art' is enshrined in the treaty and cannot be wished away. The terms and generic statements such as 'satisfactory construction and operation of the works,' 'sound and economical designs' and 'customary and accepted practice of design' which appear in the treaty imply that new technological developments be taken into account while interpreting treaty provisions and that such an interpretation takes into account the emergence of new technologies, technical standards and practices. Both India and Pakistan can use new technologies when exercising their rights under the treaty. It has also been stated in the Determination that principles of interpretation mean that the interpretation is to be made as a whole, i.e. no hierarchy exists between various components of the treaty. The NE concluded that the process of maintenance of reservoir is necessary to ensure the "sustainability" of the scheme and is not excluded from the treaty and that the maintenance of 'live storage' and 'dead storage' should be carried out, by taking recourse to the various known processes of sediment control in particular, sluicing and flushing with reservoir drawdown.

The NE's decision confirmed India's design as the most appropriate technique for managing the high volumes of sediment which characterise the Himalayan rivers. It is this element of the design which Pakistan has most strenuously objected to ever since the Baglihar design was communicated to Pakistan in 1992. This decision of the NE will help India to deal more effectively with the problems of sedimentation in its future projects.

Allaying Pakistan's apprehensions that India could acquire the capability to deprive it of natural flows for up to 26 days during lean season, the NE pointed out the principle of international law according to which good faith is presumed. The present decision of the NE upholding India's design of the sluice outlets reaffirms that the provisions of a treaty cannot be interpreted on assumptions of bad faith.

The NE gave a highly significant extension to the above decision by requiring annual drawdown of the reservoir during monsoon season for sluicing and flushing for purposes of maintaining the reservoir to ensure sustainability of the scheme. This has far reaching implications for all future projects. The observation is crucial because Pakistan had all along been arguing against the usefulness of low level sluice outlets, on the grounds that bringing the water level below the dead storage level for purposes of draw down sluicing is not permissible as per the treaty.

Pakistan's reservations over an excessively high dam for a run-of-river plant, have also been set to rest by the NE's observation that the design of this single dam would be more economical compared to three smaller dams constructed for generating the same power. The NE upheld India's view that the first objective of "pondage" is to regulate the flow of the river to meet the consumer demand; and that the "pondage" volume should be calculated taking into account only the variations in the load which, all along, had been India's contention. The NE disagreed with Pakistan's views on determination of "pondage" with the objective of operating the plant at constant power and regulating the fluctuations in the river flow. Pakistan objecting to India's construction plans on all the western rivers have become a norm. It now even alleges that India is taking away (stealing) water from the Chenab.

Another potentially contentious dispute is over the Kishanganga, a tributary of the Jhelum. India plans to construct a tunnel to divert the waters of the Kishanganga to generate power by availing of

the steep gravity fall. In the process these waters will be delivered into a *nallah* to reach river Jhelum at a different location. Pakistan objects to such a transfer of water as a violation of the IWT. India does not agree with this standpoint and counters that such an inter-tributary transfer of waters in the Jhelum basin is permitted by express provisions of the treaty. As with Baglihar, Pakistan has dragged India into a protracted dispute involving neutral experts and arbitration.

On each of the issues examined above, the provisions of the treaty are both permissive and restrictive towards Indian projects depending upon the perceptions of either side. While India tries to use the permissive provisions, Pakistan applies the restrictive ones. It is an endless upper-lower riparian political saga of propose-dispose.

The provisions of the IWT have been drafted stringently from India's point of view and do not even have an obligatory provision for periodical review. From an Indian perspective there are many loopholes in the treaty. For one, there are far too many engineering provisions which make the treaty complex as Pakistan's demand for engineering data and design computations are invariably endless. The definition of "non-consumptive use" has led to various interpretations and controversies. The interpretation of "material damage" is also ambiguous as it fails to specify how much is "material" and who decides. Some articles, for example, Article III (4) on storage lends itself to different arguments suited to individual purposes. It also clashes with the definition of "non-consumptive use" in Article I (11). This is at the heart of the Tulbul navigation project controversy. Also Articles VI (2) and VII (2) regarding the supply of data are too sweeping and can often be misused. Some other sore points for India are that the criteria for run-of-the-river (ROR) plants on western rivers do not adequately address the provisions made available to India and like-wise, ambiguities about ROR plants on the Jhelum tributaries, have led to differences on the interpretation of the release of water into another tributary. Given some of these impediments that the IWT imposes, India should strongly consider asking for a 'review' (not scrapping the treaty) essentially to tone down some of the stringent provisions and remove inadequacies and ambiguities.

What the Treaty means for Pakistan

Pakistan, as a lower riparian, could not have possibly imagined a better deal. History has been on its side. While the political division occurred in 1947, the hydrological interdependence remained. The negotiations that led to the 1960 treaty were a unique exercise in international mediation but the geo-physical partition of the Indus river system merely reflected the 'unfinished business' of the 1947 territorial division. The IWT with its three-tier approach of 'defining the problem', 'commitment to negotiation', and 'arranging the negotiations' focused on the treaty's functional aspects. The IWT sincerely addressed Pakistan's 'lifeline issue' and long-term availability of freshwater supply. So much so that it has given Pakistan considerable power over India on the usage of the western rivers. Pakistani propaganda continues to raise the lifeline issue and that of India's 'evil intentions'[43] and conveniently underplays the fact that the treaty allows India to construct storage facilities of 3.6 MAF on western rivers. India has not built any storage capacity so far. The treaty also allows a certain amount of area to be brought under irrigation through the waters of the western rivers. Out of the area of 1.34 million acres permitted for irrigation, India is currently irrigating only 0.792 million acres.[44] India

43. Pakistan's claim of India's 'evil intention' is based on the claim that India 'stole' from the Chenab 200 Maf of water to fill the Baglihar dam.
44. See Speech by High Commissioner of India to Pakistan in Karachi, April 3, 2010. http://meaindia.nic.in

is using the waters of the western rivers far below the permissible limits allowed under the treaty. On the eastern rivers, while India has complete right of usage, yet 2-3 MAF of water flows to Pakistan unaccounted and unutilised because of the lack of infrastructure and untapped resources on the Indian side. This is 'free water' to Pakistan and yet it seeks compensation.[45]

Pakistan, as lower riparian, claims to be water stressed and views water shortages as the greatest threat in the future. According to the FAO 2008 figures, water availability in Pakistan has dropped alarmingly from about 5,000 cubic metres per capita in the early 1950s to less than 1,500 today. It is expected to become water scarce (below 1,000 cubic metres per capita) by 2035. While its anguish may be understandable, it is unreasonable to blame its upper riparian neighbour for the water woes. It accuses India of suffocating its economy by manipulating the Indus waters. It even accuses India of planning a 'water bomb'. Pakistan's management of its water resources is possibly the worst in the world. Whatever may be the reasons for the water crisis, Pakistan views India with considerable suspicion and apprehension on the Indus system of rivers. Water for Pakistan is high politics which easily mixes with anger and emotions. Several Pakistan-based terrorist groups have linked water with jihad in Kashmir. The leaders of the so called 'Azad Kashmir' clearly state, "the freedom fighters of Kashmir are in reality fighting for Pakistan's water security and have prevented India from constructing a dam on the Wullar Barrage".[46] After the Mumbai attacks, and clearly to distract attention, President Zardari raised the salience of the water issue. In an article in The *Washington Post* on January 28, 2009, he wrote:

> The water crisis in Pakistan is directly linked to relations with India. Resolution could prevent an environmental catastrophe in South Asia, but failure to do so could fuel the fires of discontent that lead to extremism and terrorism. We applaud the US President's desire to engage our nation and India to defuse the tensions between us.

More recently highly charged statements have become a common feature in Pakistan. Some of these statements are listed below:

- Former foreign minister Sardar Asif Ali was quoted in *Dawn* (January 18, 2010) as saying that "if India continues to deny Pakistan its due share, it can lead to a war between the two countries."
- PML(Q) Chief Chaudhary Sujat Hussain said that the water crisis between Pakistan and India could become more serious than terrorism and can result in a war (*Dawn*, 18 January 2010).
- Majid Nizami, Chief Editor of *Nawi Waqt* group of newspapers, said that "Pakistan can become a desert within the next 10 to 15 years. We should show upright posture or otherwise prepare for a nuclear war." (*Dawn*, 18 January 2010).
- Members of the Punjab Assembly passed a resolution to deny India trade transit facility until the resolution of the Kashmir dispute and issues related to water distribution (*Dawn*, 27 January 2010). A Member of the Punjab Assembly Warris Khalo said that India would "remain an enemy" until the Kashmir dispute and water issues are resolved. (*Dawn* 27 January 2010).
- Palwasha Khan, Member of National Assembly, accused India of perpetrating "water terrorism" against Pakistan and said that "experts foresee war over the water issue in the future and any war in this region would

45. 'Provisions Regarding Eastern Rivers', Article II of Indus Water Treaty.
46. Uttam Kumar Sinha "India and Pakistan: Introspecting the Indus Treaty" *Strategic Analyses,* 32, issue 6 November 2008, p.963.

be no less than a nuclear war." (*Daily Times* 17 February 2010).

- In a recent debate in Pakistan's National Assembly, several members urged the government to impress on New Delhi "not to use" Pakistan's share of water (*Daily Times*, 25 February 2010).
- Dr. Manzur Ejaz, a commentator, writing in *Daily Times* (3 March 2010) warned that "unless Pakistan was assured on the supply of water, it will never abandon the proxies that can keep India on its toes by destabilizing Kashmir." He further added: "for Pakistan the territory of Kashmir may not be as important as the water issue."

Why is Pakistan upping the ante? There can be several reasons. By raising the issue of water, Pakistan is playing the old game of trying to get international attention on Kashmir. It also raises the bogey of nuclear deployment if India imposes an economic blockade (which can be interpreted as limited access to river waters).[47] There is also a strong terror linkage. By raising the water issue with India, Pakistan instigates terrorist groups. It is interesting to note that Pakistan does not pay any heed to the Kashmiri viewpoint, which regards the treaty as unfavourable to Jammu & Kashmir.

There is a long-standing grievance in Jammu & Kashmir that the IWT has deprived the state of its huge hydroelectric potential. The state has a hydel-power potential of 15,000MW. Yet, this cannot be easily harnessed because of Pakistani objections and nitpicking under the ambit of the treaty. Kashmiri leaders in their public statements have demanded the abrogation of the treaty.[48] In 2000, a MoU was signed between New Delhi and J&K for starting work on seven hydel power projects, of which only two Uri II and Sewa II have been taken up.[49] Given Islamabad's track record in raising objections to projects on the western rivers that flow through Kashmir, such initiatives will possibly draw Kashmir closer to New Delhi and distance it from Pakistan. Dr Manmohan Singh responding to the need for power in J&K has announced an additional power allocation of up to 500MW and further stated that J&K will get about 1000 MW of additional power from all such units which are in various stages of construction. The state government too has planned for various projects. Apart from the Baglihar Phase II, other projects such as the 600MW at Kiru; 520MW at Kawar; 1000MW at Pakuldul and the 690MW at Raple are also in the pipeline.[50]

Pakistan finds arbitration and third party involvement as a crucial mechanism to raise its concerns on the Indus basin internationally. After Baglihar, it has now raised arbitration, under article IX of the IWT, on the Kishanganga project.[51] After

47. Lt Gen Khalid Kidwai, Head of the Strategic Plan Division, outlines the circumstances under which Pakistan would use nuclear weapons: a) India attacks and captures large parts of Pakistani territories; b) India destroys a large part of Pakistani's armed forces; c) India imposes an economic blockade and d) India creates large-scale internal subversion in Pakistan. See Zia Mian, "Going MAD: Ten years of the bomb in South Asia", *Economic and Political Weekly,* June 28, 2008
48. K.Warikoo, "Indus Water Treat: View from Kashmir", in *Himalayan and Central Asian Studies volume 9, no. 3,* July-Sept. 2005, pp. 18-23.
49. *The Indian Express*, July 18, 2004
50. *The Kashmir Times*, October 29, 2009
51. The 330 MW Kishanganga hydro-electric power project involves damming of Kishanganga or Neelam River and the proposed 103 metre reservoir will submerge some parts of the Gurez valley. The water of Kishen Ganga River will be diverted through a 27 kilometre tunnel dug through the mountains to Bandipore where it will join the Wular Lake and then Jhelum River. The project has been awarded to Hindustan Construction Corporation (HCC) with a timeline of seven years. Pakistani officials consider the project harmful for its upcoming hydel power project in Neelam Valley (PoK). Pakistan is constructing a big power house there on its side of the river with China's assistance.

the last meeting of the PIC in June 2010, Pakistan has decided to raise concerns over the Nimoo Bazgo hydel-power project. There is a discernable pattern that Pakistan will seek to block and obstruct India's projects thus causing delays and frustration.[52]

At the official level too, Pakistan is raising the water issue politically. Salman Bashir, Pakistan's Foreign Secretary, was quoted by Dawn (26 February 2010) as saying that Pakistan had handed over some documents ('non-paper') to the Indian side during the Foreign Secretary level talks with the hope that India would consider resolving the water issue within the Indus Basin Water Treaty. He added that India had been informed about its violation of the Indus Water Treaty, storage of water, India's plans to build more dams, the Kishanganga project, pollution and glacier melt.[53]

Whatever Pakistani concerns over India's manipulating the waters to its territory might be and which quite clearly are for public consumption; the reality is that India has no intention to stop any flow of waters. Nor can it do so, as water is a continuously flowing entity, although temporary variations are possible. India can, if it wants, disregard the provisions of the treaty and thereby deny low flows to Pakistan but it does not. The treaty restricts it because India respects it. Pakistani apprehensions though understandable are nonetheless misleading, and often deliberate. India has been sincere in following the terms of the treaty as the Baglihar case indicates. Yet, the propaganda machinery in Pakistan continues to work overtime.

Reactions in India

There is a strong opinion in India that the treaty was extraordinarily generous to Pakistan.[54] Of the total water of the Indus river basin, 80 per cent flows to Pakistan via the western rivers while only 20 per cent flows through the eastern rivers. Thus, the treaty gave 80 per cent of water to Pakistan.[55] In addition, India also paid 60 million pounds to Pakistan under the treaty for the construction of link canals on the Pakistani side. The division of the water in 1960 was not "equitable" as it should have been in accordance with international norms like the Helsinki Rules. Some Indian experts have calculated that India should have got 42.8 per cent of the Indus basin water.[56] The treaty paid heed to the future requirements of the population of Jammu & Kashmir. If the treaty withstood the rigours of numerous tensions and wars, it was because India chose not to violate the treaty. In the face of constant terrorist attacks supported by the Pakistani state, India could have chosen to disregard the treaty.

The views of the Kashmiri people will also be critical to the continuance of the treaty. In the long-term their aspirations are bound to impact the Indian government decisions on riparian issues between Pakistan considering that coalition governments are becoming a norm both at the centre and in the states.

There is another view of the treaty. The proponents of the treaty point out that the IWT has survived the wars of 1965, 1971 and 1999. Even during times of extreme hostilities the treaty

52. See Uttam Kumar Sinha, 50-years of Indus Water Treaty, *Strategic Analysis*, Sept-Oct, 2010, pp. 667-670.
53. Arvind Gupta, "Vicious anti-India propaganda in Pakistan on Water Issues". http://www.idsa.in/idsacomments/ViciousantiIndiapropagandainPakistanonWaterissues_agupta_290310
54. For a critique of the Treaty, see K.Warikoo, "Indus Water Treat: View from Kashmir", in *Himalayan and Central Asian Studies volume* 9, no. 3, July-Sept. 2005, pp.14-18.
55. Many in Pakistan feel that the territories that went to India after partition were historically "using less than 10 per cent of the Indus waters and that the Treaty was generous to India in giving it 20 per cent of the waters.", Ramaswamy Iyer, Stimson Centre Paper, Washington DC, October 27, 2008
56. K. Warikoo in *Himalayan and Central Asian Studies* Vol. 9 No.3, July-Sept. 2005, pp.17

operated normally. Noted expert B.G. Verghese writes:

> The Indus Water Treaty must rank among the triumphs of the United Nations system since it was signed in 1960. It has worked remarkably well in keeping the peace, with the onus of performance falling almost entirely on India as the upper riparian, despite constant nitpicking by Pakistan.[57]

Ramaswamy Iyer feels that India can think of a better treaty only after India and Pakistan reach an understanding on Kashmir. Until then, in his opinion, it would be better to leave the treaty as it is and try to improve its functioning.[58] He says:

> The Indus Treaty is "essentially a partitioning treaty...How can we build cooperation on that basis? Article VII talks about 'Future Cooperation' but is at odds with the rest of the Treaty. The Treaty is basically about *division*, restricting India's rights on the western rivers and Pakistan's on the eastern rivers; two isolated sentences in Article VII about 'cooperation' and about 'undertaking engineering works' cannot change the entire nature of the treaty.[59]

The treaty essentially does not provide for joint management of the river basin. It only talks about the division of water. Some experts feel that instead of conflict, the two countries should be working towards cooperation through the integrated water management of the Indus river basin. Verghese has argued for an Indus Water-II which would involve a thorough survey of the potential of the entire Indus system and harnessing of the water through joint investment, construction, management and control. He links this with the necessity for soft borders, trade and tourism linking the two sides of LoC without derogation of *de facto* sovereignties.[60] While this is an appealing idea, its implementation has become even more difficult after the recent deterioration of India-Pakistan relations following the Mumbai terror attacks.

There are essentially five constituencies in India today with different views and perspectives on the IWT. Each of these constituencies is factored into policy and decision-making. The first constituency seeks to evolve an Indus II under the provisions of Article VII and Article XII of the IWT[61] for an integrated or joint development of the Indus water basin. Such an approach is advocated by water experts like Verghese, as mentioned earlier, who argue that Indus-II "should be fed into the current peace process as a means both of defusing current political strains over Indus I and insuring against climate change. It could reinforce the basis for a lasting solution to the J&K question by helping transform relationships across the LoC and reinventing it as bridge rather than merely as a boundary-in-the making."[62]

The second constituency while understanding the merits of a new hydrologic relationship on the Indus does not see any viability of Indus II and contends that a totally new treaty has to be

57. B.G. Verghese "The Indus, POK and the Peace Process: Building on the Foundations of the Indus Water Treaty" in Virendra Gupta and Alok Bansal's *Pakistan Occupied Kashmir the Untold Story, Manas* Publications, New Delhi, 2007, p.195.
58. Ramaswamy R. Iyer, "India's Water Relations with Her Neighbours", in USI, *National Security Series 2007*, KW Publishers Pvt. Ltd 2008, p. 14.
59. Ibid, pp.13-14
60. BG Verghese, N.57, p.208
61. Article VII of the IWT states: "The two Parties recognize that they have a common interest in the optimum development of the Rivers, and, to that end, they declare their intention to co-operate, by mutual agreement, to the fullest possible extent. Article XII allows for agreed modification of the treaty."
62. BG Verghese advocates for an integrated or joint development of the Indus River Basin. See, "It's Time for Indus-II", *The Tribune*, May 25, 2005

negotiated. Ramaswamy Iyer argues that the IWT was a "partitioning treaty, a coda to the partitioning of the land. How can we build cooperation on that basis?"[63] This constituency sees the practicality of working within the existing treaty and hoping for improved political relations to determine the future.

The third constituency is the domestic pressure group in Jammu &Kashmir which strongly feels that the IWT has restricted the state's overall development by not allowing it the unhindered usage of 'its' rivers waters of Jhelum, Chenab and Indus. Not surprisingly, it has been calling for a complete review of the treaty. The Jammu &Kashmir government has been contending that in spite of having an untapped hydro-electricity potential of 15,000MW, the state continues to suffer from acute power shortage and related agro-economic underdevelopment.[64] This constituency raises larger questions as to whether the treaty has served the purpose of buying peace from Pakistan by giving concessions on the Indus waters.

The fourth constituency springs into action when the political climate between India and Pakistan becomes acrimonious. While war over water is not an option, this group suggests strongarm tactics in dealing with Pakistan and using water as a coercive tool and a bargaining instrument in the larger politico-strategic objectives of India.

There is a fifth constituency that argues that any attempt to review the treaty, can be done only after India exploits the potential already permissible under the treaty. Only a crying child, it is argued, gets the mother's milk. This constituency argues that first India should fully exploit the existing potential and then cry for more. Any attempt otherwise to review the treaty may not be seen as logical.

What should India do?

It is clear that while the treaty may have served a purpose at the time it was signed but there is a need to look at it afresh. The treaty does not have an exit clause. So it cannot be abrogated. In any case, abrogation will not benefit India as it is impossible to cut off water at will. However, it does allow for the possibility of re-negotiation. Article XII of the IWT provides that its provision "may from time to time be modified by a duly ratified treaty concluded for that purpose between the two governments". Thus an Indus II could include some of 'modifications' by which India seeks the deletion of some of the stringent provisions of the IWT. It, of course, has to play hardball with Pakistan because Islamabad too would seek more favourable provisions. While the treaty does need to be revisited there are other areas of cooperation that India and Pakistan can explore. These relate to problems of water logging and salinity and also the sharing of information on floods.

A recent report has also warned of the melting of glaciers in Kashmir that could threaten the livelihoods of two-thirds of the region's nearly 10 million people engaged in agriculture, horticulture, livestock rearing and forestry.[65] The Kolahoi glacier which feeds the Jhelum and is vital for agriculture in Pakistan's most populous province Punjab, is particularly under stress. But any move on the Indus Treaty will be dependent on the political atmosphere prevailing between India and Pakistan. Unfortunately periods of goodwill and understanding with Pakistan are an occasional episode. Probably the men instrumental in structuring the treaty realised this aspect and were visionary enough not to impose the joint management and control of the rivers. Division/partition is ingrained in the psyche of India-Pakistan relations. Water is no exception. As

63. Ramaswamy Iyer, "Indus Treaty: A Different View", *Economic and Political Weekly*, Vol. 11 (9), July 16, 2005, p.3144
64. On April 3, 2002, the J&K Legislative Assembly, cutting across party affiliations, called for a review of the treaty.
65. See http://www.fox8.com/news/nationworld/sns-ap-as-kashmir-melting-glaciers,0,3853345.story

the general wisdom on water issues go: 'the value of water in any dispute is not sufficient to obstruct a peace treaty, nor is it large enough to be worth a war'.

However, India can attempt to do the following:

- Pakistan's allegation that India is an upper riparian bully should be effectively countered by raising the issue of the dams built by the Chinese on the tributaries and the upper reaches of the Indus in the Ngari Prefecture of Tibet. The Senge-Tsangpo Hydro-power station has a capacity of 6,400 MW.[66] Another under completion is the Ngari-Shiquanhe. This will help reshape the upper riparian water debate. Like wise, China has very quietly built a barrage on the Sutlej across the Zada gorge. The barrage is intended to produce power for Zada town in west Tibet. Several large tributaries feed the Sutlej with melted glacial waters above the point where the barrage is being built.[67] The Sutlej, with its source in Tibet, flows through Himachal and Punjab before joining the Chenab. The river Chenab is the crucial tributary as it brings together the waters of Jhelum, Sutlej, Beas and Ravi to form a single water system which then joins the Indus in Pakistan. China thus becomes the key upper riparian and its actions can cause excessive loss of water flows to both the lower riparians. For India and Pakistan, China becomes a common concern.

- Such moves and designs by China on the upper reaches should urgently prompt India to construct storages on the western rivers. India is permitted under the treaty a storage capacity of 3.6 MAF, which it has not achieved so far.

- India should firm up its negotiating stance on the Indus waters. It should not agree to negotiate any solution that will force it to give away water that it currently controls or utilises unless it can guarantee for itself additional water through new projects.

- India should 'talk' to Pakistan but not 'negotiate'. The talks should be about 'water needs' and not 'water rights'.

- India should factor in the needs and aspirations of the people of Jammu and Kashmir and speed up the Kishanganga hydro-power project and restart work on the Tulbul Navigation Project. Under the treaty, the country which first completes the hydel-project on the Neelum river (Kishanganga in India) automatically gains the priority in water rights. Pakistan's Neelum-Jhelum hydro-project awarded to a Chinese consortium has yet to fructify. India should demonstrate its capacity and use the priority principle of the treaty and quickly complete the project. The 330 MW Kishanganga Project in the Kashmir valley is of strategic relevance as it will provide electricity to the people of Jammu & Kashmir who for long have complained about their needs not being met because of the IWT.

- Plenty of water goes easily to Pakistan (about 2-3 MAF) owing to poor maintenance of existing barrages or construction of additional diversion structures on the eastern rivers. Water is a scarce resource and scarce resources have value. India cannot afford to be casual and should immediately plug the leakages and tap the flows going unutilised to Pakistan. It should also immediately put into action the desilting of canals and improve structures at the head works. In the light of this, maintenance and upgradation of the headworks at Madhopur (on Ravi), Harike (on

66. See photos of the dam on Google Earth. http://tibetanplateau.blogspot.com/2009/03/photo-of-dam-on-indus-senge-tsangpo.html

67. *Hindustan Times*, June 30, 2006

Sutlej and Beas) and Hussainiwala (on Sutlej) should be effectively undertaken.

- On the optimal utilisation of the eastern rivers and its tributaries, control/preventive measures should be immediately initiated to harness the rivers flow in Punjab and Jammu & Kashmir region. The unharnessed flow of water into Pakistan could be efficiently managed by early completion of the Shahpur Kandi dam on the Ravi in Punjab. It is equally important to build check dams/water storage schemes on all identified sources of water leakage into Pakistan. This should be bolstered by installation of network of automatic gauge recorders.[68]
- Given some stringent provisions in the treaty that thwart India's plans of developing the western rivers, a 'modification' of the provisions of the treaty should be called for. Whether it is done through renegotiations or through establishing an Indus II Treaty, modifications of the provisions are crucial in case of the western rivers.
- Use water as a political leverage and even consider unilateral abrogation of the treaty by applying the principle of 'state responsibility' as Pakistan continues to support terrorism. This response is to the oft asked question whether India can walk out of the treaty. In the draft provisions 'Responsibility of States for Internationally Wrongful Acts, reproduced in the Yearbook of International Law Commission (2001), Article 22 of Chapter V states, "Countermeasure in respect of an internationally wrongful act".[69] Thus, in case a party to a treaty fails to abide by its international obligations, the other party can through the interpretation of Article 22 take possible recourse to several actions. India can consider the abrogation of the treaty so long as it is proportionate to infringement by the other side. It is well established that Pakistan aids and abets terrorist actions from its soil. India should quantify the damage it has sustained over the decades because of Pakistani support to terrorism and seek as a first step suitable compensation from Pakistan. Given that Pakistan will not comply with this, India can possibly cite this as a reason and threaten to walk out of various bilateral agreements including the IWT. ■

68. Inputs by Maj Gen (Retd) Vijay Aga, IDSA Task Force Member on Water Security for India
69. The reproduced text 'Responsibility of States for Internationally Wrongful Acts' appears in the annex to General Assembly resolution 56/83 of 12 December 2001. http://untreaty.un.org/ilc/texts /instruments/english/draft%20articles/9_6_2001.pdf

CHAPTER 3
WATER ISSUES IN INDIA-CHINA RELATIONS

Background

India-China relations are complex and uneasy. In recent times, Chinese assertiveness against India has been more pronounced. It sees India as a rival and contender, which is not unusual in regional politics, and defines its 'pinprick policy' by raising the *ante*. While there is political assertiveness on the one hand, there is definite resource aggressiveness on the other, particularly relating to water resources. More over, Chinese activities of funding major infrastructure projects the Diamer-Bhasa dam on the Indus and the Bhunji hydro-project on the confluence of the river Indus and Gilgit in parts of Pakistan Occupied Kashmir (POK) add to the strategic complexity in the region.[70] China's assistance for infrastructural development, for example helping Pakistan to expand, upgrade and realign the Karakoram Highway (NH35) is a calculated plan to enhance its strategic reach in India's neighbourhood. On the other hand, China is an extremely thirsty country and is one of the world's driest nations. With a population of 1.3 billion and much of its rivers polluted and silt-ridden, water undoubtedly becomes a prized strategic asset. China's hardening position on Arunachal Pradesh is not mere rhetoric. In laying claims to Arunachal it is claiming the almost 200 million cusecs of waters resources in the state. It is a different matter whether or not the transfer of waters is technically feasible. However, its objective and intent cannot be downplayed. China will maintain a strategic silence on its water diversions. It is an important threat multiplier and helps create downstream riparian fears. Some of the water data figures suggest that roughly 354 BCM of water flows from Tibet into India, of which 131 BCM is accounted in the Brahmaputra.

The water resources of Tibet add great salience to China's resource aggressiveness. China occupied Tibet in 1950 and views it as a rightful part of the great motherland China. Following its occupation it made extensive modifications in the borders of the provinces of Tibet. Amdo was made the new Qinghai province. U Tsang and eastern Kham were designated as the Tibet Autonomous Region (TAR) of China and the remaining parts were merged into its provinces of Sechuan, Yunnan and Gansu. With an area spanning 470,000 sq km, Tibet is the second largest province of China after Xinjiang. The existing water resources in Tibet are estimated to be 40,000 times higher than in China.[71] The Tibetan government in exile in recent years has identified the plateau's water as a strategic resource and has been continuously criticising

70. India issued a response to the question on China projects in POK Pakistan on October 14, 2009, stating: "We have seen the *Xinhua* report quoting the President of China as stating that China will continue to engage in projects with Pakistan inside POK. Pakistan has been in illegal occupation of parts of the Indian state of Jammu and Kashmir since 1947. The Chinese side is fully aware of India's position and our concerns about Chinese activities in Pakistan Occupied Kashmir. We hope that the Chinese side will take a long term view of the India-China relations, and cease such activities in areas illegally occupied by Pakistan." http://meaindia.nic.in/speech/2009/10/14ss01.htm

71. See http://www.tibet.net/en/pdf/diirpub/environment/4/chap-2.pdf

China's water development plans. While the political issues swirling around China and Tibet are complex, there is no denying that water occupies centre stage in China's interest in Tibet.[72]

The Tibetan economy has maintained more than 12 per cent growth rate for seven consecutive years (2000-2007). The rapid economic development in Tibet has led to increased investment in infrastructure. Under China's 11th five-year plan (2006-2010), a huge development thrust involving 180 projects worth more than 770 billion yuan has been earmarked for Tibet.[73] It includes building of roads, railways and airports and importantly the completion of two hydro-projects: Zhikong on the Lhasa river (which is one of the five tributaries of the Yarlung-Tsangpo, which flows into India as the Brahmaputra) and Shiquanhe which is the upper reach of the Indus in the Ngari Prefecture.[74] China's increased infrastructural activities are a pointer to its long-term plan to build more dams and hydro-projects on the Indus, Sutlej and Yarlung-Tsangpo. It has started building a road to Medong through Tibet's Galung La Mountains in the Nyingchi Prefecture, which is slated to be completed by 2010. Medong is one of China's last unconnected regions and the route will at certain points be only 30 km from India's border.[75] Such an infrastructure boost can be linked to the proposed dam construction at the 'Great Bend' of Yarlung-Tsangpo.[76]

The Yarlung flows for about 1625 km inside the Tibet Autonomous Region and a further 918 km inside India. The Yarlung makes an abrupt hairpin turn, known as the 'Great Bend', and soars into a 4,900 metre cleft between two towering mountains, the Namcha Barwa and the Gyala Pelri. In a short distance of around 240-km the river plummets some 2700 metre through a gorge which is regarded as the deepest in the world. The Yarlung and Nujiang/Salween are the only two rivers that are yet to be dammed. Reports, however, indicate that Gezhouba, China's leading construction company, admitted to building a feed line for a dam on Yarlung at Zangmu.[77] The plans are of gargantuan scale. The proposed dams on the Yarlung, almost 28 in number, some of which are already underway, has the full support of the state-run hydropower industry. It would have a capacity of 38 gigawatt of power, almost twice the capacity of the Three Gorges Dam.[78] According to statements of Zhang Boting, deputy general secretary of the China Society for Hydropower Engineering and Yang Zhiyong, general manager of China Hydropower Engineering Consulting Group, a 500MW plant at Zangmu is under construction.[79]

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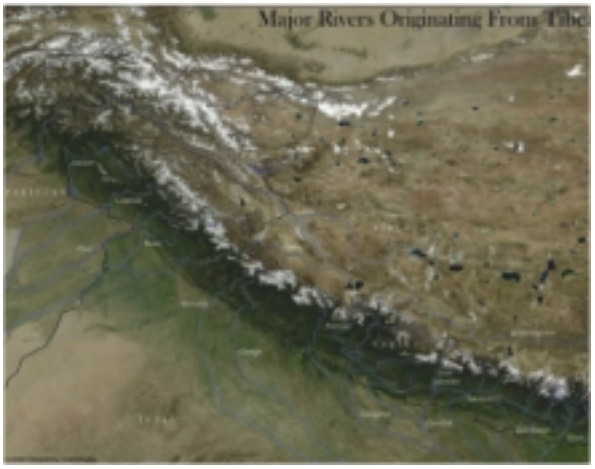
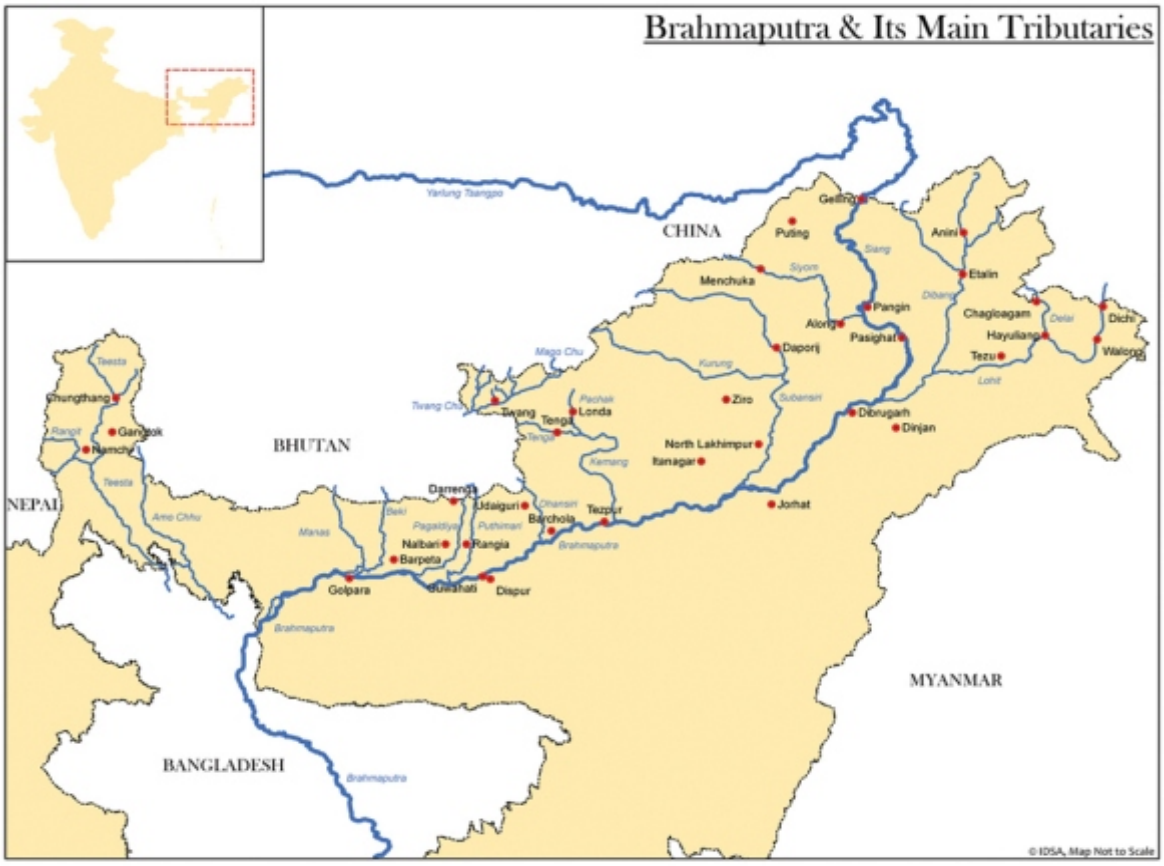
72. See Rajiv Sikri, "Tibet and China", Chapter 6 in *Challenge and Strategy: Rethinking India's Foreign Policy,* Sage, New Delhi, 2009, pp.92-111
73. *People's Daily Online*, March 31, 2008. http://www.china-un.org/eng/zt/xzwt/t420200.htm
74. Ngari is called "the ridge on the roof of the world". The Himalaya Mountain, the Kunlun Mountain and Kailash Mountain surround it. They form respectively four rivers at the maximum altitude above sea level in the world. The Shiquanhe (Lion river), Kongqu (Peacock river), Xiangquan (Horse river) and Maquan (Elephant river) are respectively the origins of the Indus, Ganges, Sutlej and Yarlung Zangbo rivers. See, http://www.tibettravelplanner.com/reg_Ngari.htm. Also, http://www.chinadaily.com.cn/english/doc/2005-08/18/content_471193.htm
75. P. Stobdan, "China should not use water as threat multiplier", http://www.idsa.in/publications/stratcomments/PStobdan231009.htm.
76. Ibid.
77. See http://www.economist.com/blogs/banyan/2009/10/dammed_rivers.cfm. October 19, 2009
78. "China's hydropower industry calls for 38GW in the Himalayas". http://www.ifandp.com/article/004552.html. Also see Brahma Chellaney, "Ties and Troubled Waters", *Times of India*, June 29, 2010.
79. Ibid

Tibet's water as a 'commons'

The Tibetan Plateau, regarded as the 'Third Pole', is a storehouse of freshwater captured in its massive glaciers, large lakes and cascading waterfalls. It serves as the headwaters of many of Asia's largest rivers including the Yellow, Yangtase, Mekong, Salween, Brahmaputra, Indus and Sutlej. Of the nine major tributaries of the Ganges that flow in from Nepal, the three principal tributaries the Karnali, Gandaki and Kosi rise from Tibet.[80] It is estimated that the net hydrological flows in Tibet total 627 cubic km per year. This is roughly six per cent of Asia's annual run-off and 34 per cent of India's total river water resources. The annual availability of fresh water is 104,500 cubic metres



making Tibet one of the largest water houses in the world.[81]



80. Madhavi Yasin, *India's Foreign Policy*: The Dufferin Years, Raj Publication, Delhi, 1994, p. 68.

81. The hydrological data of Tibet varies and most of these figures are near estimates. See http://www.tew.org/tibet2000/t2.ch2.water.html. Also see An Caidan, *Travel Guide to Tibet of China*, China Intercontinental: Beijing, 2003, p.13

Nearly two billion people in south and southeast Asia live along the watersheds of the rivers whose sources are on the Tibetan plateau. Water is critical for China but in attempting to solve its water crisis it can potentially create water shortages among its neighbours. Tibet's water resources cannot be regarded as a single country concern. China cannot be the lone stakeholder of the water of Tibet, however culturally and strategically important it may be. Figuring out how to sustainably manage the water and ensure that its natural hydrological flow is not disturbed by artificial diversion plans, is necessary if Tibetan water sources are to benefit humanity. A need to redefine a vital resource like water as a 'commons' would be a significant step towards preserving and sharing the waters of Tibet. While such a redefinition is politically sensitive as it clashes with national jurisdictions, it nonetheless, merits attention keeping in mind future water requirements of South and Southeast Asia and their dependence on water resources in Tibet. Accordingly it would require revisiting the definition of 'global commons'.[82]

Hydrological chart of Tibet

There are four rivers descending from four directions of Mount Kailash in the Ngari region of Tibet to the Indian subcontinent:[83]

- The Tackok Khabab originates in the east of Mount Kailash and flows from the upper region of Ngari down to the valley of Tsang, where it merges with the Kyichu River of central Tibet, flowing through Yarlung Dagpo and Kongpo. It then winds to the right of the Namchag Barwe mountain into Mustang and flows through the eastern region of India, becoming the Brahmaputra. It then descends into Bangladesh and finally into Bay of Bengal.
- The Ma Cha Khabab originates in the south of Mount Kailash and flows from the region of Purang into Nepal and then through the state of Uttar Pradesh in India. It merges with the Ganga and ends up in Bay of Bengal.
- The Langchen Khabab originates in the north of Mount Kailash and flows through Dhapa Thoding of Ngari region and becomes the Sutlej river flowing through Rampur and the Kinnaur valley in Himachal and then into Punjab from where it flows through Pakistan into the Arabian Ocean.
- The Senge Khabab originates in the west of Kailash and flows though Ngari Gar and then becomes the Indus flowing through Ladakh, Jammu and Kashmir and then through Pakistan finally descending into the Arabian Ocean.

The vast water resources of Tibet are also vulnerable to climate change and a host of serious environmental challenges that require global attention. In spite of the abundance, inadequate water supplies in rural Tibet have led to widespread water-borne diseases and high incidence of hepatitis. The impact of global warming on the glaciers and the melting of the permafrost is also alarming. According to the IPCC, glaciers in the plateau are receding at a rate faster than anywhere else in the world.

82. Chapter 18 of the World Conservation Strategy Report published in 1980 by IUCN defines 'Global Commons' is "a tract of land or water owned or used jointly by the members of a community. The global commons includes those parts of the earth's surface beyond national jurisdictions - notably the open ocean and the living resources found there - or held in common - notably the atmosphere. The only landmass that may be regarded as part of the global commons is Antarctica". The Report was published by the International Union for Conservation of Nature and Natural Resources (IUCN) with UNESCO and UNEP. The IUCN, the world's largest environmental organisation, has been active in raising concerns over dam building in Tibet on social and environmental aspects.
83. See Profile on Mt. Kailash. http://www.ehhs.cmich.edu/~dnewby/MountainsLessonPlans.pdf, p.9. Accessed on October 15, 2009

Why Tibet matters to China

The immense water resources in Tibet are a critical factor in China's Tibetan policy.[84] The Chinese Water Resources Ministry estimates that TAR has 448.2 billion cubic metres of water marking it as the country's top region in terms of water volume. The ministry further estimates that TAR has the potential to generate 1,800 billion kwh of electricity making it second only to Sichuan province. China's territorial position on Tibet has a significant bearing on the current and future water issues with India, which is a lower riparian vis-à-vis China.

The differing positions on Line of Control and China's claims on the territories that are parts of India further complicate the issues. Furthermore, there exist no agreements between China/Tibet and India pertaining to water resources. There is no discharge data on the Yarlung-Tsangpo and no reliable information on the present or proposed water-related developments and projects in the Tibet region. India's concerns on glacial lake outbursts in the upper regions of the rivers that flow into India from Tibet have not been adequately addressed. Voicing this concern the Prime Minister of India in a statement to the press made on January 14, 2008 after his visit to China said:

> I conveyed India's appreciation for China's assistance in providing flood season data for some of our trans-border rivers. Premier Wen and I agreed that we will continue to expand our cooperation in this area through the expert level mechanism.

The Chinese for long have been attracted to the vast water resources of Tibet. Chairman Mao Zedong way back in 1952 had observed: "The south has a lot of water, the north little…If possible, it is OK to lend a little water." What seemed an innocent remark then has now become a reality for China. The uneven distribution of water has been a critical stimulant to China's diversion plans. The region south of Yangtze river, which accounts for roughly 36 per cent of Chinese territory, has 81 per cent of water resources. The territories north of the Yangtze make up 64 per cent but have only 19 per cent of water resources. Given such disparity, the idea of *Shou-tian* or reversing the flow of Tibetan waters was proposed in 1988.[85] Harnessing the potential of the Yarlung-Tsangpo is critical to China's overall developmental plans and is part of its grand design to divert waters from the south to the north.

As a lower riparian, India will be vulnerable to any major storage projects planned on the Yarlung-Tsangpo. Given the political situation between the two countries it is hard to imagine China playing the role of a responsible upper riparian by releasing re-regulated flows from power houses immediately back into river. China's consumption requirements and long distance transfer of waters

84. In the classic book, *Communist China and Tibet*, the authors note: "He who holds Tibet dominates the Himalayan piedmont; he who dominates the Himalayan piedmont, threatens the Indian subcontinent; and he who threatens the Indian subcontinent may well have all of South-East Asia within his reach, and all of Asia." See George Ginsburg and Michiel Mathos, Communist China and Tibet: The First Dozen Years, Martinus Nijhoff, 1964

85. The idea of 'reverse-flow' (Shou-tian) was first mooted by hydrologist Guo Kai. Shou-tian canal along the 'Great Western Route' was the brainchild of Guo. He was intrigued by Chinese geologist Weng Winhao's theories on Tibetan hydrographic net. Thus the idea of diverting Tibetan rivers was planned. Guo calculated that if water from the Nujiang, Lancang, Jinsha, Yalong and Dadu rivers in Tibet were diverted through the Aba divide, a solution could be provided to the crippling water shortage felt in north and northwest China. In 1988, Guo's plan caught the attention of the military. In 1989 a committee headed by top generals was formed to study the proposal. The first field survey of furthering projects on the 'Great Western Route' took place between May 18 and June 22, 1999. Guo Kai was part of the expedition. It now has a wide support of the PLA. In 2005, the book, *Save China Through Water From Tibet* by Li Ling further caught the attention of various ministries and planners. It has been reported that the Ministry of Water Resources alone bought 100 copies.

will undoubtedly hurt the interests of India and more so Bangladesh. China will remain unforthcoming to any cooperative institutional mechanism with India on exchange of information or discussions on water resources projects.

It is believed that the south-north diversion project has the support of President Hu Jin Tao,[86] a hydrologist and the force behind the Three Gorges project. Now that China has demonstrated a strong will and competence to plan, undertake and complete gigantic water resource projects even against internal or external oppositions, India has to remain alert and monitor the headwaters of the Brahmaputra.

It is foolhardy to expect China to adhere to international principles of good neighbourliness towards the riparian nations in the region. There is no clear accepted international law on shared waters, and when one such was attempted, China was among the only three countries that voted against the Convention on the Law of the Non-Navigational Uses of International Water Courses in the UN General Assembly in 1997.[87] It will continue to pursue its national interests with regard to waters of the Tibet region. Equally it helps develop the Tibet region by providing electricity and other infrastructural development. India has a long-standing border dispute with China. China lays claims on substantial parts of India, particularly in Arunachal Pradesh through which the river Brahmaputra flows. The boundary issue comes in the way of meaningful cooperation on water issues. China is likely to use water as a tool to pressurise India and to extract concessions on the boundary question. Water will be a key issue, apart from the border issues, that will determine if the two countries are able to live in peace and harmony and cooperate (or compete) on the uses of these life sustaining major rivers coming from the Tibet region.

What Should India do?

As a lower riparian, India has to be simultaneously cautious and countervailing in its riparian relations with China. At a more practical level it has to continuously engage and open channels of communication with China on flood management. In spite of India and China having entered into agreements in the recent past on the sharing of hydrological data for flood control, the Chinese have been inconsistent in sharing of information.[88] This needs to be impressed upon at various negotiations and talks. China has an unmatched hydrological advantage vis-à-vis the South Asian countries. Not only the Brahmaputra but also the Sutlej and the Indus originate from various sources in Tibet. India being central to riparian relations in South Asia needs to refocus and reshape its Tibet policy, particularly as China will push its national interests in matters relating to waters of the Tibet Region.

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86. Hu Jintao was the Chinese Communist Party Chief of the Tibetan Autonomy Region (1989-1992)
87. The other two were Burundi and Turkey. The Convention was adopted by a vote of 103 in favour to 3 against with 27 abstentions. See N. 34
88. An MOU was signed between India and China on January 14, 2002 for provision of hydrological information namely rainfall, water level, discharge and other relevant information on Yaluzangbu/Brahamaputra river in respect of 3 stations, namely, Nugesha, Yangcun and Nuxia in flood season by China to India. The information is to be furnished from June 1 to October 15 every year and will be useful for flood forecasting purposes in the north eastern region. As a follow-up of this MOU, an Implementation Plan has also been signed between the implementing agency namely the Central Water Commission, Ministry of Water Resources (India) and the Bureau of Hydrology and Water Resources, Tibet Autonomous Region of the People's Republic of China. The Chinese side has transmitted data to India for the three above mentioned stations during the year 2002. Similar information has been requested to China for setting up additional hydrological stations on Langquinzandlu (Sutlej) and Palongzangbu (tributary of Yaluzangbu/Brahamaputra). See website of Central Water Commission.

India, given its responsible track record of an upper riparian in relation to Pakistan and Bangladesh, is well within its rights to raise its lower riparian concerns with China. Based on the fundamentals of 'equality', 'no harm' (well accepted) and 'community of co-riparian states' (regarded as ideal but not so well accepted),[89] it can reopen the debate on the principles enshrined in the international water law rules. Bangladesh has proposed a joint basin-wise management of the Brahamaputra with India and China. Dhaka and Beijing have agreed to discuss and share regular exchange of information on the use of the water resources of Brahamaputra.[90]

Simultaneously, and as explained earlier, India needs to raise global awareness on why the waters in the Tibet region matter to the almost 2 billion lower riparian people living in the subcontinent and the southeast Asia region in terms of livelihood and survivability, thereby underlining water resources as a 'commons' and not just for the consumptive use of China. International awareness of such concerns hopefully will create the grounds for sharing the benefits of the water resources of Tibet. In order to build a 'coalition for the commons', India should take the lead to introduce the 'commons' principle in the UN reports and mechanisms on transboundary water.[91]

The UN has established 'UN-Water' as a mechanism through which the UN system comes together to devise effective strategies for integrated management of water resources.[92] For example, an expert panel in the Economic and Financial Committee of the UN General Assembly has looked into mechanisms of averting water wars. International awareness through the UN system as well as India's initiative and broader-coalition on the Ganges-Brahmaputra-Meghna (GBM) river system involving Nepal, Bangladesh, Bhutan can induce China to formulate a river-basin approach. China is not unaccustomed to such arrangements. The Mekong Sub-regional Cooperation (also referred to as the Lancang-Mekong River) is a good example of river-basin cooperation that runs through six countries.[93] China's role and position in the Mekong sub-region is very prominent. Although China is not member of the Mekong River Commission, it attaches considerable importance to the Greater Mekong Sub-region (GMS). Primarily as a land-way to link the markets of the south western part of China with those of southeast Asia but more

89. 'Equality' and 'No harm' principles are based on 'limited territorial sovereignty' and 'limited territorial integrity' as opposed to 'absolute territorial sovereignty' and 'absolute territorial integrity'. According to Salman MA Salman this principle asserts that "Limited territorial sovereignty or limited territorial integrity, asserts that every riparian state has a right to use the waters of the international river, but is under a corresponding duty to ensure that such use does not harm other riparians. Accordingly, this principle restricts both principles discussed above, and asserts the equality of all riparians in the uses of the waters of the international river. See, Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspective on International Water Law, Water Resources Development, Vol.23, No. 4, December 2007, pp627-628

90. *The Daily Star* 16 June 2010 http://www.thedailystar.net/newDesign/news-details.php?nid=142804

91. UN Report on *Water Without Borders*. See http://www.un.org/waterforlifedecade/waterborders.pdf. Also see UN Report on *Water in a Changing World*, February 2009

92. UN-Water produces important inputs to policy debates and processes and is increasingly active in shaping the water agenda. See UN-Water's Triennial World Water Development Report, March 2009

93. Lancang-Mekong River starts from China and is the only international river in Asia. The Lancang River begins in the north eastern side of Tanggula mountains in Qinhai province, flows through Tibet into Yunnan province, and is called Mekong River when it flows out of 244 boundary stone in Mengla county in Yunnan province. Mekong runs all the way through Myanmar, Lao People's Democratic Republic, Thailand, Cambodia, and Vietnam and empties into the South China Sea near Ho Chi Minh in Vietnam. Lancang-Mekong River is 4,880.3 kilometres long, the section of Lancang River in China is 2,161.1 km long.

importantly to generate hydroelectricity from the sub-region.[94]

For China, any riparian cooperation clearly lies in building dams to generate electricity, whether it is on the Mekong or on the rivers flowing from Tibet. This has to be clearly understood by India in seeking any basin cooperation with China. Rivers thrill China often discounting environmental consequences and the worries of downstream riparian states.

The vast volume of water in the Brahmaputra and the natural hydrological gradient allows India, in spite of China's diversion plans on the Yarlung-Tsangpo, to harness the potential of the river in the lower reaches of Arunachal Pradesh. Sound planning based on ecological considerations and a technological assessment of dams should be thought through. Local participation based on need and requirement should equally be encouraged. Such developmental goals and integrated actions will not only create healthy centre-state relations but equally marginalise Chinese intentions in the region.

With this as a background, India can attempt to do the following:

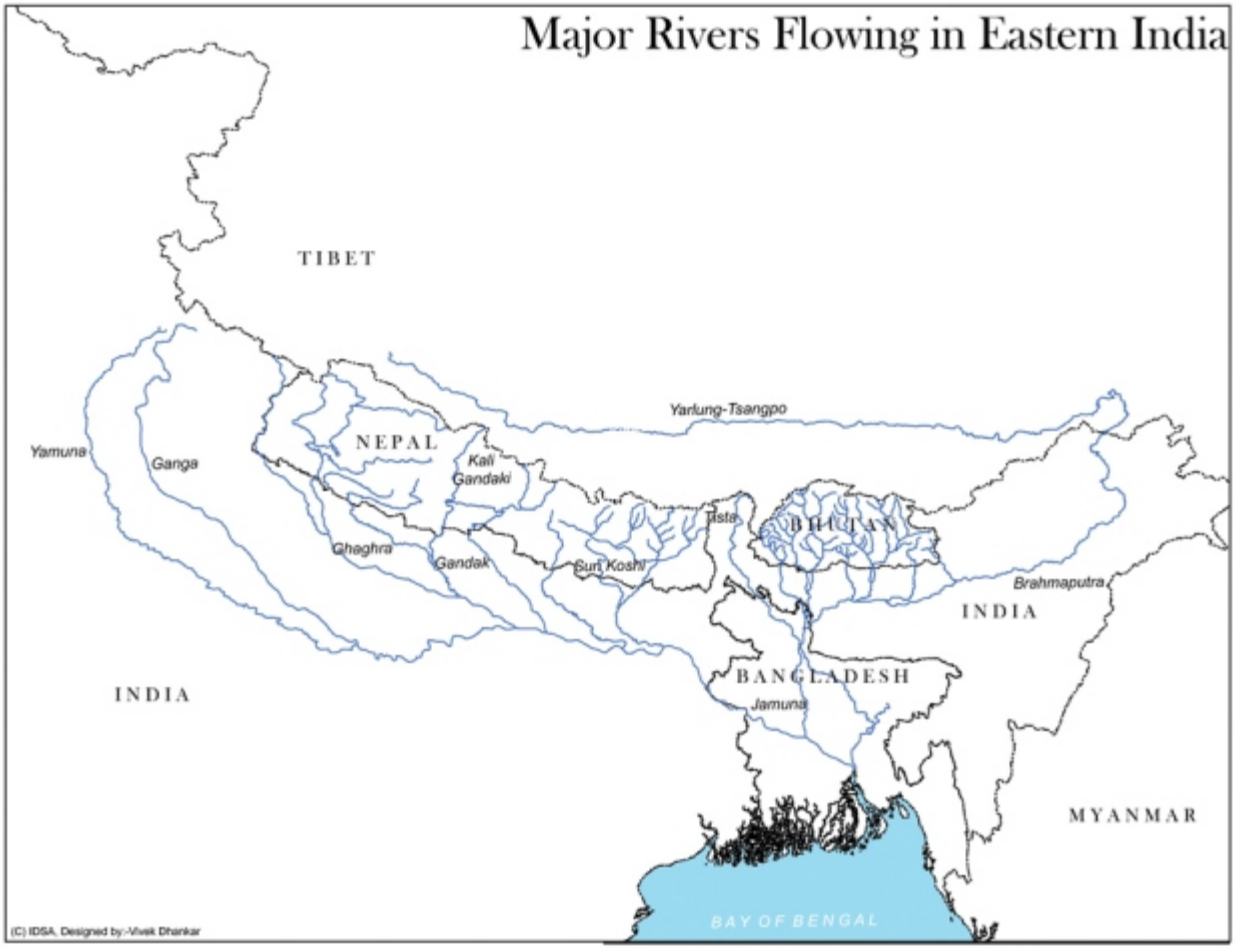
- Pakistan, Bangladesh, Nepal, as co-riparian states, should be involved to counter China's water diversion plans. A broader riparian coalition based on the principles of 'equality' and 'no harm' and the human need for water from Tibet is crucial.
- Consulting other existing river basin arrangements, apart from the Mekong, that China has, for example with Kazakhstan and Russia on the Irtysh and Ili rivers. How both these countries are dealing with China will help understand the strength and weaknesses of the basin mechanism as well as give an insight into China's intentions and approach. It will help in initiating a Sino-India river-basin dialogue that takes into consideration the environmental safety of the shared rivers from Tibet as well as the use of joint water resources.
- International pressure regarding Tibet is required. It is essential to create global awareness about the water resources in Tibet. Tibet's water is for humanity, not for China alone. Tibetans need to be also sensitised to the water resources and the extensive ecological damage that China's water diversion plans can cause.
- With climate change and deteriorating environmental conditions, the waters of the Brahamaputra are critical for the cascade of hydropower development in Arunachal Pradesh. India and China do not have any bilateral treaty and are not part of any international treaty on water sharing. Establishing the user's right is the only way available. Therefore, projects in Arunachal Pradesh should be assigned national priority. Further, all projects should have maximum possible storage capacity for tiding over the shortage created by actions of China in addition to water diplomacy.
- As a counter-measure to China's plan for the diversion of the Yarlung-Tsangpo, India should propose a south Asian-China-ADB power project with international support on the Great Bend. ■

94. So far, 25 major projects have been listed: 14 projects inside China, four inside Laos, four along the borders of Laos and Thailand and Laos and Cambodia and three projects inside Cambodia. These dams are estimated to produce 70 per cent of China's current electricity needs.

CHAPTER 4
INDIA-BANGLADESH WATER SHARING

Background

Water sharing assumes primacy in India and Bangladesh relations. There are 54 common rivers that crisscross the geographical contours of the two countries. The problem of resource allocation and sharing, primarily for irrigation purpose, is sensitive and politically charged in Bangladesh. With about 84 per cent of the total Bangladeshi population in the rural sector, 61 per cent of the total land area arable and 4/5th of the arable area under paddy cultivation, water for agriculture is vital. The Ganges Water Treaty in 1996 greatly reduced political friction but issues relating to the sharing of the Teesta waters and the Tipaimukh Hydro project that India plans on the Barak have opened up a new set of riparian concerns.



Ganges Treaty

The Ganges Treaty forms the benchmark for other river water sharing arrangements between India and Bangladesh. Though the treaty frequently becomes entangled in the domestic politics of Bangladesh and is a sensitive issue, it is the best deal that an upper riparian could possibly give. Rival political parties in Bangladesh use the 1996 agreement as a rallying point and make it an emotive issue. As a lower riparian, angst and sensitivity to water issues is to be expected in Bangladesh.

Technically the treaty is well in place. The 37th Indo-Bangladesh joint committee on implementation of the treaty, in its report in September 2007, found no dispute over the water flow at Farraka and Hardinge Bridge points. Although this treaty has provision for mandatory review after five years or even after every two years, neither of the two governments (particularly Bangladesh) has called for a review. In spite of the untroubled flow of the Ganges, some dissenting voices over the treaty are heard in both the countries. Bangladeshis have been more vociferous in their criticism of the treaty. Many quarters in Bangladesh believe India is taking advantage of the clause in the treaty which provides for the sharing of water from January 1 to May 31 but not between June 1 and December 31, which enables India to withdraw water unilaterally during this period.[95] This perception and public pressure often force Dhaka to raise the issue.[96]

The Bangladesh civil society has been actively involved in the issues concerning the sharing of the common waters and acts as a strong pressure group. A public interest writ filed in 2008 led to a court ruling questioning the government for not asking for a review of the treaty even though an international treaty is outside the purview of domestic jurisdiction. Indeed during the same year, Bangladesh received a larger quantum of water than was specified in the agreement. India's river linking project, though under review and not fully implemented, has added a new dimension to the bilateral water sharing. Although India has formally reassured Bangladesh that the proposed river linking project would not include the Ganges nor the Brahmaputra, (source of 65 per cent of water surface), Bangladeshi domestic opinion continues to voice apprehensions about the project.

Apart from the Ganges, the other major rivers that flow between the two countries are the Teesta, Brahmaputra and Barak. The sharing of Teesta waters has assumed priority in the discussion between the two states.

The Teesta Issue

River Teesta, the lifeline of Sikkim, flows through the entire length of Sikkim before joining the Brahmaputra as a tributary in Bangladesh. India and Bangladesh have been engaged in dialogue on the sharing of the Teesta since 1974. During dry season, the river faces a water crunch as India has constructed the Gozaldoba Barrage in the upstream and diverts water from the river that enters Bangladesh's greater Rangpur region. The sharing of the existing Teesta flow of 5,000 cusecs forms the core of the negotiations. According to the Bangladesh Water Development Board, the country is dependent on the Teesta for its irrigation projects covering 750,000 hectares of land and has accordingly built a barrage (1st Phase) on the Teesta. Any water shortage in the Teesta

95. '54 International Rivers, India urged to give due share of water,' *The Daily Star*, May 18, 2009 at http://www.thedailystar.net/story.php?nid=88754. Many on the contrary would argue that shortage is limited only to the lean season and that there is enough water for both during flood season.

96. Total flow reaching at Farakka during the first ten days of February, 2009 was 81,650 cusec which was lower than the 40 years historical average flow of 86,323 cusec as mentioned in treaty. Bangladesh was supposed to get 46, 323 cusec water but it apparently received 41,650 cusec water in first ten days of February.

very often disrupts irrigation in the vast tracts of land and undermines Bangladesh's agriculture. As a lower riparian under pressure from the fluctuating flows on the Teesta, Bangladesh is keen to reach a deal. In the 2009 foreign ministers meeting at New Delhi, both the sides agreed to a joint hydrological observation team, comprising experts from Bangladesh and India to prepare a draft on water availability and other related issues. As was the case with the Ganges Accord in 1996, any forward movement on the sharing of waters not only reduces the political temperature but helps create an enabling environment to resolve other longstanding differences related to other water sharing issues, connectivity, trade and border management. In this regard, an accord on Teesta water sharing can become a catlayst for improving relations through beneficial arrangements. For example, in recent bilateral talks, India has agreed to allow products from land-locked Nepal and Bhutan to reach Bangladesh via its territory (transit facility) and in response Bangladesh would allow India to use Mongla port.[97] Bangladesh would also allow India the use of Ashuganj Port[98] for transport of Indian goods, particularly heavy machinery, to the north-eastern state of Tripura for the construction of a power plant. In return India would sell Bangladesh 100 MW of electricity "on a priority basis" after connecting the power grids of the two countries.[99]

Institutional arrangements on water sharing

The India-Bangladesh Joint Rivers Commission (JRC) under the water resources ministers of both the countries has been functioning since 1972. The JRC constituted a Joint Committee of Experts (JCE) headed by the two countries water resources secretaries on the mechanism of sharing the Teesta waters and decided to follow the ground rules and benchmarks that were used to arrive at the Ganges Treaty. The JCE decided that the 'principles' and 'details' would be the basis on which any water sharing formula would be worked out. Subsequently, the positions of the two government differed, with Dhaka proposing the equal sharing of 80 per cent of the Teesta waters, preserving the rest 20 per cent as natural flow, while New Delhi insisted on sharing the waters at a ratio of 39 per cent (for India) and 36 per cent (for Bangladesh). The Indian side proposed keeping 10 per cent of the Teesta waters for its natural flow and sharing 15 per cent in proportion to the command areas in India and Bangladesh territories. In the 2003 rounds of discussion India had insisted on a scientific study and a hydrological survey before considering the water sharing formula, which Bangladesh finally agreed to in 2009.

The JRC's 36th ministerial level meeting in September 2005, focused on a few critical issues namely; sharing waters of the Teesta and six other rivers, India's planned dam at the Tipaimukh, river-linking project and erosion of border rivers. Indian decision to provide Bangladesh with flood information on the Ganges and the Brahmaputra 67 hours ahead was one of the highlights of this phase of talks. In September 2006 the water resources ministers went on a six-day joint visit to the erosion-prone areas on the borders for the first time for a first-hand experience of the natural impacts from the transborder rivers during the monsoons. Thus when the JRC met in July 2007 expectations of a positive outcome were high. In

97. Established in 1954, the port is situated on the confluence of the rivers Pashur and Mongla. It lies about 100 km north of the Bay of Bengal and is connected to major inland river ports and to the rail terminal at Khulna.

98. Ashuganj Port is in Brahmanbaria district and 30-km from Agartala (Tripura). The India-Bangladesh Joint Statement of September 2009 states that "both sides discussed designating Ashuganj as a new port of call under Article-23 of the Inland Water Transit and Trade Agreement as well as the use of Chittagong port by India."

99. The Teesta water sharing and other bilateral agreements were discussed during the visit of Bangladesh's Foreign Minister Dipu Moni (September 8-11, 2009).

the August 2007 meeting of the secretaries despite the lack of resolution on the Teesta, some headway was made on the point of water release, the site of measurement of flows, the periods of sharing and cropping patterns. Other river-linked issues like bank protection works, lift irrigation schemes, drinking water supply schemes on common border rivers and dredging of the river Ichamati in common reach was discussed. Post the impasse on Teesta, being broken by the foreign ministers meeting in October, 2009 when both sides agreed to a joint hydrological survey on the Teesta flows, the JRC now will be moving forward to resolve the Teesta water sharing issue.

Tipaimukh Project

India has decided to build the Tipaimukh Project on the Barak river in Manipur.[100] The project is designed to generate 1500-MW hydropower and ensure flood control for both Manipur and Mizoram. This involves building a 162.8 metre high rock-fill dam around 500 metres downstream of the confluence of river Barak with Tuivai. Bangladesh, as a down stream riparian, feels that the share of the Barak will be greatly reduced thus harming Bangladesh economically and ecologically. Opponents in Bangladesh compare the project to the Farraka Barrage and fear that if not challenged there would be a repeat of Bangladesh being denied less water.[101] The proposed project has also faced protests from within the Indian northeast states on the issues of displacement and compensation. Not to be seen as an unconcerned upper riparian, India has opened channels of discussion and invited Bangladesh for on-site visits to dispel any concerns over the project. Bangladeshi team returned satisfied with the clarifications and the assurances they received from their Indian counterparts.[102]

In the early 1970s, Bangladesh had requested India to address the flooding of Sylhet. This had led to the idea of damming the surplus water in the Barak. As a run-of-the-river project, the Tipaimukh was meant for power generation and not as a water diversion project. But given the limited communication from the Indian side and little objective study, the public discourse in Bangladesh was dominated by speculative fears of India's unilateral diversionary motives. With provision of water storage for no more than 10 days during the monsoon,[103] the Tipaimukh dam would not only control floods in Bangladesh, but the excess water stored will help augment the lean season flows thus making more water available to Bangladesh when they need it most.

Other Riparian Issues

Siltation is a major problem for Bangladesh. An estimated 2.4 billion tons of silt is carried by the seven major river systems, a substantial portion of which is deposited within Bangladesh territory. The reduced water flow, especially during the dry season, has led to desertification in the downstream districts and has also resulted in river

100. This project will be one of the largest hydroelectric project in eastern India to date and will be located in the district of Churacchander in Manipur, near the Manipur-Mizoram border. The Project will have a 6 X 250 MW power house and will be completed in an estimated time of 12 years. MOU with the Govt of Manipur has been executed and NOC from the Govt of Manipur and Assam have been obtained. Development work on the Stage II activities of the project is being taken up. See, http://www.neepco.gov.in/TpmHEP.html

101. Critics in Bangladesh feel that the Farraka Barrage, which was started as a trial run in 1974, was cleverly manipulated by India to extend the trial to its advantage. They feel strongly that the south western region of Bangladesh has been critically affected by the limited water it receives from the Ganges and that farming, fishing and logging have badly suffered.

102. Tipaimukh dam: Trust, but verify, *The Daily Star, August 20, 2009*. *See http://wwwthe dailystar.net /newDesign/news-details.php?nid=102092*

103. According to the MEA estimates.

beds becoming shallow with silt. Bangladesh is unable to utilise Farakka releases during the lean season due to the Gorai Hump.

In the Joint Rivers Commission (JRC) meeting in 2006, Bangladesh raised the issue of having lost 900 acres of land due to erosion of the border rivers of Ichhamati and Kalindi in Satkhira. With continued erosion, islands known as charlands emerge in mid-river, and border forces from both the sides stake claims on them. According to the Bangladesh Water Resources Ministry, Bangladesh has so far lost around 30,000 acres of land to India due to erosion of different border rivers since the Mujib-Indira Treaty of 1974. The Belonia sub-division in South Tripura, for instance, is a flash-point because the Muhuri river changes its course regularly creating vast islands, which both the countries claim.

Progress

It would be too alarmist to regard water sharing as a contentious issue between the two governments. It is, however, an emotive issue within Bangladesh, raised frequently to fever pitch by political parties. At the state level, institutional arrangements and ground realities have enabled sensible riparian approaches. India provides Bangladesh with flood data on Farakka for the Ganges (from 15th June to 15th October), and the flood data on Pandu, Goalpara and Dhubri for the Brahmaputra river and on Silchar for Barak river during monsoon period (from 15th May to 15th October). Data for ther Teesta, Manu, Gumti, Jaladhaka and Torsa are also provided. Bangladesh has been able to take precautionary measures with the availability of this free information supplied by India.

In 2008, Bangladesh agreed to India's demand for joint dredging to facilitate river navigation along the Calcutta-Haldia and Karimganj river routes. Dredging will improve navigation on the rivers between Haldia and south Assam river ports and between Kolkata and south Assam river ports, facilitating transportation between the north east and the mainland as well as between Bangladesh and north east India. Other than the common waterways India has also in the 2009 foreign ministers meeting committed to providing assistance amounting to nearly $500 million for dredging of some of Bangladesh's rivers to increase their navigability and irrigational facilities. With the inauguration of the river jetty in Badarpur, steamers which from the Kolkata and Haldia ports, can reach the Karimganj port through the Bangladesh territorial waterways, can now sail downstream on the Barak to Badarpur.[104]

What should India do?

Bilateral relations are on the upswing with the Awami League government in Dhaka. Both sides are keen to find common grounds between them. The recent (December 2009) handing over of ULFA leader Arabindo Rajkhowa reflects the Bangladeshi intention to address the primary Indian concerns relating to security. It is likely that Bangladeshi efforts to meet Indian concerns would give them greater negotiating space specially over the sharing of waters, one of the primary Bangaldeshi concerns vis-à-vis India.

With climate change and deteriorating environmental conditions impacting rivers, water sharing between India and Bangladesh will become critical in the coming years. Given the agrarian and power generation needs of the river systems and the vagaries of the monsoon, upstream-downstream animosities will arise. The Teesta talks demonstrate that there is no easy approach. Bangladesh would be bargaining for access to larger quantum of common water resources. Indeed, Bangladesh is keen that India

104. 'Seal on joint dredging of river - Dhaka accepts Delhi offer,' *The Telegraph* December 26 , 2008 at http://www.telegraphindia.com/1081226/jsp/northeast/story_10301807.jsp

comes to an early agreement not just on Teesta but also on all the major rivers that crisscross the two states.

The way forward is through good hydrodiplomacy and consultation backed by technical knowledge to manage riparian relations between the two. Bangladesh cannot change its lower riparian position and will have to accept cooperative arrangements based on water sharing and not on water rights. India as the upper riparian has the responsibility to ensure that the equitable principles are fairly adhered to without undermining its own requirements. But given the advantage that India has as an upper riparian state, India should be using that to leverage its other interests, particularly security considerations, which Bangladesh has not adequately addressed. The West Bengal government in fact has been advocating that India should link security issues with water issues and make it conditional on Bangladesh to deliver on that front before India agrees to any mutually acceptable solution of water sharing on the common rivers between the two states. ■

CHAPTER 5
INDIA-NEPAL WATER COOPERATION

Background

India is a lower riparian vis-à-vis Nepal. But given Nepal's water surplus, India does not fear being either denied water or being flooded. Nature has endowed Nepal with bountiful water resources. The problem, many would argue, is of plenty and related mismanagement. Given Nepal's limited capacity and political instability much of the water resources have not been harnessed to their potential. Many of the joint projects with India relating to flood control, irrigation and hydroelectricity have been myopic and mismanaged. Nepal has the potential of producing 40,000 MW of economically viable hydropower but only manages to produce 600 MW. Ironically, the country experiences 14 hour power cuts a week. Moreover, its fluctuating political relations with India have deterred water resources development. Nepal's mistrust, beside other factors, has been reinforced by what it perceives to be unequal treaties starting from the Sharada Dam construction (1927), Kosi Agreement (1954), Gandak Agreement ((1959), Tanakpur Agreement (1991) and the Mahakali Treaty (1996). Since about 700 million people live in the Ganges, Brahmaputra and Meghna region, India needs Nepal not only to meet some of its growing energy needs but more crucially for flood management and navigational uses as well.

Nepal is divided into five hydrological regions: Mahakali River Basin, Karnali River Basin, Gandak River Basin, Sapt-Kosi River Basin and Southern River Basin. The holding capacity of each of these basins is 6; 040; 34,243; 17, 830; 13,760; and 5,221 million cubic metres respectively. On the basis of these holding capacities, Nepal can construct 9 large dams between 144-315 metres in height, 11 medium-sized dams between 85-225 metres in height and 8 small dams of heights between 50-140 metres. Presently, around 566.1MW electricity is being generated from 21 small power plants and another 21 plants have been identified as potential hydro-power projects. Of those 21 plants, 11 are managed by private companies. According to a Nepal Electricity Authority report, 20 small hydro projects are under construction. If managed properly, Nepal can generate an estimated US$ 8 billion per year by exporting hydro-electricity to India. As far as India is concerned, it needs an additional 12,000MW for rapid industrialisation.

Geographically, India is Nepal's best customer for the sale of its hydro-electricity. Nepal can benefit, like Bhutan, by the optimum utilisation of its water resources, and in return fulfil some of India's energy requirements. The shared benefit will not only improve Nepal's trade deficit with India but help it become self sufficient in energy. Nepal's four big rivers Kosi, Gandaki, Karnali and Mahakali are snow-fed and flow in the lean season. Cooperation in the power sector, on these four big rivers, can greatly help both to meet their requirements during high demand seasons. Other benefits that can accrue from the construction of hydro-power dams are flood control and irrigation. The recent Kosi floods, described as a national calamity in India, and which caused extensive damage in Nepal as well, have opened new approaches for joint management of floods. After some expected cross-border recriminations over the failure of an embankment in Nepal, the blame-game seems to have given way to constructive talks on evolving flood control mechanisms.

While both the countries are aware about the potential and necessity of hydro-power, there is a lack of effort, cooperation and political will to transform these benefits into reality. While Nepal is short of technology and finances to set up dams, India has equally failed to extend meaningful support. Historical water treaties like the Kosi and the Gandak that failed in their purpose have acted as impediments to future cooperation. There is a strong perception in Nepal that India by according far greater priority to its national interest has often overlooked Nepal's interest and that the benefits have been one-sided rather than mutual. The unstable political situation in Nepal has also contributed to the slow progress on water issues. Some major hydro-power projects for joint development and for electricity exports to India that are under consideration/feasibility stage are as follows:

- 10,800 MW Karnali Chisapani Multipurpose Project.
- The Mahakali Pancheswar Project.
- Upper-Karnali Hydroelectric Project, which is being considered for joint development by Nepal Electricity Authority and NHPC of India.

Nepalese Concerns

Nepal's deep-seated mistrust and grievance towards India on water cooperation are historically rooted in the Kosi and Gandak treaties of the 1950's. In retrospect, both the treaties lacked vision. The projects also suffered from poor design, inefficient implementation and bad maintenance. Though both the treaties were amended Kosi in 1966 and Gandak in 1954 the level of confidence never reached the levels necessary to forge future riparian cooperation.

Presently, Nepal, like Bangladesh, is concerned over India's river inter-linking proposal. India has identified 30-link schemes.[107] Five of the 14 river-

107. 16 river-links are in Peninsular India and 14 river-links in the Himalaya India.

links of the Himalaya are directly related to Nepal's 28 storage schemes. These are Kosi-Mechi; Kosi-Gandak; Gandak-Ganga; Sarada-Yamuna and Ghagra-Yamuna. These concerns will feature predominantly in any water discussion and cooperation with Nepal.

The new government in Nepal under the leadership of Prachanda has taken initiatives to remove blockades in water cooperation with India. While, on the one hand, it is a positive move, on the other, the Maoists have demanded stoppage of work on the upper Karnali. The fourth meeting of the Joint Committee on Water Resources (JCWR) signed a 34-point agreement in New Delhi on March 13, 2009. While the Terms of Reference (TOR) for a Joint Ministerial Commission has been finalised, the TOR on Pancheshwar Development Authority has yet to be inked as both the sides feel more deliberations on the issue are required.. In fact, the meeting agreed to form a Joint Committee on Inundation and Flood Management to review issues of inundation on the Nepal-India border and solve such problems. The issue of importing more electricity from India and the construction of the Naumure hydel-project was discussed during the meeting. This is a major breakthrough in India-Nepal water cooperation. The following reasons can be considered responsible for the hitherto unsatisfactory cooperation on water resources:

- Lack of clear-cut strategy for cooperation. Differences in understanding between the two sides persist on the release of irrigation water for the Chandani Dodhra area in the Mahakali treaty
- Unsatisfactory implementation of commitments
- There are allegations that India has never consulted Nepal while building the diversion structure
- Non-cooperation by Nepal for development medium-sized rivers
- There is a divergence between the two countries on a common methodology of cost sharing of the project in proportion to the benefits
- In the Karnali Chisapani Project both the countries failed to reach an agreement on sharing of costs for different components of the project and how to apportion the benefits of energy, irrigation and flood control
- The Pancheshwar Multipurpose Project has been delayed due to differences between the two countries on cost sharing and prior use of water
- The ineffectiveness of institutional mechanism. For example, the Pancheshwar Multipurpose Project on river Mahakali (Sharda in India), the centerpiece of the Mahakali Treaty (1997), established an India-Nepal Joint Group of Experts (JGE) to oversee the physical and financial progress of the Joint Detailed Project Report (DPR). All the related field investigations have been completed but the DPR is yet to be finalised. Same is the case with the Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage cum Diversion Scheme for which a joint Project Office was set up in 2004. Such ineffectiveness is similarly seen with the Standing Committee on Inundation Problems (SCIP) that deals with the problems of inadvertent inundation caused by the construction of various works on the border rivers between India and Nepal.
- The transmission interconnection is a bottleneck for export. There is a lack of regulatory mechanism for the third party access to the grid
- There are many institutions related to water resources and hydropower development in Nepal but there is no dedicated institution which is fully responsible to implement the project. There are also unclear and overlapping roles and responsibilities of existing institutions.

- Many in Nepal are critical of selling hydro-electricity to India for hydro dollars and there is considerable opposition to following the similar path of the India-Bhutan hydro-cooperations. It is equally argued in Nepal that India should pay for the enormous benefits it will harvest from storage dams in Nepal.[108]

India's Concern

India has often felt that the Nepalese authorities have time and again stymied effective water cooperation for narrow political gains. The fault, India feels, has less to do with the treaties framed but with Nepal's lack of trust and genuine political will to implement the treaties. For example, the Nepalese authority more often than not fails to extend support to the Indian technical teams when they visit the barrages for maintenance or other related work. As a result, Bihar has faced monsoonal floods every year. The other half of the problem lies with Bihar's poor and often callous record of maintenance of the barrages on the Indian side. Considering the sensitivity of water relationship, India needs to pay adequate attention to the various barrages built by it across the border that Nepal alleges causes flooding in its border villages, such as the Laxmanpur barrage and the construction at Mahalisagar, Rasiawal Khurdalotan and Gandak. Barrages constructed under the treaties are located on the border; confusion often prevails on the upkeep of the barrages and canals meant for irrigation and flood management. As per bilateral agreements, India is entirely responsible for the repair, maintenance and operation of these barrages.

What should India do?

Often a proactive approach is interpreted as being intrusive and interfering. India's Nepal policy has been one of river water development without paying adequate attention to building political relations. Such a one-track approach has created mistrust and led to setbacks that are hard to overcome. Failures on the water cooperation front are perceived as India's incapacity to forge solid relations with its neighbours. Nepal, a small country, will always feel smothered by excessive closeness and will always gain international sympathy whenever a treaty or an accord breaks down. India needs to bring about a turn around in the overall dysfunctional relationship with Nepal and invest in long-term political linkages.

The first step towards this is to rethink the entire riparian approach with Nepal which has largely been based on hydro-generation. This has always created misunderstandings and done more harm than good. Moreover seismic factors make the terrain unsuitable for building large dams and large storages. India's focus should be on flood management and control; prevention of sediment, inundation and soil erosion; and irrigation benefits for both. The devastation caused by the Kosi in December 2007 that affected 50,000 families in Nepal and three million in Bihar activated the two countries to resume bilateral water-sharing talks in January 2008 after a hiatus of four years. This new engagement should be structured keeping in mind wider related water management issues and not be excessively driven by hydropower generation. While reconstructing a new and trustworthy relationship should be high on the agenda, India can simultaneously think on the following lines:

- India should address Nepal's concerns and ensure, by word and deed that its policies are meant to be mutually beneficial and not one-sided.
- India should invest in Nepal's water infrastructure power, irrigation and flood control. Identification and feasibility studies on small, medium and if required big dams should be undertaken.

108. Dipak Gyawali, "Basic of Nepali hydro diplomacy". See http://nepaliperspective.blogspot.com/2008/08/basics-of-neplai-hydro-diplomacy.html.

- Low risk, quick yield less-controversial projects such as small run-of-the-river projects should be started to build confidence in the beginning
- Building on the confidence of shared benefits, medium-size hydroelectric projects can be initiated. Financing for the project could be mobilised jointly by involving private sectors of both countries and the governments should facilitate and provide incentives to the developers
- Public awareness regarding power project development and power trading should form an important component of the joint development and management of rivers. This is necessary to dispel suspicion and negative notions regarding power trading
- The Kosi and Gandak treaties should be revisited and the positive elements should be repackaged. New hydrological knowledge and new methods of river water management should be wholeheartedly introduced in framing future India-Nepal water cooperation policies. It has to be remembered that both the Kosi and the Gandak were signed in the 1960s at a time when India was poor in dam technology and economically not robust enough to support big projects. With projects like Sapta Kosi and Pancheswar recommencing and plans afoot for the construction of the 240MW Naumure hydropower project, India should learn from the past to ensure future feasibility. ■

CHAPTER 6
INDIA-BHUTAN WATER DEVELOPMENT

Background

India's water relations are stress-free and unproblematic with Bhutan. The relationship is essentially one of hydro-electricity generation. India aids and assists the construction of hydro projects in Bhutan and then buys the power. The revenues thus accruing to Bhutan have helped the mountain kingdom to become the richest state in the region in per capita terms. Unlike the bad experience with Nepal on the Kosi and Gandak, in the case of Bhutan the success of one project has led to another, based on confidence, economic viability and shared benefits. The growing confidence has led to a recent agreement between the two countries to develop 10 hydropower projects with a total capacity of 11,576 MW by 2020 in Bhutan.[109] The India-Bhutan hydro-cooperation is a case in point to understand the enabling factors that make river water cooperation beneficial.

Hydro Power Development

There are four major rivers in Bhutan: the Torsa (Ammochu), Sankosh (Punatsangchu), Wangchu (Raidak) and the Manas.[110] Other smaller rivers like the Jaldhaka, Mao, Badnadi and the Dhansiri originate from the middle hills. The middle hills have no permanent snow but receive heavier rainfall during the monsoon.

The major rivers navigate the country in a north-south direction before finally joining the Brahmaputra and carry an estimated potential of 30,000 MW of hydro power. The Master Plan, developed with World Bank assistance, estimates that the four major rivers the Ammochu (Torsa), Wangchu (Raidak), Punatsangchu (Sankosh) and Manas alone have the potential to economically generate around 20,000 MW of hydroelectricity.[111] As per the available estimates only 468 MW of this potential has been harnessed.[112] The residential sector consumes about 48.7 percent of the total energy consumed in the country[113] and since the country's electricity generation is significantly higher than the maximum domestic demand of 130 Mw[114], Bhutan exports most of its electricity. It is precisely for this reason that hydro-power

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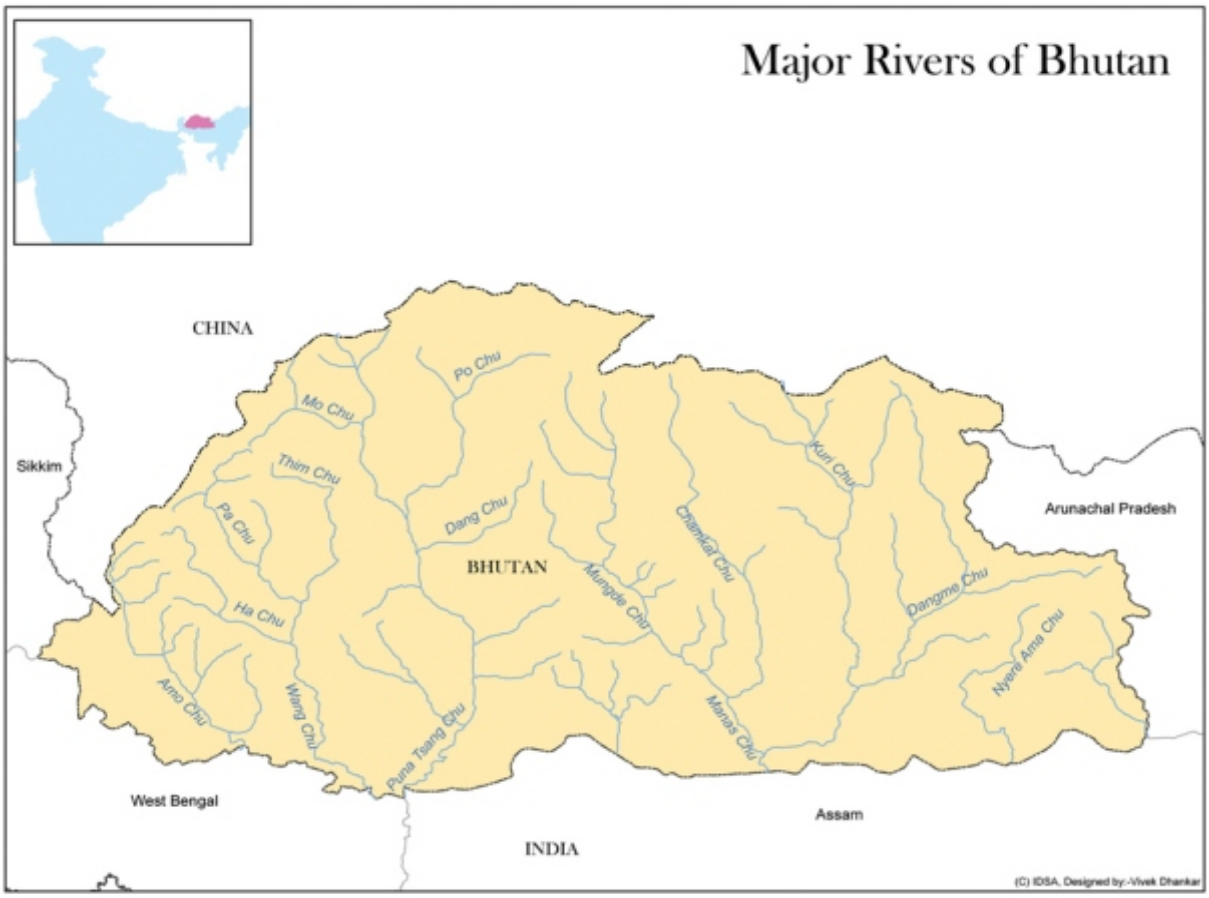
109. "Indo-Bhutan hydropower initiative increase installation capacity", *Economic Times,* March 26, 2009, at: http://economictimes.indiatimes.com/News/News-By-Industry/Indo-Bhutan-hydropower-initiative-increase-installation-capacity/articleshow/4320446.cms. This is above the 10,000 MW
110. Manas is formed from the Tongsa chu, Bumthang chu, Kuri chu and the main Manas tributary.
111. Nepali Times, 30 August - 5 September 2000, at: http://himalaya.socanth.cam.ac.uk/collections/journals/nepalitimes/pdf/Nepali_Times_007.pdf
112. Kalegama, "*SAARC Energy Cooperation: Energy Security and Environmental Challenges*", Institute for Policy Studies, Sri Lanka, at: http://www.isasnus.org/events/activities/20081128%20-%20Dr%20Saman%20Kelegama.pdf
113. Bhutan Electricity Authority, Ministry of Economic Affairs, at: http://www.bea.gov.bt/index.php?subaction=showfull&id=1190702278&archive=&start_from=&ucat=&
114. "Vibrant trade marks India, Bhutan ties", *Financial Express*, March 30, 2009, at: 2009http://www.financialexpress.com/news/vibrant-trade-marks-india-bhutan-ties/350823/0

projects are a win-win for both India and Bhutan. The Chukha Hydro-power Corporation Ltd contributes 336 MW to the installed capacity (71.69 percent); Kurichu hydro project 60 MW while the Tala has added another 1020 MW to the existing capacity.



The hydropower cooperation between Bhutan and India started with the signing of the Jaldhaka agreement in 1961. The Jaldhaka hydropower plant is located on the Indian side of the Indo-Bhutan border in the state of West Bengal. The 27 MW Jaldhaka hydropower project Stage-I was commissioned in 1967-72 and Stage-II with an installed capacity of 8 MW was commissioned in 1983. The major portion of power produced at Jaldhaka hydropower plant was exported to the southern part of Bhutan. However both countries started production of hydropower on a much larger scale with the Chukha Hydel Project, which also marked the starting point for a mutually beneficial relationship between the two countries. The project while on the one hand was expected to generate substantive revenues for economic development, on the other hand it was meant to fulfil the energy requirements of the two countries.[115] The Chukha was built under a 99-year agreement between India and Bhutan, whereby India provided a financial package that was 40 per cent loan and 60 per cent grant. Later a guaranteed power buy-back provision was also included in the

115. Agreement between The Government Of India And The Royal Government Of Bhutan Regarding The Chukha Hydro-Electric Project , 23 March 1974, New Delhi, at:http://www.bhutanpeoplesparty.org/lawtreaty/chukhahydro.htm

agreement. This arrangement has proved beneficial to both - a power deficit India and a Bhutan striving towards self-reliant development. The Chukha led to the doubling of Bhutan's national revenues between 1985/86 and 1987/88. In 1998/99 this project alone accounted for 35 percent of Bhutan's revenues Though Bhutan was initially paid Nu 0.50 per unit, India later increased the tariff to Nu 1.00 in April 1997 and further to Nu 1.50 in July 1999.[116] The revision of the tariff was a generous gesture, setting the pace for further cooperation.

The second hydel project was the 60-MW Kurichu Dam on the river Kurichu, set up in 1994. The project comprised the construction of a 55-metre high concrete dam and a surface powerhouse at the foot of the dam with four generating units having an installed capacity of 15 MW. Ninety per cent of the power generated by the dam is exported to India.[117] The project has been executed again on turnkey basis (60:40) at a total cost of Rs 555 crores. The project was envisaged to stimulate growth of industries and create job opportunities for the local people of eastern Bhutan.[118]

The third project is part of the Tala Agreement, signed in 1996. The Tala HE Project is located immediately downstream to the existing Chukha HE Project. The Project involved the construction of a 91-metre high dam on the river Wangchu to provide storage of 3.20 Mcum and to produce 1040 MW of power annually. All the units of the project have been commissioned during 2006-07. The project is being funded by India through grant (60 per cent) and loan (40 per cent) at 9 per cent interest per annum and the power surplus is being sold to India. As per the agreement between India and Bhutan the project shall be solely owned by Bhutan. Also a Protocol to the agreement was signed on July 28, 2006, which stipulates that the tariff for both primary and secondary energy shall be Rs.1.80 per unit. The sale of surplus power from Tala project to India within the scope of the 1996 agreement, protocol and subsequent PPA shall be valid for a period of thirty five years.[119]

The Chukha, the Kurichu and Tala projects together produce about 1,500 MW of hydropower. These power projects are also the main sources of national revenue for Bhutan.[120] Their successful completion and the benefits following from them give indications of further cooperation in future projects in Bhutan. [121]

Elements of Cooperation

River water cooperation between India and Bhutan is reciprocal in nature. Actions are contingent on rewarding reactions.[122] Reciprocity can either be

116. Nepali Times, 30 August - 5 September 2000, at: http://himalaya.socanth.cam.ac.uk /collections/journals/nepalitimes/pdf/Nepali_Times_007.pdf
117. The project was signed in September 1995 between Kurichu Project Authority and NHPC. See NHPC Ltd, at: http://www.nhpcindia.com/Projects/English/Scripts/Prj_Introduction.aspx?vid=55.
118. Cooperation with Neighbouring Countries, July 2008, at: http://www.cea.nic.in/hydro/ Cooperation%20with%20Neighbouring%20Countries.pdf
119. Cooperation with Neighbouring Countries, July 2008, at: http://www.cea.nic.in/hydro/Cooperation%20with %20Neighbouring%20Countries.pdf
120. Bhutan and India: History stays alive, Kuensel Online, 18 May, 2008, At:\http://www.kuenselonline.com/ modules.php?name=News&file=article&sid=10387Accessed 16 March 2008.
121. Some of the other projects envisaged between the two countries are: Punatsangchhu H.E. Project Stage-I (1095 MW), Punatsangchu H.E. Project-II (992/1000 MW), Mangdechu H.E. Project (360/600 MW), Manas Multipurpose Project (2800 MW), Wangchu Reservoir Scheme (4X225 MW), Bunakha H.E. Project (3X60 MW), Sankosh Multi-purpose project(4060 MW)
122. A. Gouldner, "The Norm of Reciprocity: A Preliminary Statement", *American Sociological Review*, 25 (2), 1960, pp.160-178

'specific' or 'diffused'. Specific reciprocity happens when two cooperating sides exchange items of equivalent value. In a diffused reciprocity equivalence is less precise and the sequence of events is more narrowly bounded.[123] A congenial political relationship between two countries is an essential element for shaping diffused reciprocity. The India-Bhutan relationship is one of diffused reciprocity.

A strong political relationship is the bedrock that determines any water cooperation. In the case of Nepal, India appeared to push Nepal into water cooperation without stabilising political relations and building trust. In the case of Bhutan, India gave Bhutan the space to think and make its decisions on hydroelectric cooperation rather than forcing the issue. Bhutan has not always been comfortable at being surrounded by two big Asian neighbours India and China. Though the 1949 Treaty on Peace and Friendship with India defined the relationship between two as "special", but being a small state with shared borders with China, Bhutan has been cautious about demonstrating an overt dependence on India. However the benefits reaped from the Chukha power project and the reassurances by India of not interfering in its domestic affairs have made cooperation on hydel projects a success story. The cooperation has been nurtured and sustained by generous financial support and concessions. Bhutan earns substantial profits due to the financing model being employed. Sixty per cent of the investment for any hydro project is provided as a grant, and the rest as loan. As a result the project's total cost is slashed by 60 per cent and therefore the cost of generation also goes down by roughly half. For instance Bhutanese consumers pay the cheapest rate in the world for electricity i.e. Nu 0.70 (Rs 1.12) per unit in urban areas and Nu 0.50 (Re .80) in rural areas. The reason for this is the low generation cost per kilowatt. Its preference for India as a partner for hydro projects is evident from a report, which states that Bhutan is considering allowing 100 per cent foreign direct investment by Indian companies in hydel power which is a departure from the maximum 70 per cent permitted in any sector.[124] The recent agreement between both the countries also merits attention as according to the agreement, India would be the sole buyer of the total output, leaving 12 per cent for Bhutan as its legal share.[125] The cooperative structures have been based on the following:

- **Concessionary rates:** Hydro-projects in Bhutan are financed under concessional terms by India. For instance the financial discount rate does not affect the annual revenue flow, as the borrowing rate for Bhutan is non-existent.[126]
- **Pay-off:** The pay-off structures and preferences are often influenced and determined by events which are beyond the control of the actors. The geo-strategic location of Bhutan, with its vast hydro-electric potential complements the growing demand for electricity in eastern India and this determines the pay-off structure between the two countries. Bhutan is surrounded by India in the east, south and west. Moreover, Bhutan neither has the financial resources to tap its

123. Robert Keohane, "Reciprocity in International Relations", *International Organisation*, 40(1), 1986, pp.1-27

124. "Bhutan may allow 100% Indian FDI in hydro power" *Business Standard*, January 19, 2008, at: http://www.business-standard.com/india/news/bhutan-may-allow-100-indian-fdi-in-hydro-power/311106/

125. "Indo-Bhutan hydropower initiative increase installation capacity", *Economic Times*, March 26, 2009, at: http://economictimes.indiatimes.com/News/News-By-Industry/Indo-Bhutan-hydropower-initiative-increase-installation-capacity/articleshow/4320446.cms

126. Dhakal and Jenkins, "International Trade in Energy", *Development Discussion Paper* 412, Harvard Institute for International Development, 1991.

vast hydro-power potential nor does it have huge domestic requirements. On the other hand, India has an ever expanding electricity market. The installed capacity of the power generating units in the eastern region of India connected to the eastern grid as on March 31, 2005 was 16020.68 MW, comprising 13331 MW of thermal power, 2494.68 MW of hydel power, 190 MW from gas turbines and 5 MW generated by diesel units. The Chukha and Kurichu hydro-projects, through the Power Trade Corporation, contribute about 360 MW and 55 MW respectively.[127]

- **Run-of-the-river projects:** Unlike large hydro-projects which are politically sensitive and often result in flooding, the energy produced from run-of-the-river projects is generated from the natural flows of mountain waters. Such river projects are less dependent on stored water for power and therefore last longer than a high dam project. Most of the rivers in Bhutan have run-of-the-river projects. These single purpose projects, for example the Tala, the Chukha and the Kurichu, suit both the countries as power generation is their only requirement.

- **Side-payments:** Connections and correlations between issues often make deals attractive. Apart from the actual advantages derived from hydro-projects, the two countries also enjoy various side-benefits. Electricity is the key product and this leads to industrial development which further contributes to improving socio-economic conditions. For Bhutan, hydropower development is key to achieving economic self reliance and poverty alleviation. Hydropower is therefore recognised as the backbone of the Bhutanese economy. For example, the Tala project doubled the country's GDP growth rate to 17 per cent in 2007.

What should India do?

India should continue to build upon the successes of hydro-cooperation with Bhutan. The commitment to achieve a target of 10,000 MW of hydroelectricity by 2020 is a step in the right direction. As explained earlier, the relations between India and Bhutan are structured in reciprocity. Given Bhutan's geo-strategic position, a deepening dependence keeps China at bay.

India, however, should also look at flood control and ecological preservation. A first step towards this has already been taken with the creation of a Joint Group of Experts (JGE) on Flood Management that will look at effects of recurring floods and erosion in the southern foothills of Bhutan. The first meeting of the JGE included several discussions as well as field visits to some of the affected areas, which included the sites prone to landslides, and the dolomite mining areas. Based on their findings the JGE felt that a more detailed technical examination was required and accordingly a North Bengal Flood Control Commission was constituted which held its first meeting in April 2006. Recently a "Comprehensive Scheme for Establishment of Hydro-Meteorological and Flood Forecasting Network" has been established on rivers common to India and Bhutan in order to prevent recurrence of floods in near future.[128] This network consists of 44 hydrometeorological/meteorological stations located in Bhutan and funded by India. The data

127. Annual Aministration Report, Regional Grid Performance, 2004-05, at: cea.nic.in/god/reb/ereb/Chapters %20in%20English/chapter-2.doc

128. "Bhutan hydro projects not responsible for Assam floods", *Times of India*, March 2, 2009 , At: http://timesofindia.indiatimes.com/Guwahati/Bhutan-hydro-projects-not-responsible-for-Assam-floods-/articleshow/4209437.cms

received from these stations is utilised in India by the Central Water Commission for formulating flood forecasts.[129]

The visit of Jigme Wangchhuck, the fifth King of Bhutan, in December 2009, his first visit to any foreign country since his formal coronation in November 2008, signifies the importance Bhutan accords to India. Bhutan is undoubtedly India's closest friend in the neighbourhood and India should leave no stone unturned to further this relation. Bhutan's 'Gross National Happiness' owes much to the benefits derived from the hydro electricity. Bhutan's total requirement does not exceed 400MW and its current installed capacity is 1500MW. The current surplus, which is significant, will become larger by 2020. This will help India meet its own growing energy requirements in the north east. The Punasangchhu-I project with an installed capacity of 1200 MW is already under construction. Agreements on two other projects, Punasangchhu-II (1200MW) and Mangdechhu (1200MW), are on the anvil. The mega-project Sankosh (4000MW) is also under discussion. It is expected that by 2011 the DPR for all these three projects would be cleared. In addition the DPR for four more hydroelectric projects is being worked out.

Sharing the benefits of river cooperation has given quality and substance to India-Bhutan ties. India, as the far bigger country with far greater challenges should build upon the hydrosolidarity and strengthen ties in areas like security and defence cooperation as well. As a central actor in the neighbourhood, India should enable Bhutan to export power to Bangladesh and possibly at some stage to Pakistan so as to avoid fears of a single buyer monopoly. The success story in Bhutan in a way offers a blueprint for fashioning a South Asian power grid.

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129. India-Bhutan Cooperation, at: http://india.gov.in/sectors/water_resources/international_corp.php

CHAPTER 7
RECOMMENDATIONS

Water has played a primary role in the rise of ancient civilisations. How water is shared will determine whether regions and their populations will struggle or thrive in the future. Any water outlook necessitates an interdisciplinary approach which creates a synergy between the natural sciences, politics and policy. As population around the world grow and the available water resources shrink, riparian relations will be critical. While this prompts fresh thinking on water security and water management it can, given the enormous requirement of water, create stresses and strains because of competing claims for volume and access.

The uneasy marriage of politics and external drivers that govern most shared waters cannot be overlooked. The challenge for decision-makers in the midst of palpable tensions and strife over transboundary waters (inter-state) and inter-provincial water transfers (intra-state) is to constantly find new mechanisms and approaches to reduce the tension resulting from water issues.

India requires a new and integrated framework to deal with water security issues. The existing national water policy is a stand-alone document which does not tie in with the country's food, energy, and health policies. Nor does it take into account the impact of climate change. Also the riparian relations have not been factored in. Thus, the national security discourse cannot be complete without discussing water security. Due to the growth of population, inadequate management of water resources and climatic factors, India will become water stressed by 2025 and water scarce by 2050.

The salience of water in India's relations with its neighbours will increase in the coming years. Whether water turns out to be a source of conflict or of cooperation will depend upon the policy choices made by India and its neighbours. If South Asia remains in turmoil, cooperation will become difficult. The challenge before India in the coming years will be two-dimensional: to manage its water resources better; and simultaneously to manage its riparian relations with its neighbours. Based on the analysis in this report, the following steps are recommended:

National Water Policy: It is vital to update and improve the National Water Policy 2002. The water policy should take into account the updated figures of demand and supply and incorporate modern water management methodologies and conservation technologies. It should also factor the international dimensions of water sharing. In particular, the policy should focus on water cooperation with India's neighbours. It is recommended that river waters should move up in India's foreign policy priorities. In so far as the neighbours are concerned, conflicting interests, particularly the distributive issues of river waters - getting more of what is in dispute - is clearly the more critical and immediate concern. Common interests like water management are less immediate and longer-term. Due attention should thus be given to multilateral efforts involving river-basin actors on water management issues. Water security requires to be viewed through the lens of "rationality", which entails, for the main part, prudent national water management and sensible co-riparian relations so as to secure freshwater supply in the long-term.

With Pakistan: The Indus Water Treaty has been generous towards Pakistan. The lower riparian has used it as a tool of pressure on India. The treaty has

also come in the way of development of Jammu & Kashmir. India should make a formal proposal to Pakistan for revision of the Treaty. In case Pakistan persists in supporting terrorism, India should unilaterally consider abrogation of the treaty. This is permissible in international law relating to . In the meanwhile India should take all steps to utilise the waters of the eastern rivers which are going to Pakistan even though India has a complete rights over them. The government should implement the suggestions made by a high powered committee in 2004 on the utilisation of the waters of the eastern rivers. India should resume and complete the construction of Tulbul Navigation Project. India should also take steps to complete the Kishanganga dam ignoring the Pakistani objections which have been raised only to delay the project. Likewise India should build projects on the western rivers to harness their power potential while keeping within the bounds of the treaty. Pakistani objections should be ignored.

With China: China controls the headwaters of the Brahmaputra and Sutlej rivers which flow into India as also the Indus that flows through Ladakh before it enters Baltistan in POK. China has plans to divert the waters of the Yarlung-Tasangpo. It has also made a barrage on the river Sutlej and a 6400MW Senge-Tsangpo dam on the Indus. Although India and China have had some rudimentary cooperation on water issues like the exchange of data, etc. this is insufficient. India should pursue a higher level of hydrological cooperation with China. At the same time it should be prepared for non-cooperation from the Chinese. It should discuss with Bangladesh the prospect of China diverting the water of the Brahmaputra. India should take the initiative to propose tapping the U-bend from Tibet to Assam as a major regional carbon saving project with international collaboration and the basis for a south Asian-China-ADB project.

With Bangladesh: The Ganges Treaty has been generous towards Bangladesh. Unfortunately, Bangladeshis continue to complain against the treaty and demand more water. The Bangladeshis are also concerned about the sharing of the Teesta waters, the construction of Tipaimukh dam and the Indian project for interlinking of the waters. India has to continue its dialogue with Bangladesh proposing joint river basins wherever possible. However, India has to be careful in negotiations over water with Bangladesh as it has to look after its own interest as well. In general, India's approach should be to deal with water issues in the overall political and security context. Bangladesh should be persuaded to show sensitivity to India's security concern as well. The approach of granting unilateral concessions to Bangladesh should be avoided.

With Nepal: India and Nepal have had a long history of wide-ranging cooperation on water issues but this has not been free of problems. There are a number of existing bilateral mechanisms which are devoted to different aspects of water cooperation. Nepal has generally complained about India not being sensitive to Nepal's concerns on sovereignty, technical and financial assistance and the unequal benefits from water sharing. India's efforts should be to address Nepal's concerns in as reasonable manner as possible and to provide it adequate financial and technical assistance. India will need to be patient with Nepal as the country is passing through a difficult transition period. The efficacy of the bilateral cooperation needs to be increased by improving the working of the existing bilateral mechanism including the Joint Committee on Water Resources.

With Bhutan: India's cooperation with Bhutan on water issues has been proceeding satisfactorily. This should be continued and improved continuously. India should pursue the idea of joint development of river basins with neighbouring countries. Environment and climate change should be given priority in bilateral cooperation. India should work towards a common regional water management policy for sustainable development. India should propose a basin-oriented approach involving Nepal, Bhutan, Bangladesh, China and India to improve water management. As a key

player in south Asia, India should think in terms of enabling Bhutan to export power to Bangladesh so as to allay the fears of a single buyer monopoly. The success story in Bhutan in a way offers a road map to fashion a south Asian power grid.

The government should take necessary steps to enhance public awareness about water issues. Neglect of water issues could lead to tension and conflict in the future not only within India but also with neighbours. In particular, there should be a greater discussion and understanding of the challenges faced by India and the salience of water in India's bilateral relations. The government needs to allocate adequate human and technical resources for water data collection and dissemination. India should raise public awareness about water resources of Tibet on which the survival of a vast number of people in South Asia and South East Asia depends. India should discuss the reported diversion of waters of Yarlung-Tsangpo/Brahamaputra with China and also with its lower riparian countries. ■

Appendices

APPENDIX I

THE INDUS WATER TREATY 1960

TREATY BETWEEN THE GOVERNMENT OF INDIA AND THE GOVERNMENT OF PAKISTAN CONCERNING THE MOST COMPLETE AND SATISFACTORY UTILISATION OF THE WATERS OF THE INDUS SYSTEM OF RIVERS

Karachi, 19 September 1960

PREAMBLE

The Government of India and the Government of Pakistan, being equally desirous of attaining the most complete and satisfactory utilisation of the waters of the Indus system of rivers and recognising the need, therefore, of fixing and delimiting, in a spirit of goodwill and friendship, the rights and obligations of each in relation to the other concerning the use of these waters and of making provision for the settlement, in a cooperative spirit, of all such questions as may hereafter arise in regard to the interpretation or application of the provisions agreed upon herein, have resolved to conclude a Treaty in furtherance of these objectives, and for this purpose have named as their plenipotentiaries :

THE GOVERNMENT OF INDIA:

Shri JAWAHARLAL NEHRU,
Prime Minister of India,
and

THE GOVERNMENT OF PAKISTAN

Field Marshal MOHAMMAD AYUB KHAN, HP., H.J.,
President of Pakistan;

who, having communicated to each other their respective Full Powers and having found them in good and due form, have agreed upon the following Articles and Annexures ;

Article I

Definitions

As used in this Treaty:

1. The terms "Article and "Annexure" mean respectively an Article of, and an Annexure to, this Treaty.

   Except as otherwise indicated, references to Paragraphs are to the paragraphs in the Article or in the Annexure in which the reference is made.

2. The term "Tributary" of a river means any surface channel whether in continuous or intermittent flow and by whatever name called, whose waters in the natural course would fall into that river, e.g. a tributary, a torrent, a natural drainage, an artificial drainage, a nadi, a nallah, a nai, a khad, a cho. The term also includes any sub-tributary or branch or subsidiary channel, by whatever name called, whose waters, in the natural course, would directly or otherwise flow into that surface channel.

3. The term "The Indus," "The Jhelum," "The Chenab," "The Ravi," "The Beas" or "The Sutlej" means the named river (including Connecting Lakes, if any) and all its Tributaries : Provided however that

   (i) none of the rivers named above shall be

deemed to be a Tributary;

(ii) The Chenab shall be deemed to include the river Panjnad; and

(iii) the river Chandra and the river Bhaga shall be deemed to be Tributaries of The Chenab.

4. The term "Main" added after Indus, Jhelum, Chenab, Sutlej, Beas or Ravi means the main stem of the named river excluding its Tributaries, but including all channels and creeks of the main stem of that river and such Connecting Lakes as form part of the main stem itself. The Jhelum Main shall be deemed to extend up to Verinag, and the Chenab Main up to the confluence of the river Chandra and the river Bhaga.

5. The term "Eastern Rivers" means The Sutlej, The Beas and The Ravi taken together.

6. The term 'Western Rivers" means The Indus, The Jhelum and The Chenab taken together.

7. The term "the Rivers" means all the rivers, The Sutlej, The Beas, The Ravi, The Indus, The Jelum and The Chenab.

8. The term "Connecting Lake" means any lake which receives water from, or yields water to, any of the Rivers; but any lake which occasionally and irregularly receives only the spill of any of the Rivers and returns only the whole or part of that spill is not a Connecting Lake.

9. The term "Agricultural Use" means the use of water for irrigation, except for irrigation of household gardens and public recreational gardens.

10. The terms "Domestic Use" means the use of water for

(a) drinking, washing, bathing, recreation, sanitation (including the conveyance and dilution of sewage and of industrial and other wastes), stock and poultry, and other like purposes;

(b) household and municipal purposes (including use for household gardens and public recreational gardens); and

(c) industrial purposes (including mining, milling and other like purposes);

but the term does not include Agricultural Use or use for the generation of hydro-electric power.

11. The term "Non-Consumptive Use" means any control or use of water for navigation, floating of timber or other property, flood protection or flood control, fishing or fish culture, wild life or other like beneficial purposes, provided that, exclusive of seepage and evaporation of water incidental to the control or use, the water (undiminished in volume within the practical range of measurement) remains in, or is returned to, the same river or its Tributaries; but the term does not include Agricultural Use or use for the generation of hydro-electric power.

12. The term "Transition Period" means the period beginning and ending as provided in Article 11(6).

13. The term' Bank" means the International Bank for Reconstruction and Development.

14. The term "Commissioner" means either of the Commissioners appointed under the provisions of Article VIII(1) and the term "Commission" means the Permanent Indus Commission constituted in accordance with Article VIII(3).

15. The term "interference with the waters" means:

(a) Any act of withdrawal therefrom; or

(b) Any man-made obstruction to their flow which causes a change in the volume (within the practical range of measurement) of the daily flow of the water : Provided however that an obstruction which involves only an

insignificant and incidental change in the volume of the daily now, for example, fluctuations due to afflux caused by bridge piers or a temporary by-pass, etc., shall not be deemed to be an interference with the waters.

16. The term "Effective Date" means the date on which this Treaty takes effect in accordance with the provisions of Article XII, that is, the first of April 1960.

Article II

Provisions Regarding Eastern Rivers

1. All the waters of the Eastern Rivers shall be available for the unrestricted use of India, except as otherwise expressly provided in this Article.

2. Except for Domestic Use and Non-Consumptive Use, Pakistan shall be under an obligation to let flow, and shall not permit any interference with, the waters of the Sutlej Main and the Ravi Main in the reaches where these rivers flow in Pakistan and have not yet finally crossed into Pakistan. The Points of final crossing are the following : (a) near the new Hasta Bund upstream of Suleimanke in the case of the Sutlej Main, and (b) about one and a half miles upstream of the syphon for the B-R-B-D Link in the case of the Ravi Main.

3. Except for Domestic Use, Non-Consumptive Use and Agricultural Use (as specified in Annexure B), Pakistan shall be under an obligation to let flow, and shall not permit any interference with, the waters (while flowing in Pakistan) of any Tributary which in its natural course joins the Sutlej Main or the Ravi Main before these rivers have finally crossed into Pakistan.

4. All the waters, while flowing in Pakistan, of any Tributary which, in its natural course, joins the Sutlej Main or the Ravi Main after these rivers have finally crossed into Pakistan shall be available for the unrestricted use of Pakistan : Provided however that this provision shall not be construed as giving Pakistan any claim or right to any releases by India in any such Tributary. If Pakistan should deliver any of the waters of any such Tributary, which on the Effective Date joins the Ravi Main after this river has finally crossed into Pakistan, into a reach of the Ravi Main upstream of this crossing, India shall not make use of these waters; each Party agrees to establish such discharge observation stations and make such observations as may be necessary for the determination of the component of water available for the use of Pakistan on account of the aforesaid deliveries by Pakistan, and Pakistan agrees to meet the cost of establishing the aforesaid discharge observation stations and making the aforesaid observations.

5. There shall be a Transition Period during which, to the extent specified in Annexure H, India shall

   (i) limit its withdrawals for Agricultural Use,

   (ii) limit abstractions for storages, and

   (iii) make deliveries to Pakistan from the Eastern Rivers.

6. The Transition Period shall begin on 1st April 1960 and it shall end on 31st March 1970, or, if extended under the provisions of Part 8 of Annexure H, on the date up to which it has been extended. In any event, whether or not the replacement referred to in Article IV(1) has been accomplished, the Transition Period shall end not later than 31st March 1973.

7. If the Transition Period is extended beyond 31st March 1970, the Provisions of Article V(5) shall apply.

8. If the Transition Period is extended beyond 31st March 1970, the provisions of Paragraph (5) shall apply during the period of extension beyond 31st March 1970.

9. During the Transition Period, Pakistan shall receive for unrestricted use the waters of the

Eastern Rivers which are to be released by India in accordance with the provisions of Annexure H. After the end of the Transition Period, Pakistan shall have no claim or right to releases by India of any of the waters of the Eastern Rivers. In case there are any releases, Pakistan shall enjoy the unrestricted use of the waters so released after they have finally crossed into Pakistan : Provided that in the event that Pakistan makes any use of these waters, Pakistan shall not acquire any right whatsoever, by prescription or otherwise, to a continuance of such releases or such use.

Article III

Provisions Regarding Western Rivers

1. Pakistan shall receive for unrestricted use all those waters of the Western Rivers which India is under obligation to let flow under the provisions of Paragraph (2).

2. India shall be under an obligation to let flow all the waters of the Western Rivers, and shall not permit any interference with these waters, except for the following uses, restricted (except as provided in item (c) (11) 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;

   (e) 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 Annexure D and E, India shall not store any water of, or construct any storage works on, the Western Rivers.

Article IV

Provisions Regarding Eastern Rivers and Western Rivers

1. Pakistan shall use its best endeavours to construct and bring into operation, with due regard to expedition and economy, that part of a system of works which will accomplish the replacement, from the Western Rivers and other sources, of water supplies for irrigation canals in Pakistan which, on 15th August 1947, were dependent on water supplies from the Eastern Rivers .

2. Each Party agrees that any Non-Consumptive Use made by it shall be so made as not to materially change, on account of such use, the flow in any channel to the prejudice of the uses on that channel by the other Party under the provisions of this Treaty. In executing any scheme of flood protection or flood control each Party will avoid, as far as practicable, any material damage to the other Party, and any such scheme carried out by India on the Wejern Rivers shall not involve any use of water or any storage in addition to that provided under Article III.

3. Nothing in this Treaty shall be construed as having the effect of preventing either Party from undertaking schemes of drainage, river training, conservation of soil against erosion and dredging, or from removal of stones, gravel or sand from the beds of the Rivers : Provided that

   (a) in executing any of the schemes mentioned above, each Party will avoid, as far as practicable, any material damage to the other Party;

(b) any such scheme carried out by India on the Western Rivers shall not involve any use of water or any storage in addition to that provided under Article III;

(c) except as provided in Paragraph (5) and Article VII(l)(b), India shall not take any action to increase the catchment area, beyond the area on the Effective Date, of any natural or artificial drainage or drain which crosses into Pakistan, and shall not undertake such construction or remodelling of any drainage or drain which so crosses or falls into a drainage or drain which so crosses as might cause material damage in Pakistan or entail the construction of a new drain or enlargement of an existing drainage or drain in Pakistan; and

(d) should Pakistan desire to increase the catchment area, beyond the area on the Effective Date, of any natural or artificial drainage or drain, which receives drainage waters from India, or, except in an emergency, to pour any waters into it in excess of the quantities received by it as on the Effective Date, Pakistan shall, before undertaking any work for these purposes, increase the capacity of that drainage or drain to the extent necessary so as not to impair its efficacy for dealing with drainage waters received from India as on the Effective Date.

4. Pakistan shall maintain in good order its portions of the drainages mentioned below with capacities not less than the capacities as on the Effective Date

(i) Hudiara Drain

(ii) Kasur Nala

(iii) Salimshah Drain

(iv) Fazilka Drain.

5. If India finds it necessary that any of the drainages mentioned in Paragraph (4) should be deepened or widened in Pakistan, Pakistan agrees to undertake to do so as a work of public interest, provided India agrees to pay the cost of the deepening or widening.

6. Each Party will use its best endeavours to maintain the natural channels of the Rivers, as on the Effective Date, in such condition as will avoid, as far as practicable, any obstruction to the flow in these channels likely to cause material damage to the other Party.

7. Neither Party will take any action which would have the effect of diverting the Ravi Main between Madhopur and Lahore, or the Sutlej Main between Harike and Suleimanke, from its natural channel between high banks.

8. The use of the natural channels of the Rivers for the discharge of flood or other excess waters shall be free and not subject to limitation by either Party, and neither Party shall have any claim against the other in respect of any damage caused by such use. Each Party agrees to communicate to the other Party, as far in advance as practicable, any information it may have in regard to such extraordinary discharges of water from reservoirs and flood flows as may affect the other Party.

9. Each Party declares its intention to operate its storage dams, barrages and irrigation canals in such manner, consistent with the normal operations of its hydraulic systems, as to avoid, as far as feasible, material damage to the other Party.

10. Each Party declares its intention to prevent, as far as practicable, undue pollution of the waters of the Rivers which might affect adversely uses similar in nature to those to which the waters were put on the Effective Date, and agrees to take all reasonable measures to ensure that, before any sewage or industrial waste is allowed to flow into the Rivers, it will be treated, where necessary, in such manner as not materially to affect those uses :

Provided that the criterion of reasonableness shall be the customary practice in similar situations on the Rivers.

11. The Parties agree to adopt, as far as feasible, appropriate measures for the recovery, and restoration to owners, of timber and other property floated or floating down the Rivers, subject to appropriate charges being paid by the owners.

12. The use of water for industrial purposes under Articles 11(2), 11(3) and HIM shall not exceed

    (a) in the case of an industrial process known on the Effective Date, such quantum of use as was customary in that process on the Effective Date;

    (b) in the case of an industrial process not known on the Effective Date :

        (i) such quantum of use as was customary on the Effective Date in similar or in any way comparable industrial processes; or

        (ii) if there was no industrial process on the Effective Date similar or in any way comparable to the new process, such quantum of use as would not have a substantially adverse effect on the other Party.

13. Such part of any water withdrawn for Domestic Use under the provisions of Articles 11(3) and 111(2) as is subsequently applied to Agricultural Use shall be accounted for as part of the Agricultural Use specified in Annexure B and Annexure C respectively; each Party will use its best endeavours to return to the same river (directly or through one of its Tributaries) all water withdrawn therefrom for industrial purposes and not consumed either in the industrial processes for which it was withdrawn or in some other Domestic Use.

14. In the event that either Party should develop a use of the waters of the Rivers which is not in accordance with the provisions of this Treaty, that Party shall not acquire by reason of such use any right, by prescription or otherwise, to a continuance of such use.

15. Except as otherwise required by the express provisions of this Treaty, nothing in this Treaty shall be construed as affecting existing territorial rights over the waters of any of the Rivers or the bod& ar,banks thereofi or as affecting existing property rights under municipal law over such waters or beds or banks.

Article V

Financial Provisions

1. In consideration of the fact that the purpose of part of the system of works referred to in Article IV(1) is the replacement, from the Western Rivers and other sources, of water supplies for irrigation canals in Pakistan which, on 15th August 1947, were dependent on water supplies from the Eastern Rivers, India agrees to make a fixed contribution of Pounds Sterling 62,060,000 towards the costs of these works. The amount in Pounds Sterling of this contribution shall remain unchanged irrespective of any alteration in the par value of any currency.

2. The sum of Pounds Sterling 62,060,000 specified in Paragraph (1) shall be paid in ten equal annual instalments on the Ist of November of each year. The first of such annual instalments shall be paid on lst November 1960, or if the Treaty has not entered into force by that date, then within one month after the Treaty enters into force.

3. Each of the instalments specified in Paragraph (2) shall be paid to the Bank for the credit of the Indus Basin Development Fund to be established and administered by the Bank, and payment shall be made in Pounds Sterling, or in such other currency or currencies as may from time to time be agreed between Indiaand the Bank.

4. The payments provided for under the provisions of Paragraph (3) shall be made without deduction or set-off on account of any financial claims of India on Pakistan arising otherwise than under the provisions of this Treaty : Provided that this provision shall in no way absolve Pakistan from the necessity of paying in other ways debts to India which may be outstanding against Pakistan.

5. If, at the request of Pakistan, the Transition Period is extended in accordance with the provisions of Article 11(6) and of Part 8 of Annexure H, the Bank shall thereupon pay to India out of the Indus Basin Development Fund the appropriate amount specified in the Table below :

Table

Period of Extension of Transition Period	Aggregate Payment to India	
One year	stg.	3,125,000
Two years.	stg	6,406,250
Three years	stg	9,850,000

6. The provisions of Article IV(1) and Article V(1) shall not be construed as conferring upon India any right to participate in the decisions as to the system of works which Pakistan constructs pursuant to Article IV(1) or as constituting an assumption of any responsibility by India or as an agreement by india in regard to such works.

7. Except for such payments as are specifically provided for in this Treaty, neither Party shall be entitled to claim any payment for observance of the provisions of this Treaty or'to make any charge for water received from it by the other Party.

Article VI

Exchange of Data

1. The following data with respect to the flow in, and utilisation of the waters of, the Rivers shall be exchanged regularly between the Parties :

   (a) Daily (or as observed or estimated less frequently) gauge and discharge data relating to flow of the Rivers at all observation sites.

   (b) Daily extractions for or releases from reservoirs.

   (c) Daily withdrawals at the heads of all canals operated by government or by a government agency (hereinafter in this Article called canals), including link canals.

   (d) Daily escapages from all canals, including link canals.

   (e) Daily deliveries from link canals.

These data shall be transmitted ' monthly by each Party to the other as soon as the data for a calendar month have been collected and tabulated, but not later than three months after the end of the month to which they relate : Provided that such of the data specified above as are considered by either Party to be necessary for operational purposes shall be supplied daily or at less frequent intervals, as may be requested. Should one Party request the supply of any of these-data by telegram, telephone, or wireless, it shall reimburse the other Party for the cost of transmission.

2. If, in addition to the data specified in Paragraph (1) of this Article, either Party requests the supply of any data relating to the hydrology of the Rivers, or to canal or reservoir operation connected with the Rivers, or to anv provision of this Treaty, such data shall be supplied by the other Party to the extent that these are available.

Article VII

Future Co-operation

1. The two Parties recognize that they have a common interest in the optimum development of the Rivers, and, to that end, they declare their intention to co-operate, by mutual agreement, to the fullest possible extent. In particular:

   (a) Each Party, to the extent it considers practicable and on agreement by the other Party to pay the costs to be incurred, will, at the request of the other Party, set up or install such hydrologic observation stations within the drainage basins of the Rivers, and set up or install such meteorological observation stations relating thereto and carry out such observations thereat, as may be requested, and will supply the data so obtained.

   (b) Each Party, to the extent it considers practicable and on agreement by the other Party to pay the costs to be incurred, will, at the request of the other Party, carry out such new drainage works as may be required in connection with new drainage works of the other Party.

   (c) At the request of either Party, the two Parties may, by mutual agreement, co-operate in undertaking engineering works on the Rivers.

The formal arrangements, in each case, shall be as agreed upon between the Parties.

2. If either Party plans to construct any engineering work which would cause interference with the waters of any of the Rivers and which, in its opinion, would affect the other Party materially, it shall notify the other Party of its plans and shall supply such data relating to the work as may be available and as would enable the other Party to inform itself of the nature, magnitude and effect of the work. If a work would cause interference with the waters of any of the Rivers but would not, in the opinion of the Party planning it, affect the other Party materially, nevertheless the Party planning the work shall, on request, supply the other Party with such data regarding the nature, magnitude and effect, if any, of the work as may be available.

Article VIII

Permanent Indus Commission

1. India and Pakistan shall each create a permanent post of Commissioner for Indus Waters, and shall appoint to this post, as often as a vacancy occurs, a person who should ordinarily be a high-ranking engineer competent in the field of hydrology and water-use. Unless either Government should decide to take up any particular question directly with the other Government, each Commissioner will be the representative of his Government for all. matters arising out of this Treaty, and will serve as the regular channel of communication on all matters relating to the implementation of the Treaty, and, in particular, with respect to

   (a) the furnishing or exchange of information or data provided for in the Treaty; and

   (b) the giving of any notice or response to any notice provided for in the Treaty.

2. The status of each Commissioner and his duties and responsibilities towards his Government will be determined by that Government.

3. The two Commissioners shall together form the Permanent Indus Commission.

4. The purpose and functions of the Commission shall be to establish and maintain co-operative arrangements for the, implementation of this Treaty, to promote co-operation between the Parties in the development of the waters of the Rivers and, in particular,

(a) to study and report to the two Governments on any problem relating to the development of the waters of the Rivers which may be jointly referred to the Commission by the two Governments : in the event that a reference is made by one Government alone, the Commissioner of the other Government shall obtain the authorization of his Government before he proceeds to act on the reference;

(b) to make every effort to settle promptly, in accordance with the provisions of Article IX(1), any question arising there under;

(c) to undertake, once in every five years, a general tour of inspection of the Rivers for ascertaining the facts connected with various developments and works on the Rivers,

(d) to undertake promptly, at the request of either Commissioner, a tour of inspection of such works or sites on the Rivers as may be considered necessary by him for ascertaining the facts connected with those works or sites; and

(e) to take, during the Transition Period, such steps as may be necessary for the implementation of the provisions of Annexure H.

5. The Commission shall meet regularly at least once a year, alternately in India and Pakistan. This regular annual meeting shall be held in November or in such other month as may be agreed upon between the Commissioners. The Commission shall also meet when requested by either Commissioner.

6. To enable the Commissioners to perform their functions in the Commission, each Government agrees to accord to the Commissioner of the other Government the same privileges and immunities as are accorded to representatives of member States to the principal and subsidiary organs of the United Nations under Sections 11, 12 and 13 of Article IV of the Convention on the Privileges and Immunities of the United Nations (dated 13th February, 1946) during the periods specified in those Sections. It is understood and agreed that these privileges and immunities are accorded to the Commissioners not for the personal benefit of the individuals themselves but in order to safeguard the independent exercise of their functions in connection with the Commission; consequently, the Government appointing the Commissioner not only has the right but is under a duty to waive the immunity of its Commissioner in any case where, in the opinion of the appointing Government, the immunity would impede the course of justice and can be waived without prejudice to the purpose for which the immunity is accorded.

7. For the purposes of the inspections specified in Paragraph (4) (c) and (d), each Commissioner may be accompanied by two advisers or assistants to whom appropriate facilities will be accorded.

8. The Commission shall submit to the Government of India and to the Government of Pakistan, before the first of June of every year, a report on its work for the year ended on the preceding 31st of March, and may submit to the two Governments other reports at such times as it may think desirable.

9. Each Government shall bear the expenses of its Commissioner and his ordinary staff. The cost of any special staff required in connection with the work mentioned in Article VII(1) shall be borne as provided therein.

10. The Commission shall determine its own procedures.

Article IX

Settlement of Differences and Disputes

1. Any question which arises between the Parties concerning the interpretation or application of this Treaty or the existence of any fact which,

if established, might constitute a breach of this Treaty shall first be examined by the Commission, which will endeavour to resolve the question by agreement.

2. If the Commission does not reach agreement on any of the questions mentioned in Paragraph (1), then a difference will be deemed to have arisen, which shall be dealt with as follows :

(a) Any difference which, in the opinion of either Commissioner, falls within the provisions of Part I of Annexure F shall, at the request of either Commissioner, be dealt with by a Neutral Expert in accordance with the provisions of Part 2 of Annexure F;

(b) If the difference does not come within the provisions of Paragraph (2) (a), or if a Neutral Expert, in accordance with the provisions of Paragraph 7 of Annexure F, has informed the Commission that, in his opinion, the difference, or a part thereof, should be treated as a dispute, then a dispute will be deemed to have arisen which shall be settled in accordance with the provisions of Paragraphs (3), (4) and (5) :

Provided that, at the discretion of the Commission, any difference may either be dealt with by a Neutral Expert in accordance with the provisions of Part 2 of Annexure F or be deemed to be a dispute to be settled in accordance with the provisions of Paragraphs (3), (4) and (5), or may be settled in any other way agreed upon by the Commission.

3. As soon as a dispute to be settled in accordance with this and the succeeding paragraphs of this Article has arisen, the Commission shall, at the request of either Commissioner, report the fact to the two Governments, as early as practicable, stating in its report the points on which the Commission is in agreement and the issues in dispute, the views of each Commissioner on these issues and his reasons therefore.

4. Either Government may, following receipt of the report referred to in Paragraph (3), or if it comes to the conclusion that the report is being unduly delayed in the Com mission, invite the other Government to resolve the dispute by agreement. In doing so it shall state the names of its negotiators and their readiness to meet with the negotiators to be appointed by the other Government at a time and place to be indicated by the other Government. To assist in these negotiations, the two Governments may agree to enlist the services of one or more mediators acceptable to them.

5. A Court of Arbitration shall be established to resolve the dispute in the manner provided by Annexure G

   (a) upon agreement between the Parties to do so; or

   (b) at the request of either Party, if, after negotiations have begun pursuant to Paragraph (4), in ' its opinion the dispute is not,likely to be resolved by negotiation or mediation; or

   (c) at the request of either Party, if, after the expiry of one month following receipt by the other Government of the invitation referred to in Paragraph (4), that Party comes to the conclusion that the other Government is unduly delaying the negotiations.

6. The provisions of Paragraphs (3), (4) and (5) shall not apply to any difference while it is being dealt with by a Neutral Expert.

Article X

Emergency Provision

If, at any time prior to 31st March 1965, Pakistan should represent to the Bank that, because of the outbreak of large-scale international hostilities arising out of causes beyond the control of Pakistan, it is unable to obtain from abroad the materials and equipment necessary for the completion, by 31st March 1973, of that part of

the system of works referred to in Article IVU) which relates to the replacement referred to therein, (hereinafter referred to as the "replacement element") and if, after consideration of this representation in consultation with India, the Bank is of the opinion that

(a) these hostilities are on a scale of which the consequence is that Pakistan is unable to obtain in time such materials and equipment as must be procured from abroad for the completion, by 31st March 1973, of the replacement element, and

(b) since the Effective Date, Pakistan has taken all reasonable steps to obtain the said materials and equipment and, with such resources of materials and equipment as have been available to Pakistan both from within Pakistan and from abroad, has carried forward the construction of the replacement element with due diligence and all reasonable expedition,

the Bank shall immediately notify each of the Parties accordingly. The Parties undertake, without prejudice to the provisions of Article XII (3) and (4), that, on being so notified, they will forthwith consult together and enlist the good offices of the'Bank in their consultation, with a view to reaching mutual agreement as to whether or not, in the light of all the circumstances then prevailing, any modifications of the provisions of this Treaty are appropriate and advisable and, if so, the nature and the extent of the modifications.

Article XI

General Provisions

1. It is expressly understood that

(a) this Treaty governs the rights and obligations of each Party in relation to the other with respect only to the use of the waters of the Rivers and matters incidental thereto; and

(b) nothing contained in this Treaty, and nothing arising out of the execution thereof, shall be construed as constituting a recognition or waiver (whether tacit, by implication or otherwise) of any rights or claims whatsoever of either of the Parties other than those rights or claims which are expressly recognized or waived in this Treaty.

Each of the Parties agrees that it will not invoke this Treaty, anything contained therein, or anything arising out of the execution thereof, in support of any of its own rights or claims whatsoever or in disputing any of the rights or claims whatsoever of the other Party, other than those rights or claims which are expressly recognized or waived in this Treaty.

2. Nothing in this Treaty shall be construed by the Parties as in any way establishing any general principle of law or any precedent.

3. The rights and obligations of each Party under this Treaty shall remain unaffected by any provisions contained in, or by anything arising out of the execution of, any agreement establishing the Indus Basin Development Fund.

Article XII

Final Provisions

1. This Treaty consists of the Preamble, the Articles hereof and Annexures A to H hereto, and may be cited as "The Indus Waters Treaty 1960".

2. This Treaty shall be ratified and the ratifications thereof shall be exchanged in New Delhi. It shall enter into force upon the exchange,of ratifications, and will then take effect retrospectively from the first of April 1960.

3. The provisions of this Treaty may from time to time be modified by a duly ratified treaty concluded for that purpose between the two Governments.

4. The provisions of this Treaty, or,the

provisions of this Treaty as modified under the provisions of Paragraph (3), shall continue in force until terminated by a duly ratified treaty concluded for that purpose between the two Governments.

IN WITNESS WHEREOF the respective Plenipotentiaries have signed this Treaty and have hereunto affixed their seals.

DONE in triplicate in English at Karachi on this Nineteenth day of September 1960.

For the Government of India:

(Sd) JAWAHARLAL NEHRU

For the Government of Pakistan

(Sd) MOHAMMAD AYUB KHAN

Field Marshal, H.P., H.J.

For the International Bank for Reconstruction and Development

for the purposes specified in Articles V and X and Annexures F, G and H:

(Sd) W.A.B. ILIFF ■

APPENDIX II

THE INDO-BANGLADESH WATER TREATY 1996

TREATY BETWEEN THE GOVERNMENTS OF THE PEOPLE'S REPUBLIC OF BANGLADESH AND THE GOVERNMENT OF THE REPUBLIC OF INDIA ON SHARING OF THE GANGA / GANGES VATECS AT FARAKKA.

THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH AND THE GOVERNMENT OF THE REPUBLIC OF INDIA.

DETERNNED to promote and strengthen their relations of friendship and good neighbourliness.

INSPIRED by the common desire of promoting the well being of their peoples.

BEING desirous of sharing by mutual agreement the waters of the international rivers flowing through the territories or the two countries and of making the optimum utilisation of the water resources of their region in the fields of flood management irrigation, river basin development, and generation of hydro-power for the mutual interests of the peoples of the two countries.

BEING desirous of finding a fair and just solution without affecting the rights and entitlement of either country other than those covered by this Treaty, or establishing any general principles of law or precedent.

HAVE AGREED AS FOLLOWS:

Article I

The quantum of waters agreed to be released by India to Bangladesh will be at Farakka.

Article II

(i) The sharing between India and Bangladesh or the Ganga / Ganges waters at Farraka by ten day periods from the 1st January to the 31st May every year will be with reference to the formula at Annexure I and an indicative schedule giving the implications of the sharing arrangement under Annexure I is at Annexure II.

(ii) The indicative schedule at Annexure II as refereed to in sub Para (i) above is based on 40 years (1949-1988) 10-day period average availability of water at Farakka. Every effort would be made by the upper riparian to protect flows of water at Farakka as in the 10 years average availability as mentioned above.

(iii) In the event flow at Farakka falls below 50,000 cusecs in any 10-day period, the two governments will enter into immediate consultations to make adjustments on an emergency basis, in accordance with the principles of equity, fair play and no harm to either party

Article III

The waters released to Bangladesh at Farakka under Article I shall not be reduced below Farakka except for reasonable uses of waters, not exceeding 200 cusecs, by India between Farakka and the point on the Ganga/Ganges where both its banks are in Bangladesh.

Article IV

A committee consisting of representatives nominated by the two Governments in equal numbers (hereinafter called the joint Committee)

shall be constituted following the signing of this treaty. The joint committee shall set up suitable teams at Farakka and Hardinge Bridge to observe and record at Farakka the daily flows below Farakka Barrage, in the Feeder Canal, and at the Navigation Lock, as well as at the Hardinge Bridge.

Article V

The joint Committee shall decide its own procedure and method of functioning.

Article VI

The joint Committee shall submit to the two Governments all data collected by it and shall submit a yearly report to both the Governments. Following submission of the reports the two Governments will meet at appropriate levels to decide upon such further actions as may be needed.

Article VII

The joint Committee shall be responsible for implementing the arrangements contained in this Treaty and examining any difficulty arising out of the implementation of the above arrangements and of the operation of Farakka Barrage.

Any difference or dispute arising in this regard, if not resolved by the joint Committee, shall be referred to the Indo-Bangladesh Joint Rivers Commission. If the difference or dispute remains unresolved, it shall be referred to the two Governments, which shall meet urgently at the appropriate level to resolve it by mutual discussion.

Article VIII

The two Governments recognize the need to cooperate with each other in finding a solution to the long-term problem of augmenting the flows of the Ganga/Ganges during the dry season.

Article IX

Guided by the principles of equity, fairness and no harm to either party, both the Governments agree to conclude water sharing Treaties / Agreements with regard to other common rivers.

Article X

The sharing arrangement under this Treaty shall be reviewed by the two Governments at five years interval or earlier, as required by either party and needed adjustments, based on principles of equally, fairness, and no harm to either party made thereto, if necessary .It would be open to either party seek the first review after two years to assess the impact and working of the sharing arrangement as contained in this Treaty.

Article XI

For the period of this Treaty, in the absence of mutual agreement on adjustments following reviews as mentioned in Article X, India shall release downstream of Farakka Barrage, water at a rate not less than 90 percent (ninety percent) of Bangladesh's share according to the formula referred to in Article II, until such time mutually agreed flows are decided upon.

Article XII

This Treaty shall enter into force upon signature and shall remain in force for a period of thirty years and it shall be renewable on the basis of mutual consent.

IN WITNESS WHEREOF the undersigned being duly authorised their to by the respective Governments, have signed this Treaty.

DONE at New Delhi 12th December, 1996 in Hindi, Bangla and English languages. In the event of any conflict between the texts, the English text shall prevail.

(SHEIKH HASINA)
PRIME MINISTER,
PEOPLE'S REPUBILIC OF BANGLADESH.

(H.D. DEVE GOWDA)
PRIME MINISTER,
REPUBLIC OF INDIA ■

APPENDIX III

INDO-NEPAL WATER TREATIES

Mahakali Treaty

Treaty Between His Majesty's Government of Nepal
And
The Government of India Concerning The Integrated Development of the Mahakali Barrage Including Sarada Barrage, Tanakpur Barrage and Pancheshwar Project

His Majesty's Government of Nepal and the Government of India (hereinafter referred to as the" Parties")

Reaffirming the determination to promote and strengthen their relations of friendship and close neighborliness for the co-operation in development of water resources;

Recognizing that the Mahakali River is a boundary river on major stretches between the two countries;

Realizing the desirability to enter into a treaty on the basis of equal partnership to define their obligations and corresponding rights and duties thereto in regard to the waters of the Mahakali River and its utilization;

Noting the Exchange of Letters of 1920 through which both the Parties had entered into an arrangement for the construction of the Sarada Barrage in the Mahakali River, whereby Nepal is to receive some waters from the said Barrage;

Recalling the decision taken in the Joint Commission dated 4 -5 December, 1991 and the Joint Communique issued during the visit of the Prime Minister of India to Nepal on 21st October, 1992 regarding the Tanakpur Barrage which India has constructed in a course of the Mahakali River with a part of the eastern afflux bund at Jimuwa and the adjoining pondage area of the said Barrage lying in the Nepalese territory;

Noting that the Parties are jointly preparing a Detailed Project Report of the Pancheshwar Multipurpose Project to be implemented in the Mahakali River;

Now, therefore, the Parties hereto hereby have agreed as follows:

Article I

1. Nepal shall have the right to a supply of 28.35m^3/s (1000 cusecs) of water from the Sarada Barrage in the wet season (i.e. from 15th May to 15th October) and 4.25m^3/s (150 cusecs) in the dry season (i.e. from 16th October to 14th May).

2. India shall maintain a flow of not less than 10 m^3/s (350 cusecs) downstream of the Sarada Barrage in the Mahakali River to maintain and preserve the river eco-system.

3. In case the Sarada Barrage becomes non-functional due to any cause:

   a) Nepal shall have the right to a supply of water as mentioned in Paragraph 1 of this Article, by using the head regulator(s) mentioned in Paragraph 2 of Article 2 herein. Such a supply of water shall be in addition to the water to be supplied to Nepal pursuant to Paragraph 2 of Article 2.

   b) India shall maintain the river flow pursuant

to Paragraph 2 of this Article from the tailrace of the Tanakpur Power Station downstream of the Sarada Barrage.

Article II

In continuation of the decisions taken in the Joint Commission dated 4 -5 December 1991 and the joint Communique issued during the visit of the Prime Minister of India to Nepal on 21st October 1992, both the Parties agree as follows:

1. For the construction of the eastern afflux bund of the Tanakpur Barrage, at Jimuwa and tying it up to the high ground in the Nepalese territory at EL 250 M, Nepal gives its consent to use a piece of land of about 577 meters in length (an area of about 2.9 hectares) of the Nepalese territory at the Jimuwa Village in Mahendranagar Municipal area and a certain portion of the No-Man's land on either side of the border. The Nepalese land consented to be so used and the land lying on the west of the said land (about 9 hectares) up to the Nepal-India border which forms a part of the pondage area, including the natural resources endowment I in within that area, remains under the continued sovereignty and control of Nepal and Nepal is free to exercise all attendant rights thereto.

2. In lieu of the eastern afflux bund of the Tanakpur Barrage, at Jimuwa this constructed, Nepal shall have the right to:

   a) a supply of 28.35 mhall have the right to a supply of 28.35m^3/s (1000 cusecs) of water in the wet season (i.e. from 15th May to 15th October) and 8.50 m^3/s (300 cusecs) in the dry season (i.e. from 16th October to 14th May) from the date of the entry into force of this Treaty. For this purpose and for the purposes of Article I herein, India shall construct the head regulator(s) near the left under sluice of the Tanakpur Barrage and also the waterways of the required capacity up to the Nepal-India border. Such head regulator(s) and waterways shall be operated jointly.

   b) a supply of 70 millions kilowatt-hour (unit) of energy on a continuous basis annually, free of cost, from the date of the entry into force of this Treaty. For this purpose, India shall construct a 132 kV transmission line up to the Nepal-India border from the Tanakpur Power Station (which has, at present, an installed capacity of 120,000 kilowatt generating 448.4 millions kilowatt-hour of energy annually on 90 percent dependable year flow).

3. Following arrangements shall be made at the Tanakpur Barrage at the time of development of any storage project(s) including Pancheshwar Multipurpose Project upstream of the Tanakpur Barrage:

   a) Additional head regulator and the necessary waterways, as required, up to the Nepal-India border shall be constructed to supply additional water to Nepal. Such head regulator and waterways shall be operated jointly.

   b) Nepal shall have additional energy equal to half of the incremental energy generated from the Tanakpur Power Station, on a continuous basis from the date of augmentation of the flow of the Mahakali River and shall bear half of the additional operation cost and, if required, half of the additional capital cost at the Tanakpur Power Station for the generation of such incremental energy.

Article III

Pancheshwar Multipurpose Project (hereinafter referred to as the "Project") is to be constructed on a stretch of the Mahakali River where it forms the boundary between the two countries and hence both the Parties agree that they have equal entitlement in the utilization of the waters of the Mahakali River without prejudice to their

respective existing consumptive uses of the waters of the Mahakali River. Therefore, both the parties agree to implement the Project in the Mahakali River in accordance with the Detailed Project Report (DPR) being jointly prepared by them. The Project shall be designed and implemented on the basis of the following principles:

1. The project shall, as would agreed between the Parties, be designed to produce the maximum total net benefit. All benefits accruing to both the Parties with the development of the Project in the forms of power, irrigation, flood, control etc., shall be assessed.

2. The project shall be implemented or caused to be implemented as on integrated project including power station of equal capacity on each side of the Mahakali River. The two power stations shall be operated in an integrated manner and the total energy generated shall be shared equally between the Parties.

3. The cost of the project shall be borne by the parties in proportion to the benefits accruing to them. Both the Parties shall jointly endeavour to mobilize the finance required for the implementation of the project.

4. A portion of Nepal's share of energy shall be sold to India. The quantum of such energy and its price shall be mutually agreed upon between the parties.

Article IV

India shall supply 10 m3/s (350 cusecs) of water for the irrigation of Dodhara -Chandani area of Nepalese Territory. The technical and other details will be mutually worked out.

Article V

1. Water requirements of Nepal shall be given prime consideration in the utilization of the waters of the Mahakali River.

2. Both the Parties shall be entitled to draw their share of waters of the Mahakali River from the Tanakpur Barrage and/or other mutually agreed points as provided for in this Treaty and any subsequent agreement between the Parties.

Article VI

Any project, other than those mentioned herein, to be developed in the Mahakali River, where it is a boundary river, shall be designed and implemented by an agreement between the Parties on the principles established by this Treaty.

Article VII

In order to maintain the flow and level of the waters of the Mahakali River, each Party undertakes not to use or obstruct or divert the waters of the Mahakali River adversely affecting its natural flow and level except by an agreement between the Parties. Provided, however, this shall not preclude the use of the waters of the Mahakali River by the local communities living along both sides of the Mahakali River, not exceeding five (5) percent of the average annual flow at Pancheshwar.

Article VIII

This Treaty shall not preclude planning, survey, development and operation of any work on the tributaries of the Mahakali River, to be carried out independently by each Party in its own territory without adversely affecting the provision of Article 7 of this Treaty.

Article IX

I. There shall be a Mahakali River Cernmission (hereinafter referred to as the "Commission"). The Commission shall be guided by the principles of equality, mutual benefit and no harm to either Party.

2. The Commission shall be composed of equal number of representatives from both the Parties.

3. The functions of the Commission shall, inter-alia, include the following:

a) To seek information on and, if necessary, inspect all structures included in the Treaty and make recommendations to both the Parties to take steps which shall be necessary to implement the provision of this Treaty,

b) To make recommendations to both the Parties for the conservation and utilization of the Mahakali River as envisaged and provided for in this Treaty,

c) To provide expert evaluation of projects and recommendation thereto,

d) To co-ordinate and monitor plans of actions arising out of the implementation of this Treaty, and

e) To examine any differences arising between the Parties concerning the interpretation and application of this Treaty.

4. The expenses of the Commission shall be borne equally by both the Parties.

5. As soon as the Commission has been constituted pursuant to Paragraphs 1 and 2 of this Article, it shall draft its rules of procedure, which shall be submitted to both the Parties for their concurrence.

6. Both the Parties shall reserve their rights to deal directly with each other on matters, which may be in the competence of the Commission.7.

Article X

Both the Parties may form project specific joint entities for the development, execution and operation of new projects including Pancheshwar Multipurpose project in the Mahakali River for their mutual benefit.

Article XI

1. If the Commission fails under Article 9 of this Treaty to recommend its opinion after examining the differences of the Parties within three (3) month of such reference to the Commission or either Party disagrees with the recommendation of the Commission then a dispute shall be deemed to have been arisen which shall then be submitted to arbitration for decision. in so doing either Party shall give three (3) month prior notice to the other Party.

2. Arbitration shall be conducted by a tribunal composed of three arbitrators. One arbitrator shall be nominated by Nepal, one by India, with neither country to nominate its own national and the third arbitrators shall be appointed jointly, who, as a member of the tribunal, shall preside over such tribunal. In the event that the Parties are unable to agree upon the third arbitrator within ninety (90) days after receipt of a proposal, either Party request the Secretary-General of the Permanent Court of Arbitration at the Hague to appoint such arbitrator who shall not be a national of either country.

3. The procedures of the arbitration shall be determined by the arbitration tribunal and the decision of a majority of the arbitrators shall be the decision of the tribunal. The proceeding the tribunal shall be conducted in English and the decision of such a tribunal shall be in writing. Both the Parties shall accept the decision as final, definitive and binding.

4. Provision for the venue of arbitration, the administrative support of the arbitration tribunal and the remuneration and expenses of its arbitrators shall be as agreed in an exchange of notes between the Parties. Both the Parties may also agree by such exchange of notes on alternative procedures for settling differences arising under this Treaty.

Article XII

1. Following the conclusion of this Treaty, the earlier understanding reached between the Parties concerning the utilization of the waters of the Mahakali River from the Sarada Barrage and the Tanakpur Barrage, which have been

incorporated herein, shall be deemed to have been replaced by this Treaty.

2. This Treaty shall be subject to ratification and shall enter into force on the date of exchange of instruments of ratification. It shall remain valid for a period of seventy-five (75) years from the date of its entry into force.

3. This Treaty shall be reviewed by both the Parties at ten (10) years interval or earlier as required by either Party and make amendments thereto, if necessary.

4. Agreements, as required, shall be entered into by the Parties to give effect to the provisions of this Treaty.

In Witness Whereof the authorized representatives of the respective Parties have signed this Treaty in two originals in the English language and have hereunto affixed seals.

Done at Kathmandu. Nepal on the twenty-ninth day of January of the year one thousand nine hundred ninety six.

(Dr. Prakash Chandra Lohani)
Minister for External Affairs His Majesty's Government of Nepal

(Mr. Pranab Mukherijee) Minister for Foreign Affairs Government of India

This was finally signed at Delhi by respective P.M. on 12 Feb. 1996 ■

APPENDIX IV

KOSI AGREEMENT BETWEEN INDIA-NEPAL

THIS Agreement made this twentyfifth day of April 1954, between the Government of the Kingdom of Nepal (hereinafter referred to as the 'Government') and the Government of India (herein after referred to as the 'Union')

WHEREAS the Union is desirous of constructing a barrage, head-works and other appurtenant work [s] about 3 miles upstream of Hanuman Nagar town on the Kosi River with afflux and flood banks, canals and protective works, on land lying within the territories of Nepal, for the purpose of flood control, irrigation, generation of hydroelectric power and prevention of erosion of Nepal areas on the right side of the river, upstream of the barrage (hereinafter has referred to as the 'Project');

AND WHEREAS the Government has agree to the construction of the said barrage, head-works and other connected works by and a the cost of the Union, in consideration of the benefits hereinafter appearing;

1. Now the parties agree as follows:

(i) The barrage will be located about 8 miles upstream of Hanuman Nagar town.

(ii) Details of the Project - The general layout of the barrage, the areas within afflux bank, flood embankments and the lines of communications are shown in the plan annexed to this agreement as Annexure A1.

(iii) For the purpose of clauses 3 and 8 of the agreement, the land under the ponded areas and boundaries as indicated by the plan specified in sub-clauses (ii) above, shall be deemed to be submerged.

2. Preliminary Investigations and Surveys

(i) The Government shall authorise and give necessary facilities to the canal and other officers of the Union or other persons acting under the general or special orders of such officers to enter upon such lands as necessary with such men, animals, vehicles, equipment, plant, machinery and instruments as necessary and undertake such surveys and investigations required in connection with the said Project before, during and after the construction, as may be found necessary from time to time by the Chief Engineer, Public Works Department (Kosi Project) in the Irrigation Branch of the Bihar Government. These surveys and investigations will comprise aerial and ground surveys, hydraulic, hydrometric, hydrological and geological surveys including construction of drillholes for surface and sub-surface explorations; investigations for communications and for materials of construction; and all other surveys and investigations necessary for the proper design, construction and maintenance of the barrage and all its connected works mentioned under the Project.

(ii) The Government will also authorise and give necessary facilities for investigations of storage or detention dams on the Kosi or its tributaries, soil conservation measures such as check dams, afforestation, etc., required for a complete solution of the Kosi problem in the future.

3. Authority for Execution of Works and Occupation of Land and other Property.

(i) The Government will authorise the Union to

proceed with the execution of the said Project as and when the Project or a part of the Project receives sanction of the said Union and notice has been given by the Union to the Government of its intention to commence work on the Project and shall permit access by the engineer(s) and all other officers, servants and nominees of the Union with such men, animals, vehicles, plants, machinery, equipment and instruments as may be necessary for the direction ad execution of the project to all such lands and places and shall permit the occupation, for such period as may be necessary of all such lands and places as may be required for the proper execution of the Project.

(ii) The land required for the purposes mentioned in the clause 3(i) above shall be acquired by the Government and compensation thereof shall be paid by the Union in accordance with provisions of clause 8 hereof.

(iii) The Government will authorise officers of the Union to enter on land outside the limits or boundaries of the barrage and its connected works in case of any accident happening or being apprehended to any of the said works and to execute all works which may be necessary for the purpose of repairing of preventing such accident: compensation, in every case, shall be tendered by the Union to the proprietors or the occupiers of the said land for all damages done to the some through the Government in order that compensation may be awarded in accordance with clause 8 hereof.

(iv) The Government will permit the Union to quarry the construction materials required for the Project from the various deposits as Chatra, Dharan Bazar or other places in Nepal.

4. Use of water and power

(i) Without prejudice to the right of Government to withdraw for irrigation or any other purpose in Nepal such supplies of water, as may be required from time to time, the Union will have the right to regulate all the supplies in the Kosi River power at the Barrage site in to generate power at the same site for the purpose of the Project.

(iii) The Government shall be entitled to use up to 50 percent of the hydro-electric power generated at the Barrage site Power House on payment of such tariff rates as may be fixed for the sale of power by the Union in consultation with the Government.

5. Sovereignty and Jurisdiction

The Union shall be the owner of all lands acquired by the Government under the provisions of clauses 3 hereof which shall be transferred by them to the Union and of all water rights secured to it under clause 4

(i) Provided that the sovereignty rights and territorial jurisdiction of the Government in respect of such lands shall continue unimpaired by such transfer.

6. Royalties

(i) The Government will receive royalty in respect of power generated and utilized in the Indian Union at rates to be settled by agreement hereafter. Provided that on royalty will be paid on the power sold to Nepal.

(ii) The Government shall be entitled to receive payment of royalties from the Union in respect of stone, gravel and ballast obtained from the Nepal territory and used in the construction and future maintenance of the barrage and other connected works at rated to be settled by agreement hereafter.

(iii) The Union shall be at liberty to use and remove clay, sand and soil without let or hindrance from lands acquired by the Government and transferred to the Union.

(iv) Use the timber from Nepal forests, required for the construction shall be permitted on payment of compensation.

Provided to compensation will be payable to the Government for such quantities of timber as may be decided upon by the Government and the Union to be necessary for use on the spurs or other training works required for the prevention of caving and erosion of the right bank in Nepal.

Provided likewise that no compensation will be payable by the Union for any timber obtained from the forest lands acquired by the Government and transferred to the Union.

7. Customs Duties

The Government shall charge no customs duty or duty of any kind during construction and subsequent maintenance, on any articles or materials required for the purpose of the project and the work connected therewith or for the bona fide use of the Union.

8. Compensation for Land and Property

(i) For assessing the compensation to be awarded by the Union to the Government in cash (a) lands required for the execution of the various works as mentioned in clause 3(ii) and (b) submerged lands, will be divided into the following classes:

1. Cultivated lands
2. Forest lands
3. Village lands and houses and other immovable property standing on them.
4. Waste lands (i) All lands recorded in the register of lands in the territory of Nepal as actually cultivated shall be deemed to be cultivated lands for the purposes of this clause.

(ii) The Union shall pay compensation (a) to the Government for the loss of land revenue as at the time of acquisition in respect of the area acquired and (b) to whomsoever it may be due for the Project and transferred to the Union.

(iii) The assessment of such compensation, and the manner of payment shall be determined hereafter by mutual agreement between the Government and the Union.

(iv) All lands required for the purposes of the project shall be jointly measured by the duly authorised officers of the Government and the Union respectively.

9. Communications

(i) The Government agrees that the Union may construct and maintain roads, tramways, ropeways etc. required for the Project in Nepal and shall provide land for these purposes on payment of compensation as provided in clause 8.

(ii) Subject to the territorial jurisdiction of the Government the ownership and the control of the metalled roads, tramways, and railway shall vest in the Union. The roads will be essentially departmental roads of the irrigation Department of the Union and any concession in regard to their use by commercial and non-commercial vehicles of Nepal shall not be deemed to confer any right of way.

(iii) The Government agreed to permit, on the same terms as for other users, the use of all roads, waterways and other avenues of transport and communication in Nepal for bona fide purposes of the construction and maintenance of the barrage and other connected works.

(iv) The bridge over Hanuman Nagar Barrage will be open to public traffic but the Union shall have the right to close the traffic over the bridge for repairs, etc.

(v) The Government agrees to permit the use of telephone and telegraph in the project area to authorised servants of the Government for business in emergencies provided such use does not in any way interfere with the construction and operation of Projects.

10. Use of River Craft

All navigation rights in the KosiRiver in Nepal will

rest with the Government. The use of water-craft like boat launches and timbe rafts within two mils of the Barrage and headworks shall not be allowed except by special licence under special permits to be issued by the Executive Engineer, Barrage. Any unauthorised watercraft found within this limit shall be liable to prosecution.

11. Fishing Rights

All the fishing rights in the KosiRiver in Nepal except within two miles of the Barrage shall vest in the Government of Nepal. No fishing will be permitted within two miles of the Barrage and Headworks.

12. Use of Nepali labour

The union shall give preference to Nepali labour, personnel and contractors to the extent available and in its opinion suitable for the construction of the Project but shall be at liberty to import labour of all classes to the extent necessary.

13. Administration of the Project Areas in Nepal

The Union shall carry out inside the Project areas in the territory of Nepal functions such as the establishment and administration of schools, hospitals, provision of water-supply and electricity, drainage, tramway lines and other civic amenities.

14. The Government shall be responsible for the maintenance of laws and order in the Project areas within the territory of Nepal. The Government and Union shall, from time to time consider and make suitable arrangements calculated to achieve the above object.

15. If so desired by the Union, the Government agrees to establish special court or courts in the Project area to ensure expeditions disposal of cases arising within the Project area. The Union shall bear the cost involved in the establishment of such courts, if the Government so desires.

16. Future Kosi Control Works

If further investigations indicate the necessity of storage or detention dams and other soil conservation measures on the Kosi and its tributaries, the Government agree to grant their consent to them on conditions similar to those mentioned herein.

17. Arbitration

If any question, differences or objections whatever shall arise in any way, connected with or arising out of this agreement or the meaning or operation of any part thereof or the rights, duties or liabilities of either party, except as to decisions of any such matter as therein before otherwise provided for, every such matter shall be referred for arbitration to two persons-one to be appointed by the Government and the other by the Union-whose decision shall be final and binding, provided that in the event of disagreement between the two arbitrators, they shall refer the matter under dispute for decision to an umpire to be jointly appointed by the two arbitrators before entering on the reference.

18. This agreement shall be deemed to come into force with effect from the date of signatures of the authorised representatives of the Government and the Union. respectively.

IN WITNESS WHEREOF the undersigned being duly authorised thereto by their respective Governments have signed the present agreement.

DONE at Kathmandu, in duplicate, this twentyfifth day of April 1954.

Government
Sd/-
GULZARILAL NANDA
For the Government of India.

Sd/-
MAHA BIRSHUMSHER
For the Government of Nepal. ■

APPENDIX V

UPPER KARNALI TREATY

MEMORANDUM OF UNDERSTANDING between The Government of Nepal, represented by Ministry of Water Resources and GMR-ITD Consortium, concerning the Execution of Upper Karnali Hydro-power Project in Nepal

This Memorandum of Understanding (hereinafter referred to as "MOU") is made and entered into as of this 24th day of January 2008 by and between The Government of Nepal represented by Ministry of Water Resources (hereinafter referred to as "MOWR") and the GMR-ITD Consortium comprising of GMR Energy Limited (GEL), a company incorporated under the Companies Act, 1956 of the Republic of India, GMR Infrastructure Limited (GIL), a company incorporated under the Companies Act, 1956 of the Republic of India, both having their registered offices at Skip House, 25/1,Museum Road, Bangalore 560 025, India and Italian-Thai Development Public Company Limited (ITD), a company incorporated under the appropriate laws of Thailand and having its Registered office at 2034/132-161 New Petchburi Road, Bang Kapi, Huay Kwang, Bangkok 10320, Thailand (hereinafter referred to as "GMR-ITD"), which expression shall unless repugnant to the context or meaning thereof, include its Members of the Consortium, successor(s), administrator(s) and permitted assignee(s) including a public limited company which shall be incorporated in Nepal for the purpose of executing the Upper Karnali Hydropower Project as defined in the subsequent provisions contained herein.

WHEREAS, the Government of Nepal has promulgated its Hydropower Development Policy, 2001 to enhance the development process of hydropower by creating investment friendly settings;

WHEREAS, MOWR on behalf of the Government of Nepal has been working for the promotion of hydropower development in the country in order to implement hydropower projects based on the concept of Build, Operate, Own and Transfer (BOOT);

WHEREAS, the Government of Nepal solicited the Expression of Interest (EOI) to select the Proponent/Developer in order to implement the Upper Karnali Hydropower Project with a minimum installed capacity of 300 MW and associated transmission system for evacuation of power and energy and access road (hereinafter referred to as "Project");

WHEREAS, GMR-ITD had submitted its proposal and wishes to implement the Project and the Government of Nepal, after the careful evaluation of the proposals submitted by various other potential developers evaluated and established GMR-ITD as the most substantially responsive developer to implement the Project of such magnitude thereby invited GMR-ITD to enter into this MOU;

WHEREAS, GMR-ITD is to involve Nepal Electricity Authority (hereinafter referred to as "NEA"), an entity constituted under the Nepal Electricity Authority Act, 2041, having its office at Durbar Marg, Kathmandu, as an equity partner in the execution of the Project;

WHEREAS, the Government of Nepal appreciates that GMR-ITD shall choose

appropriate financial options, suppliers, credit options and technologies in the best interests of the Project, and

WHEREAS, MOWR and GMR-ITD have held discussions and wished to formalize endeavor to expedite the execution of the Project; and

NOW, THEREFORE, MOWR and GMR-ITD hereto hereby agree as follows:

1. Both the Parties acknowledge that the Project is export oriented. GMR-ITD agrees to execute the Project, a peaking Run-of- the river Project located in Karnali River in Achham, Surkhet and Dailekh Districts of Far Western Development Region of Nepal. The Project is more fully described in the report as studied by NEA. The brief description of the Project is attached herewith as Annex I for ready reference. GMR-ITD shall receive, within a period of two weeks, all available information, document, and the Report etc., from NEA, with an one-time complete payment of NRs 80,000,000/- (Nepali Rupees Eight Crores only), for the same. List of documents to be provided, is enclosed as Annexure II.

2. For the purpose of developing the Project, GMR-ITD shall enter into an agreement with Nepal Electricity Authority to establish a Joint Venture Company in accordance with the Company Act, 2056 of Nepal. The Joint Venture Company, (hereinafter referred to as the "JVC"), shall be incorporated within ninety (90) days from the date of signing of this MOU. It is agreed that NEA shall be subscribed 27.00 (Twenty Seven point zero zero) percent of equity, free of costs, by GMR-ITD in the JVC. Provided, however, no financial obligation shall be imposed to NEA for being equity partner. The GMR-ITD consortium, through the JVC, will be responsible for the management and implementation of the Project.

3. GMR-ITD agrees to provide 12 (twelve) percent of monthly generated power and energy from the Project, net of auxiliary consumption and transformation losses, measured at the Bus-bar, free of costs from the date of the commencement of generation in addition to the royalty and export tax applicable pursuant to the Hydropower Development Policy 2001 and Electricity Act, 2049 respectively. The export tax shall not be exceeding 0.005% (Point Zero Zero Five Per cent) of export sales revenue.

4. GMR-ITD agrees that JVC shall carry further studies and investigations as may be required bringing the level of studies of the Project to Detailed Engineering Report ("DER") level so as to make the studies at par with internationally accepted pre-construction engineering level. The DER shall also include the access road and the transmission line study for evacuation of power and energy to India and switchyard infrastructure necessary for supply of Power and energy to Nepal, as an integral part of the study.

5. GMR-ITD further assures that JVC shall carry out the Environmental Impact Assessment of the Project in accordance with the Environment Protection Act, 2053, Environment Protection Rules, 2054 and other relevant internationally accepted practices as an integral part of the DER.

6. GMR-ITD shall ensure that the JVC shall apply for Survey License as required to undertake required studies and investigations as mentioned hereinabove with all particulars required therein in accordance with the Electricity Act, 2049 and the Electricity Regulation, 2050 within thirty (30) days from the date of establishment of JVC.

7. A non-refundable fee of NRs. 1,00,000/- (Nepali Rupees One Lac only) per MW of the proposed installed capacity shall be submitted in favour of Department of Electricity Development (DOED), Ministry of Water Resources before the application for survey licence is submitted.

8. The Government of Nepal agrees to grant the Survey License to JVC within 15 (Fifteen) days of submission of complete application to DoED in accordance with the prevailing laws of Nepal. The validity of the Survey License to carry out the necessary study/survey/investigation and completion of DER as well as concluding necessary agreement(s) and arranging finance for the development of the Project shall be for the period of thirty (30) months from the date of issuance of such license.

9. GMR-ITD shall ensure that JVC shall start the works within three (3) months from the date of issuance of the Survey License and duly inform the same to MOWR. The JVC shall submit progress of its works to MOWR every six (6) months. The JVC shall submit five copies of DER along with all relevant documents including data/maps at the end of the study/investigation.

10. In the event JVC does not apply for the Generation License or fails to meet the requirements stipulated hereinabove for the purpose of grant of Generation License, all documents, reports including DER, Data /maps, etc. submitted to MOWR shall remain as the property of the Government of Nepal without any obligation, whatsoever.

11. The JVC shall conduct an Environmental Impact Assessment Study (EIA) and prepare a detailed EIA Report and an Environmental Management Plan for the Project. The Government of Nepal agrees to provide any assistance requested by the JVC during the time the EIA is conducted and prepared. The Government of Nepal also agrees to use its best efforts to procure the grant of all environmental approvals and forest clearances from the concerned departments within the minimum possible time for the Project.

12. GON shall make available all necessary land, structures, buildings and utilities owned by third parties to JVC for the construction of the project in accordance with section 33 of the electricity act 2049. If the land is already owned by GON, the land shall be made available on lease, with either a reasonable annual rent or such other rent as may be required by applicable law, for the period of project license for land needed for permanent use or for such shorter period as may be necessary for temporary use. For rehabilitation of displaced families, rehabilitation and resettlement arrangement would be facilitated by Govt. of Nepal and implemented by the JVC as per prevailing guidelines and practices.

13. The Government of Nepal shall grant to the JVC such incentives and concessions as are provided in the relevant Policy and enactments in force. The Government of Nepal shall take necessary action to provide overall security as per applicable law. Any additional security arrangements as may be required by the JVC for the Project , the same shall be provided by the Govt. of Nepal and the cost of the same shall be borne by the JVC

14. JVC shall ensure that JVC shall apply for Generation License and Transmission License along with relevant Power Purchase Agreement(s), Financial Closure, approved EIA, etc. within the validity period of the Survey License in accordance with the Electricity Act, 2049 and Electricity Regulations, 2050.

15. JVC shall be held responsible for the completion of the construction works within fifty four (54) months from the date of Financial Closure to Commissioning of the Project. Provided that, in case JVC completes the work envisaged as in Clause 11 above, before 30 months, then the time so saved (30 months minus actual time taken in months) will be credited to the period from Financial Closure to Commissioning of the Project i.e., 54 months plus time saved in completing the works envisaged in clause 11 above.

16. The JVC while implementing the Project

undertakes to comply with all statutory requirements in respect of laws, regulations and procedures governing establishment and operation of hydro-power.

17. The Government of Nepal agrees to grant the licenses for generation and transmission of Electricity to JVC for the development and operation of the Project for a period of thirty (30) years from the date of issuance of such licenses on Build, Own, Operate and Transfer (BOOT) basis. During the validity period of the licenses, JVC shall maintain and operate the Project according to generally acceptable prudent hydropower and electricity utility practices and handover the ownership of the Project to the Government of Nepal, free of cost, at the end of such period. At the time of handing over to the Government of Nepal, the Project shall be in a good running condition. Government of Nepal shall have an entitlement to inspect Project periodically. The Cost of such inspection shall be borne by the Government of Nepal.

18. The Government of Nepal, in the course of issuing a Generation License, shall demand a Performance Security at the rate of NRs 5,00,000/- (Nepali Rupees Five Lacs only) per MW which shall be in the form of an unconditional Bank Guarantee issued by an international bank acceptable to MOWR and counter guaranteed by a Nepalese Bank. The Government of Nepal shall have the unconditional entitlement to forfeit such Performance Security, if JVC fails to comply with any material terms and conditions prescribed in the Generation License.

19. The performance security shall be valid until the commissioning of the Project. No claim shall be made against such security after the commissioning of the Project.

20. GMR-ITD shall ensure that JVC shall develop the Project in accordance with the terms and conditions as agreed upon as well as within the purview of the relevant laws of Nepal and shall be responsible for all taxes, duties, fees, levies etc., to be paid to the Government of Nepal as provided in the applicable Nepalese laws in force on the date of this MoU. However, in case of any reduction in the taxes, duties, fees, levies etc., the benefit of such change shall be extended to the JVC.

21. The Government of Nepal shall facilitate all clearances and approvals. It also agrees to extend all privileges and facilities to JVC according to the Electricity Act, 2049, the Electricity Regulations, 2050 and other prevailing laws of Nepal in relation to licenses, permissions, authorizations and assurances, etc for the preparation of DER and development and operation of the Project.

22. JVC shall save harmless and indemnify the Government of Nepal in respect of all claims, proceedings, costs, damages, charges and expenses whatsoever arising out of, or in relation to, any such matter in so far as JVC is responsible for the Project.

23. Each Party hereto agrees that it shall not divulge throughout the validity of the Survey License, any trade, commercial or technical secrets or confidential matters, reports, documents, data, information, including DER, of one another to any third Party save and except for the purpose of implementing the understanding reached in this MOU. However, any sharing of information between the Parties shall be subject to their respective policies on the disclosure of information.

24. Neither Party shall be liable for any default in performing activities hereunder beyond its control including but not limited to, acts of God, war, riots, civil disturbances/dis-obediences and acts of terrorism or suppression or any other cause beyond the reasonable control of the Party whose performance is affected.

25. GMR-ITD agrees to ensure that JVC shall utilize as much as possible and to the extent

qualified, available local skills and labour crafts and shall maximize the use of local institutions, consulting firms, professionals, individuals and contractors for the preparation of DER and the development and operation of the Projects pursuant to the Labour Act, 2049 and the Labour Regulations, 2050.

26. JVC shall ensure that their employees, contractors, advisers or any authorized person/body involved in the preparation of DER and the development and operation of the Project shall abide by the prevailing laws of Nepal.

27. Time is the essence for each and every provision of this MoU and the target dates mentioned herein shall form an integral part. Failure to accomplish the assignments as prescribed in this MoU within the stipulated time limit for reasons other than Force Majeure or beyond the control of any Party, shall lead this MoU null and void except for Article 9 above. However, in the event any Force Majeure conditions or conditions beyond the control of any Party, time shall be extended for such duration.

28. Provided that in the event of failure by GMR-ITD to accomplish the assignments as prescribed in this MoU, within the stipulated time limit or breach of any conditions in this MoU, due opportunity shall be provided to GMR-ITD to remedy any delay or fulfill any obligations within a period of not less than Ninety (90) days, after receipt of the notice.

29. Each Party to this MOU and each individual signing on behalf of each Party, hereby represents and warrants to the other that it has full power and authority to enter into this MOU and that both the Parties shall facilitate each other for the execution, delivery and performance of the terms of this MOU.

30. In addition to the actions specifically mentioned in this MOU, the Parties will each do whatever may reasonably be necessary to accomplish the transactions contemplated in this MOU including, without limitation, executing any additional documents reasonably necessary to effectuate provisions and purposes of this MOU. Both Parties shall enter into a detailed Project Agreement for the development and operation of Project, within the validity period of this MOU, where the content or contents of this MOU may be incorporated in the Project Agreement.

31. GMR-ITD shall not assign responsibilities under this agreement without the prior approval of the Government of Nepal. The transfer of License shall not be allowed during the period of Survey License.

32. The terms and conditions prescribed at the time of solicitation of EOI and the offer made by GMR-ITD shall be an integral part of this MOU. If any provision of EOI together with the GMR-ITD's offer and MOU contradict each other the provision of MOU shall prevail.

33. GON acknowledges that due consideration may be accorded to GMR-ITD Consortium for the allotment of upstream / downstream project, if any.

34. GoN shall ensure that the development, implementation and operation of upstream / downstream Projects by other developers shall not be detrimental in any way to the Project.

35. If any provision or any part or parts of the provision of this MOU is held invalid or contrary to the prevailing laws of Nepal, the remaining provisions of this MOU shall remain valid and unaffected.

36. This MOU shall commence from the date of its signature. It shall remain valid up to the validity of the Survey License or the Project Agreement, whichever is earlier, unless otherwise agreed between the parties in writing.

37. This MOU constitutes the entire MOU and understanding of the Parties. This MOU may

not be modified except in writing signed by both the Parties.

38. Any difference or dispute arising out of this MOU at any time between the Parties shall be resolved by mutual consultation and in good faith.

IN WITNESS WHEREOF, the Parties hereto, acting through their duly authorized representatives, have caused this Memorandum of Understanding signed on the date first above written at Kathmandu, Nepal.

On behalf of On behalf of

The Government of Nepal, GMR-ITD Consortium

Ministry of Water Resources

Mr. Anup Kumar Upadhyay Mr. Avinash Shah

Joint Secretary Sr. Vice President

Witnesses Witnesses 1. Mr. Rajendra K. Kshatri Joint Secretary Water and Energy Commission Secretariat	1. Mr. Harvinder Manocha Associate Vice President GMR Energy Limited
2. Mr. Sunil B. Malla Deputy Director General Department of Electricity Development	2. Mr. Rajib Misra General Manager GMR Energy Limited

APPENDIX VI

Convention on the Law of the Non-navigational Uses of International Watercourses 1997

Adopted by the General Assembly of the United Nations on 21 May 1997.
Not yet in force. See General Assembly resolution 51/229, annex, Official Records of the General Assembly, Fifty-first Session, Supplement No. 49 (A/51/49).

Convention on the Law of the Non-navigational Uses of International Watercourses

Adopted by the General Assembly of the United Nations on 21 May 1997

The Parties to the present Convention,

Conscious of the importance of international watercourses and the non-navigational uses thereof in many regions of the world,

Having in mind Article 13, paragraph 1 (a), of the Charter of the United Nations, which provides that the General Assembly shall initiate studies and make recommendations for the purpose of encouraging the progressive development of international law and its codification,

Considering that successful codification and progressive development of rules of international law regarding non-navigational uses of international watercourses would assist in promoting and implementing the purposes and principles set forth in Articles 1 and 2 of the Charter of the United Nations,

Taking into account the problems affecting many international watercourses resulting from, among other things, increasing demands and pollution,

Expressing the conviction that a framework convention will ensure the utilization, development, conservation, management and protection of international watercourses and the promotion of the optimal and sustainable utilization thereof for present and future generations,

Affirming the importance of international cooperation and good-neighbourliness in this field,

Aware of the special situation and needs of developing countries,

Recalling the principles and recommendations adopted by the United Nations Conference on Environment and Development of 1992 in the Rio Declaration and Agenda 21,

Recalling also the existing bilateral and multilateral agreements regarding the non-navigational uses of international watercourses,

Mindful of the valuable contribution of international organizations, both governmental and nongovernmental, to the codification and progressive development of international law in this field,

Appreciative of the work carried out by the International Law Commission on the law of the nonnavigational uses of international watercourses,

Bearing in mind United Nations General Assembly resolution 49/52 of 9 December 1994,

Have agreed as follows:

PART I

INTRODUCTION

Article 1

Scope of the present Convention

1. The present Convention applies to uses of international watercourses and of their waters for purposes other than navigation and to measures of protection, preservation and management related to the uses of those watercourses and their waters.

2. The uses of international watercourses for navigation is not within the scope of the present Convention except insofar as other uses affect navigation or are affected by navigation.

Article 2

Use of terms

For the purposes of the present Convention:

(a) "Watercourse" means a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus;

(b) "International watercourse" means a watercourse, parts of which are situated in different States;

(c) "Watercourse State" means a State Party to the present Convention in whose territory part of an international watercourse is situated, or a Party that is a regional economic integration organization, in the territory of one or more of whose Member States part of an international watercourse is situated;

(d) "Regional economic integration organization" means an organization constituted by sovereign States of a given region, to which its member States have transferred competence in respect of matters governed by this Convention and which has been duly authorized in accordance with its internal procedures, to sign, ratify, accept, approve or accede to it.

Article 3

Watercourse agreements

1. In the absence of an agreement to the contrary, nothing in the present Convention shall affect the rights or obligations of a watercourse State arising from agreements in force for it on the date on which it became a party to the present Convention.

2. Notwithstanding the provisions of paragraph 1, parties to agreements referred to in paragraph 1 may, where necessary, consider harmonizing such agreements with the basic principles of the present Convention.

3. Watercourse States may enter into one or more agreements, hereinafter referred to as "watercourse agreements", which apply and adjust the provisions of the present Convention to the characteristics and uses of a particular international watercourse or part thereof.

4. Where a watercourse agreement is concluded between two or more watercourse States, it shall define the waters to which it applies. Such an agreement may be entered into with respect to an entire international watercourse or any part thereof or a particular project, programme or use except insofar as the agreement adversely affects, to a significant extent, the use by one or more other watercourse States of the waters of the watercourse, without their express consent.

5. Where a watercourse State considers that adjustment and application of the provisions of the present Convention is required because of the characteristics and uses of a particular international watercourse, watercourse States shall consult with a view to negotiating in good faith for the purpose of concluding a watercourse agreement or agreements.

6. Where some but not all watercourse States to a particular international watercourse are parties to an agreement, nothing in such agreement shall affect the rights or obligations under the present. Convention of watercourse States that are not parties to such an agreement.

Article 4

Parties to watercourse agreements

1. Every watercourse State is entitled to participate in the negotiation of and to become a party to any watercourse agreement that applies to the entire international watercourse, as well as to participate in any relevant consultations.

2. A watercourse State whose use of an international watercourse may be affected to a significant extent by the implementation of a proposed watercourse agreement that applies only to a part of the watercourse or to a particular project, programme or use is entitled to participate in consultations on such an agreement and, where appropriate, in the negotiation thereof in good faith with a view to becoming a party thereto, to the extent that its use is thereby affected.

PART II

GENERAL PRINCIPLES

Article 5

Equitable and reasonable utilization and participation

1. Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse.

2. Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner. Such participation includes both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention.

Article 6

Factors relevant to equitable and reasonable utilization

1. Utilization of an international watercourse in an equitable and reasonable manner within the meaning of article 5 requires taking into account all relevant factors and circumstances, including:

   (a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;

   (b) The social and economic needs of the watercourse States concerned;

   (c) The population dependent on the watercourse in each watercourse State;

   (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States;

   (e) Existing and potential uses of the watercourse;

   (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect;

(g) The availability of alternatives, of comparable value, to a particular planned or existing use.

2. In the application of article 5 or paragraph 1 of this article, watercourse States concerned shall, when the need arises, enter into consultations in a spirit of cooperation.

3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In

determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

Article 7

Obligation not to cause significant harm

1. Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States.

2. Where significant harm nevertheless is caused to another watercourse State, the States whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of articles 5 and 6, in consultation with the affected State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

Article 8

General obligation to cooperate

1. Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.

2. In determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions.

Article 9

Regular exchange of data and information

1. Pursuant to article 8, watercourse States shall on a regular basis exchange readily available data and information on the condition of the watercourse, in particular that of a hydrological, meteorological, hydrogeological and ecological nature and related to the water quality as well as related forecasts.

2. If a watercourse State is requested by another watercourse State to provide data or information that is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.

3. Watercourse States shall employ their best efforts to collect and, where appropriate, to process data and information in a manner which facilitates its utilization by the other watercourse States to which it is communicated.

Article 10

Relationship between different kinds of uses

1. In the absence of agreement or custom to the contrary, no use of an international watercourse enjoys inherent priority over other uses.

2. In the event of a conflict between uses of an international watercourse, it shall be resolved with reference to articles 5 to 7, with special regard being given to the requirements of vital human needs.

PART III

PLANNED MEASURES

Article 11

Information concerning planned measures

Watercourse States shall exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse.

Article 12

Notification concerning planned measures with possible adverse effects

Before a watercourse State implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures.

Article 13

Period for reply to notification

Unless otherwise agreed:

(a) A watercourse State providing a notification under article 12 shall allow the notified States a period of six months within which to study and evaluate the possible effects of the planned measures and to communicate the findings to it;

(b) This period shall, at the request of a notified State for which the evaluation of the planned measures poses special difficulty, be extended for a period of six months.

Article 14

Obligations of the notifying State during the period for reply

During the period referred to in article 13, the notifying State:

(a) Shall cooperate with the notified States by providing them, on request, with any additional data and information that is available and necessary for an accurate evaluation; and (b) Shall not implement or permit the implementation of the planned measures without the consent of the notified States.

Article 15

Reply to notification

The notified States shall communicate their findings to the notifying State as early as possible within the period applicable pursuant to article 13. If a notified State finds that implementation of the planned measures would be inconsistent with the provisions of articles 5 or 7, it shall attach to its finding a documented explanation setting forth the reasons for the finding.

Article 16

Absence of reply to notification

1. If, within the period applicable pursuant to article 13, the notifying State receives no communication under article 15, it may, subject to its obligations under articles 5 and 7, proceed with the implementation of the planned measures, in accordance with the notification and any other data and information provided to the notified States.

2. Any claim to compensation by a notified State which has failed to reply within the period applicable pursuant to article 13 may be offset by the costs incurred by the notifying State for action undertaken after the expiration of the time for a reply which would not have been undertaken if the notified State had objected within that period.

Article 17

Consultations and negotiations concerning planned measures

1. If a communication is made under article 15 that implementation of the planned measures would be inconsistent with the provisions of article 5 or 7, the notifying State and the State making the communication shall enter into consultations and, if necessary, negotiations with a view to arriving at an equitable resolution of the situation.

2. The consultations and negotiations shall be conducted on the basis that each State must in

good faith pay reasonable regard to the rights and legitimate interests of the other State.

3. During the course of the consultations and negotiations, the notifying State shall, if so requested by the notified State at the time it makes the communication, refrain from implementing or permitting the implementation of the planned measures for a period of six months unless otherwise agreed.

Article 18

Procedures in the absence of notification

1. If a watercourse State has reasonable grounds to believe that another watercourse State is planning measures that may have a significant adverse effect upon it, the former State may request the latter to apply the provisions of article 12. The request shall be accompanied by a documented explanation setting forth its grounds.

2. In the event that the State planning the measures nevertheless finds that it is not under an obligation to provide a notification under article 12, it shall so inform the other State, providing a documented explanation setting forth the reasons for such finding. If this finding does not satisfy the other State, the two States shall, at the request of that other State, promptly enter into consultations and negotiations in the manner indicated in paragraphs 1 and 2 of article 17.

3. During the course of the consultations and negotiations, the State planning the measures shall, if so requested by the other State at the time it requests the initiation of consultations and negotiations, refrain from implementing or permitting the implementation of those measures for a period of six months unless otherwise agreed.

Article 19

Urgent implementation of planned measures

1. In the event that the implementation of planned measures is of the utmost urgency in order to protect public health, public safety or other equally important interests, the State planning the measures may, subject to articles 5 and 7, immediately proceed to implementation, notwithstanding the provisions of article 14 and paragraph 3 of article 17.

2. In such case, a formal declaration of the urgency of the measures shall be communicated without delay to the other watercourse States referred to in article 12 together with the relevant data and information.

3. The State planning the measures shall, at the request of any of the States referred to in paragraph 2, promptly enter into consultations and negotiations with it in the manner indicated in paragraphs 1 and 2 of article 17.

PART IV

PROTECTION, PRESERVATION AND MANAGEMENT

Article 20

Protection and preservation of ecosystems

Watercourse States shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses.

Article 21

Prevention, reduction and control of pollution

1. For the purpose of this article, "pollution of an international watercourse" means any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct.

2. Watercourse States shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution of an international watercourse that may cause significant harm to other watercourse States or to their

environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse. Watercourse States shall take steps to harmonize their policies in this connection.

3. Watercourse States shall, at the request of any of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse, such as:

   (a) Setting joint water quality objectives and criteria;

   (b) Establishing techniques and practices to address pollution from point and non-point sources;

   (c) Establishing lists of substances the introduction of which into the waters of an international watercourse is to be prohibited, limited, investigated or monitored.

Article 22

Introduction of alien or new species

Watercourse States shall take all measures necessary to prevent the introduction of species, alien or new, into an international watercourse which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse States.

Article 23

Protection and preservation of the marine environment

Watercourse States shall, individually and, where appropriate, in cooperation with other States, take all measures with respect to an international watercourse that are necessary to protect and preserve the marine environment, including estuaries, taking into account generally accepted international rules and standards.

Article 24

Management

1. Watercourse States shall, at the request of any of them, enter into consultations concerning the management of an international watercourse, which may include the establishment of a joint management mechanism.

2. For the purposes of this article, "management" refers, in particular, to:

   (a) Planning the sustainable development of an international watercourse and providing for the implementation of any plans adopted; and

   (b) Otherwise promoting the rational and optimal utilization, protection and control of the watercourse.

Article 25

Regulation

1. Watercourse States shall cooperate, where appropriate, to respond to needs or opportunities for regulation of the flow of the waters of an international watercourse.

2. Unless otherwise agreed, watercourse States shall participate on an equitable basis in the construction and maintenance or defrayal of the costs of such regulation works as they may have agreed to undertake.

3. For the purposes of this article, "regulation" means the use of hydraulic works or any other continuing measure to alter, vary or otherwise control the flow of the waters of an international watercourse.

Article 26

Installations

1. Watercourse States shall, within their respective territories, employ their best efforts to maintain and protect installations, facilities

and other works related to an international watercourse.

2. Watercourse States shall, at the request of any of them which has reasonable grounds to believe that it may suffer significant adverse effects, enter into consultations with regard to:

   (a) The safe operation and maintenance of installations, facilities or other works related to an international watercourse; and

   (b) The protection of installations, facilities or other works from wilful or negligent acts or the forces of nature.

PART V

Harmful Conditions And Emergency Situations

Article 27

Prevention and mitigation of harmful conditions

Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification.

Article 28

Emergency situations

1. For the purposes of this article, "emergency" means a situation that causes, or poses an imminent threat of causing, serious harm to watercourse States or other States and that results suddenly from natural causes, such as floods, the breaking up of ice, landslides or earthquakes, or from human conduct, such as industrial accidents.

2. A watercourse State shall, without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of any emergency originating within its territory.

3. A watercourse State within whose territory an emergency originates shall, in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency.

4. When necessary, watercourse States shall jointly develop contingency plans for responding to emergencies, in cooperation, where appropriate, with other potentially affected States and competent international organizations.

PART VI

Miscellaneous Provisions

Article 29

International watercourses and installations in time of armed conflict

International watercourses and related installations, facilities and other works shall enjoy the protection accorded by the principles and rules of international law applicable in international and noninternational armed conflict and shall not be used in violation of those principles and rules.

Article 30

Indirect procedures

In cases where there are serious obstacles to direct contacts between watercourse States, the States concerned shall fulfil their obligations of cooperation provided for in the present Convention, including exchange of data and information, notification, communication, consultations and negotiations, through any indirect procedure accepted by them.

Article 31

Data and information vital to national defence or security

Nothing in the present Convention obliges a watercourse State to provide data or information vital to its national defence or security. Nevertheless, that State shall cooperate in good faith with the other watercourse States with a view to providing as much information as possible under the circumstances.

Article 32

Non-discrimination

Unless the watercourse States concerned have agreed otherwise for the protection of the interests of persons, natural or juridical, who have suffered or are under a serious threat of suffering significant transboundary harm as a result of activities related to an international watercourse, a watercourse State shall not discriminate on the basis of nationality or residence or place where the injury occurred, in granting to such persons, in accordance with its legal system, access to judicial or other procedures, or a right to claim compensation or other relief in respect of significant harm caused by such activities carried on in its territory.

Article 33

Settlement of disputes

1. In the event of a dispute between two or more parties concerning the interpretation or application of the present Convention, the parties concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means in accordance with the following provisions.
2. If the parties concerned cannot reach agreement by negotiation requested by one of them, they may jointly seek the good offices of, or request mediation or conciliation by, a third party, or make use, as appropriate, of any joint watercourse institutions that may have been established by them or agree to submit the dispute to arbitration or to the International Court of Justice.
3. Subject to the operation of paragraph 10, if after six months from the time of the request for negotiations referred to in paragraph 2, the parties concerned have not been able to settle their dispute through negotiation or any other means referred to in paragraph 2, the dispute shall be submitted, at the request of any of the parties to the dispute, to impartial fact-finding in accordance with paragraphs 4 to 9, unless the parties otherwise agree.
4. A Fact-finding Commission shall be established, composed of one member nominated by each party concerned and in addition a member not having the nationality of any of the parties concerned chosen by the nominated members who shall serve as Chairman.
5. If the members nominated by the parties are unable to agree on a Chairman within three months of the request for the establishment of the Commission, any party concerned may request the Secretary- General of the United Nations to appoint the Chairman who shall not have the nationality of any of the parties to the dispute or of any riparian State of the watercourse concerned. If one of the parties fails to nominate a member within three months of the initial request pursuant to paragraph 3, any other party concerned may request the Secretary-General of the United Nations to appoint a person who shall not have the nationality of any of the parties to the dispute or of any riparian State of the watercourse concerned. The person so appointed shall constitute a single-member Commission.
6. The Commission shall determine its own procedure.
7. The parties concerned have the obligation to

provide the Commission with such information as it may require and, on request, to permit the Commission to have access to their respective territory and to inspect any facilities, plant, equipment, construction or natural feature relevant for the purpose of its inquiry.

8. The Commission shall adopt its report by a majority vote, unless it is a single-member Commission, and shall submit that report to the parties concerned setting forth its findings and the reasons therefore and such recommendations as it deems appropriate for an equitable solution of the dispute, which the parties concerned shall consider in good faith.

9. The expenses of the Commission shall be borne equally by the parties concerned.

10. When ratifying, accepting, approving or acceding to the present Convention, or at any time thereafter, a party which is not a regional economic integration organization may declare in a written instrument submitted to the depositary that, in respect of any dispute not resolved in accordance with paragraph 2, it recognizes as compulsory ipso facto, and without special agreement in relation to any party accepting the same obligation:

    (a) Submission of the dispute to the International Court of Justice; and/or

    (b) Arbitration by an arbitral tribunal established and operating, unless the parties to the dispute otherwise agreed, in accordance with the procedure laid down in the annex to the present Convention.

    A party which is a regional economic integration organization may make a declaration with like effect in relation to arbitration in accordance with sub-paragraph (b).

PART VII

Final Clauses

Article 34

Signature

The present Convention shall be open for signature by all States and by regional economic integration organizations from 21 May 1997 until 20 May 2000 at United Nations Headquarters in New York.

Article 35

Ratification, acceptance, approval or accession

1. The present Convention is subject to ratification, acceptance, approval or accession by States and by regional economic integration organizations. The instruments of ratification, acceptance, approval or accession shall be deposited with the Secretary-General of the United Nations.

2. Any regional economic integration organization which becomes a Party to this Convention without any of its member States being a Party shall be bound by all the obligations under the Convention. In the case of such organizations, one or more of whose member States is a Party to this Convention, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under the Convention. In such cases, the organization and the member States shall not be entitled to exercise rights under the Convention concurrently.

3. In their instruments of ratification, acceptance, approval or accession, the regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by the Convention. These organizations shall also

inform the Secretary-General of the United Nations of any substantial modification in the extent of their competence.

Article 36

Entry into force

1. The present Convention shall enter into force on the ninetieth day following the date of deposit of the thirty-fifth instrument of ratification, acceptance, approval or accession with the Secretary- General of the United Nations.

2. For each State or regional economic integration organization that ratifies, accepts or approves the Convention or accedes thereto after the deposit of the thirty-fifth instrument of ratification, acceptance, approval or accession, the Convention shall enter into force on the ninetieth day after the deposit by such State or regional economic integration organization of its instrument of ratification, acceptance, approval or accession.

3. For the purposes of paragraphs 1 and 2, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States.

Article 37

Authentic texts

The original of the present Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

IN WITNESS WHEREOF the undersigned Plenipotentiaries, being duly authorized thereto, have signed this Convention.

DONE at New York, this twenty-first day of May one thousand nine hundred and ninety- seven. ■

APPENDIX VII

ARBITRATION

Article 1

Unless the parties to the dispute otherwise agree, the arbitration pursuant to article 33 of the Convention shall take place in accordance with articles 2 to 14 of the present annex

Article 2

The claimant party shall notify the respondent party that it is referring a dispute to arbitration pursuant to article 33 of the Convention. The notification shall state the subject matter of arbitration and include, in particular, the articles of the Convention, the interpretation or application of which are at issue. If the parties do not agree on the subject matter of the dispute, the arbitral tribunal shall determine the subject matter.

Article 3

1. In disputes between two parties, the arbitral tribunal shall consist of three members. Each of the parties to the dispute shall appoint an arbitrator and the two arbitrators so appointed shall designate by common agreement the third arbitrator, who shall be the Chairman of the tribunal. The latter shall not be a national of one of the parties to the dispute or of any riparian State of the watercourse concerned, nor have his or her usual place of residence in the territory of one of these parties or such riparian State, nor have dealt with the case in any other capacity.

2. In disputes between more than two parties, parties in the same interest shall appoint one arbitrator jointly by agreement.

3. Any vacancy shall be filled in the manner prescribed for the initial appointment.

Article 4

1. If the Chairman of the arbitral tribunal has not been designated within two months of the appointment of the second arbitrator, the President of the International Court of Justice shall, at the request of a party, designate the Chairman within a further two-month period.

2. If one of the parties to the dispute does not appoint an arbitrator within two months of receipt of the request, the other party may inform the President of the International Court of Justice, who shall make the designation within a further two-month period.

Article 5

The arbitral tribunal shall render its decisions in accordance with the provisions of this Convention and international law.

Article 6

Unless the parties to the dispute otherwise agree, the arbitral tribunal shall determine its own rules of procedure.

Article 7

The arbitral tribunal may, at the request of one of the parties, recommend essential interim measures of protection.

Article 8

1. The parties to the dispute shall facilitate the work of the arbitral tribunal and, in particular, using all means at their disposal, shall:

   (a) Provide it with all relevant documents, information and facilities; and

(b) Enable it, when necessary, to call witnesses or experts and receive their evidence.

2. The parties and the arbitrators are under an obligation to protect the confidentiality of any information they receive in confidence during the proceedings of the arbitral tribunal.

Article 9

Unless the arbitral tribunal determines otherwise because of the particular circumstances of the case, the costs of the tribunal shall be borne by the parties to the dispute in equal shares. The tribunal shall keep a record of all its costs, and shall furnish a final statement thereof to the parties.

Article 10

Any party that has an interest of a legal nature in the subject matter of the dispute which may be affected by the decision in the case, may intervene in the proceedings with the consent of the tribunal.

Article 11

The tribunal may hear and determine counterclaims arising directly out of the subject matter of the dispute.

Article 12

Decisions both on procedure and substance of the arbitral tribunal shall be taken by a majority vote of its members.

Article 13

If one of the parties to the dispute does not appear before the arbitral tribunal or fails to defend its case, the other party may request the tribunal to continue the proceedings and to make its award.

Absence of a party or a failure of a party to defend its case shall not constitute a bar to the proceedings.

Before rendering its final decision, the arbitral tribunal must satisfy itself that the claim is well founded in fact and law.

Article 14

1. The tribunal shall render its final decision within five months of the date on which it is fully constituted unless it finds it necessary to extend the time limit for a period which should not exceed five more months.

2. The final decision of the arbitral tribunal shall be confined to the subject matter of the dispute and shall state the reasons on which it is based. It shall contain the names of the members who have participated and the date of the final decision. Any member of the tribunal may attach a separate or dissenting opinion to the final decision.

3. The award shall be binding on the parties to the dispute. It shall be without appeal unless the parties to the dispute have agreed in advance to an appellate procedure.

4. Any controversy which may arise between the parties to the dispute as regards the interpretation or manner of implementation of the final decision may be submitted by either party for decision to the arbitral tribunal which rendered it. ■

APPENDIX VIII

HELSINKI RULES 1966

The Helsinki Rules on the Uses of the Waters of International Rivers- Helsinki, 1966

Chapter 1

General

Article I

The general rules of international law as set forth in these chapters are applicable to the use of the waters of an international drainage basin except as may be provided otherwise by convention, agreement or binding custom among the basin States.

Article II

An international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

Article III

A "basin State" is a state the territory of which includes a portion of an international drainage basin.

Chapter 2

Equitable utilization of the waters of an international drainage basin

Article IV

Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

Article V

1. What is a reasonable and equitable share within the meaning of Article IV is to be determined in the light of all the relevant factors in each particular case.

2. Relevant factors which are to be considered include, but are not limited to:

   (a) the geography of the basin, including in particular the extent of the drainage area in the territory of each basin State;

   (b) the hydrology of the basin, including in particular the contribution of water by each basin State;

   (c) the climate affecting the basin;

   (d) the past utilization of the waters of the basin, including in particular existing utilization;

   (e) the economic and social needs of each basin State;

   (f) the population dependent on the waters of the basin in each basin State;

   (g) the comparative costs of alternative means of satisfying the economic and social needs of each basin State;

   (h) the availability of other resources;

   (i) the avoidance of unnecessary waste in the utilization of waters of the basin;

   (j) the practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses; and,

   (k) the degree to which the needs of a basin

State may be satisfied, without causing substantial injury to a co-basin State.

3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable share, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

Article VI

A use or category of uses is not entitled to any inherent preference over any other use or category of uses.

Article VII

A basin State may not be denied the present reasonable use of the waters of an international drainage basin to reserve for a co-basin State future use of such waters.

Article VIII

1. An existing reasonable use may continue in operation unless the factors justifying its continuance are outweighed by other factors leading to the conclusion that it be modified or terminated so as to accommodate a competing incompatible use.

2. a. a use that is in fact in operation is deemed to have been existing use from the time of the initiation of construction directly related to the use or, where such construction is not required, the undertaking of comparable acts of actual implementation.

   b. such a use continues to be an existing use until such time as it is discontinued with the intention that it be abandoned.

3. A use will not be deemed an existing use if at the time of becoming operational it is incompatible with an already existing reasonable use.

Chapter 3

Pollution

Article IX

As used in this Chapter, the term "water pollution" refers to any detrimental change resulting from human conduct in the natural composition, content, or quality of the waters of an international drainage basin.

Article X

1. Consistent with the principle of equitable utilization of the waters of an international drainage basin, a State:

   (a) must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State, and

   (b) should take all reasonable measures to abate existing water pollution in an international drainage basin to such an extent that no substantial damage is caused in the territory of a co-basin State.

2. The rule stated in paragraph (1) of this Article applies to water pollution originating:

   (a) within a territory of the State; or

   (b) outside the territory of the State, if it is caused by the State's conduct.

Article XI

1. In the case of a violation of the rule stated in paragraph (l) a. of Article X of this Chapter, the State responsible shall be required to cease the wrongful conduct and compensate the injured co-basin State for the injury that has been caused to it.

2. In a case falling under the rule stated in paragraph (l) b. of Article X, if a State fails to

take reasonable measures, it shall be required promptly to enter into negotiations with the injured State with a view toward reaching a settlement equitable under the circumstances.

Chapter 4

Navigation

Article XII

1. This Chapter refers to those rivers and lakes portions of which are both navigable and separate or traverse the territories of two or more States.

2. Rivers or lakes are "navigable" if in their natural or canalized state they are currently used for commercial navigation or are capable by reason of their natural condition of being so used.

3. In this Chapter the term "riparian State" refers to a State through or along which the navigable portion of a river flows or a lake lies.

Article XIII

Subject to any limitations or qualifications referred to in these Chapters, each riparian State is entitled to enjoy rights of free navigation on the entire course of a river or lake.

Article XIV

"Free navigation", as the term is used in this Chapter, includes the following freedom for vessels of a riparian State on a basis of equality:

(a) freedom of movement on the entire navigable course of the river or lake;

(b) freedom to enter ports and to make use of plants and docks; and,

(c) freedom to transport goods and passengers, either directly or through transhipment, between the territory of one riparian State and the territory of another riparian State and between the territory of a riparian State and the open sea.

Article XV

A riparian State may exercise rights of police, including but not limited to the protection of public safety and health, over that portion of the river or lake subject to its jurisdiction, provided the exercise of such rights does not unreasonably interfere with the enjoyment of the rights of free navigation defined in Articles XIII and XIV.

Article XVI

Each riparian State may restrict or prohibit the loading by vessels of a foreign State of goods and passengers in its territory for discharge in such territory.

Article XVII

A riparian State may grant rights of navigation to non-riparian States on rivers or lakes within its territory.

Article XVIII

Each riparian State is, to the extent of the means available or made available to it, required to maintain in good order that portion of the navigable course of a river or lake within its jurisdiction.

Article XVIII

1. A riparian State intending to undertake works to improve the navigability of that portion of a river or lake within its jurisdiction is under a duty to give notice to the co-riparian States.

2. If these works are likely to affect adversely the navigational uses of one or more co-riparian States, any such co-riparian State may, within a reasonable time, request consultation. The concerned co-riparian States are then under a duty to negotiate.

3. If a riparian State proposes that such works be undertaken in whole or in part in the territory of one or more other co-riparian States, it must obtain the consent of the other co-riparian State or States concerned. The co-riparian

State or States from whom this consent is required are under a duty to negotiate.

Article XIX

The rules stated in this Chapter are not applicable to the navigation of vessels of war or of vessels performing police or administrative functions, or, in general, exercising any other form of public authority.

Article XX

In time of war, other armed conflict, or public emergency constituting a threat to the life of the State, a riparian State may take measures derogating from its obligations under this Chapter to the extent strictly required by the exigencies of the situation, provided that such measures are not inconsistent with its other obligations under international law. The riparian State shall in any case facilitate navigation for humanitarian purposes.

Chapter 5

Timber floating

Article XXI

The floating of timber on a watercourse which flows through or between the territories of two or more States is governed by the following Articles except in cases in which floating is governed by rules of navigation according to applicable law or custom binding upon the riparians.

Article XXII

The States riparian to an international watercourse utilized for navigation may determine by common consent whether and under what conditions timber floating may be permitted upon the watercourse.

Article XXIII

1. It is recommended that each State riparian to an international watercourse not used for navigation should, with due regard to other uses of the watercourse, authorize the co-riparian States to use the watercourse and its banks within the territory of each riparian State for the floating of timber.
2. This authorization should extend to all necessary work along the banks by the floating crew and to the installation of such facilities as may be required for the timber floating.

Article XXIV

If a riparian State requires permanent installation for floating inside a territory of a co-riparian State or if it is necessary to regulate the flow of the watercourse, all questions connected with these installations and measures should be determined by agreement between the States concerned.

Article XXV

Co-riparian States of a watercourse which is, or is to be used for floating timber should negotiate in order to come to an agreement governing the administrative régime of floating, and if necessary to establish a joint agency or commission in order to facilitate the regulation of floating in all aspects.

Chapter 6

Procedures for the prevention and settlement of disputes

Article XXVI

This Chapter relates to procedures for the prevention and settlement of international disputes as to the legal rights or other interests of basin States and of other States in the waters of an international drainage basin.

Article XXVII

1. Consistently with the Charter of the United Nations, States are under an obligation to settle international disputes as to their legal rights or other interests by peaceful means in such a manner that international peace and security, and justice are not endangered.
2. It is recommended that States resort

progressively to the means of prevention and settlement of disputes stipulated in Articles XXIX to XXXIV of this Chapter.

Article XXVIII

1. States are under a primary obligation to resort to means of prevention and settlement of disputes stipulated in the applicable treaties binding upon them.

2. States are limited to the means of prevention and settlement of disputes stipulated in treaties binding upon them only to the extent provided by the applicable treaties.

Article XXIX

1. With a view to preventing disputes from arising between basin States as to their legal rights or other interest, it is recommended that each basin State furnish relevant and reasonably available information to the other basin States concerning the waters of a drainage basin within its territory and its use of, and activities with respect to each waters.

2. A State, regardless of its location in a drainage basin, should in particular furnish to any other basin State, the interests of which may be substantially affected, notice of any proposed construction or installation which would alter the régime of the basin in a way which might give rise to a dispute as defined in Article XXVI. The notice should include such essential facts as will permit the recipient to make an assessment of the probable effect of the proposed alteration.

3. A State providing the notice referred to in paragraph (2) of this Article should afford to the recipient a reasonable period of time to make an assessment of the probable effect of the proposed construction or installation and submit its views thereon to the State furnishing the notice.

4. If a State has failed to give the notice referred to in paragraph (2) of this Article, the alteration by the State in the régime of the drainage basin shall not be given the weight normally accorded to temporal priority in use in the event of a determination of what is a reasonable and equitable share of the waters of the basin.

Article XXX

In case of a dispute between States as to their legal rights or other interests, as defined in Article XXVI, they should seek a solution by negotiation.

Article XXXI

1. If a question or dispute arises which relates to the present or future utilization of the waters of an international drainage basin, it is recommended that the basin States refer the question or dispute to a joint agency and that they request the agency to survey the international drainage basin and to formulate plans or recommendations for the fullest and most efficient use thereof in the interests of all such States.

2. It is recommended that the joint agency be instructed to submit reports on all matters within its competence to the appropriate authorities of the member States concerned.

3. It is recommended that the member States of the joint agency in appropriate cases invite non-basin States which by treaty enjoy a right in the use of the waters of an international drainage basin to associate themselves with the work of the joint agency or that they be permitted to appear before the agency.

Article XXXII

If a question or a dispute is one which is considered by the States concerned to be incapable of resolution in the manner set forth in Article XXXI, it is recommended that they seek the good offices, or jointly request the mediation of a third State, of a qualified international organization or of a qualified person.

Article XXXIII

1. If the States concerned have not been able to resolve their dispute through negotiation or have been unable to agree on the measures described in Article XXXI and XXXII, it is recommended that they form a commission of inquiry or an ad hoc conciliation commission, which shall endeavour to find a solution, likely to be accepted by the States concerned, of any dispute as to their legal rights.

2. It is recommended that the conciliation commission be constituted in the manner set forth in the Annex.

Article XXIV

It is recommended that the States concerned agree to submit their legal disputes to an ad hoc arbitral tribunal, to a permanent arbitral tribunal or to the International Court of Justice if:

(a) a commission has not been formed as provided in Article XXXIII; or

(b) the commission has not been able to find a solution to be recommended; or

(c) a solution recommended has not been accepted by the States concerned; and

(d) an agreement has not been otherwise arrived at.

Article XXXV

It is recommended that in the event of arbitration the States concerned have recourse to the Model Rules on Arbitral Procedure prepared by the International Law Commission of the United Nations at its tenth session in 1958.

Article XXXVI

Recourse to arbitration implies the undertaking by the States concerned to consider the award to be given as final and to submit in good faith to its execution.

Article XXXVII

The means of settlement referred to in the preceding Articles of this Chapter are without prejudice to the utilization of means of settlement recommended to, or required of, members of regional arrangements or agencies and of other international organizations. ■

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