BLUES BEYOND BOUNDARIES

Transboundary Water Commons
India Report

actionaid

Natural Resource Knowledge Activist Hub

BLUES BEYOND BOUNDARIES

Transboundary Water Commons India Report

actionaid

Natural Resource Knowledge Activist Hub

Report Published in 2015

Photo Credits- Biren Nayak, Priyabrata Satapathy, Malay Ranjan Samantaray

Published by:

Natural Resource Knowledge Activist Hub- A Knowledge Initiative of Actionaid India.
331/A, Saheed Nagar, Bhubaneswar -751007
Pnone - 0674 - 2548224/2548503

Editing, Design and Printing by:
New Concept Information Systems Pvt. Ltd.
Email: communication@newconceptinfosys.com

FOREWORD

The rivers flowing from the Himalayas are the cultural and economic backbone of South Asia. The Ganga, Indus and Brahmaputra have contributed to the rise and prosperity of earliest civilisations in history and today they are the source of life and livelihood for millions. These South Asian river basins support rich ecosystems and sustain the riparian communities. However, rivers are also a source of conflict between countries and people in the region. For many years, water has been one of the most commonly contested bilateral and multilateral issues between countries of South Asia.

The rapid retreat of the Himalayan glaciers, increasing effects of climate change, unrealistic command area of irrigation projects, draining waste water into the rivers, deteriorating river ecology, unplanned developmental activities on flood plains, thrust for hydro power and inattentive water governance through age-old water treaties and agreements have all impacted the life of rivers in South Asia. The question, whether to harness rivers are necessary for flood control or to dam it for hydropower generation and commercial irrigation, is an issue of great concern and a source of controversy. Large-scale water and river-related structures have contributed to the ruin of many river basin communities in South Asia.

Water-sharing conflicts among countries of the region have a long and conflict-ridden history. Bangladesh and India maintain a tense relationship over issues of water management at Farakka barrage and the hitherto unsolved Teesta water-sharing predicament. Indo-Nepal relations have also been over shadowed by issues regarding the region's trans-boundary rivers, such as Kosi, Gandak and Sharda. Pakistan depends on a single river system i.e. the Indus River and its tributaries; however there is regular tussle between India and Pakistan on sharing of water from this river.

Several complexities, in particular lack of political trust, historical misunderstandings and a continuing state of mistrust currently exacerbate the water sharing conflicts between the countries of South Asia. Institutional arrangements to solve India's water-sharing conflicts have also proved inadequate. The Joint Rivers Commission (JRC) does not formulate and implement solutions effectively, due to limited cooperation between countries. Weak water management systems have also created impediments in solving the South Asian water crisis. The political suspicion between the countries make solutions more difficult to find for communities residing alongside the rivers.

"Blues Beyond Boundaries", a study on trans-boundary water commons, recognises that rivers are not restricted by boundaries; they have their own life and flow to give life to a total ecosystem. This study has attempted to understand river water governance between India and its neighbouring countries by studying various river water sharing treaties/agreements and domestic water governance to arrive at pro-riparian policies that benefit communities as well as ecosystems of rivers. It is against this background that people must be consulted through – 'Free, Prior Informed Consent' before going ahead with any treaty or understanding between countries that would impact the river water flow and dependent communities. This report would provide policy makers with useful context about people's perspectives on transboundary river water and how to address their needs before taking any decision on river water management. This report contains valuable inputs from riverine communities. The report suggests active community participation and political will for 'trans-boundary water commons sharing' in a positive, inclusive and needful approach. This will help sustain the river, dependent communities and the ecosystem.

Dr. Kalyan Rudra
Advisor
International Union for Conservation of Nature and Natural Resources (IUCN)

PREFACE

South Asia is about transboundary rivers and water commons. The relations among South Asian countries are bound by rivers and water. It is a region of both water abundance and water scarcity. The Hindukush Himalayan region is the storehouse of major glaciers and fresh water. Prominent rivers that flow through South Asian countries, originate here. Three major rivers- the Indus, the Ganga and the Brahmaputra are the life line for people living on the banks and regulate their social, economic and cultural life. The political relations among countries revolve around these rivers with riparian positions, people's perceptions and government priorities.

Rivers know no 'human-made' political borders and flow freely across countries, cities, and villages, across fields and industrial corridors. In terms of hydrography, one can argue that the states and societies of South Asia share a remarkable unity and its rivers bind the landscape into a composite whole. Nepal and India share the Mahakali-Ganga Basin, India and Pakistan share the Indus Basin, India and Bangladesh share the Ganga-Brahmaputra-Meghna basin. If one looks at the overall riverscape of these transboundary waters, these river systems together cover the vast Indo-Gangetic plains – or what constituted the ancient Sapt-Sindhu (seven rivers) valley and the Gangetic basin.

Control over water in the subsequent period created disputes and conflict among countries. Upper riparian countries exercise their power to have more control over water while lower riparian countries face scarcity if water is not released on time. India is in an advantageous position both as lower and upper riparian country for many rivers and exercises its position accordingly.

It is against this background that this study "Blues Beyond Boundaries" taken up by Natural Resources Knowledge Activist Hub (NR-KAHUB) holds significance. It is a part of a study on South Asia being simultaneously taken up by Bangladesh, Nepal and Pakistan. It has been brought out at a time when the issue of water commons has been the centre of conflict as well as development in each country. Communities are largely ignored and sidelined on water management and governance. Women face the consequence of water scarcity and need to cover large distances to reach the water at river-end. Treaties and agreements on water and rivers are made without taking into account views of dependent communities. The study reveals ground realities behind water and river politics.

One major objective of this study is to find out the level of people's involvement in trans-boundary water governance and suggest alternatives in framing of upcoming treaties and agreements related to water. The study has covered all other aspects and put forth appropriate suggestions. I hope this would contribute to formulation of policies in India and the South Asia region.

My heartiest congratulation to the study team for their effort in bringing out this report, especially the leader and colleagues in NR- KA Hub.

Sandeep Chachra
Executive Director,
Action Aid India

ACKNOWLEDGEMENT

Our study on trans-boundary water commons has culminated in the form of a report titled "Blues Beyond Boundaries" with collective effort and inspiration from so many individuals and groups having expertise and experience on water issues. We feel proud and delighted to express our gratitude to all of them. Our special thanks go to all community members, leaders, local NGO/CBO volunteers for spending time with us to provide information beyond our expectations.

Immense thanks to all our State Coordinators- Somnath Ghosh of West Bengal, Dr. Wasim Akhtar of Uttar Pradesh, Rayees Rasool of Jammu & Kashmir and investigators Mirza Safi Kamal, Bhaswati Roy Chowdhury, Rupak Mukherjee, Hasiara Sultana, Kalpana Sarkar and Nikhil Chandra Ray of WB, Rambriksha Giri, Vikram Prasad of Uttar Pradesh, Sunil Kumar Mandal of Bihar and Qazi Umer, Farooz Ahmed and Khalid Hussain of J&K who helped in data collection. We are grateful to Kameswar Kamati and Tariqul Islam for their involvement as State Coordinator and researcher for their vast experience with the struggling group in Bihar and West Bengal. We are grateful to Bhabani Mallia and Ashes Mustafi for their support in data compilation and analysis for the study.

We are thankful to Chittaranjan Mandal, Vinay Gadhar, Debabrata Patra and Khalid Chowdhury, the Regional Managers of ActionAid from West Bengal, Bihar, Uttar Pradesh respectively for their initiation and support for the study. We thank Arvind Kumar and Rajan Singh for their support during field visits. We greatly appreciate Shoaeb Afra and Tanveer Dar from Jammu & Kashmir, for providing support in conducting the study in the state. We are also immensely grateful to late Vijay Kumar from Bihar who provided his expertise in an earlier part of the study.

We sincerely acknowledge the contribution of our colleagues – Shamsher Ali from Bangladesh, Nasir Aziz from Pakistan, Rajkumar Trikhetry and Dinesh Gurung from Nepal, for their very valuable suggestions and contributions to enrich this study. We are profoundly thankful to Farah Kabir, Country Director, ActionAid Bangladesh and Bimal Phunyal, Country Director, ActionAid Nepal for their continuous and unconditional support for this study from the outset.

We would also like to express our gratitude to Prof. Imtiaz Ahmed from Bangladesh and Ajay Dixit from Nepal for sharing their pearls of wisdom with us during the course of this study and we thank Dr. Kalyan Rudra, Manoj Pandey and Dr. Uttam Kumar Sinha for their valuable insights.

We are indebted to Shri Anupam Mishra for his insightful suggestions to make this report lively for the readers. We express our gratitude to our lead researcher Prof. Anuradha Chenoy who has consistently led the study process from the beginning to its completion.

We appreciate the contribution and cooperation of our colleagues, Dr. Sricharan Behera, Ratikanta Rana, Supriya Patra and Malay Samantaray for smooth completion of the study.

We appreciate efforts of Programme Manager Biren Nayak and Project Coordinator of this study, Priyabrata Satapathy, for facilitating the study at the ground level and finalising the report at the national level.

We thank New Concept for editing, designing and printing the study report. Our sincere thanks to DFID for providing resource support to this study.

We owe our special thanks to Sandeep Chachra, Executive Director, ActionAid India for his constant support and inspiration to this research.

Bratindi Jena
Head, Natural Resources Knowledge Activist Hub,
ActionAid India

ABBREVIATION

BCM	Billion Cubic Metre
BHEP	Baglihar Hydro Electric Project
CFF	Committee on Flood Forecasting
COA	Court of Arbitration
DIST	Districts
EF	Environmental Flows
FFMP	Flood Forecasting Master Plan
FGD	Focus Group Discussion
FT	Feet
GGB	Greater Ganga Basin
Govt.	Government
GP	Gram Panchayat
HH	Household
HKH	Hindu Kush-Himalayan region
HRP	Human Resource Planning
HSC	Higher Secondary Certificate
ICA	International Court of Arbitration
ICDS	Integrated Child Development Services
IDP	Internal Displacement of People
ILA	International Law Association
INGO	International Non Governmental Organisation
IWT	Indus Waters Treaty
J&K	Jammu & Kashmir
JCE	Joint Committee of Experts
JRC	Joint Rivers Commission
JSCWR	Joint Standing Committee on Water Resources
JSTC	Joint Standing Technical Committee
JTG	Joint Technical Group
Km	Kilometre
KW	Kilowatt
MAF	Million Acre Feet
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MHA	Million Hectare
MI	Mile
MoU	Memorandum of Understanding
MW	Megawatt
NA	Not Applicable
NGO	Non Government Organisation
OBC	Other Backward Classes
SC	Scheduled Caste
Sq km	Square Kilometre
Sq mi	Square Mile
SSC	Secondary School Certificate
ST	Scheduled Tribe
TAR	Tibet Autonomous Region
UN	United Nations
UNEP	United Nations Environment Programme
UP	Uttar Pradesh
WB	West Bengal
WWAP	World Water Assessment Programme

Contents

Executive Summary

Water, the 'blue gold', has been the lifeline of civilisations for generations. Common source of water in the form of ponds, lakes, streams, rivers and oceans maintain the ecological balance on earth. Rivers, as creation of nature, are free-flowing allowing all aquatic forms to survive in their waters. Thus, an 'environmental flow'/'minimum flow' is required in order to maintain a reasonable condition. Rivers constitute identities and create societies in many different ways, having both symbolic value as well as being the primary agency in culture. Socio-economic and cultural rights of human society revolve around the flow of rivers irrespective of geo-climatic locations. Thus, symbolically the river is referred to as 'Mother'. Around 264 of the largest rivers in the world flow through basins that are shared by more than one nation. These Transboundary Rivers that cross country boundaries deal with a number of treaties/memorandums of understanding related to sharing of water. Most conflicts over river waters arise due to water sharing as part of large scale development projects. River rights, human rights, water commons with special reference to transboundary water commons are dealt with in Chapter one.

Chapter two is the methodology. This study aims to understand river water governance between India-Nepal, India-Bangladesh and India-Pakistan by studying various river water sharing treaties/agreements and domestic water governance in India to arrive at pro-riparian policies that benefit communities as well as the rivers' ecosystems. It covers seven river valleys–Chenab, Kisan Ganga (Jammu & Kashmir), Kosi (Bihar), Sarada, Gandak (Uttar Pradesh), Ganga and Teesta (West Bengal). In these seven river valleys, four states, 10 districts, 20 blocks, 48 Gram Panchayats, 80 villages and 2000 households are covered. The primary information was collected through household (HH) surveys, focus group discussions (FGDs) and case studies while secondary information was collected from different articles and research papers of prominent authors and researchers by browsing through various websites. A number of treaties entered between countries were also taken into consideration for this purpose. News covered in different newspapers was referred to, for understanding of recent developments.

Chapter three focuses on treaties signed between countries on the transboundary rivers taken in this study. Treaties signed between countries on various rivers are not only related to sharing water, but reflect the diplomatic relationship between countries. Sustainable management of water within and between India and its neighbouring countries is vital to the national interest of all countries. One of the most contentious issues between India and other countries has been sharing and developing trans-boundary water resources. Controversies surrounding past treaties and deep-seated suspicions have held up mega-projects planned on different rivers.

Chapter four deals with analysis of household and village level information for communities located on trans-boundary rivers. Analysis and interpretations have also been made on socio-economic and educational factors. The major factors analysed were river sharing between neighbouring countries across international borders; awareness amongst local people about the international treaties for river water sharing; the dependency on the river; the changes in river morphology; the impact due to these changes; increasing disasters; factors impacting vulnerability of riverine communities; local community's perception of treaties, awareness and participation in decision-making process; specific impact on women and capacity to cope up with the situation. Chapter five deals with conclusion and recommendations which have emerged from the study.

Major Findings

Communities studied are well informed about the origin of the trans-boundary river and its' path, flowing from one to another country.

Countries benefitting from the river water are perceptions driven more by community affinity rather than being upper or lower riparian. Respondents squarely put the blame for floods on the upper riparian and the 'other state' and state administration for failure of water management. It seems evident that river management has been replaced by the politics of blaming the 'other'.

This study shows that fishing, navigation and even access to drinking water is becoming increasingly difficult and even diminishing in many cases. Instead, shrinking river channels, decline of species and pollution of water is making life dangerous for these riverine communities.

Communities have experienced a shift in the pattern of river water use over the last decade. Barrages constructed on rivers have disrupted free flow of water and created sudden disasters like flood and river bank erosion as the flood plains that are the natural habitat of the river were barraged.

River bank erosion has played an important role in displacing communities from their original place of habitation. River bank erosion is creating a situation of 'Internal Displacement of People' as many villages located on the river basin face regular inundation and flooding.

Constant fear and reality of multiple displacement creates tensions and trauma amongst all, especially women and children. Women become the main caregivers in these

situations, while there are no facilities for the care of women themselves.

The very approach to manage the river has been a structure based water management system which ignores a holistic river basin approach. Water problems result largely from poor water management especially when there is either direct hostility between countries who share the river or where competitive nationalism shapes the discourse on river water sharing.

Women face multiple levels of burden and exploitation in public and private spheres of their lives. Social relations of power are skewed in favour of men even within the households, while both men and women face the exploitation and wrath of river disasters collectively. Women have little or no say in policy making at public levels.

Treaties and agreements between countries control river water and impacts community life on the riverbank but the study shows that there was barely any awareness amongst people on this and they were hardly consulted.

Major Recommendations

Rivers must be understood as harbingers of civilisation and allowed to flow freely without any construction on the flood plain. This is for protecting the socio-economic, cultural and religious rights of dependent communities and all living beings.

Survival and rights of aquatic creatures must be ensured as reduced/dried up flow kills many species. This affects their breeding ground resulting in the extinction of some varieties. Steps should be taken to ensure the protection and survival of all such aquatic life.

Ecological flow and environmental flow of the rivers must be well defined, and information on such flow needs to be shared with the community and maintained for all rivers throughout the year.

Transboundary rivers that connect South Asian countries and communities living across borders must be recognised as living beings and these rights must be recognised by the law of the land.

There is a need to facilitate transboundary community interaction for a healthy relationship and cooperation on water commons.

Women play an important role in water collection and storage for household consumption; hence they should be treated as the primary stakeholders. All their expertise, experience and difficulties must be considered as an input while formulating water and river policies.

The government must have a policy in place to address ownership over newly formed Char lands as and when it is formed. Ownership must be attributed to families factoring in at their vulnerability and loss of land.

Any intervention or agreement on a transboundary river has to be multi-lateral not bi-lateral, so that all countries through which the rivers flow are involved.

Old treaties or agreements need to be reviewed in the context of the present need of the river and dependent communities.

People must be consulted through – 'Free, Prior Informed Consent' before going ahead with any treaty or understanding between countries that would impact the river water flow and dependent communities. Community consultation must be held before developing the agreement.

Women and children must be involved in community capacity building process to deal with climate change related disasters on the river bank.

Climate resilient agriculture/horticulture practices must be promoted on river banks to address change in livelihood pattern and massive migration.

Displacement due to floods (created due to water mismanagement upstream) and river bank erosion need to be recognised as 'Internal Displacement of People' (IDP) and required support needs to be provided. Also, proper and timely rehabilitation should be ensured.

River bank erosion must be considered as a natural disaster in relief codes and due compensation must be provided to affected families.

Post disasters, government needs to reach out to people on both relief and rehabilitation, which is lagging behind in the current situation.

The state must make all efforts to reach out to women and people from vulnerable communities on a priority basis. Those who are already vulnerable suffer unequally because of social structures.

Emphasis must be given to people's traditional knowledge and governance system of river water. This will help in coping with floods and erosion.

The linkages between the locals and the authorities on sharing information related to disaster need to be addressed on a priority basis. Measures are required for ensuring access to information, technology, resources and public participation to deal with disaster.

CHAPTER 1

INTRODUCTION

1.1 Water Commons

Water is the lifeline for survival of all life. This 'blue gold' in all its forms, whether it is sweet, salty, muddy or frozen – is inseparable from life. The presence of the large quantity of water, which is two-thirds of the earth, gives a blue look seen from space. The common source of water in the form of ponds, lakes, streams, rivers and oceans maintains the ecological balance on earth.

The idea of water commons has been synthesised by Wall Jasper as: "The water commons as a concept is easy to understand. And in a time when our planet is threatened by global warming, the importance of the idea is all-too-obvious. To put it simply, the water commons means that water is no one's property; it rightfully belongs to all of humanity and to the earth itself. It is our duty to protect the quality and availability of water for everyone around the planet. This ethic should be the foundation of all decisions made about use of this life giving resource. Water is not a commodity to be sold or squandered or hoarded."[1]

There are thousands of campaigns across the world with this as the focus. These are based on shared principles and advance the idea of water commons in diverse languages and specificity.[2]

Barlow argues that: "Every human activity now needs to be measured by its impact on water and the water commons," Maude Barlow declared. "It is a flagrant violation of human rights when only the rich have access to clean water," she added.[3]

The idea of water commons has been included in the - Constitutions of South Africa, Uruguay, Ecuador and Bolivia as a human right, making it difficult for delivery systems to be sold into private hands. In Colombia, Costa Rica, Mexico, El Salvador and Italy, advocates are working towards the same goal with their respective Constitutions. Similarly, communities across US and Canada have triumphed against sweetheart deals allowing Nestlé to pump water from rivers, lakes and aquifers, to be sold at 1,000 times the cost of tap water. After years of public pressure, the local government in Kerala, India, ruled that residents' access to water was a priority and not of corporate power and ordered a highly polluting and water-consuming Coca-Cola plant to close down in 2005.

Water has the same popular appeal as justice, freedom, equality, representation and power. There is also something elemental or inherently controversial about water because searching for solutions to manage and cope with water issues creates a set of different problems

[1] Jay Walljasper, http://otherworldsarepossible.org/claiming-protecting-water
[2] Maude Barlow, (2012) Water as a Commons: Only Fundamental Change Can Save Us, The Wealth of the Commons; A world beyond market & state, Levellers Press.
[3] Ibid

that are political, emotive and divisive.[4] There are deep linguistic, cultural, migrational, religious and historical ties that people share across borders. Amidst this, rivers have been a stream of "collective belonging"—sustaining ecosystems, communities and acting as a unifying force for South Asia's 'geo-economic and geo-cultural landscape'.[5]

In order to uphold water commons, it is essential to imbibe that water belongs to all and needs to be preserved for future generations both in sufficient quality and quantity. While the rights of rivers are ensured to flow free, all aquatic creatures have the right to survive in suitable water conditions and flourish in all forms of water commons going beyond geo political boundaries.

1.2 Rights of Rivers

The World Wild Life Report defines free-flowing river "as any river that flows undisturbed from its source to its mouth, either at the coast, an inland sea or at the confluence with a larger river, without encountering any dams, weirs or barrages, without being hemmed in by dykes or levees. In today's world, such rivers, particularly those that flow over long distances, are increasingly rare. In large river systems, distinct stretches of rivers can retain characteristics of a free-flowing river, despite the presence of water infrastructure upstream or downstream of this stretch".[6]

Rivers are parts of integrated systems that include flood plains and riparian corridors. Collectively these systems provide a large menu of benefits. Dr. Kalyan Rudra emphasised that the river systems along with issues of ecology, culture, livelihood, resource sharing, river bank erosion and floods have to be taken into consideration. All these issues should be seamlessly woven or inter-linked. Any study about a river would be incomplete otherwise.[7]

By the 1990s, scientists realised that the biological and social systems supported by rivers are too complicated to be summarised by a single minimum flow requirement. Hence, restoring and maintaining more 'comprehensive environmental flows' has gained increasing support.[8] This concept has evolved to further dam reoperation and water management including groundwater and surface water diversions. In a global survey of water specialists

> समाज ने पीढ़ियों से, शताब्दियों से, यहां फिसलगुंडी की तरह फुर्ती से उतरने वाली नदियों के साथ जीवन जीने की कला सीखी थी, बाढ़ के साथ बढ़ने की कला सीखी थी। उसने और उसकी फसलों ने बाढ़ में डूबने के बदले तैरने की कला सीखी थी। वह कला धीरे-धीरे मिटती जा रही है।
>
> तैरने वाला समाज,
> आलेखः श्री अनुपम मिश्र, मई 2008

undertaken in 2003 to gauge perceptions of environmental flow, 88 percent of the 272 respondents agreed that this concept is essential for sustainably managing water resources and meeting the long-term needs of people.[9] Ecological flow describes the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystem and human ensuing their well-being.[10]

Developed nations have focused largely on maximising flood protection and water management from the turn of the 20th century through the 1960s. During the 1970s, the ecological and economic effects of these projects prompted scientists to seek ways to modify dam operations to maintain certain fish species. Environmental flows evolved from this concept of "minimum flows" and later, "in-stream flows," which emphasised the need to keep water within waterways.

In 2007, the Brisbane Declaration on Environmental Flows was endorsed by more than 750 practitioners from more than 50 countries.[11] The Declaration announced an official pledge to work together to protect and restore the world's rivers and lakes. By 2010, many countries throughout the world had adopted environmental flow policies, although their implementation remains a challenge.[12] These flows ensure a flow regime capable of sustaining a complex set of aquatic habitats and ecosystem processes and are referred to as "environmental flows", "environmental water requirements", "environmental flow requirements", "environmental water demand", etc.[13] Environmental Flows (EF) is a simple concept of compromise between water resources development on one hand and river maintenance in a reasonable condition on the other. However, difficulties arise in the actual estimation of EF values.

[4] India's water woes, Dr. Uttam Kumar Sinha, March 2014
[5] Ajaya Dixit, "Rivers of Collective Belonging," Himal South Asia, August 2003.
[6] Free-flowing rivers: Economic luxury or ecological necessity? (2006) WWF Report,
[7] Ecosystems for Life, IUCN, January 2014, http://mcrg.ac.in/IUCN/IUCN_Report_Kolkata.pdf
[8] Bunn, S. E., and Arthington, A. H. 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. Environmental Management 30:492-507.
[9] Moore, M. 2004. Perceptions and interpretations of environmental flows and implications for future water resource management: A survey study. Masters Thesis, Department of Water and Environmental Studies, Linköping University, Sweden
[10] http://www.eflownet.org/viewinfo.cfm?linkcategoryid=4&linkid=64&siteid=1&FuseAction=display
[11] The Brisbane Declaration, Environmental Flows Conference, held in Brisbane, Australia, 3rd – 6th Sept 2007
[12] Le Quesne, T., Kendy, E., and Weston, D. 2010. The Implementation Challenge: Taking stock of government policies to protect and restore environmental flows. WWF and The Nature Conservancy.
[13] Knights, P. 2002. Environmental flows: lessons from an Australian experience. Proceedings of International Conference: Dialog on Water, Food and Environment. Hanoi, Vietnam. 18 pp.

In India, Ramaswamy Iyer (2005), advocated the importance of distinguishing between in-stream flows for different purposes: "Flows are needed for maintaining the river regime, making it possible for the river to purify itself, sustaining aquatic life and vegetation, recharging groundwater, supporting livelihoods, facilitating navigation, preserving estuarine conditions, preventing the incursion of salinity and enabling the river to play its role in the cultural and spiritual lives of the people."[14]

Rivers are not simple channels of water at varied flow intensity. Rivers are a dynamic combination of water, sediment, aquatic organisms, and riparian vegetation, all participating in a complex dance from the point of origin, or headwaters, toward the ocean or basin where the journey ends. Prof. Imtiaz Ahmed observed that water as a vital component is not given its due importance. All human beings are associated with water, not just a hydrologist. According to Ahmed, for science, water is only a compound (H_2O) and for social science, it also encompasses varied aspects of power, politics, pollution and profit.[15]

The shape of rivers and streams changes with time as erosion, deposition and transport of sediment occurs. Rivers and streams maintain a dynamic equilibrium between discharge, slope, sediment load, and sediment size.[16] Landscape evolution is a result of interaction between water, sediment and vegetation. However, the world's rivers are increasingly being altered with the construction of dams and diversions. More than half of the world's large rivers are dammed,[17] a figure that continues to increase. South Asian rivers are amongst the most dammed. Dams and other river structures change the downstream flow patterns and consequently affect water quality, temperature, sediment movement and deposition, fish and wildlife and the livelihoods of people who depend on healthy river ecosystems. Environmental flows seek to maintain these river functions, while at the same time providing for traditional off stream benefits.[18]

1.3 River as Human Rights - Socio, Economic, Cultural and Religious Existence of Civilisation

The river, in its many facets, matters for humans, while the social, cultural, ideological and religious roles of water include deep ontological relations and identities ranging from personal perceptions to religious rituals.[19]

Without integrating the river as a relevant variable for understanding people's identities, cultures and religions in the past and present, one misses crucial aspects of historical agencies and structures at work in society and religion with its ramifications for future generations.

Rivers that cross state boundaries acquire geo political rivalries, even though they involve the identities of people regions and a certain type of behaviour pattern. States have often built dams without doing adequate social impact assessment. In the effort to build dams and generate power, the core of the existence of river communities in terms of identity, tradition, culture and religion has not been adequately assessed. For example, if the Tehri dam gates are not regulated to maintain the flow of Bhagirathi, the downstream Ganga flow gets restricted.

Water constitutes identities and creates societies in many different ways, having both symbolic value as well as being the primary agency in culture. Water creates certain social and cultural practices of collection and sharing. By conducting such practices on a daily, seasonal and annual basis, traditions are made and the collectiveness of practices creates values and norms not only at the household, community and regional levels but also creates national identity. The political boundaries of states may not correspond to the cultural units as these identities have their point of departure in the very physical presence of the river. Reverence for the River Ganga for example, changes as it crosses the national border. India is identified as a country where the River Ganga flows because it is not only the identity of the country but the cultural, religious and social fabric of communities that are woven around the existence of the River Ganga. Symbolically, this river is referred to as 'Mother'.

Rivers have a deep religious significance relating to communities inhabiting their banks for generations. Idols of Gods and Goddess are prepared from the river bank mud and immersed in river water after worship. Many important religious performances start with a dip in the river and by carrying river water for the ceremony. In fact 'religious bath' on a large scale is observed accompanied by big religious fairs at a regular interval, depending on the lunar calendar. When the river is miles away, just sprinkling a few drops of the Ganga water is believed to purify the place of offering. Not only for performing worship or purification, Ganga water is believed to liberate one from the cycle of life and death for Hindus. In rural India, river water plays an important role from birth rituals to death rituals. "....for the present day Bangladeshi, Nepali,

[14] Iyer, R. R. 2005. The Notion of Environmental Flows: A Caution NIE/IWMI Workshop on Environmental Flows, New Delhi, March 23-24, 2005.
[15] Prof. Imtiaz Ahmed, Water Futures: A Dialogue for Young Scholars and Professionals Ecosystems for Life: A Bangradesh- India Initiative, November, 2013
[16] Lane, E. W. The importance of fluvial morphology in hydraulic engineering. Proceedings of the American Society of Civil Engineering 81, paper 745, 1–17 (1955).
[17] Nilsson, C., Reidy, C. A., Dynesius, M., and Revenga, C. 2005. Fragmentation and flow regulation of the world's large river systems. Science 308: 405-408.
[18] Postel, S., and Richter, B. 2003. Rivers for Life: Managing Water for People and Nature. Island Press, Washington, D.C.
[19] Terje Oestigaard, 2009, Water, Culture and Identity: Comparing Past and Present traditions in the Nile Basin Region,

हमारे समाज ने गंगा को मां माना और ठेठ संस्कृत से लेकर भोजपुरी तक में ढेर सारे श्लोक मंत्र, गीत, सरस, सरल साहित्य रचा। समाज ने अपना पूरा धरम उसकी रक्षा में लगा दिया गया। इस धरम ने यह भी ध्यान रखा कि हमारे धरम, सनातन धरम से भी पुराना एक और धरम है। वह है नदी धरम। नदी अपने उद्गम से मुहाने तक एक धरम का, एक रास्ते का, एक घाटी का, एक बहाव का पालन करती है। हम नदी धरम को अलग से इसलिए नही पहचान पाते क्योंकि अबतक हमारी परपंरा तो उसी नदी धरम से अपना धरम जोडे रखती थी।

रावण सुनाए रामायण,
आलेखः श्री अनुपम मिश्र, जून 2013

Sri Lankan, Pakistani or Indian, the Ganga is a denominative absolute, be it the Burhi Ganga of Bangladesh, the Trisuli Ganga of Nepal, the Mahaweli Ganga of Sri Lanka, the Sindhu Ganga of Pakistan, or the Cauvery Ganga of peninsular India. The Trisuli Ganga, hurtling past the gorge, evokes in the Nepali villager the same sentiment as the Ganga entering from upstream to join the Bay of Bengal does in the Bangladeshi farmer."[20]

Rivers and divinities are not limited to any one religion. Christianity and Islam also have the concept of 'Holy Water'. Although the basis of social and religious core values has been changing throughout history, the ontology of water has been and still is part of the fundamental belief system in society and religion. Importantly, water beliefs and rituals often overlap and transcend dogmatic beliefs and rites in "great traditions" or world religions.[21]

1.4 River and Gender

In India, since ancient times, the river has been revered as a great source of spiritual and religious existence closely related to women. Regular offerings and prayers on the river bank by communities seeking blessings, have been in practice for generations. Rivers are referred to as 'Nadi' and worshipped as 'Mother'. Often floods and related disasters are interpreted as the River goddess being furious for some reason, so communities located on riverbanks worship the river to keep it calm and contained. All rivers in India have feminine names, except the Brahmaputra that becomes the Jamuna after entering Bangladesh.

During floods and erosion, women are the first to be affected. Conventionally, at the HH level, collecting water has normally been the task of women, thus creating gender relations between 'water and women'. In rural India, both morning and evening water collection points at rivers or ponds becomes the only time for women of different age groups to interact with each other and often share their experiences, sorrows and happiness. These too vary depending on the distance women cover to reach the river bank. Often women have to walk for miles to collect water. In some locations, where the river is at close proximity, women carry on washing, cleaning and tending the livestock on the river bank itself. Apart from HH chores, water plays an important role in agriculture and livestock rearing. Most often, these are not individual but community activities. Thus, women and water especially in form of the river are inseparable as entire HH responsibilities related to water are lay the shoulders of women.

1.5 River Water sharing – India and Transboundary Rivers

All the 264 largest rivers in the world flow through basins that are shared by more than one nation and are home to at least 40 percent of the world's population.[22] Water being an essential resource and because of its scarcity, there are arguments on 'water war 'or 'water crises'. This is more evident in arid and semi-arid zones. India has a large number of rivers like the Indus, the Ganges, the Sharda, the Kosi, the Bramhaputra and the Teesta that traverse international (South Asia) and inter-state boundaries, starting from Kashmir till West Bengal.[23] Apart from these major rivers, there are many small transboundary rivers connecting communities across the borders. Since rivers physically link upstream and downstream users, knowledge can also be 'constructed' to suit the riparian state interest. The possession or capture and control of water resources can result in aggressive tendencies and can readily translate into power and dominance. Water, thus, can assume hegemonic attribution.[24]

Most conflicts over river water develop due to water sharing and large scale development projects and also when they tend to ignore issues surrounding political power and equity. The uniqueness of each basin and its' riparian states suggest that any universal set of principles must, by necessity, be fairly general. There are many treaties and agreements between countries sharing transboundary river water, in order to regulate and have control over water by riparian countries. It is ultimately the river bed communities that are affected by these treaties and agreements. Thus, the study on transboundary water commons aims to reveal the reality at the ground level.

[20] Ajay Dixit, Himal South Asian, August 2003.
[21] Terje Oestigaard, 2009, Water, Culture and Identity: Comparing Past and Present traditions in the Nile Basin Region,
[22] Wolf, Aaron T.1998. 'Conflict and Cooperation along International Waterways', Water Policy, 1 (2)
[23] ibid
[24] "Himalayan Hydrology and the Hydro politics", Water Hegemony: Examining China's Hydro-behaviour, Uttam Kumar Sinha February 2011

CHAPTER 2

RESEARCH METHODOLOGY

2.1 Objectives of the Study

2.1.1 Broad Objective

To understand river water governance between India-Nepal and India-Bangladesh and India–Pakistan by studying various river water sharing treaties/agreements and domestic water governance in India to arrive at pro-riparian policies that benefit communities as well as the ecosystems of rivers.

2.1.2 Specific Objective

1. To conduct qualitative evidence based research on river water treaties/agreements between India and its neighbouring countries Nepal (Sharda, Gandak and Kosi), Pakistan (Indus - Chenab and Kishan Ganga) and Bangladesh (Ganga and Teesta);
2. To understand how the treaties and the respective projects under them have affected river banks, embankments for flood control, lives and livelihoods of people;
4. To understand the impact of transboundary river water sharing on lives of communities (socio-economic, cultural and religious);
5. To disseminate the findings from the study in order to advocate proper river water sharing mechanisms and community alliance across borders on water issues

2.1.3 Focus of the Study

i) Study the transboundary rivers (between India – Nepal, Bangladesh and Pakistan) and its relation with river bed communities, both as upper and lower riparian.

ii) Understand and find out the impact of treaties/ agreements between countries on river eco-system and community water governance.

iii) To analyse the socio-cultural, economic and religious impact of rivers due to human interference, change in river course and river bank erosion, impact on communities –especially on women.

2.2 Water Commons South Asia Study-State, National and International Journey

Sl. No	Time	Events
1.	June 2012	Proposal on Water Commons was initiated by newly formed NR Hub as a joint initiative of AA India – Hub & Regional offices located on transboundary rivers with Nepal and Bangladesh.
2.	Sept 2012	Water commons issues discussed at Asia CD meeting. Planned to take up at Nepal, Bangladesh and India level.
3.	Dec 2012	Study team from Nepal, Bangladesh & India met in Dhaka to plan the study proposal (19th – 20th). CDs from Nepal, Bangladesh, India and Pakistan met at Kathmandu for finalising the study outline and Pakistan joined the study (28th – 29th).
4.	April 2013	India water study proposal got approved from IPAP budget till December.
5.	June 2013	Meeting was held at Kolkata on 18th – 19th June 2013 for identification of study location and frame questionnaire.
6.	July 2013	Meeting of all four country study teams in Kathmandu for mapping of study location, work out modalities of research. (5th – 6th July)
7.	Aug 2013	Meeting was held at Kolkata to conduct the pilot study on ground and interact with communities (21st – 22nd).
8.	Dec 2013	Finalised a common study design research methodology and questionnaire to maintain uniformity of the research (19th – 20th), Dhaka.
9.	Aug/Sept 2014	Stock taking meet in Kathmandu. (30th – 31st).
10.	Nov/Dec 2014	WC Study team participated and shared transboundary river water issues with larger audience of PSAARC (22nd – 27th Nov) in Kathmandu. Sharing of study outcome and analysis framework worked out in Dhaka. (22nd – 23rd December) National water study team meet for India in Odisha (28th December).
11.	Jan 2015	Regional data analysis workshop for analysts in Kathmandu. South Asia data consolidated. (25th – 26th)
12.	Apr 2015	Draft study report presented in Kathamandu by all countries. Decided to go ahead with printing of country reports. South Asia report and policy brief to be finalised by Sept 2015 for sharing at South Asia level (10th – 11th).

2.3 Study Universe

The study universe is based on seven river valleys - Kosi (Bihar), Chenab, Kishan Ganga (Jammu & Kashmir), Ganga, Teesta (West Bengal) Sharda and Gandak (Uttar Pradesh), the covering states, districts, blocks, *gram panchayats* and villages are given below. (List of sample states, districts, blocks, *gram panchayats*, villages, river valleys and number of HHs covered)

State	District	Block	*Gram Panchayat*	Name of Village	River Valley	No. of HHs
J&K	Doda, Ramban, Bandi pora	Assar, Pasirota, Malmat, Malwat, Doda, Doda, Ramban, Dawar Gurez	Chaka-A, Bibrota, Assar, Chaka-A, Masmat (Prayota-v), Rasihot, Pasiyota-B, Doda, Rasihot, Kunpher, Badwan, Khopri, Badwan, Dawar, Markoot, Badwan Wamphoora, Shahpora Balla (Dawar), Shahpoora Payeen, Dawar-A , Dawar-B, Shahpora Balla	Chokakhundi, Sasnasool, Assar, Sewa, Jomata, Jaglewada, Bagairmi, Pull Doda, Rehasi, Kumpher, Badwan Kupri, Khandiwal Gurez, Mastan, Morkoot, Wamphoora, Shapoora, Achoora, Dawar Gurez, Charwan	Chenab, Kishan ganga	500

State	District	Block	*Gram Panchayat*	Name of Village	River Valley	No. of HHs
Bihar	Supaul	Nirmali, Basantpur	Dogbara, Dighiya, Kunauli, Kamalpur, Kamalpur, Bhagbanpur, Satan patti, Bhagbanpur, Bhimanagar, Ratan Pura	Sikarhatta, Dighiya, Batnaha, Haripur, Kamalpur, Saheban, Lalmenpatti, Raniganja, Bhimanagar, Pipparahi,	Kosi	250
Uttar Pradesh	Maharaj Ganj, Lakhimpur Khiree	Nichlaul, Phul Behed	Baradaya Mustkil, Kalnahi Khurd, Kan Miswa, Shohgi Burwa, Shikarpur, Gum, Pipragoom, Narhar, Gaura	Gethiyawa, Kalnahi Khurd, Karwatahi, Bhedihari, Gosainpur, Katan Tola, Bhuthaha, Bazaar Tola, Dauvanahawa, Dharampur, Jungle No-11 (Raghavpuri), Manpur Kardadihya (Baba Puruwa), Langdi Purwa (Narhar), Pakria Purwa, Jungle No-10 (Tapar Purwa), Jungle No-11 (Bedha Butiya), Jungle No- 11 (Chaklawa), Jagannath Purwa, Mainha Ghat, Ichharam Purwa,	Gandak, Sharda	500
West Bengal	Malda, Murshidabad, Cooch Behar, Jalpaiguri	Bagalachak, Kaliachak, Baishnab Nagar, Farakka, Samserganj, Mekhliganj, Haldibari, Mainaguri, Kotowali	Panchanandapur-I, Bangitola, Bir Nagar-I, Lakshmipur, Beniyagram, Nayensukh, Dhuliyan, Samserganj, Nijtaraf, Par Mekhliganj, Padmati-2, Dakshin Padamati, Kharia, Baropatia, Patkata	Ashok Tola, Majhia Saran, Bangi Tola, Naya Gram, New Jahan Tola, Birnagar China Bazar, Durgaran Tola, Atar Tola, Bir Nagar Sarkar Tola, Molla Tola, Beniyagram, Brahman Gram, Jafarganj, Ramrampur, Raghunathpur, Hatichitra Bagan, Krishnapur, Lakhinagar, Lalpur, Paharganj, 125 Kharkharia, 25 Poyosthi (Booth: 72 Nijtaraf), Panierchar, Biswaspara, Uttar Daribas, Natun Paya (Dakshin Padmati), Dhaulur Char/ Motiar Char/ Shantir Char/Sanyasir Char, Sarada Palli, Basunia Para, Rangdhamli Bazar	Ganga, Teesta	750
4 States	**10 Districts**	**20 Blocks**	**48 *Gram Panchayat***	**80 Villages**	**7 Rivers**	**2000**

The study covers two districts, 20 villages and 500 HHs from the State of Uttar Pradesh (UP), three districts, 20 villages and 500 HHs from the State of Jammu & Kashmir (J&K), one district, 10 villages and 250 HHs from the State of Bihar and four districts, 30 villages and 750 households from the State of West Bengal (WB).

2.4 Sample Design of the Study

The study has used stratified purposive sampling for collection of primary data. The criteria for the selection of river valleys and villages for this study were set up collectively with all four country research teams including four lead researchers at a meeting held in Kathmandu. After a lot of debate and discussion, the following criteria were adopted for the selection of the samples.

- Transboundary Rivers which both riparian countries take up for their respective country level studies. The river basins mentioned above were selected accordingly.
- Villages near the international border and those that are far from the border
- Villages near and far from river banks
- Villages affected by natural hazards like flood, river bank erosion and water scarcity and villages that have no impact of these hazards
- Villages affected by projects like dams, embankments, water harvesting structures etc.

A total of 80 villages were selected on the basis of the above criteria. The list includes 20 villages from J&K, 20 from UP, 30 from WB and 10 from Bihar. Variance in the number of villages is due to the number of river valleys covered in the states of WB and Bihar. Selection of 2,000 HHs was done randomly by taking caste, class and other vulnerabilities into consideration. Within these total number of HHs, WB covers 750 because of two river valleys and four districts, Bihar 250, because of one river valley, and 500 HHs each from J&K and UP because of two river valleys in each state.

2.5 Tools and Techniques used for Data Collection

Both qualitative and quantitative data collection methods are used for collection of primary and secondary data. Questionnaires for HH data and village (community) level data were finalised through a consultative process jointly by four country research teams. Prior to the final consultation for the questionnaire, each country research team had developed their country level questions with field testing to verify reliability and acceptability in their community. After necessary corrections, all four research teams shared their questionnaires and finally, India and Bangladesh questions were taken as the base to develop the final version. Thus, the final questionnaires for HH and village level data collection were developed.

The structured questionnaires cover questions related to water treaties, uses of water and problems related to water. Apart from this, the study has also adopted methods like collection of individual case studies and oral histories. Face to face interviews along with focus group discussions (FGDs) to gather overall community perception and knowledge about the situations in villages.

Information collection was done by a team consisting of one state coordinator and two field investigators for each of the four states. They were trained through an initial orientation on study design, objective, methodology, data collection process and study activities.

2.6 Data Analysis

The information used in the study has been collected both from primary and secondary sources. The data collected from primary sources are processed through MS Excel and analyed through an advanced version of statistical package SPSS. The secondary information were collected from reports and records of the central as well as the state governments, relevant statistics, previous research, books and relevant papers and policy documents.

2.7 Study Limitations

1. Reaching out to communities starting from J&K to WB was a challenge, in terms of language and timing of festivals.
2. It was difficult to get access to respondents due to application of the code of conduct of the general election for Lok Sabha (Feb – April 2014) held in the middle of the study
3. Reaching out to communities living on char (newly accredited) land.
4. It was challenging to collect data during the rainy season as most study areas are flood affected.
5. Most of the respondents are unaware about the treaties and the management of river valley projects, so they could not respond properly about the problem.

CHAPTER 3

River Basin and International Treaties

"Fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict. …If all the world's peoples work together, a secure and sustainable water future can be ours."

Kofi Annan, World Water Day 2002

The inter linkages of rivers reveal the composite nature of the geography and destiny of South Asia and have been the basis for life and civilisation for the region. They characterise the commonalities and continuities of historical and cultural experiences. These rivers deeply influence the socio-political and economic contexts of people who live together and are yet separated along these. Nepal and India share the Mahakali-Ganga basin; India and Pakistan share the Indus Basin, India and Bangladesh share the Ganga-Brahmaputra-Meghna Basin. This chapter examines the treaties between India and her neighbours on river water with an effort to understand the discourse around these from the point of view of the grass root level.

3.1 Geo Politics of River Basins (Indus to Teesta)

About 40 percent of the world's population lives in river basins that comprise two or more countries. Over 90 percent lives in countries that share such basins. Out of the transboundary river basins, 263 cover nearly one half of the earth's land surface and account for an estimated 60 percent of global freshwater flow. A total of 145 states include the territory within such basins, while 30 countries lie entirely within them.[25]

South Asia is a region of both water abundance and water scarcity. The Hindu Kush-Himalayan region (HKH) is one of the largest storehouses of fresh water in the world, and its mountains are the source of the main river systems. The three Himalayan rivers, the Indus, the Ganga and the Brahmaputra arise within 300 km of each other in the Himalayan glaciers.[26] While the Ganga originates inside the Himalayas, the Indus and the Brahmaputra originate beyond, in the Trans-Himalayan Tibetan region — the Indus taking a westward course towards the Arabian Sea, and the Ganga and Brahmaputra making the journey towards the Bay of Bengal in the east of the subcontinent.

[25] Transboundary Waters: Sharing Benefits, Sharing Responsibilities, 2008, UN Water Thematic Paper
[26] Bhim Subba, Himalayan Waters, (Kathmandu, Nepal: Panos South Asia), 2001, p. 49.

South Asia has four major riverbasins, i.e., the Brahmaputra, the Indus, the Ganges and the Meghna which provide livelihood to millions of people in this region. The South Asian river basins irrigate millions of hectares of fields and provide livelihood to millions of people in this geographical location. The South Asian region's four main co-riparian states are India-Pakistan and India–Bangladesh–Nepal lying in the west and in the east respectively. Water distribution, its utilisation, its management and above all, the hydro-electric power projects are affecting the upper and lower riparian countries. Water security is gradually becoming an epi-centre of interstate relations and water scarcity is increasing the miseries of people of this area.[27] In South Asia's case, timing is also an important issue. As in the case of Pakistan, 'if India fills its dams when water is needed for crops in Pakistan, it will be disastrous for Pakistani peasants and the planting season over there.' [28]

India has more than 17 percent of the world's population, but has only four percent of the world's renewable water resources with 2.6 percent of the world's land area. There are further limits on utilisable quantities of water owing to uneven distribution over time and space.[29] India is a co-riparian country and many rivers are shared between the boundaries with Bangladesh, Pakistan, China, Nepal and Bhutan. India is diplomatically engaged with these countries in connection with transboundary water sharing and management since its independence.

At the same time, water as a resource is dramatically decreasing in many parts of the world including South Asia (WWAP-2009).[30] National boundaries make these water issues political and geo strategic. As a result, competitions to access water across the sectors are increasing within countries and between countries.

3.2 Transboundary River Issues

Transboundary rivers are a source of political tension globally and this region, replete with water resources, is no exception. To put this in context, about 40 percent of the world's population relies on shared water resources and as regards China, over a third of the country is an international river basin, with 18 shared rivers.[31] In Asia, Pakistan has been identified as at extreme water security risk, while China, India, Bangladesh, Thailand and Cambodia are considered as high risk, according to a 2010 index by Maplecroft.[32]

3.3 International Dimension

There are currently two main international convention that provide principles for the governance of transboundary waters: the 1997 UN Convention on the Non-Navigational Uses of International Watercourses and the 2004 Berlin Rules. The UN Convention is by and large based on the International Law Association's (ILA) 1966 Helsinki Rules.[33] As a framework convention, it provides the principles and rules that may be applied to suit the characteristics of specific international watercourses, which can then be further developed through protocols. Two important premises are: the principles of equitable and reasonable utilisation of shared watercourses; and the obligation to do no harm.

No South Asian and South East Asian countries are either a party to, or signatory to these conventions. A number of downstream states, including India, had abstained from this Convention, concerned that the Convention favours upstream riparian because it subordinates the no harm rule to the concept of equitable and reasonable utilisation.

3.4 International Transboundary Water Governance

It is estimated that international river basins that include political boundaries of two or more countries cover 45.3 percent of the earth's land surface, host about 40 percent of the world's population, and account for approximately 60 percent of global river flow. In total, there are 263 Transboundary basins which include the territory of 145 states. These shared watercourses can give rise to significant bilateral or multilateral disputes. Typically, international law has primarily been concerned with the 'development and optimal use' of watercourses, and it is only in recent times that 'the ecological services provided by water and the resulting importance of conserving and protecting water quality have become important concerns' of the international law of watercourses. Accordingly, the incorporation of the environmental dimension in international instruments dealing with water should therefore be seen as a work in progress.[34]

[27] Alexander Cariou, Water, Conflict and Cooperation, Canada: institute of Peace and Conflict, 2003, p.54
[28] Hari Kumar, "Water Dispute Increases India-Pakistan Tension" New York Times, July 21, 2010, page A1-see also, John, Briscoe. Usmon, Qamar, "Pakistan's Water Economy: Running Dry", Water P-Notes, issue, 17, October 2008, pp.1-4, see also: "Water at a crossroads", Dialogue and Debate at the 5th World Water Forum, Istanbul 2009. World Water Council, pp: 50.
[29] Draft National Water Policy (2012) as recommended by National Water Board in its 14th meeting held on 7th June, 2012, Para 1.1
[30] World Water Assessment Programme, 2009, UNESCO
[31] The World's Water, Volume 7, 2012
[32] maplecroft.com/about/news/water-security.
[33] The Helsinki Rules were introduced by the International Law Association in 1966, providing a code of conduct with respect to the uses of waters of international
[34] Transboundary Freshwater Governance and the Environment: An Overview, Dr. Migai Akech, United Nations Environment Program, Bangkok, Thailand, 20 – 22 May, Bangkok, 2009.

The evolution of International Water Law provides a useful insight into the context of the legal aspects of water conflicts and their resolution. In 1997, the UN Convention on the Non-Navigational Uses of International Water Courses was adopted by the United Nations and it is considered to be an international framework agreement for use by states in negotiating water disputes.[35] In many cases, countries have made some progress in adopting watercourse agreements at basin and sub-basin levels, but cooperative management frameworks exist for only about 40 percent of the world's international watercourses.[36] A recent United Nations Environment Programme (UNEP) assessment notes that 80 percent of the existing agreements are bilateral, even though there may be more states within the basin. In such cases, if all riparians ratified, the Convention would provide an overarching framework for the entire basin.[37]

Cooperation between the countries is essential for the effective governance of transboundary water resources. This is because the governance of transboundary water resources requires interaction and trust building between basin states. The UN declarations would be welcome if we are able to take credible and effective steps towards water cooperation at every level in an equitable, sustainable way and through local participation. This becomes increasingly relevant when demand for water is increasing due to rising population, urbanisation, industrialisation, increased per capita use and increased losses due to climate change.[38]

3.5 Sharing and Management of Transboundary Waters in South Asia

For more than five millennia, water rules and relationships have evolved in the midst of clashes of local needs, customs, and social, cultural and religious beliefs. Yet all civilisations were able to manage such clashes with agility. (Uprety, K. & Salman, S. M. A. 2011) Historically, the development of cooperation among South Asian countries and most importantly Bangladesh, India, Nepal and Pakistan with respect to the Indus and the Ganges-Brahmaputra-Meghna river basins, South Asia's major transboundary rivers, has been a cause of tension, apprehension and ongoing disputes. In the late 20th century, the focus of water governance shifted to containing pollution together with allocation, the emphasis in the early 21st century is shifting to manage water resources in an integrated manner and in the context of sustainable development. Indeed, the historical evolution of rules, regulations, rights and responsibilities with respect to water implies a certain path dependency (Dellapenna and Gupta 2008), and creation of a balance among the clashes. Interstate disputes, in one form or another, are currently occurring in many regions. These rivers not only provide water but are also a major focus of religious and cultural life in the region.[39]

South Asia is increasingly becoming a water-stressed region. Overuse of water is triggering conflict in the region of South Asia. With the growing population, industrial, agricultural and domestic uses, glaciers are melting, and the environment is getting degraded, resultantly, the rivers are also becoming a bone of contention between countries and communities in this area.

3.6 India's Concern on Transboundary River Water Sharing

India is the land of a thousand rivers and many poets praise it for this rich resource. India has long standing water disputes in South Asia with her neighbours, on the distribution of water resources, particularly rivers. These disputes are increasing their intensities gradually, as the demand for fresh water is increasing. There is the possibility that if the present demographic, economic and environmental challenges may precede then this tension may lead to a crisis like situation and probably lead to wars between India and its neighbours, thus, threatening regional stability. There is conflict around Transboundary Rivers and the site for considerable intra-state and international geopolitical disputes. Balanced against such competing claims, it is difficult to preserve the heritage values of these unique rivers throughout the developing world[40].

भारतानुवर्णनम् ।

भूमेः सहजानि लक्षणानि यानि सम्भाव्यन्ते, तानि सर्वाणि भारते पश्यामः । अत्र हि तुङ्गां पर्वताः सन्ति; भीषणानि वनानि विद्यन्ते; विस्तीर्णा उर्वरा उपलभ्यन्ते; आजयः सिकतिलाः प्रदेशाः; मरवो मालानि च वर्तन्ते; नद्यो बहुलाः प्रवहन्ति; महान्ति च सरांसि समुल्लसन्ति ।।

टी गणपती शास्त्री,
त्रिवेन्द्रम, 1905

[35] Overview of literature on conflict negotiation and cooperation over shared waters, Bridges over water, Dinar and Dinar, July, 9, 2007
[36] Everything you need to know about the UN Watercourses Convention, Flavia Loures, Dr. Alistair Rieu-Clarke, Marie-Laure Vercambre, January 2009
[37] UN Watercourse convention, Online users guide, http://www.unwatercoursesconvention.org/faqs/
[38] India and South Asia: From Conflict to Co-Operation, March 2013, SANDRP, https://sandrp.wordpress.com/page/30/
[39] Transboundary Water Politics and Conflicts in South Asia: Towards 'Water for Peace', Richa Singh, Centre For Democracy And Social Action (CDSA)
[40] Transboundary River basins: a discourse on water scarcity, conflict, and water resource management, Timothy Riley, University of North Texas, December 2003

In some cases, India is situated in the upper riparian region while in other cases India is situated in the middle and lower riparian regions as well as in the drainage basin. There are multiple influences and these have had a significant negative impact on public safety, irrigation, agriculture, fishing, and water quality. Subject to dynamic course shifting, Himalayan rivers radically alter the landscape, making it difficult to farm along the banks. The greater part of UP and WB are affected by this effect, which causes massive subsidence and endangers entire communities. Anthropogenic stressors, such as dam construction, upstream diversions, pollutant loading, poorly treated or untreated sewage, has increased flooding and desertification, decreased water quality, and negatively impacted estuary commercial fishing stocks. Both factors have limited the overall ability to effectively develop and manage natural resources dependent upon the rivers. Given the atmosphere of hostility, 'upstream-downstream' syndrome, 'unequal' partnerships, lack of definitive international laws, regional principles or enforceable global conventions, a number of conflicts has erupted in South Asia on trans-border water issues.[41]

3.7 Transboundary Rivers and Draft National Water Policy of India

The importance of transboundary waters to individual countries is embodied in the interdependencies created by shared resources cannot be simple. With the demand and scarcity of resources, the challenge to sort these out is more. What is perhaps surprising is that despite the extent of shared water resources globally and its obvious importance, there are no international legally binding treaties in force today. Existing treaties take the form of bilateral or multilateral agreements usually to provide governance in relation to a particular river basin.

The Draft National Water Policy also had given importance to these interdependencies within different countries for better management of water resources. For institutional development and arrangement, the river basin/sub-basin has been taken as a unit[42]. The Policy again put emphasis on efforts to deal with the transboundary rivers with its neighbouring countries and stated that:[43]

- Even while accepting the principle of basin as a unit of development, on the basis of practicability and easy implementation, efforts should be made to enter into international agreements with neighbouring countries on bilateral basis for exchange of hydrological data of international rivers on near real time basis.
- Negotiations about sharing and management of water of international rivers should be done on a bilateral basis in consultative association with riparian states keeping national interests paramount. Adequate institutional arrangements should be set up at the Centre to implement international agreements.

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. The facts indicate that India is expected to become 'water stressed' by 2025 and 'water scarce' by 2050. It requires the use of all available water resources in the country. The Indian 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 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[44].

The main river systems, the Indus, the Ganga and the Brahmaputra are all connected to the Tibet Autonomous Region (TAR) of China. The Indus basin connects China, Afghanistan, Pakistan and India, while the Brahmaputra and the Ganga connect China, Bhutan, India, Nepal and Bangladesh. India has been involved in military conflict with China and Pakistan and water-related tensions with Pakistan and Bangladesh. The major catchment area of the main transboundary rivers of India lies within the country. This is the reason the draft National Water Policy also put emphasis on the sharing of these water resources.

Major Transboundary River Basins of India Unit:				BCM
Sl. No.	River Basin	Catchment Area (sq km)	Average Water Resource Potential	Utilisable surface water resources
1.	A) Ganga B) Brahmaputra C) Barak and Others	861452 194413 41723	525.02 537.24 48.36	250.0 24.0
2.	Indus (up to border)	321289	73.31	46.0

Source: *Central Water Commission December 2010*

[41] Ibid 7
[42] Para 12.4 Draft National Water Policy 2012
[43] Para 13, Draft National Water Policy 2012
[44] Institute for Defence Studies and Analyses, New Delhi, Taskforce Report, 2010

Ganges-Brahmaputra-Meghna		Total area: 1,634,900 km²
Countries	**Area of Basin in Country km²**	**%**
India	948,400	58.01
China	321,300	19.65
Nepal	147,181	9.01
Bangladesh	107,100	6.55
India, claimed by China	67,100	4.11
Bhutan	39,900	2.44
India control, claimed by China	1,200	0.07
Myanmar (Burma)	80	0.00

Source: *Atlas of International Freshwater Agreements 2002*

Indus		Total area: 1,138,800 km²
Countries	**Area of Basin in Country km²**	**%**
Pakistan	597,700	52.48
India	381,600	33.51
China	76,200	6.69
Afghanistan	72,100	6.33
Chinese control, claimed by India	9,600	0.84
India control, claimed by China	1,600	0.14
Nepal	10	0.00

Source: *Atlas of International Freshwater Agreements 2002*

3.8 Treaties and Transboundary Riparian Policies of India

India's riparian relations with its neighbours like Pakistan, China, Bangladesh, Nepal and Bhutan is very complex in nature. The most crucial geo-political aspect of the transboundary basins is the hydrological dependence of all of them on China. The headwaters of all these rivers, except the main Ganga River, rise within a few hundred kilometres of each other, in the south-western region of the Tibetan plateau.

The second major geo-political factor is that now three different countries, Bangladesh, India and Pakistan, were administratively a single unit under the British Empire, before being divided first into two and then three countries. With the first division into India and Pakistan in 1947, both the Indus basin and the Ganga-Brahmaputra basin were divided between the two countries. Subsequently, Bangladesh, where the Ganga-Brahmaputra-Meghna system flows into the Bay of Bengal, was created out of East Pakistan in 1971.

The treatment of rivers as a commodity in the subcontinent and the upstream-downstream supply disputes are some common features in riparian politics. Currently, there is no understanding, no agreement on international rivers between India and China. Between India and Pakistan, there is a treaty that provides for third party arbitration and also defines the rules and no-go areas.

Key Indian Water Treaties

River/River Basin	Countries	Treaties
Indus	India, Pakistan	Indus waters treaty 1960. Pre- 1960, two treaties on border disputes, one on water quantity
Ganges-Brahmaputra-Meghna	India, Nepal	Five treaties between 1954 and 1996, mainly covering hydropower and water quantity
	India, Bangladesh	Eight treaties between 1972 and 1996, , mainly covering water quantity

Source: *Transboundary Freshwater Dispute Database*

3.9 India- Pakistan Relations

The Indus River system is the largest contiguous irrigation system in the world, with a command area of 20 million hectares and an annual irrigation capacity of over 12 million hectares. At the time of independence, the boundary line between the two newly created independent countries i.e., Pakistan and India was drawn right across the Indus Basin, leaving Pakistan as the lower riparian. Moreover, two important irrigation head works, one at Madhopur on the Ravi River and the other at Ferozepur on the Sutlej River on which the irrigation canal supplies in Punjab (Pakistan) had been completely dependent, were left in the Indian Territory. A dispute thus arose between two countries regarding the utilisation of irrigation water from existing facilities.

The Indus Basin

Length	1800 miles (2880 km)
Basin size	418 000 sq mi (1 070 080 km^2)
Average discharge, % of the basin in different countries	142 MAF* per year (175 154 421 000 m^3) Pakistan (52); India (34); China/Tibet (7); Afghanistan (6); Disputed-China-India (<1)

**MAF (million acre feet) = 1 233 481 840 m3. (Source: adapted from Encyclopaedia of International Rivers, 2002).*

Major River System of Indus Basin

River system	Major rivers flowing out from the Himalayas	Catchment area (km^2)
The Indus and its tributaries	Indus, Jhelum, Chenab, Ravi, Beas, Sutlej	132090

Source: http://baike.baidu.com/view/320811.htm

Indus Waters Treaty

The distribution of Indus River waters is governed by the Indus Waters Treaty (IWT), which was advised by the World Bank and signed by India and Pakistan in 1960. The Treaty was signed at Karachi by Field Marshal Mohammad Ayub Khan, the then President of Pakistan, Shri Jawaharlal Nehru, the then Indian Prime Minister and Mr. W.A.B. Illif of the World Bank on 19th September, 1960. The Treaty however is effective from 1st April, 1960 (effective date). 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. 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. However, in terms of water allocation, both countries interpret it differently and regard it as being unfair.

Features of Indus Waters Treaty

Major issues	Pakistan's Part	India's Part
Rights on Water	The IWT gives Pakistan rights on waters of the Indus, the Jhelum, and the Chenab rivers, which constitute 75 percent of the flow of the whole Indus system.	It allows India under specified conditions to tap the water of three rivers allocated to Pakistan.
Provisions regarding western rivers	Pakistan shall receive for unrestricted use all waters of the western rivers – the Indus, the Jhelum, and the Chenab.	India shall not interfere with the waters of the western rivers except for the following uses: (a) Domestic Use (b) Non-Consumptive use (c) Agricultural Use (limited) (d) Generation of Hydro-electric Power (e) Storage Works (limited)
Provisions regarding eastern rivers	Pakistan is allowed limited agriculture use of 45,500 acres from tributaries of the River Ravi namely Basantar, Bein, Tarnah and Ujh.	All the water of the eastern rivers is available for unrestricted use by India.

Major issues	Pakistan's Part	India's Part
Provisions to deal with emergency	Pakistan is dependent upon the Indus River for its fresh water supply .The Indus and its tributaries are the only surface water source for the entire country.	The headwaters of all six rivers are within the Indian Territory; accordingly, the Indian government can significantly limit the flow of water into Pakistan. India is not permitted to build projects on the Indus, the Jhelum or the Chenab rivers to divert or store water flowing to Pakistan.

Source: *IWT 1960*

Kishan Ganga River Valley

Origin	The Neelum River (known as Kishan Ganga in India) originates from Krishansar Lake in the vicinity of Sonamarg and runs northwards to Badoab village where it meets a tributary from the Dras side and runs westwards along the Line of Control in J&K . It is fed by many glacial tributary streams on its way. It enters Azad Kashmir in the Gurais sector of the Line of Control, and then runs west until it meets the Jhelum River north of Muzzafarabad.
Length	The Neelum River is 245 kilometres long; it covers 50 kilometres in J&K and the remaining 195 kilometres in Azad Kashmir.
Discharge (Average)	465 m^3/s (16,421 cu ft/s)

Source: *Atlas of International Freshwater Agreements 2002*

Conflict over Kishan Ganga River

The 330-MW Kishan Ganga hydro-electric project, a run of the river project on Neelum River (Kishan Ganga) in Gurez Valley situated near Bandipora in Kashmir is the matter of conflict. It will create a large reservoir of water. A channel and a 27 km tunnel will be dug south through the North Kashmir mountain range. It will re-direct the Kishan Ganga waters to the Wullar Lake at Bandipur. Pakistan always raises the issue that India has redesigned the Kishan Ganga project and there will be environmental concerns. It envisages a diversion of the Neelum River to Wullar Lake and there will be little water for Neelum Valley. Pakistan has said that India cannot divert water from rivers allocated to Pakistan according to IWT. The diversion can endanger some hydropower development plans in Pakistan such as Neelum-Jhelum project. However, India denies it by saying that it has the right to divert the waters of western rivers, in a non-consumptive manner, for optimal generation of power.

The International Court of Arbitration gave its "final award" on 20th December 2013, wherein it allowed India to go ahead with the construction of the Kishan Ganga dam in J&K, over which Pakistan had raised objections. The court delivered its "final award" after India requested clarification of an order issued by it in February. The "final award" specifies that 9 m^3/s of natural flow of water must be maintained in the Kishan Ganga river at all times to maintain the environment downstream. The court said alternative techniques will have to be used for the Kishan Ganga hydroelectric project and all future runs of the river projects undertaken on the western rivers of the Indus system. Although, the construction work has not been finalised yet, people of the Gurez Valley are expressing environmental and displacement concerns.

3.10 India-Bangladesh Relations

Water sharing assumes primacy in India and Bangladesh relations. There are 54 common rivers that crisscross the geographical contours of the two countries. Dr. Kalyan Rudra stated that "the official records say 54 rivers flow between the two countries, though, in reality, there can be many more. Across the world, there are 260 rivers flowing from one country to another, and everywhere, disputes are emerging over sharing of their waters,"[45] The Greater Ganga Basin (GGB) consists of the areas in Nepal, Bhutan, India and Bangladesh drained by the Ganga and its tributaries, the Brahmaputra, and the Barak Meghna rivers. The Ganga and the Brahmaputra are complex systems made up of an intricate web of rivers that flow through different countries and terrains.

The Ganga rises in the Garhwal Himalayas in India. Before the Ganga enters Bangladesh, it branches into two. While the eastern branch flows into Bangladesh, the western branch flows into the Indian state of West Bengal. Brahmaputra, joined by many tributaries as it flows westwards, enters Bangladesh where it becomes the Jamuna and merges with the Ganga to become the Padma. This is joined by the Barak, which becomes the Meghna on entering Bangladesh.

गोदी मे खेलती है इसकी हजारो नदियां गुलशन है
जिनके दम से रश्क-ए-जना हमारा

ए अब रौद गंगा वो दिन है याद तुझको उतर तेरे
किनारे जब कारवां हमारा

इक़्बाल, अगस्त, 1904

[45] Dr. Kalyan Rudra, Charting rivers beyond borders, December 2014, The Hindu, http://www.thehindu.com/news/national/charting-rivers-beyond-borders/article6713407.ece

The problem of resource allocation is continuing between India and Bangladesh. An Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972 to maintain liaison in order to ensure the most effective joint effort in maximising the benefits from common river systems which is headed by Water Resources Ministers of both the countries. The Ganges Water Treaty in 1996 was the first step to reduce the political fiction between the countries.

Ganges Treaty

A new chapter in the Indo-Bangladesh relations opened up with the signing of a Treaty by the Prime Ministers of India and Bangladesh on 12th December 1996 on the sharing of the Ganga/Ganges waters. The Treaty shall remain in force for a period of thirty years, to be renewed by mutual consent. For monitoring the implementation of the Treaty, a Joint Committee has been set up. The 37th Indo-Bangladesh joint committee on the implementation of the treaty, in its report in September 2007, found no dispute over the water flow at Farraka and Hardinge Bridge points.

Timeline of Ganges Treaty

Date	Treaty Basin	Signatories	Treaty Name
December 12, 1996	Ganges	Bangladesh, India	Treaty between the government of the Republic of India and the government of the People's Republic of Bangladesh on sharing of the Ganga/Ganges waters at Farakka
July 20, 1983	Ganges	Bangladesh, India	Meeting of the Joint Rivers Commission
October 7, 1982	Ganges	Bangladesh, India	Indo-Bangladesh memorandum of understanding on the sharing of Ganga waters at Farakka
November 5, 1977	Ganges	Bangladesh, India	Agreement between the government of the People's Republic of Bangladesh and the government of the Republic of India on sharing of the Ganges waters at Farakka and on augmenting its flows
November 24, 1972	Ganges, Brahmaputra	Bangladesh, India	Statute of the Indo-Bangladesh Joint Rivers Commission

Source: *Atlas of International Freshwater Agreements 2002*

Water Allocation in the 1996 Ganges Treaty

Flow at Farakka barrage	Share of India	Share of Bangladesh
75,000 cusecs	40,000 cusecs	Balance of flow
70,000 to 75,000 cusecs	Balance of flow	35,000 cusecs
50,000 to 70,000 cusecs	50%	50%
50,000 cusecs	Both countries will enter into immediate consultation to make adjustments on emergency basis.	

Source: *Ganges Treaty 1996*

Teesta River Issue

Apart from the Ganges, the other major rivers that flow between the two countries are the Teesta, Brahmaputra and Barak.

Catchment Area of Teesta River

in sq km	India	Bangladesh
Hilly Region	8,051	NA
Plain Area	2,104	2,004
Total	10,155	2,004

Source: http://www.sikkimforest.gov.in/soer/Water%20Resources.pdf

In recent times, the sharing of Teesta waters has assumed priority in the discussion between the two countries. The River Teesta flows through Sikkim before joining the Brahmaputra as a tributary in Bangladesh. India and Bangladesh have been engaged in dialogue on the sharing of the Teesta waters since 1974. Discussions have been continuing with Bangladesh for the sharing of waters of the Teesta River. For this purpose, the Joint Rivers Commission had constituted a Joint Committee of Experts (JCE) which is headed by Water Resources Secretaries of both countries. The JCE has so far held seven meetings. The JCE has constituted a Joint Technical Group (JTG) to discuss and examine all pending issues and come up with recommendations on the draft of the terms of reference for the Joint Scientific Study to assess the availability and requirement of waters of the Teesta and also for the draft of the interim agreements for sharing of the lean season when the Teesta flows between the two countries.

Timeline of Teesta Waters Agreement

1974	India and Bangladesh have been engaged in dialogue on the sharing of the waters of the Teesta River.
July 20, 1983	Agreement on ad hoc sharing of the Teesta waters between India and Bangladesh reached during the 25th meeting of the Indo Bangladesh Joint Rivers Commission held in July 1983, in Dhaka. It was stipulated there that 36 percent of the Teesta waters would go to Bangladesh while 39 percent would be India's share. However, the agreement was not implemented.
19th March 2010	During the 37th meeting of the Joint Rivers Commission at the ministerial level, the two countries decided to sign an agreement on the Teesta waters sharing by 2011 and for that purpose, a draft agreement was exchanged between the parties.
12th September 2011	The signing of the agreement on Teesta waters was one of the objectives during the Indian Prime Minister Manmohan Singh's visit to Bangladesh in September, 2011. However, the Chief Minister of West Bengal opposed the agreement and unexpectedly dropped out of the Prime Minister's entourage to Bangladesh by stating that water was a state subject under the Indian Constitution, and the state needed to give its consent to the central government prior to any agreement with Bangladesh. Thus, the negotiations on the draft of the Teesta agreement failed to fructify and the treaty has remained unsigned by the parties ever since.

Source: *Atlas of International Freshwater Agreements 2002*

On the issue of the sharing of information which is highly essential for a downstream riparian country, India is providing 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 the Barak River during the monsoon period. Data for the Teesta, the Manu, the Gumti, the Jaladhaka and the Torsa are also provided. Currently the issue of the Teesta River agreement is an emotional issue for leaders and people from both countries, resulting in different positions despite common interests and it is not yet been finalised.

3.11 India - Nepal Relations

Since about a huge population lives in the Ganges, the Brahmaputra and the Meghna region, India needs Nepal not only to meet some of its growing energy needs but more crucially for flood management navigational uses as well. The principal tributaries from Nepal rising in the trans-Himalayan watershed join the Ganga midstream. These are Mahakali, Gandaki, Karnali and Kosi rivers.

Major Rivers Flowing Out from the Himalayas

River system	Major rivers flowing out from the Himalayas	Catchment area (km2)
The Ganges and its tributaries	The Ganges, the Yamuna, the Ramganga, the Kali-Sharda, the Karnali, the Rapti, the Gandak, the Baghmati, the Kosi	217560

Source: http://baike.baidu.com/view/320811.htm

Sapta Kosi River Basin

Length	513 km
Basin size	60,400 km^2 (excluding 1410 km^2 of glaciers)
Basin area in different countries	This snow-fed river drains water and snow from the east of Gosaikunda and the west of Kanchanjunga. Within the total basin area, 28 500 km^2 is located in Tibet, 27,863 km^2 in Nepal, and 11 400 km^2 in India. The main tributaries of the River Kosi are Tamor, Arun, Indrawati Sunkoshi, Tamakoshi, Dudhkoshi and Likhu and this river is also collectively known as the Sapta Kosi. The Kosi barrage located at the border of Nepal and India drains water to Bihar from Nepal. The river joins with Ganga at Kursela, 254 km away from the Nepal border

Source: *Water resources of Nepal in context of climate change, WECS, 2011, Koshi River basin Management strategic plan (2011-2021), WECS, 2011*

Sharda River Basin

Length	223 kilometres
Basin size	15,260 square kilometres
Basin area in different countries	The Mahakali (Sharda in India) is one of the five major river basins of Nepal which is shared with India and has a total basin area of 5410 km^2 in Nepal.
Origin	The Mahakali River originates through the confluence of the Kali River at Taklakot in Tibet and the Kuti Yandi River at Janskar Himalayas and mixes at Kawamalla, Darchula. The river flows alongside the border of Nepal and India. Its major tributaries include Chamelia and Suranyaghadh (Dixit, 2008).

Source: *Environment statistic of Nepal, 2011*

Gandak River Basin

Length	332 km
Basin size	34,960 km^2
Basin area in different countries	It has a total catchment area of 34960 square kilometres and 28090 km^2 in Nepal. Its drainage area in India is 6870 square kilometres.
Origin	The Kali Gandaki river source is at the border with Tibet at an elevation of 6,268 metres (20,564 ft) at the Nhubine Himal Glacier in the Mustang region of Nepal. The entry point of the river at the Indo–Nepal border is also the confluence called Triveni with rivers Pachnad and Sonha descending from Nepal. It joins the Ganges near Patna just downstream of Hajipur at Sonepur.

Source: *Water resources of Nepal in context of climate change, WECS, 2011*

The first international treaty in the basin was the Sharda Barrage Letter of Exchange between the British Indian government and the government of Nepal in 1920 for the diversion of the Mahakali-Sharda water for irrigation of what is currently UP in India. This agreement was the historical precursor for all subsequent agreements, treaties and projects between India and Nepal (Dr. Siwakoti, Kathmandu 2011). The second treaty was the Koshi Agreement of 1954 in which Nepal's prior right to withdraw water from the Kosi River and/or its tributaries as and when required was preserved. The treaty was signed on 25th April 1954 and again was rectified on 9th December 1966 to give some more benefit to Nepal. The third agreement was the 1959 Gandak Agreement, and through this agreement, Nepal was to receive 15,000KW of power and 20 cusecs of water for irrigation from each of the western and eastern canals of the project on the River Kosi. In 1991 Tanakpur Barrage agreement was signed in a form of a memorandum of understanding (MoU) between the two governments. It expanded the scope of the original Sharda project to cover the Tanakpur hydropower project on the same river, work on which had already commenced in 1988.

The fourth agreement, known as the Mahakali Treaty, was signed on 12th February 1996 and again rectified on 4th September 1996 between Nepal and India. In addition to the incorporation of the Sharda Barrage and the revival of the constitutionally defunct Tanakpur Barrage, its centre piece was the construction of the multipurpose Pancheswar dam. This treaty, for the first time in India-Nepal water relations, laid down some specific principles on the sharing of the waters of the transboundary river. Under this treaty, India-Nepal Joint Group of Experts was constituted to oversee the physical and financial progress of the joint detailed project report.

Timeline Sharda Treaty

Sl. No.	Date	Event
1.	August 23, 1920	Sharda Barrage Letter of Exchange- Letter from Maharaja Chandra, Nepal, to Colonel Kennion for the Sharda Treaty
2.	October 21, 1920	Letter from The British Legation, Nepal, to Maharaja Chandra, Nepal for the Treaty
3.	1915-1926	The Sharda Canal Project for the irrigation of about a million acres in Uttar Pradesh was commenced
4.	December 6,1991	In the spirit of furthering cooperation within the Mahakali River area, the governments of India and Nepal entered into a Memorandum of Understanding (MoU), commonly referred to as the Tanakpur Agreement
5.	1992	Tanakpur Barrage was completed which was commenced on 1988
6.	1992	A writ petition was filed in the Supreme Court, with the Prime Minister as one of the respondents, challenging the validity of the Tanakpur Agreement. B. K. Neupane vs. Prime Minister of Nepal, Writ No. 1851 (Nepal Supreme Court 1992).
7.	December 1992	The Supreme Court issued its verdict by concluding that the Tanakpur Agreement was, indeed, a treaty that required ratification by the Parliament, and was not a mere MoU
8.	February 12, 1996	The Mahakali Treaty was signed by the Prime Minister of India, Mr. P.V. Narasimha Rao, and the Prime Minister of Nepal, Mr. Sher B. Deuba
9.	June 5, 1997	The Mahakali Treaty was ratified on June 5, 1997. The Treaty is to remain valid for a period of seventy-five years

Source: *Salman M.A. Salman & Kishor Uprety Hydro-Politics in South Asia: A Comparative Analysis of the Mahakali and the Ganges Treaties*

Sharda Treaty between British Government and Nepal Kingdom

	India receives:	Nepal receives:
Land exchange	4000 acres, east bank of Mahakali	4000 acres of forestland
	Not limited 4 m> 3/ s Water transfer (wet season)	Water transfer (dry season) Not limited 13-28.34m>3/s
Cash	N/A	50,000 Rs

Sources: *The Mahakali Treaty India and Nepal*

Mahakali Treaty - Issues of Negotiations

Major issues of Disagreement	Nepal's stand	India's stand
Status of Mahakali River	Border river	Border river stretches
Equal sharing of water	Mahakali boundary river, hence both countries have 50:50 share over water	The river can be used by the two countries but does not belong to either; equal sharing really applies to the incremental benefits and costs attached with Pancheswar Project.
Existing consumptive uses	2 Mha areas irrigated from the Lower Sharda Barrage, 160 km. Further, downstream in India, is outside the scope of the Mahakali agreement and not a protected existing use.	Area comes under existing consumptive uses
Benefit sharing	Power benefit is to be assessed on the basis of saving is actually replacement or avoided cost.	Alternative means can be other HRP's, gas based projects, thermal projects and not necessarily the thermal source only.

Source: *Emma Condon, Resource Disputes in South Asia: Water Scarcity the Potential and for Interstate conflict, 2009*

Timeline Gandak Treaty

Sl. No.	Date	Event
1.	1871	A canal was planned on Gandak (Tribeni Canal) to harness the large irrigation potential of the River Gandak.
2.	1947	Dr. Rajendra Prasad, the then Food and Agriculture Minister wrote to the Government of Bihar to explore the possibilities of constructing a canal system from the Gandak for irrigation.
3.	4th December 1959	Finally, an international agreement was concluded between India and Nepal over the Gandak Project. Letters were exchanged and signed on the same day, spelling out some operational details and mentioning provision for the establishment of a coordination committee.
4.	30th April, 1964	The Agreement has been revised on the Gandak Irrigation and Power Project in the common interests of both Nepal and India to construct a barrage, canal head regulators and other appurtenant works for purposes of irrigation and the development of power.

Source: *Emma Condon, Resource Disputes in South Asia: Water Scarcity the Potential and for Interstate conflict, 2009*

Gandak Agreement

	India receives:	Nepal receives:
Irrigation	Bihar - 14,480 lakh hectare Uttar Pradesh - 3,363 lakh hectare	Western Canal- 40,000 acres Eastern Canal- 1,03,500 acres
Hydro power	The Government of India agrees to construct one Power House with an installed capacity of 15,000 KW in Nepal territory on the main Western Canal.	The Government of India shall supply power to His Majesty's Government at the Power House and/or at any point in the Grid upto and including Raxaul to an aggregate maximum of 10,000 KW up to 60 percent load factor at power factor not below 0.85.
Protection of Riparian rights	N/A	The Nepal Government will continue to have the right to withdraw for irrigation or any other purpose from the river or its tributaries in Nepal such supplies of water as may be required by them from time to time in the valley.

Source: *Gandak Agreement 1964*

Timeline Kosi Agreement

Sl. No.	Date	Event
1.	1896	Historically, the idea of tapping the waters of the River Kosi had been discussed in India but because of the absence of serious feasibility studies, no immediate decision was made.
2.	1946	Though the problem of floods and the shifting tendency of the river course has been engaging the attention of engineers for a long time, the work of surveys and investigation for the purpose of preparing a project was taken up in this year
3.	1953	The erstwhile Central Water and Power Commission formulated a project, which envisaged construction of (i) a barrage at Hanuman Nagar at a distance of 48 km below Chatra to serve as a controlling structure and to provide gradient control in the steep reach of the river below Chatra, (ii) flood embankments on either side of the river to confine it in its existing course, and (iii) canals on the eastern side to provide irrigation in India and Nepal.
4.	25th April 1954	Agreement between His Majesty's Government of Nepal and the Government of India concerning the Kosi Project.
5.	[illegible]ecember 1966	The Agreement between His Majesty's Government of Nepal and the Government of India again revised.
6.	1962, 1972, 1982	The Barrage and the Eastern Main Canal were completed , the construction of Western Main Canal was taken up and was put into use in these years respectively
7.	19th December 1966	The agreement was again revised

Source: *Emma Condon, Resource Disputes in South Asia: Water Scarcity the Potential and for Interstate conflict, 2009*

Kosi Agreement

Project design	Designed to hold 9.3 lakh cusecs of water, the barrage's total irrigation capacity was estimated at 1.5 million acres, of which around 29,000 acres lay in Nepali territory. The project was supposed to generate 20,000 KW from the Eastern canal, of which around 50 percent was to be sold to Nepal
River water use	Nepal shall have every right to withdraw for irrigation and for any other purpose in Nepal, water from the Kosi River and from the Sun-Kosi River or within the Kosi basin from any other tributaries of the Kosi river as may be required from time to time. The Union shall have the right to regulate all the balance of supplies in the Kosi River at the barrage site thus available from time to time and to generate power in the Eastern Canal.
Use of hydro electric power	Nepal shall be entitled to obtain for use in Nepal any portion up to 50 percent of the total hydro-electric power generated by any Power House situated within a 10 mile radius from the barrage site and constructed by or on behalf of the Union, as Nepal shall from time to time determine and communicate to India.
Royalty and other rights	Nepal will receive royalty with respect to power generated and utilised in the Indian Union at rates to be settled by agreement. All navigation rights in the Kosi River in Nepal shall rest with Nepal. All the fishing rights in the Kosi River in Nepal shall continue to rest with Nepal.

Source: *Revised Agreement between His Majesty's Government of Nepal and the Government of India on the Kosi Project, 1975*

Some other institutional arrangements were also made with Nepal to settle a database system for hydrological information. A plan scheme namely, "Flood Forecasting and Warning System on rivers common to India and Nepal" which has 42 meteorological/hydrometric sites in Nepalese territory is in operation since 1989. A Joint India - Nepal Committee on Flood Forecasting (CFF) was set up in April, 2001 to review the existing flood forecasting system and prepare a Flood Forecasting Master Plan (FFMP). Further, for qualitative improvement of flood forecasting on the Indian side, the Nepalese side has also agreed to transmit hydrological data with respect to the five key stations located on the Rivers Ganga, Kosi, Rapti, Bagmati and Mahananda twice a day. In order to have interaction at a higher level pertaining to the cooperation in the field of Water Resources, including implementation of various agreements and understandings, a Nepal–India Joint Committee on Water Resources (JSCWR) headed by Water Resources Secretaries of both the countries is functioning with the mandate to act as an Umbrella Committee of all committees and groups.

3.12 Post Treaty Developments

The period between 2005 and 2015 was declared the decade of water cooperation by the UN and concepts of transboundary water collaboration, shared waters and shared responsibilities were initiated. Co-riparian states were asked to use this, so that natural resources could be used for the common good and for development and not for conflicts and wars.

The sustainable management of water within and between India and other neighbouring countries is vital to the national interests of all countries. Now there is emphasis on large scale cooperation along the lines of the economy, trade and transit can be achieved by using water as an instrument of peace-building. One of the most contentious issues between India and other countries has been sharing and developing transboundary water resources. Controversies surrounding past treaties and deep-seated suspicions have held hostage mega-projects planned on different rivers.

> उत्तर बिहार में समाज का एक दर्पण साहित्य रहा होगा तो दूसरा तरल दर्पण नदियां थी। इन असंख्य नदियों में वहां का समाज अपना चेहरा देखता था और नदियों के चंचल स्वभाव को बड़े शांत भाव से अपनी देह में, अपने मन और अपने विचारों में उतारता था।
>
> तैरने वाला समाज
> आलेखः श्री अनुपम मिश्र. मई 2008

There is always mistrust among countries and the politics remains heated following a controversy over different hydropower development agreements. "India-Nepal relations are constantly being upset by insensitivity and blundering on the part of India and hypersensitivity and proneness to misunderstanding on the part of Nepal," the former Indian Water Resources Secretary, Ramaswami Iyer wrote in the Indian Express newspaper following the latest controversy.[46] The controversial treaty's major component is the Pancheswar project that plans to irrigate huge swathes of land and generate more than 6,400 MW of hydropower to be shared by the two countries. The project was intended to have been built within eight years, but

[46] Iyer, R. Ramaswamy. (2014) How to misunderstand each other So far, India and Nepal have provided a textbook case, Indian Express, July 26, (http://indianexpress.com/article/opinion/columns/how-to-misunderstand-each-other/).

even 17 years since its signing, a detailed project report is yet to be prepared. The devastating floods occurring every year now, the effects of which were felt both in Nepal and India were a crucial discussion item in the recent meeting of India-Nepal Joint Standing Technical Committee (JSTC). The Government of India assured Nepal about the necessary flood protection works alongside the Sharda, the Kosi and the Gandak Rivers.

In the case of India-Bangladesh, the other contested issue is the construction of the Tipaimukh Dam, proposed on the River Barak in Manipur, India. This dam has been a contentious issue since its inception in 1978. The dam is planned in an ecologically sensitive region. In addition, it will submerge a wide area of Manipur. Bangladesh has voiced its concern on the adverse impact as it is a lower riparian country and as in the case of Farakka barrage, the waters will always rise.

मानसून के बल पर सदनीरा बनने वाली नदियां वर्षा की बूंदों को अपने आंचल में छुपाकर एक लंबी यात्रा के साथ हमारे होंठो को तरलता देकर जीवन चक्र को गतिमान करती हैं। प्रकृति के इस विराट खेल का अंदाज़ा इसी बात से चल जाता है कि भारत के पश्चिमि तट पर करीब 75 अरब टन जल बरसता है। मैदानी इलाका 15 लाख कि.मी. के क्षेत्र में फैला है बेशकीमती प्रकृति स्रोत प्रदान करने वाली नदियों-नालों के साथ हो रही छेड़छाड़ ने संकट खड़ा कर दिया है। कराहती नदियां अपनी पीड़ा कहें तो किससे कहें? कौन सुनेगा उनकी अकाल मृत्यु की शोक गाथा! कौन मनाएगा मातम!

कराहती नदियां, चौथी दुनिया
जुलाई, 2010

Pakistan's Indus River Commission has said several times that India is constructing more than 200 dams and hydropower structures on all three western rivers and especially on the Jhelum and the Chenab. Pakistan went to the International Court of Arbitration (ICA) to stop India from constructing conventional dams. The ICA barred India from constructing anything permanent. When Pakistan went to a neutral expert, the verdict was given in India's favour and some river projects were allowed and this situation is continuing.

The relationship of India with China as a lower riparian country is always in discussion. The existing arrangement with China is limited to sharing hydrological information through two separate MoUs regarding sharing hydrological information (water Level, discharge and rainfall) in flood season (1 June to 15 October) on the Brahmaputra (Yaluzangbu in China) and the Satluj (Langquin Zangbu in China). China is also reported to have identified 39 projects on the tributaries of the Brahmaputra, including seven on the main river. India's proposal for establishing a joint water commission with China for greater transparency about these projects were firmly rebuffed by China, leaving room for uncertainty and doubt on the status of development projects on the river.

UN Secretary General Ban Ki-moon cautioned, "A shortage of water resources could spell increased conflicts in the future. Population growth will make the problem worse. So will climate change. As the global economy grows, so will its thirst. Many more conflicts lie just over the horizon."[47]

[47] Address to a gathering of business leaders at the World Economic Forum at Davos, Switzerland, in January 2008

CHAPTER 4

STUDY FINDINGS

The village and HH level information on responses to issues relating to river water was collected from ten districts of four states of J&K , UP, Bihar and WB. Some major questions raised were - rivers sharing between international borders with neighbouring countries; awareness amongst local people about the international treaties for river water sharing; the dependency on the river; the changes in river morphology; the impact due to these changes; increasing disasters; factors & vulnerability of riverine communities; local community's perception of treaties, awareness and participation in decision making process, specific impact on women and capacity to cope up with the situation.

4.1 State Profile and River Valley

i. Jammu & Kashmir

Jammu & Kashmir state comprising divisions of Ladakh, Jammu and Kashmir, with an area of 2.22 lakhs sq km lies to the north-west of India. This state is rich in forest and water resources. The administrative setup of the state consists of twenty two districts, eighty two tehsils, one hundred forty two blocks, four thousand one hundred twenty eight *panchayats* and seven urban agglomerations. The main rivers of Himalayan origin that flow through the state are Jhelum, Chenab, Indus and Tawi. The villages near Baglihar project on the River Chenab of Doda District and Kishan Ganga Hydroelectric Project on the Kishan Ganga River in Bandipora District are the areas of this study.

The River Chenab flows through Doda and Ramban district from Thathri to Baggar taking a road length of 65 km. Ramban District was carved-out of the erstwhile District Doda in 2007. Baglihar Hydroelectric Power Project is a run-off-the-river power project on the Chenab River and situated in the southern Doda district. Bandipore is another district carved out of Baramulla in 2007, comprising of seven tehsils and eleven blocks. Kishan Ganga hydro electric project is situated in this district. Low-lying areas of the Kashmir Valley are prone to floods. Upper catchments of all the tributaries of the Jhelum, Indus, Chenab and Tawi rivers are prone to flash floods. Areas along the major highways, particularly Ramban, Panthial, Banihal, Doda, Kishtwar, Gulmarg, Dawar, Gurez, Tangdhar, Rajouri etc., are landslide prone .[48]

ii. Uttar Pradesh

Uttar Pradesh, a state in northern India, is bestowed with a variety of geographical land and cultural diversities. The

[48] http://jkenvis.nic.in/water_resources_district_wise.html as visited on 23 February 2015

state is one of the most ancient cradles of Indian culture and lies largely in the plains formed by the Ganga and Yamuna rivers with an area of 2,40,928 sq km. UP is bound by Nepal on the Northern side. UP has seventy-five districts and 820 development blocks. The State of Uttar Pradesh is drained by the River Ganga and the River Yamuna and their tributaries. The eastern parts are drained by other tributaries like Sharda, Gandak, Ghagra, Sarju, Rapti, Gomati and Ramganga. The villages near Sharda barrage on Sharda River in Lakhimpur Kheri district and Gandak barrage on Gandak River in Maharajganj district are the area of our study.

Lakhimpur Kheri is the largest district in UP bordering with Nepal. The River Gandak and the River Sharda flow through this district. There are a total of six *tehsils* and 15 blocks in the district. Maharajganj district comprises four *tehsils* and 12 blocks. The River Gandak flows through this district and the Gandak barrage is at Balmiki Nagar. The districts under study are always getting flooded and this adversely affects the economic condition of the people. Flood waters and regular river bank erosion along the river banks are causing major damage not only to humans and livestock but also to people's assets and livelihood.

iii. Bihar

The State of Bihar is located in the eastern part of India and it is an entirely land–locked state mid-way between WB in the east and UP in the west. It is bound by Nepal in the north and Jharkhand in the south. The state is divided into 38 districts and 534 blocks. The River Ganga which is the main drainage system for the state, flows in an easterly direction and stretches 432 km across Bihar. North Bihar, the plain, located north of the Ganga, is interspersed with eight major river basins: the Ghaghra, the Gandak, the Burhi Gandak, the Bagmati, the Adhwara group of rivers, the Kamala, the Kosi, and the Mahananda. Thus, all the rivers in North Bihar share basins either with another Indian state or with Nepal and Tibet. The villages near Kosi barrage on Kosi River in Supaul District of Bihar is the area of study.

Supaul district covers an area of 2,420 sq km and is a part of Kosi division. The district is bound by Nepal in the north. The river Kosi flows through the district which is considered as the sorrow of this area. All rivers of north Bihar drain into the main Ganga. Any rainfall occurring in Tibet and Nepal directly affects the flow in these river systems. River bar[illegible] Bihar is one of the important issues.

iv. West Bengal

West Bengal is situated in the eastern part of the country with total area of 88,752 sq km. The state has two distinct natural divisions - the Northern Himalayan region and the Southern Alluvial plains. WB is bordered by Bangladesh to the east, by Nepal to the northwest and in the north by Bhutan. WB consists of 20 districts and 341 blocks. Teesta, Torsa, and Jaldhaka are the three main rivers in the north. They are tributaries of the river Bramhaputra. The other important river passing through the state is Ganga (known as Hooghly). The Ganga drains into the Bay of Bengal forming the famous delta of the Indian Sundarbans. The villages near Farakka barrage on river Ganga in Malda and Murshidabad district and the confluence of River Teesta near the Bangladesh border in Jalpaiguri and Cooch Behar districts are the area of study.

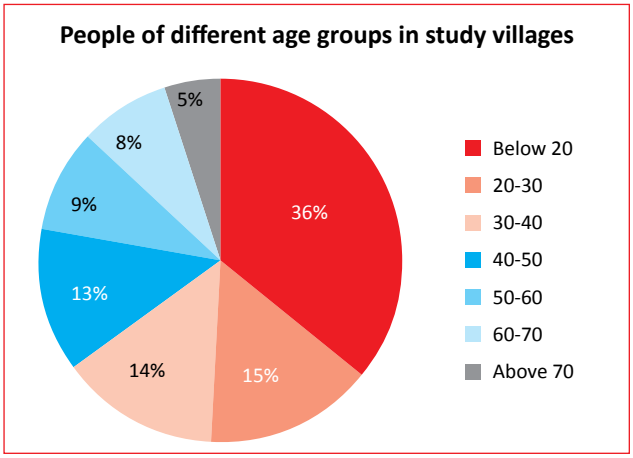
Malda in WB covers an area of 3733 sq km and has an international border with Bangladesh. Ganga makes its first entry in WB near Manikchak of Malda. As it is a low lying basin, it is prone to floods and severe river bank erosion. Murshidabad is in the middle of WB with a total area of 5316.11 sq km. The River Padma flows through the entire eastern boundary, separating the district from the districts of Malda and Rajshahi (Bangladesh). The district has an international border with Bangladesh covering a distance of 125.35 km. The district has 26 blocks and 254 *gram panchayats*. Jalpaiguri district consists of seven blocks and 80 *gram panchayats* in 2286 sq km. The district situated in the northern part of WB has international borders with Bhutan and Bangladesh in the north and south respectively. In the north-eastern part of WB, Cooch Behar district shares the border with Bangladesh boundary in the south and south-west. The total area of the district is 3387 sq km with 12 blocks and 128 *gram panchayats*. The rivers Teesta, Torsa, Jaldhaka, and Raidak flow through the districts of Jalpaiguri and Cooch Behar. They originate in the neighbouring country of Bhutan and the state of Sikkim, flow onwards down to Bangladesh, where they meet the Bramhaputra at different points. Flood and river bank erosion cause regular and major disasters that occur frequently causing devastation in these districts.

4.2 Sample Village Profile

In the sample village, the facilitators interviewed the head of the sample families. An overall profile of the communities cutting across different river valleys was created. These profiles provide studied HH details on account of – age, caste, sex ratio, religion, education, occupation, monthly income, government safety net and status of land holding. The analysis gives a trend of the HH profiles studied.

i. Age Group

The age group of the sample HHs was divided into seven categories starting from below 20 years to more than 70 years, at intervals of 10 years. Below 20 years was the highest at 35.47 percent, followed by up to 30 years which was 15 percent, and up to 40 years was 14 percent. Only five percent people were found in the above 70 year old category. However, 51 percent people fall in the combined category of 20 to 60 years of age, which is the main work force of the community.



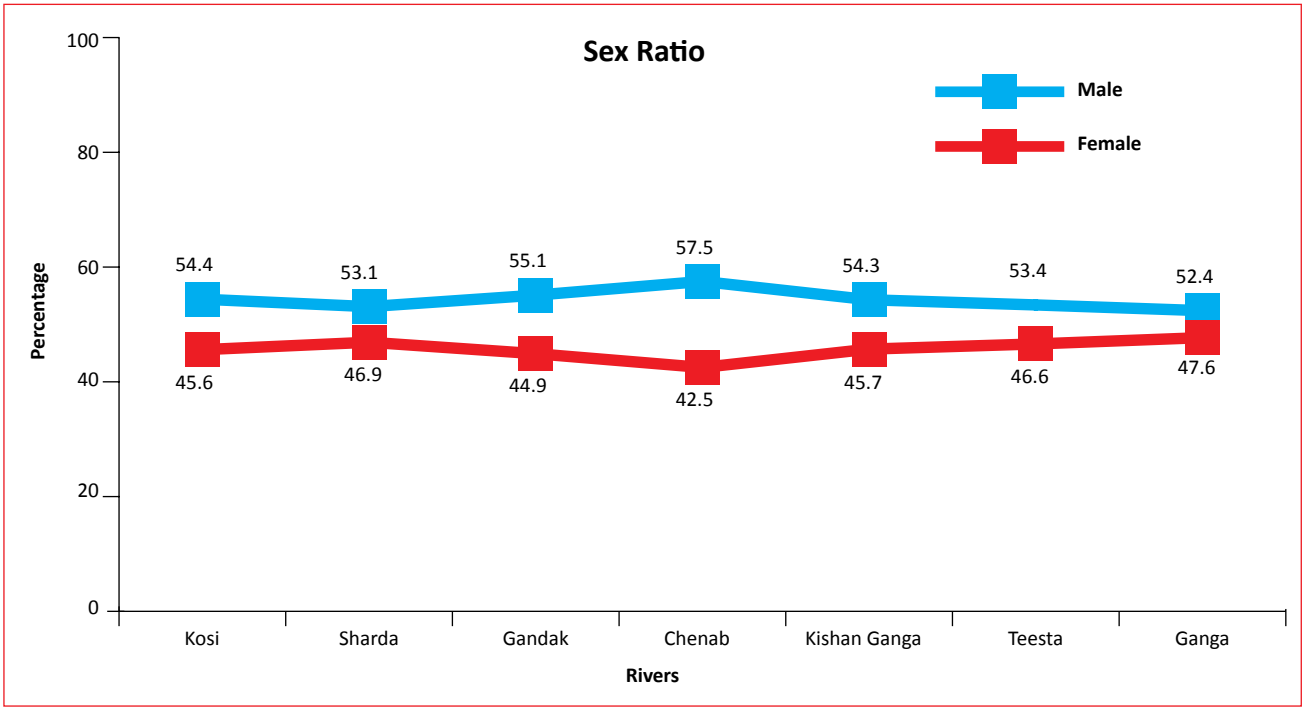
ii. Caste Composition

Villages have people from various caste groups and they were broadly divided into four categories of Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC) and General as per India government norms. When analysed on the basis of riverbanks, it was found that SC HHs were the highest in Teesta at 50 percent, followed by Ganga at 40.2 percent and Gandak at 34.8 percent. ST communities were the highest in Kishan Ganga at 98.4 percent, followed by Gandak at 22 percent and Chenab at 11.6 percent. In WB for Ganga (50%) and Teesta (42.8%) river valley, the villages are mostly dominated by people from the General category.

Caste Category									
	Total Household	SC	%	ST	%	OBC	%	Gen	%
Kosi	250	72	28.8	9	3.6	125	50	44	17.6
Sharda	250	81	32.5	8	3.2	145	58.2	16	7
Gandak	250	87	34.8	55	22	96	38.4	12	4.8
Chenab	250	24	9.6	29	11.6	191	76.4	6	2.4
Kishan Ganga	250	0	0	246	98.4	0	0	4	1.6
Teesta	250	125	50	5	2	13	5.2	107	42.8
Ganga	500	201	40.2	7	1.4	42	8.4	250	50
Total	2000	590	29.5	359	17.95	612	30.6	439	21.95

iii. Sex Ratio

A comparative analysis of the sex ratio for all river valleys indicates the trend of more males as opposed to female, which confirms the ratios in the census data pattern of the country. The widest gap is in Chenab at 42.5 percent female against 57.5 percent male. On the other hand, the lowest gap is in Ganga at 47.6 percent female against 52.4 percent male.



iv. Religion

In the sample villages, the religious background of the communities varied for each river valley. The maximum number of Hindus were in Kosi (95.4%), whereas the maximum number of Muslims (98.4%) and the minimum number of Christians (1.6%) were in in Kishan Ganga. Religion and cultural practices played an important role in the perception of the importance of river for many community members.

Religion							
River valleys	Total population	Hindu	%	Muslim	%	Christian	%
Kosi	1736 (100)	1656	95.4	80	4.6	0	0
Sharda	1700 (100)	1594	93.8	106	6.2	0	0
Gandak	1515 (100)	1422	93.9	92	6.1	1	0.1
Chenab	1083 (100)	605	55.9	477	44	1	0.1
Kishan Ganga	1095 (100)	0	0	1078	98.4	17	1.6
Teesta	1429 (100)	492	34.4	937	65.6	0	0
Ganga	2028 (100)	646	31.9	1382	68.1	0	0

v. Education

Analysis of the education status gives an idea about the qualification of the sample HHs , in different river valleys. Illiteracy among community members was found to be the highest in Kosi (49.96%), followed by Gandak (46.94%) and Sharda (39.49%). A greater number of people were found to be educated up to HSC and beyond in Kishan Ganga (5.45%), followed by Chenab (5.13%) and Kosi (4.22%). The trend of dropouts from the primary level to HSC and above is clearly visible for the available information. It is at the primary (30.69%), secondary (22.52%), SSC (6%) and HSC and above (3.4%). The education level could be a useful yardstick to measure community participation in development related decision making and also influencing any decision that adversely impacts the community.

Education										
River valley	Primary		Secondary		SSC		HSC & above		Illiterate	
	Total	%	Total	%	Total	%	Total	%	Total	%
Kosi	385	24.29	259	16.34	82	5.17	67	4.22	792	49.96
Sharda	505	34.21	168	11.38	170	11.51	50	3.38	583	39.49
Gandak	456	34.86	173	13.22	43	3.28	22	1.68	614	46.94
Chenab	322	30.63	387	36.82	69	6.56	54	5.13	219	20.83
Kishan Ganga	319	30	395	37.15	70	6.58	58	5.45	221	20.79
Teesta	332	27.89	310	26.05	57	4.78	32	2.68	459	38.57
Ganga	567	32.77	426	24.62	67	3.87	43	2.48	627	36.24
Total (%)	2886	30.69	2118	22.52	558	6	326	3.4	3515	37.39

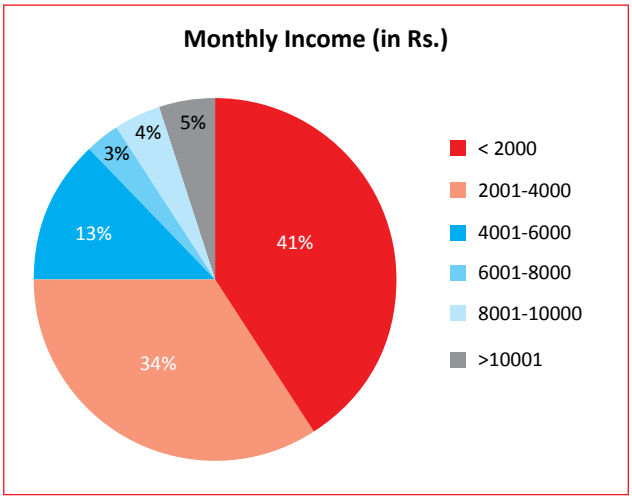
vi. Occupation

Rural HHs follow multiple occupations for their sustenance. Thus, each HH, including students and housewives, is engaged in multiple activities. Across all river valleys, the majority have daily labour as an occupation (19.25%). But the highest number is found in Teesta (29.1%), followed by Ganga (27.4%) and Gandak (27.3%). However, due to loss of farmland, now the farmers are subsistence cultivators and only 4.80 percent HHs depended upon agriculture as their main occupation. Another interesting observation was that, the dependence upon fishing was very low and less than one percent of the people considered it as their occupation. Other occupations like business, artisan and government jobs were on negligible account. A woman, while being considered as a 'housewife', was engaged in all kinds of unpaid and paid labour. Domestic labour in these areas is particularly harsh, as water collection consumes time and hard labour. Therefore, the term housewife, is inappropriate and should be termed 'domestic labour' and given value.

Occupation								
	Kosi	Sharda	Gandak	Chenab	Kishan Ganga	Teesta	Ganga	Total (%)
Housewife	418 (24.1)	398 (23.40	266 (17.6)	251 (23.2)	31 (2.8)	271 (19)	408 (20.1)	2019 (19)
Student	352 (20.3)	439 (25.8)	331 (21.8)	394 (36.4)	17 (1.6)	421 (29.5)	645 (31.8)	2586 (24.28)
Daily Labour	253 (14.6)	325 (19.1)	414 (27.3)	87 (8)	0	416 (29.1)	555 (27.4)	2050 (19.25)
Farmer	118 (6.8)	93 (5.5)	112 (7.4)	80 (7.4)	389 (35.6)	6 (0.4)	14 (0.7)	512 (4.80)
Fisherman	2 (0.1)	3 (0.2)	3 (0.2)	1 (0.1)	0	19 (1.3)	23 (1.1)	51 (0.47)
Govt. Employee	15 (0.9)	3 (0.2)	4 (0.3)	88 (8.1)	565 (51.6)	0.4	10 (0.5)	179 (1.68)
Business	25 (1.4)	4 (0.2)	6 (0.4)	90 (8.3)	44 (4)	23 (1.6)	31 (1.5)	189 (1.77)
Rickshaw puller	4 (0.2)	0	0	1 (0.1)	0	9 (0.6)	9 (0.4)	23 (0.21)
Unemployed	200 (11.5)	4 (0.2)	15 (1)	7 (0.6)	4 (.4)	80 (5.6)	99 (4.9)	409 (3.84)
Others	148 (8.5)	173 (10.2)	99 (6.5)	12 (1.1)	44 (4)	17 (1.2)	30 (1.5)	523 (5)
Not Applicable	198 (11.4)	232 (13.6)	244 (16.1)	72 (6.6)	0	161(11.3)	203 (10)	1110 (10.24)
Artisan	1 (0.1)	0	17 (1.1)	0	0	0	1(0.004)	19 (0.17)
Sailor	2 (0.1)	0	3 (0.2)	0	0	0	0	5 (0.04)

vii. Monthly Income

Community monthly income was derived from various sources. Community income has been categorised in six groups in a range of Rs.2,000, starting from Rs.2,000 to more than Rs.10,000. However, around 41 percent people earned less than Rs.2,000 while only five percent earned more than Rs.10,000 per month. Around 50 percent fell in the combined category of Rs.4000 to Rs.8000 per month.



viii. Government Safety Net

A large number of people in these villages were covered under the government safety net schemes. Across the river valleys, maximum people were covered under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) (56.25%), followed by Integrated Child Development Services (ICDS) (31.35%) and Antodaya (16.95%). This analysis establishes a clear link between the highest numbers of people projecting daily labour as an occupation. On the river basin specific trend, it shows that under MGNREGA, the highest number of people are engaged in Gandak (96.8%), followed by Chenab (66%) and Teesta (63.6%). On the other hand, coverage under the food security scheme of Annapurna and Antodaya was the highest in Ganga (7%) and Sharda (49.2%). But there was no coverage in Kishan Ganga area. ICDS reached out to the maximum beneficiaries in Kishan Ganga(99.2%) and the least number in Chenab (2.8%). Indira Awas Yojana and Pension was received by the highest numbers in Sharda (36%) and Ganga (21%). It was clear that these villages and people were able to survive and have some dignity primarily because of government schemes, subsidies and social safety net. Without these, people in the areas surveyed would be reduced to penury and starvation and almost to the level of slow social genocide.

Government safety net								
	Kosi	Sharda	Gandak	Chenab	Kishan Ganga	Teesta	Ganga	Total
MGNREGA	56 (13.7)	142 (56.8)	242 (96.8)	165 (66)	61 (24.4)	159 (63.6)	300 (60)	1125 (56.25)
ANNAPURNA	5 (1.2)	9 (3.6)	5 (2)	1 (0.4)	0	15 (6)	35 (7)	70 (3.5)
Antyodaya	16 (3.9)	123 (49.2)	117 (46.8)	3 (1.2)	0	24 (9.6)	56 (11.2)	339 (16.95)
Indira Awas Yojana	60 (14.7)	90 (36)	71 (28.4)	1 (0.4)	0	26 (10.4)	56 (11.2)	304 (15.2)
Pension	72 (17.6)	35 (14)	40 (16)	7 (2.8)	9 (3.6)	45 (18)	105 (21)	313 (15.65)
ICDS	41 (10)	83 (33.2)	52 (20.8)	7 (2.8)	248 (99.2)	65 (26)	131 (26.2)	627 (31.35)

ix. Land Holding Status

The land profile of the sample HHs indicate that the majority of the villages have small and marginal land owning HHs. Across the river valleys, cultivable un-irrigated land is the maximum (33.05%), followed by cultivable irrigated land (28.9%) and waste land-uncultivable (22.95%). In the riverbank analysis, cultivable–irrigated land is the maximum in Kishan Ganga (99.2%), followed by Kosi (46.4%) and Gandak (46%). On the contrary, waste land – uncultivable is the highest in Gandak (38%), followed by Kosi (32.88%) and Kishan Ganga (14.2%). While availability of land for orchards is high in Kishan Ganga (17.6%), it is not available in Ganga region (0%). The land categorised under other categories is mainly char land; there is not much access or ownership to those lands and it is only 2.7 percent people who have access to it. Surveys show a high rate of land alienation which has deprived people of land through various ways, which include change in river course, inundation as well as land loss due to penury and indebtedness. People in this region, therefore, face the double burden of natural disasters - which are actually a result of system failure as well as exploitation.

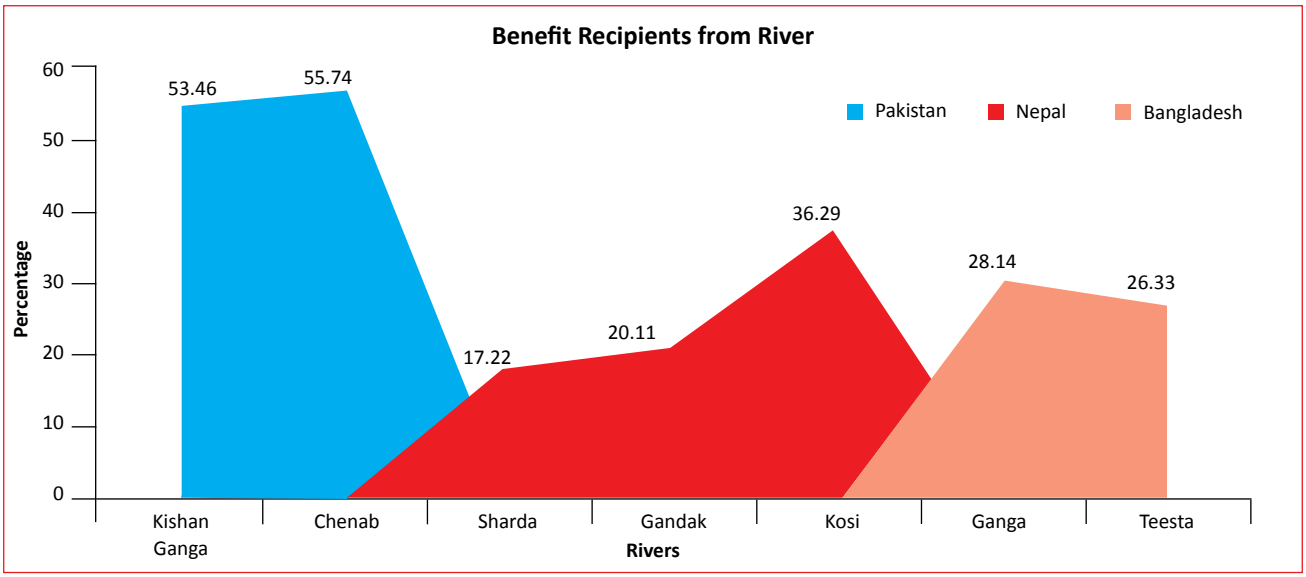
Status of Land Holding						
River Valley	Cultivable irrigated	Cultivable un-irrigated	Orchard	Currently fallow land	Wasteland/ uncultivable	Other
Kosi	116 (46.4)	53 (21.2)	2 (0.8)	2 (0.8)	171 (32.88)	17 (6.8)
Sharda	37 (14.8)	8 (3.2)	1 (0.4)	0	1 (0.4)	6 (2.4)
Gandak	115 (46)	192 (76.8)	33 (13.2)	16 (6.4)	95 (38)	0
Chenab	27 (10.8)	186 (74.4)	1 (0.4)	170 (68)	44 (17.6)	0
Kishan Ganga	248 (99.2)	198 (79.2)	44 (17.6)	1 (0.4)	48 (19.2)	0
Teesta	28 (11.2)	9 (3.6)	10 (4)	9 (3.6)	29 (11.6)	9 (3.6)
Ganga	7 (1.4)	15 (3)	0	7 (1.4)	71 (14.2)	22 (4.4)
Total (%)	578 (28.9)	661 (33.05)	91 (4.55)	289 (14.45)	459 (22.95)	54 (2.7)

4.3 Ground Realities

Interactions with adult women and men from communities of different river valleys were around various issues that impacted their lives, livelihoods, and access to natural resources and disasters faced. During the sharing sessions, one could see shades of expressions of pain and sorrow due to loss caused by floods and erosion, resulting in frustration and anger. Flood and river bank erosion are among the prominent causes that lead to multiple displacement and loss of livelihood options, especially in Sharda, Kosi, Teesta and Ganga. It was not uniform throughout the year and it changed with the seasons for many rivers. Women bear multiple burden and exploitation in public and private spheres of their lives. Social relations of power are skewed in favour of men even in the HHs, while both men and women face exploitation and the wrath of river disasters collectively. Women exercise some amount of agency and are often heads of HHs, but have little or no say in decision making at HH or public levels.

i. Importance of River for Communities

River is treated with respect by communities living on the banks as they regard the river symbolically as 'Mother' and 'Holy'. In some locations, such respect was given as a mixture of fear, unpredictability and for reasons beyond explanation. Most people in the study are aware about the name, origin of the rivers flowing near their habitation and also aware about the country with which they share the river. People apprehended that the water management systems through signed treaties are faulty. On an average, 24.54 percent people from Kosi, Sharda and Gandak valley stated that Nepal is getting more benefits from the river valley projects and that they are suffering from floods, without rains, riverbank erosion and reduced water flow. While 75.46 percent perceived India getting more benefit, 27.23 percent people from Ganga and Teesta basin stated that Bangladesh is getting benefit from the water sharing treaty, whereas 72.68 percent perceived India is getting benefit. From Chenab and Kishan Ganga river valley, 54.75 percent people opined that Pakistan is getting more benefit, while 45.25 percent opined that India is getting the benefits. They viewed that the fault lies with both countries and people are suffering because of faulty administration. In almost all the study areas, people expressed that, only the peoples' struggles can change the scenario and they will fight for the cause and in an organised and collective manner, so that they can overcome the problem. It is evident, that river management has been replaced by the politics of blaming the 'other' - in this case, the 'other people benefitting'.



ii. Uses of River Water

There are multiple uses of river water – starting from irrigation to navigation. Accumulated responses across rivers, indicates that people render the maximum importance to religious and cultural values of the river at 54 percent and 47 percent respectively. However, both Kishan Ganga and Chenab had the lowest values on this account (0.4%, 3.6%) and (2.8%, 2%). For irrigation and drinking, 99.6 percent depended on Kishan Ganga, 98 percent for religious purposes and 94.8 percent for cultural purposes in Sharda. Use of Sharda for navigation purpose indicated 72.8 percent while for fishing on Kishan Ganga, it was 98.4 percent. Rivers and their immediate environments play an important role in maintaining the eco systems and natural life habitats. They form part of the food chain from vegetative products to aquatic creatures like fish, crab, shrimp and many more varieties. As indicated in the data, communities settled on various river banks use river water for varied purposes and their perception of river water use too varies widely. For navigation use, the Sharda River is the highest at 72.8 percent, followed by Teesta 65.2 percent and Ganga 62.8 percent. Similarly, the religious importance of Sharda (otherwise known as Mahakali) is the maximum at 98 percent, followed by Gandak (Kali Gandak where Saligram Shila is found) at 95.2 percent and Kosi at 80.4 percent.

Different Uses of Water							
Rivers	**Irrigation**	**Drinking**	**Religious**	**Cultural**	**Fishing**	**Navigation**	**Other**
Kosi	15 (6)	43 (17.2)	201(80.4)	186 (74.4)	12 (4.8)	18 (7.2)	1 (0.4)
Sharda	132(52.8)	17 (6.8)	245 (98)	237(94.8)	30 (12)	182 (72.8)	2(0.8)
Gandak	168 (67.2)	144 (57.6)	238 (95.2)	230 (92)	94 (37.6)	148 (59.2)	5 (2)
Chenab	33 (13.2)	13 (5.2)	7 (2.8)	5 (2)	20 (8)	5 (2)	0
Kishan Ganga	249 (99.6)	249 (99.6)	1 (0.4)	9 (3.6)	246 (98.4)	4 (1.6)	2 (0.8)
Teesta	32 (12.8)	71 (28.4)	144 (57.6)	122(48.8)	81 (32.4)	163 (65.2)	27 (10.8)
Ganga	72 (14.4)	133(26.6)	252 (50.4)	251 (50.2)	106 (21.2)	314 (62.8)	50 (10)
Total (%)	701 (35.05)	670 (33.5)	1088 (54.4)	940 (47)	589 (29.45)	834 (41.7)	87 (4.35)

iii. Recent Changes in River Water uses as Observed by People

Over the last ten years, communities have experienced a shift in the pattern of river water use. The overall scenario depicts that irrigation is at 31.4 percent, availability of drinking water 27.4 percent, rituals 9.45 percent and transportation 38.1 percent. People have observed an increase in multiple hazards like floods and river bank erosion. People residing on river banks are always under a state of threat and over a period of time, the intensity of disasters are on the increase due to different factors. All HHs studied were affected by multiple disasters and displacements since the last few years. They are facing floods every year especially in Malda, Murshidabad, Cooch Behar, Jalpaigudi districts of WB and Maharajganj and Lakhimpur Kheri districts of UP are severely affected by river bank erosion. Some people have already been displaced more than 10 times and have lost all their agricultural land in the river. In Kishan Ganga and Chenab river valley, the communities do not get water for irrigation

as the river valley projects in these rivers restrict the use of water from the project site. Riverine people face multiple displacement they lose their land and livelihood and are forced to migrate. There seems to be little future for them. There is a serious issue of a slow disintegration of such unique riverside communities.

Recent Changes Related to River Water Uses								
	Kosi	Sharda	Gandak	Chenab	Kishan Ganga	Teesta	Ganga	Total (%)
Less water for irrigation	39 (15.6)	148 (59.2)	171 (68.4)	28 (11.2)	241 (96.4)	26 (10.4)	29 (5.8)	628 (31.4)
Not getting water on time	95 (38)	155 (62)	166 (66.4)	41 (16.4)	240 (96)	57 (22.8)	56 (11.2)	810 (40.5)
Non-availability of drinking water	44 (17.6)	5 (2)	97 (38.2)	32 (12.8)	237 (94.8)	42 (16.8)	91 (18.2)	548 (27.4)
Not getting water for deity bath	20 (8)	3 (1.2)	56 (22.4)	11 (4.4)	239 (95.6)	34 (13.6)	60 (12.0)	423 (21.15)
No access to water for rituals	17 (6.8)	7 (2.8)	85 (26)	11 (4.4)	4 (1.6)	30 (12.0)	35 (7)	189 (9.45)
Less fish yielding (Hilsa fish)	79 (31.6)	242 (96.8)	193 (77.2)	30 (12)	236 (94.4)	142 (56.8)	224 (44.8)	1146 (57.3)
No/unsafe means of transport	34 (13.6)	130 (52)	80 (32)	192 (76.2)	2 (.8)	132 52.8)	192 (38.4)	762 (38.1)
Frequency of riverbank erosion increased	205 (82)	246 (98.4)	233 (93.2)	93 (76.8)	240 (96)	225 (90.0)	442 (88.4)	1684 (84.2)
Creation of new land (char- lands)	143 (57.2)	241 (96.4)	183 (73.2)	14 (5.6)	1 (.4)	216 (86.4)	428 (85.6)	1226 (61.3)
Other	3 (1.2)	0	5 (2)	0	0	39 (15.6)	47 (9.4)	94 (4.7)

iv. Impact on People Due to Changes in Traditional use of the Rivers

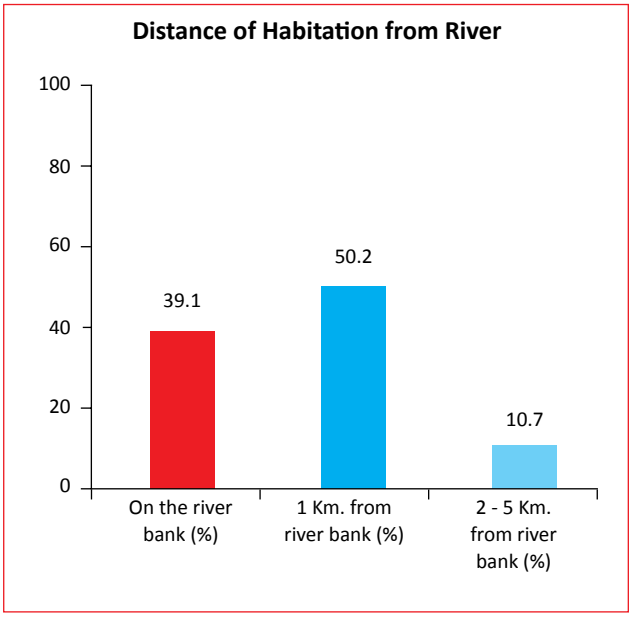
The current distribution of river waters at the barrages constructed under the treaties does not address drought or flood mitigation, it only harms the agro-ecological and economic wellbeing of people residing alongside the river. The locals are familiar with the meandering waters, big or small, and with their collaboration, the impact of floods can be less destructive. People in this part of the country knew how to live with floods. They did not try to hold the rivers in check but wove around them a life of boats, fisheries and appropriate crops.[49] Now 75 percent people are not getting proper livelihood options from the river. Massive river bank erosion and floods have caused loss of home and farmland for 74.75 percent people. In Kishan Ganga River valley, 92.8 percent people were using river water for drinking purpose and now that is not available. Due to reduced fish catch, 54.2 percent fisher-folk communities have lost their livelihood option. Now navigation is not safe in the river and around 51 percent families observed that their mobility in the river is now restricted. There is conflict over the access and ownership on newly emerged char land. Around 28 percent people observed this as an impact for faulty governance system. The local opinion is that construction of barrages and big dams destroy the flow of the river and people living on its sides.

Affected Due to Changes in Traditional Use of Rivers								
	Kosi	Sharda	Gandak	Chenab	Kishan Ganga	Teesta	Ganga	Total (%)
Massive bank erosion and loss of home and farm land	216 (86.4)	182 (13.9)	173 (69.2)	40 (16)	192 (76.8)	222 (88.8)	470 (94)	1495 (74.75)
Loss of crop (food insecurity)	202 (80.8)	226 (17.3)	225 (90)	33 (13.2)	237 (94.8)	179 (71.6)	363 (72.6)	1465 (73.25)
Conflict on the ownership and access to newly created land	126 (50.4)	168 (12.8)	92 (36.8)	10 (4)	14 (5.6)	55 (22.0)	93 (18.6)	558 (28)
Less livelihood option	170 (68)	227 (17.3)	221 (88.4)	136 (54.4)	233 (93.2)	160 (64.0)	355 (71)	1502 (75.1)
Extra effort to get safe drinking water	65 (26)	2 (.2)	53 (21.2)	26 (10.4)	232 (92.8)	66 (26.4)	130 (26)	574 (28.7)
Agony for not observing religious-cultural activities	24 (9.6)	16 (1.2)	90 (36)	17 (6.8)	6 (2.4)	51 (20.4)	46 (9.2)	250 (12.5)
Loss of livelihood of fisher folk	103 (41.2)	186 (14.2)	184 (73.6)	46 (18.4)	241 (96.4)	124 (49.6)	200 (40)	1084 (54.2)
Reduced food variety	153 (61.2)	239 (18.2)	202 (80.8)	50 (20)	233 (93.2)	191 (76.4)	376 (75.2)	1444 (72.2)
Unsafe and expensive mobility & navigation	109 (43.6)	64 (4.9)	114 (45.6)	225 (90)	3 (1.2)	184 (73.6)	321 (89)	1020 (51)

[49] Tairne wala samaj dub raha hai, Anupam Mishra, http://www.indiawaterportal.org/articles/taral-darpane-samajer-mukh-joya-mitra-bengali-translation-anupam-mishras-booklet-tairne,2008

v. Vulnerable Locations Trigger Losses

River bank erosion is another form of disaster for people from Sharda, Gandak, Ganga and Teesta. This problem is severe in Malda and Murshidabad districts on the bank of the Ganga. Land loss is massive each year and if this trend continues, then many people will lose all their lands within a few years, which will render them homeless. Many villages in Sharda and Gandak River have also been submerged. However, people have shifted themselves and many have settled in a linear pattern along the road, in temporary encampments, made of bamboo and straw. While 39.1 percent people from all river valleys reside on the river bank, 50.2 percent reside within one km from river and 10.7 percent people reside within two to five km from the river.



vi. Displacement from Original Settlement and Patterns of Rehabilitation

River bank erosion plays an important role in displacing communities from their original place of habitation. Over a period of time, the river takes many turns and erodes its banks and submerges villages, markets and cultivable land in the process. People of many villages get displaced many times during their lifetime. During the interaction for each river valley, people who were settled for a number of years at a particular location were studied. Only 29.6 percent families are residing at their present place since their childhood. Out of these, 24.9 percent people have been staying there for less than five years or 5-10 years in their present place and around 36.5 percent people are residing there for more than 10 years. However, the scenario is quite different for the river valley of Chenab (86.4%) and Kishan Ganga (80.4%) where people have been residing from their childhood. This is mainly because of the mountainous terrain of the region and low displacement due to erosion. The least number of people who have been residing from childhood are located on river banks of Teesta and Ganga accounting for 8 percent each.

Settlement in current location					
River valley	< 5 years	5 - 10 years	> 10 years	From childhood	Total (%)
Kosi	19 (7.6)	42 (16.8)	119 (47.6)	70 (28)	250 (100)
Sharda	37 (14.8)	73 (29.2)	116 (46.4)	24 (9.6)	250 (100)
Gandak	12 (4.8)	72 (28.8)	145 (58)	21 (8.4)	250(100)
Chenab	1 (0.4)	28 (11.2)	5 (2)	216 (86.4)	250 (100)
Kishan Ganga	1 (0.4)	43 (17.2)	5 (2)	201 (80.4)	250 (100)
Teesta	10 (4)	100 (40)	120 (48)	20 (8)	250 (100)
Ganga	100 (20)	140 (28)	220 (44)	40 (8)	500 (100)
Total (%)	230(11.5)	498 (24.9)	730 (36.5)	592 (29.6)	2000 (100)

For people settled on river banks, river bank erosion and floods cause displacement several times from the original place of habitation. Out of these, 22 percent families have changed their habitation 5-10 times in their lifetime, while 15 percent people have changed it more than 10 times. Multiple displacements are the main cause behind poverty and always there is the risk on the life and livelihood of these families. However, the government has failed to recognise this as an internal displacement of people and provide required support.

Displacement of the inhabitants									
	Total Households	Never changed		< 5 Times		5 - 10 times		> 10 times	
		Total	%	Total	%	Total	%	Total	%
Kosi	250 (100)	35	14	198	79.2	17	6.8	0	0
Sharda	250 (100)	55	22	5	2	143	57.2	47	18.8
Gandak	250 (100)	13	5.2	37	14.8	90	36	110	44
Chenab	250 (100)	213	85.2	36	14.4	1	0.4	0	0
Kishan Ganga	250 (100)	202	80.8	47	18.8	1	0.4	0	0
Teesta	250 (100)	30	12	120	36	60	24	40	16
Ganga	500 (100)	120	24	145	29	130	26	105	21
Total	2000 (100)	668	33.4	588	29.4	442	22.1	302	15.1

vii. Faulty Water Management System

Water problems result largely from poor water management by countries with transboundary rivers who share the river on transboundary. Across river valleys, 47.2 percent people were affected and the highest was in Kishan Ganga (97.6%), followed by Teesta (64%). The least affected was Sharda (96.4%), followed by Kosi (46.4%). People have accumulated knowledge about river and the impact of construction around the river; however, this knowledge is not used at policy levels thus, it negatively impacts the local people. Prof. Jayanta Bandyopadhyay observed that the river not only consists of water flow but also solid flow causing several magnificent changes and disasters. Thus, three elements are introduced by him for the broader understanding of the subject matter, i.e., provision for a broad environmental picture of the Himalayan rivers and related ecosystem services, identification of a set of boundary conditions for designing water -futures and lastly, locating knowledge/ institutions needed for realising such a design.[50]

Affected by Faulty Water Management				
River Valley	Not affected (%)	Affected (%)	Don't Know (%)	Total (%)
Kosi	116 (46.4)	127 (50.8)	7 (2.8)	250 (100)
Sharda	241 (96.4)	9 (3.6)	0	250 (100)
Gandak	60 (24)	30 (12)	160 (64)	250 (100)
Chenab	63 (25.2)	84 (33.6)	103 (41.2)	250 (100)
Kishan Ganga	6 (2.4)	244 (97.6)	0	250 (100)
Teesta	88 (35.2)	160 (64)	0	250 (100)
Ganga	210 (42)	290 (58)	0	500 (100)
Total (%)	784 (39.2)	944 (47.2)	270 (13.5)	2000(100)

viii. Main Causes Behind the Changes

In people's lives, the main changes are attributed to causes varying from improper treaties with neighbouring countries to river bank erosion and improper governance system. Almost 83.6 percent people observed that construction of river valley projects as the main threat for their suffering, while 66.7 percent families observed that the frequent change of the course of the river is the main cause. As they were not aware about the contents of the treaties, most of them do not consider the treaties as a valid cause behind the changes. Out of these families, 66.1 percent thought that river bank erosion is also another cause that they are not able to use the river as they used it previously. Improper governance of water has been perceived as another reason by 76.65 percent people. There is enough water in the river basins to provide livelihoods of its residents for a long time provided water is managed efficiently, equitably and that additional water is made available not just through storage.

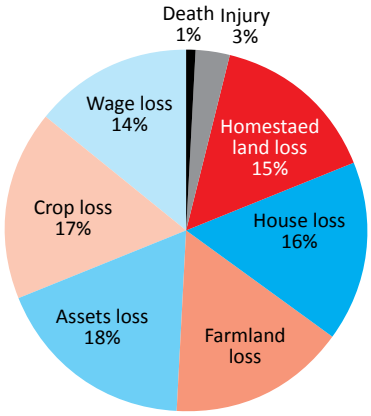
[50] Water Futures: A Dialogue for Young Scholars and Professionals Ecosystems for Life: A Bangladesh- India Initiative, November, 2013

Main Causes behind the Changes							
River valley	Improper treaty with riparian countries	Construction of different river valley projects	Less water availability	Frequent change of course by river	Massive river bank erosion	Improper governance/ management system	Any other
Kosi	74 (29.6)	183 (73.2)	169 (67.6)	189 (75.6)	202 (80.8)	218 (87.2)	8 (3.2)
Sharda	7 (.6)	231 (19.6)	195 (16.6)	245 (20.8)	241 (20.5)	222 (18.9)	0
Gandak	223 (89.2)	230 (92)	94 (37.6)	232 (92.8)	229 (91.6)	203 (81.2)	3 (1.2)
Chenab	158 (63.2)	204 (81.6)	37 (14.8)	115 (46)	82 (32.8)	242 (96.8)	1 (0.4)
Kishan Ganga	11 (4.4)	241 (96.4)	241 (96.4)	0	0	0	0
Teesta	28 (11.2)	199 (79.6)	89 (35.6)	185 (74.0)	186 (74.4)	216 (86.4)	18 (7.2)
Ganga	46 (9.2)	384 (76.8)	111 (22.2)	368 (73.6)	382 (76.4)	432 (86.4)	24 (4.8)
Total (%)	547 (27.35)	1672 (83.6)	936 (46.8)	1334 (66.7)	1322 (66.1)	1533 (76.65)	54 (2.7)

ix. Impact on Assets and Food Security

Agriculture, fishing and livestock are the major source of livelihood. These are becoming increasingly vulnerable because of the increase in disasters like floods and the land loss due to river bank erosion. Crop loss is now a regular phenomenon due to floods, amounting to 17 percent of crop losses. In most of the areas, the prime agricultural lands have gone under water and people have no access to newly emerged char lands. Due to disasters, 16 percent of the people have lost their farmland and 15 percent of the people have lost their homestead land. In the current year (2014), floods have destroyed all standing crops. Out of the people interviewed, 14 percent stated that they had lost their wages and other livelihood options. Sand casting has been mentioned by farmers as a major threat in villages affected by floods. Loss of HH assets was up to 18 percent. Now floods and erosions have a significant impact on livestock. Livestock population has substantially declined due to the non availability of sufficient grazing land and safe places in which to keep them. Poor people in the study areas are now left with very few livestock due to lack of fodder. This not only impacts livelihood but the entire food and agriculture and livestock chain is disrupted. This can lead to a major shortfall in livestock patterns nationally.

Loss due to flood & River bank erosion



x. Impact on Women

During discussions at the community level, efforts were made to reach out to women to understand the issues that concerned and impacted them, in relation to their location near the river bank. As a result of patriarchal practices, women were at the receiving end of most of the problems the community and family faced.

The faulty river water management system and its impacts such as bio-diversity degradation, food insecurity and increasing disaster have affected women in the study locations adversely. Traditional and modern gender roles make women more vulnerable and less capable of adapting to the situation. Women get less information as their participation in decision making is negligible. Increased workloads prevent them from participating in the formal decision making process. The impact of river degradation and devastation is experienced by women in three specific areas: direct impact of available economic activities, increase in hardship and decline in reproductive health.

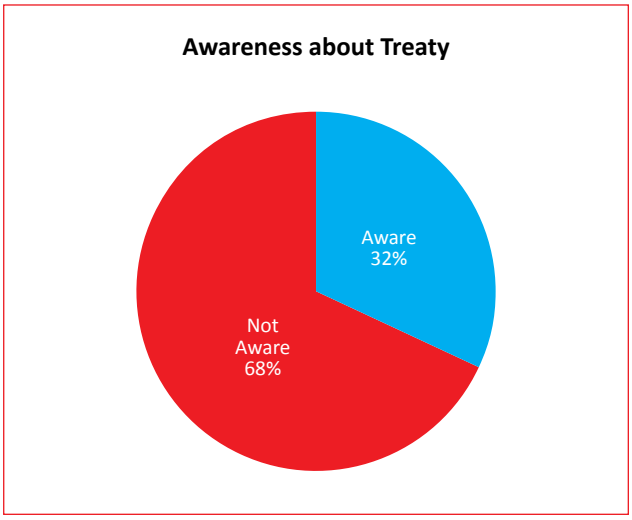
The first impact is on women's economic activities which are hampered by frequent floods and river bank erosion. Many women stated that they have lost control over their income due to frequent change in environment. Stringent forest conservation laws prohibiting entry in the forest is another problem in most of the study areas in UP. Women also mentioned about increase in workload in managing food for their families due to reduced income and loss of assets. Due to loss of grazing and homestead land, they are not able to keep livestocks and maintain kitchen gardens and it has ultimately impacted their nutritional food intake leading to malnutrition. Reduced income from traditional sources has forced women to be dependent on the forest leading to regular conflict with forest officials. The second impact is related to increased hardships during and post disaster period. Women are responsible for collecting drinking water from distant sources and because of the increasing unavailability of safe water near their home, this becomes an extremely arduous and difficult as well as

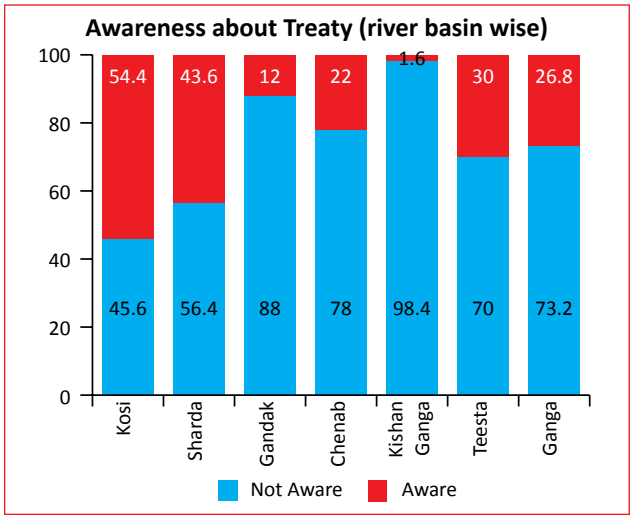
time consuming task. As sanitation facilities are also not available, and as flood water submerges most of the areas under study for three to four months in a year, people use boats to travel some distance for their basic needs. Pregnant and ailing women face more problem as they are not able to get timely treatment due to the connectivity problem. Apart from this, the overall health of women gets affected because of the deterioration of nutrition and poor hygienic conditions; thus, the incidence of infections amongst women is very high. Constant fear and the reality of multiple displacements also creates tensions and trauma amongst all but especially amongst women and children. Women become the main caregivers in these situations, while there are no facilities for the care of women themselves. Due to river bank erosion and shrinking space, cultural and religious practices of women are getting affected. This results in feeling of isolation and depression of frequently being separated from close friends and relatives.

xi. Public Participation, Awareness & Consultation on Treaties

Some people in the study area are aware that there are some agreements/treaties between the river sharing countries but not about the terms and contents of those treaties. People have never been consulted before entering into any agreement and there is little impact assessment of people affected. Diplomatic relationships between the countries have little understanding from the point of view of the people who are likely to be affected. Community participation is important not only to ensure efficient water distribution but also at the decision-making level. At this level, it is the communities that know what their requirements are and what needs to be done.[51] However, local people are not aware of the mechanics of how their country controls and manages the barrages and often the responsibility of giving adequate warning before floods or maintaining the water flow is not communicated to the people.

There were two instances – awareness of the treaty and being involved or consulted in the treaty process. In India, this was applicable for the rivers being shared with all three neighbouring countries of Nepal, Bangladesh and Pakistan. Across all the rivers, 32 percent families are aware about the existence of the treaty while 68 percent families are completely unaware.

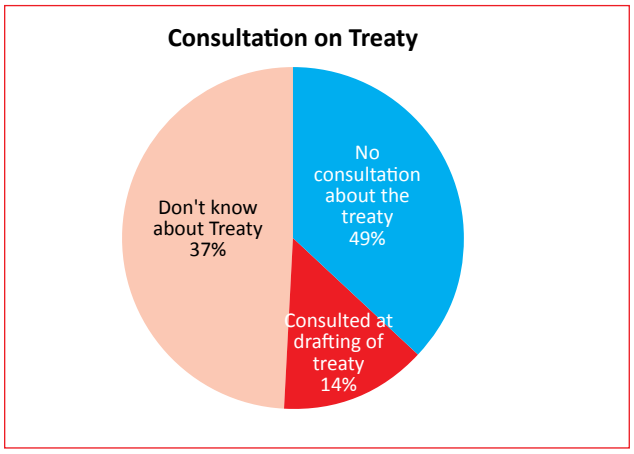




However, individual river related information shows that the maximum number of people were aware of the treaty for Kosi (54.4%), followed by Sharda (43.6%) and Teesta (30%), while, the lack of awareness was the highest in the case of Kishan Ganga (98.4%), followed by Gandak (88%) and Chenab (78%).

xii. Consultation on Treaty

There was no consultation process with the local people when the two countries were entering into any treaty and this is also clear from the study that 49 percent of the people had not been consulted and 37 percent did not know anything about the process. Only 14 percent



[51] Infochange India, interview with Anupam Mishra, October 2005, http://infochangeindia.org/agenda/the-politics-of-water/rural-distress-urban-greed-interview-with-anupam-mishra.html

people stated that they were part of some meeting on river water management, but not regarding this treaty in particular. Thus, it is clear that public participation in decision making process is not being followed. The people, whose lives and livelihoods completely depend upon river water, are always affected by the decisions taken by the government and unplanned management of water.

xiii. Implication of Climate Variability on Life of River and People

Transboundary rivers flow from the Himalayas and this region is sensitive to any kind of climatic shift. Heavy rains, avalanche and snow fall timing and frequency have been varying in recent years. This is being attributed to climate change - a key driver responsible for impacting rains and the flow of the river with increased threat of disaster making people more vulnerable. Frequent and untimely rains, floods and related poor water management at the storage level are leading to a number of problems for communities settled on the riverbank. These range from river bank erosion to reduced fish catch.

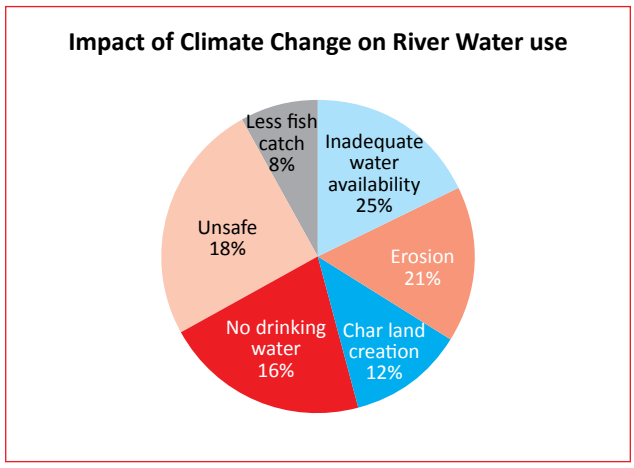
While 25 percent people stated that they are not getting adequate water for their use, 16 percent people stated less drinking water being available. River bank erosion was increased to about 21 percent while fish catch reduced to 8 percent. Apart from this, the river bank has become unsafe to 18 percent people. Since people in the study area are dependent on the river and its bank for their survival, such changes impact them to a great extent.

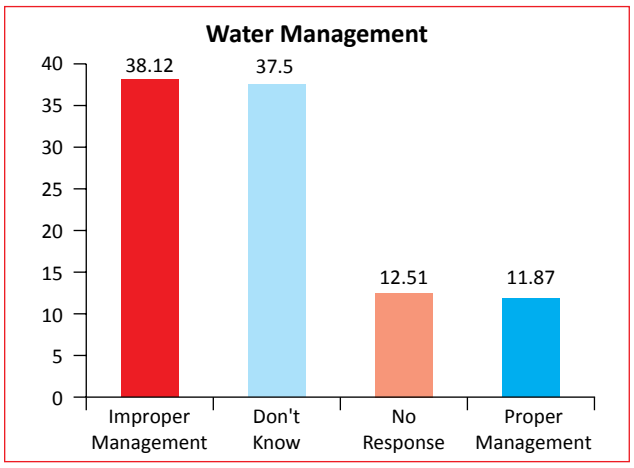
xiv. Climate Change Vis-à-vis River Water Management

People living alongside the rivers are already experiencing the impact of the changing pattern and behaviour of river and faulty management systems by governments. People were not familiar with the water management systems in place. Around 38.12 percent voiced improper water management, 37.5 percent did not know about the system while 11.87 percent felt that water governance needed to change and was not in accordance with the changes caused due to climate change. This goes to show that better water management systems need to be in place where life and livelihood depend on the river. This will save people from impending disasters.

xv. Early Warning, Relief & Rehabilitation & Access to Char Land

An early warning system for people liable to be affected by floods is an essential instrument to minimise loss of life and assets. For the most part people are not prepared to adapt to the situation due to lack of capacity and support from government functionaries. People are getting early warnings from different sources including government (70%), followed by the community (53.75%) and NGOs (52.5%). Thus, death and injury due to disasters are less in the study area. Yet 22.5 percent people are not getting any information prior to any disaster.

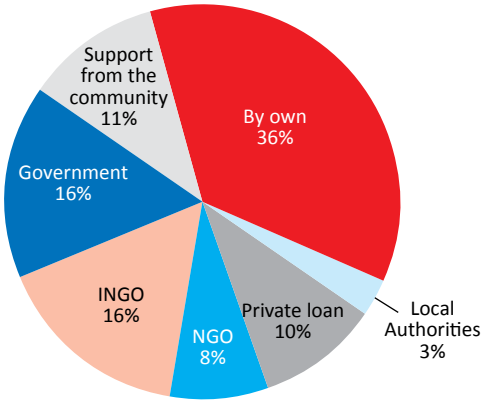




Early Warnings on Disasters					
River Valley	Government	NGOs	Community	Relatives	No Warning
Kosi	50	40	60	10	30
Sharda	0	10	90	0	0
Gandak	70	90	40	40	10
Chenab	80	40	30	10	30
Kishan Ganga	70	30	30	10	20
Teesta	100	40	60	40	20
Ganga	190	170	120	100	70
Total (%)	560 (70)	420 (52.5)	430 (53.75)	210 (26.25)	180 (22.5)

Relief and rehabilitation is essential to resettle disaster affected people. It was found that post disaster, the majority of people (36%) managed the rehabilitation process on their own, while the government and INGOs provided support to (16%) each, followed by support from the community (11%) and private loans (10%). This indicates the poor and inadequate reach from both the government and aid agencies to disaster affected families. The majority (57%) of flood affected people are forced to manage by themselves – through community support, private loans and on their own. The state has clearly failed in its responsibility to protect vulnerable people.

Source of Relief/rehabilitation Support



Char land is created every time after the flood water recedes on the river banks or between the river flows. As the river takes turns, many people lose their cultivable land and the conflict starts to access the newly created char lands. Such process is noticed only in river Kosi, Sharda, Gandak, Teesta and Ganga. But there are no state policies to access and ownership of the newly emerged char lands. Such land is accessed though community conflict or amicable settlements. About 33.4 percent people have some access in Ganga River valley and 39.6 percent in Teesta. In Gandak and Kosi River valley, people stated that they have no access to such lands.

> बाढ़ अतिथि नहीं है। यह कभी अचानक नहीं आती। दो-चार दिन का अंतर पड़ जाए तो बात अलग है। इसके आने की तिथियां बिल्कुल तय हैं। लेकिन जब बाढ़ आती है तो हम कुछ ऐसा व्यवहार करते हैं कि यह अचानक आई विपत्ति है। इसके पहले जो तैयारियां करनी चाहिए, वे बिल्कुल नहीं हो पाती हैं। और हमारा समाज इससे खेलना जानता था। लेकिन अब हम जैसे-जैसे ज्यादा विकसित होते जा रहे हैं, इसकी तिथियां और इसका स्वभाव भूल रहे हैं।
>
> तैरने वाला समाज
> आलेखः श्री अनुपम मिश्र, मई 2008

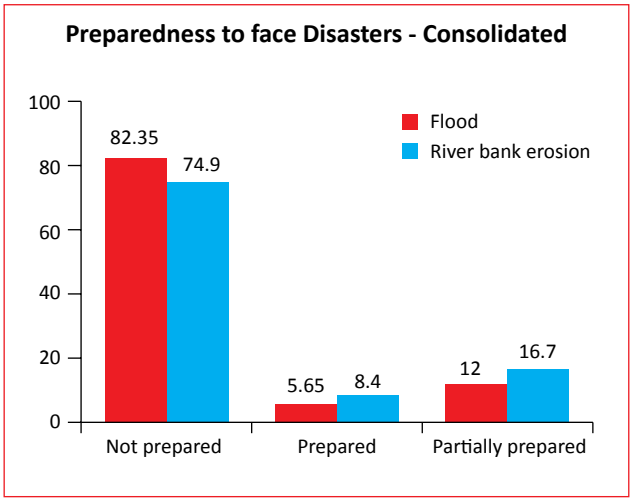
xvi. Preparedness to Face Disaster

Preparedness to face disaster caused by both flood and erosion is another challenge though this disaster is a regular phenomenon on the river bank. In our study villages, 82.35 percent people stated that they were not prepared to cope with the flood situation and 74.9 percent people stated that they were not prepared for river bank erosion. Lack of preparedness was the highest in Chenab (98.4%), followed by Ganga (97.6%) and Teesta (96.4%). Similarly, in the case of erosion, lack of preparedness was the highest in Ganga (95.6%), followed by Teesta (94.4%) and Kosi (83.2%). Dinesh Kumar Mishra observed that, the river flows brim-full during monsoon, damaging the embankment and intruding the floodplains at several locations, thus leaving no option for people other than to resettle. Negligence by executioners of the project and also by the Government has caused havoc.[52] Discussions with community revealed that conditions are beyond the people's current capacity to cope.

Access over Newly Emerged Land (Char)		
	No access (%)	Access on new land (%)
Kosi	0	0
Sharda	198 (79.2)	52 (20.8)
Gandak	0	0
Teesta	151 (60.4)	99 (39.6)
Ganga	333 (66.6)	167 (33.4)

Preparedness to Face Disaster - Riverbank						
	Flood			River bank erosion		
	Not prepared (%)	Prepared (%)	Partially prepared (%)	Not prepared (%)	Prepared (%)	Partially prepared (%)
Sharda	152 (60.8)	59 (23.6)	39 (15.6)	137 (54.8)	27 (10.8)	86(34.4)
Gandak	133 (53.2)	17 (6.8)	100 (40)	161 (64.4)	27 (10.8)	62(24.8)
Kosi	234 (93.6)	16 (6.4)	0	208 (83.2)	42 (16.8)	0
Chenab	246 (98.4)	0	4 (1.6)	104 (41.6)	49 (19.6)	97 (38.8)
Kishan Ganga	153 (61.2)	9 (3.6)	88 (35.2)	174 (69.6)	1 (0.4)	75 (30)
Ganga	488 (97.6)	12 (2.4)	0	478 (95.6)	22 (4.4)	0
Teesta	241 (96.4)	0	9 (3.6)	236 (94.4)	0	14 (5.6)
Total (%)	1647 (82.35)	113 (5.65)	240 (12)	1498 (74.9)	168 (8.4)	334 (16.7)

[52] Technical roundtable on dimensions of river morphology in the GBM Region, December 2013



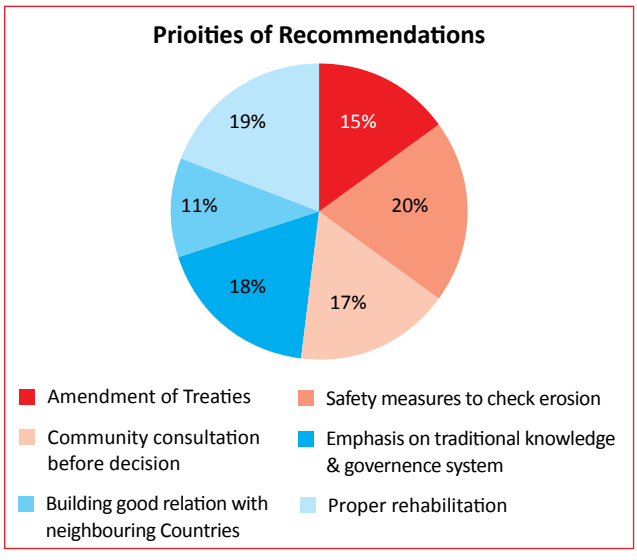
xvii. Proper Steps to Deal with the Issue & Recommendations

As the problems are visualised by people in study area, they suggested and recommended some steps which could deal with the problems to some extent. Across all the rivers, communities felt that government should minimise riverbank erosion (100%), followed by proper rehabilitation measures (94.75%) and importance of traditional knowledge & governance system (93.75%). Community consultations before taking decisions was also given importance (85%).

Proper Steps to Deal with Issues								
	Kosi	Sharda	Gandak	Chenab	Kishan Ganga	Teesta	Ganga	Total (%)
The clause in the treaty should be reworked as per the changes	70 (70%)	100 (100%)	100 (100%)	70 (70%)	60 (60 %)	70 (70 %)	160 (80 %)	630 (78.75%)
The government should take safety measures to minimise river bank erosion	100 (100%)	100 (100%)	100 (100%)	100 (100%)	100 (100%)	100 (100%)	200 (100%)	800 (100 %)
The community should be consulted before taking any decision	100 (100%)	100 (100%)	100 (100%)	90 (90%)	70 (70%)	60 (60%)	160 (80 %)	680 (85%)
Traditional knowledge and governance system should be given importance	100 (100%)	100 (100%)	100 (100%)	100 (100%)	100 (100%)	90 (90%)	160 (80 %)	750 (93.75%)
The political relationship between the states should be rectified	50 (50%)	60 (60%)	100 (100%)	50 (50%)	40 (40%)	50 (50%)	120 (60%)	470 (58.75%)
Proper rehabilitation measures should be taken by the government	100 (100%)	100 (100%)	100 (100%)	100 (100%)	93 (93%)	85 (85%)	180 (90%)	758 (94.75%)
Any other	0	0	10 (10%)	0	0	0	0	10 (1.25%)

Recommendations of the community to deal with the situation were discussed in detail and prioritised. Safety measures to check erosion was the highest (20%), proper rehabilitation (19%), traditional knowledge and governance (18%) and community consultation before decision making (17%). Only 15 percent people stated that the treaties should be amended as per the changing climate and riverine system.

People suggested that communities' participation must be ensured before taking any decision on river water sharing. Proper rehabilitation is critically important to deal with disaster situations. A further point of contention is that only bilateral relations with co-riparians are not sufficient but needs a total basin approach for proper management of river water.



Mohammed Ashraf Mir, aged 50 years is a resident of Badwan village, Gurez block of Bandipora district, J&K. He lives with his seven member family comprising of his parents, wife and three children. The proposed dam over the **Kishan Ganga** River would submerge Badwan village among others leading to displacement. Voicing his apprehension, Ashraf said, "We are told that the village will be submerged and villagers will be relocated. This has already taken away our mental peace. Though we are still living in our houses, but every night we wonder, if this would be last night in this generation-old hous[illegible]ccording to Ashraf, most people spent the compensation amount on managing their daily livelihood.

Expressing his anguish, Ashraf also stated "the government is snatching away our land. We are farmers and cannot live without land which is the only source of income and survival for us. Secondly, people are scared to go to their farms and fields near the dam site due to fear of blasting. Thus, it has not only caused huge loss of crops but also damaged and destroyed some important medicinal plants from forests, which we collected for our livelihood. The dust of dam construction site has seriously affected human health and crops. Lastly, we are not getting proper water for irrigation due to the decreasing level of water in the river."

He further said "Now we request the authorities to withdraw the amount they have released. We don't need money or employment. We know we cannot save our house or our land. We only demand that the government gives us an equal amount of agricultural land for cultivation, an equal area of homestead land for building our house and compensation for the houses which are going to be damaged."

Devi Raj, aged 59 years, lives in Pul Doda village, of Doda district of J&K. He recalls his plight in the days of construction and after the impact of the Baglihar dam. The government has constructed Baglihar dam on the River ***Chenab***, which has resulted in the rise of the level of river water. The entire town including shops, houses and roads has been submerged. Before the construction of the dam, the district authorities forcefully evacuated and demolished his house and shop. Most people of his village migrated to other places. He says, "The government did not listen to anything that people said. Our communities have been living there since centuries and we have strong social and emotional bonding. The people are now living scattered in different areas. We have lost our identity."

Devi Raj narrates, "The maximum number of people living here were dependent upon farming. We lost our land, people started starving and were impoverished for a long time till they found alternate labour work. Now they roam around looking for wages. Many people spend their nights in tents having lost their houses. There are families who are yet to build a roof over their heads. As promised by the government, the actual compensation was not paid for shops and houses as per norms and rates of the time. A committee was constituted to look after the assessment of land and submitted their report to the government. In that report, it was alleged that the town was constructed on forest land, hence no compensation would be given for the loss of land. However, our families were living in this town since 1910 till the dam was constructed. The land was registered in the revenue records as agricultural land. However, the committee has forged the revenue records and rendered us landless. We are still waiting for compensation".

Rabadi Devi of Pakariya village (Jungle No. 10), a widow, tells her story about the crisis her family faced due to erosion of the ***Sharda*** **River**. She is the head of her family, lives with five daughters and two sons and is landless. Two of her daughters are already married. With her eyes full of tears, Rabadi said that due to the large scale devastation and displacement, her life is full of sorrow. She lost agricultural land and as a result of her debt she became a landless labourer.

Before 2009, Rabadi had a happy family in the village. She was part of a joint family headed by her late father in-law Rajdev Rajbhar. Rajdev had three sons who were solely dependent on their agricultural land. The size of their land was three acres, where they produced and marketed vegetables and rice. In this way, they contributed to the income of the family. However this support chain was disturbed in 2003 when Rajdev died at the age of 65. After his death, his three sons, Ramadhar, Chaturi and Mohan (Rabadi's husband) had a family dispute which resulted in partition of parental land. The share of land was one acre for each son, which was inadequate to sustain them. In 2009, they witnessed sudden floods and erosion of land. Her husband died due to illness, and his medical expenses pushed them into debt. The death of Mohan and the submergence of agriculture lands due to river bank erosion in the same year devastated Rabadi's family. She took a loan from the local money-lender/banker for the marriage of her daughters. Presently having lost everything, she is living in the catchment area of the flood and erosion, hardly 500 metres from the river's bank in the south. She spends sleepless nights and has been surviving on wage labour.

Indrajeet Prasad 45 years old is from village Sohgi Barwa, Nichlaul block of district Maharajganj, Uttar Pradesh. He lives with his family of six members. His main source of income is daily wages, which is not enough to feed the family and to live a dignified life. Earlier, his family was not in this condition and was dependent on fishing. His parents would fish for more than four hours every day and successfully got five to ten kg of fish per catch. Though,

the fishing profession is at great risk, people who have been dependent upon it for generations continue to struggle with the same. Indrajeet's family was among those whose livelihood was totally dependent on fishing. 1972 was the turning point in his life when they got trapped into the cycle of poverty, hunger and unemployment. Villagers underwent a devastating calamity, when floods and massive river bank erosion in ***Gandak*** submerged the whole village. The people of this village somehow escaped, though they lost their agriculture fields.

People like Indrajeet were displaced and unemployed. He observed that after the flood, the river was gradually changing its natural flow. River bank erosion started and people lost all their agricultural land. The next livelihood option was fishing and that was badly affected due to various reasons including poor flow and pollution. Gradually the availability of fish declined and at present it is quite difficult to get half a kg of fish in a day. Indrajeet says that in the past there were various types of of fishes in the river such as *Chepua*, *Kursa*, *Bhaakur*, *Mangura*, *Rohu*, *Barari*, *Tengra*, *Sumha*, *Singhi* and *Kachua*. Gradually however, these varieties of fish have drastically reduced in the river.

The construction of the hydro-power project (Triveni dam on the border of Nepal, UP, Bihar) is the main reason why fish catch from the river has reduced. Due to changing nature in the flow of the river, mixed with power plant wastes and sugar mills wastes in the river water, the quantity of fishing has gradually come down in the last few decades. The problem began with the control of river flow for corporate benefits through hydro-power plants. The river not only changed its flow but displaced people and deprived them of their traditional occupations. Now the families that are dependent on fishing are compelled to work as daily labour with inadequate wage opportunities. Indrajeet said, "They hardly earn Rs. 50 to 60 per day, which is insufficient to feed a six-member family and access the basic minimum needs of life."

Narayan Mukhiya, aged 70 years of Dighiya village, Supaul district in Bihar, lives close to the *Kosi* embankment. He shares his family tragedy. Narayan possessed a good amount of fertile land. He was living happily by doing good cultivation and cattle rearing. He has maintained social relations and lives in harmony with all the people in his village. This village is situated on the banks of ***Kosi River***. Frequent floods have wrought havoc in villages on the river bank and the people's economic condition was affected due to frequent and massive floods in the river. Narayan recalled his past and his relationship with the Kosi river water. He said, "Suddenly, we heard that the River Kosi's water would be controlled with embankments to save us from the flood. We became happy when we heard this plan. God knows who gave this suggestion to the government. Most of our villagers were influential people in those times. Nobody had demanded the embankment. We believed that government was doing this with good intentions. When the actual construction started in 1956, our villagers got organised and contributed to the construction of the embankment after an appeal from several leaders like Jawaharlal Nehru, Dr. Rajendra Prasad who visited our villages and appealed for voluntary services for construction that could save people from floods and provide water for irrigation. The embankment was completed soon. We were happy. Things went well."

However, he said the happiness did not last for long. The government made several new provisions for the people but did not comply with it later. According to Narayan "Now, we had to pay taxes to travel through our own land. If a person wanted to cross the river, he has to pay taxes for the ferry even if the river was flowing over his own land. The land revenue was collected even when our land was waterlogged or turned into an un-cultivable plot. If the river changed its course, the land that was released became government property. Presently the government has started collecting land revenue forcibly."

As a fisherman, Narayan's livelihood was mostly dependent on the river. Besides fishing, he used to collect wood which comes along with the water flowing down from the mountains of Nepal. Now, the government has banned everything on which his livelihood is dependent.

Narayan said that government did not ask or consult people before the construction of the bridge on the Kosi River. The Kosi Bridge was constructed near Majhari village. The 16 km span of the Kosi River has been narrowed down to 2 km. He experienced the rise of the water level in the north of the river. His village had two ponds, which are now damaged as the raised water level entered the ponds and filled them with sand. Narayan says, "The tractor owners are earning a lot because every year people have to raise their homestead land to cope with the raising of the land inside the embankment. The land adjacent to the embankment is water logged as is the case with the area outside. Both are due to seepage and congestion of drainage." Narayan cursed the engineers who advised people on the embankments, "Engineers are fools. They do not know what the river wants or what the people need."

In another case, ***Sakila Bibi*** aged 45 years, a resident of Majhiasaran village, district Malda, WB talks about her plight because of river erosion and floods in the River ***Ganga*** in her village. Ganga, the lifeline of India, enters WB in its third or lower phase, before moving through

the region and reaching the sea. It has limited length in the state with a bank line of only 76 km on its left bank in Malda district.

Sakila has been residing here with her five-member family, including her husband, two daughters and a son for the last 14 years. In 1998, suddenly her land and house got submerged in Ganga due to river bank erosion and at present the whole family lives on the roadside under a temporary shelter. Her mango orchard and agriculture field were destroyed along with all her belongings. She remembered the severe floods of 1971 and 1986 but the severe loss to property was in the 1998 flood. She says, "Previously the water from the Farakka barrage was regulated properly, so the rate of erosion was not so severe. In 1998 when the village got submerged, we could only save our lives and for the next two months, we were not able to get minimum food and shelter. We could not rescue anything from our house and everything got submerged the River Ganga."

When her family came to this place in year 2000 with other 240 families, the residents of nearby villages like Mahadevpur and Shibutola vehemently objected and there were conflicts between the communities. However, these people were finally able to stay on government land on the roadside and there has been no rehabilitation till date from the government.

Sakila helps her husband in making *bidis*, which does not give them good profit. Since the family lost its houses and land, the members are not able to get a residence certificate to apply for any facility. They do not get any government facilities to deal with situations under the Public Distribution System (PDS).

She says, "Now there is nothing between us and the River Ganga that can save us and the rest of our belongings from being swept away. Now she (Ganga) will sweep away everything in the next monsoon and you will not see us here. We are completely at her mercy. I cannot think of the next monsoon. This is for the first time I witnessed an altogether different Ganga and since then, I have not come out of the trauma – every night I go to sleep with my children with dread and fear in my heart. If the Ganga devours us in the night, we may not see the morning sun again."

Maho Ali Mandal is now in his late 50s. He was born in the mainland in Nijtaraf, Cooch Behar, WB but he had to shift to Ponier char. Maho says, "There was a time when people did not bother about grain, it was plentiful and even grew on its own. Moreover, the routine flood was not devastating, but made the agricultural land more fertile. Following the flood in 2008, the productivity is declining, and the river has started to bring down more sand than fertile soil. Sometimes, a black oily substance also gets deposited on the char river bed. Maho recalls

that the river had a single channel and was deep, and the stream was forceful compared to the present ones, whose beds are rising continuously. Now the ***River Teesta*** is flowing in five channels. Because of the shallow flow, fish catch is on the decline.

Maho adds, "Previously we were catching sufficient fish for the family within half an hour. Now, we struggle for more than two hours but can hardly ensure one kg of small fish. It seems some of the varieties of fish are finished. The children did not ever see some of the varieties for which Teesta was famous. There used to be fish like *Hogla* and *Beth* on these char lands, both of which have market value, especially *Beth* was very precious. In some parts of the chars you can see *Hogla*; these varieties are reduced by at least 75 percent and *Beth* ceased to grow here in any of the chars. During summer we used to grow watermelon in good quantity and there was a demand for it because of its taste. Last year we had a meagre quantity and as the taste was really bad we had no market for it. Our main earning is now gradually shifting from agriculture, fishing and selling seasonal crop to animal husbandry. As for the trends of erosion, we do not know what will be the shape and size of the char land next year."

Maho said, "Ponier char is the biggest one among the chars and naturally more populated, but here getting your son married to a girl from a family from the mainland is difficult. Moreover, I have seen so much change take place for the worse, that I cannot call any land as mainland. Who knows what course the River Teesta will take tomorrow and not sweep away our hard earned mainland? The river is now completely unpredictable and only we know that in the face of its fury, you are nothing and can do nothing. Yes, we have nowhere to go and no one to fall back on. You know no political party will ever bother to hold a meeting here, they don't count our votes, and they have made us into a new herd that has to master the art of living precariously, forever. Young men are migrating nowadays but they all have to come back before the monsoon for you never know what will happen to the family during the rainy season. It is God's grace that we have some primary education and health facilities. The River Teesta has changed so much, it seems that the old River Teesta never really existed outside the memory of these char land people."

CHAPTER 5

Conclusion and Recommendations

Rivers are source of civilisation, culture, religion and the history of societies settled for generations on their banks. Stories, life experiences, and local knowledge mixes with the multiple realities and myths around these rivers.

On transboundary rivers, the communities studied are well informed about the origin of the river and its path, flowing from one to another country, the country benefitting from the river (perceptions are driven more by community affinity rather than upper or lower riparian). Respondents squarely put the blame for floods on the upper riparian and the 'other state' and on state administration for failure for water management. It seems evident that river management has been replaced by the politics of blaming the 'other'. Governments have not addressed these claims since they do not take responsibility for addressing distress that comes with water mismanagement.

The study shows that fishing, navigation and even access to drinking water is becoming increasingly difficult and even diminishing in many cases. Instead, river channels, decline of species, pollution of water is making life dangerous for these riverine communities. Over a period of ten years, communities experienced a shift in the pattern of river water use. Barrages constructed on the river have disrupted the free flow of water and created sudden disasters like floods and river bank erosion as the flood plains that are the natural habitat of the river were barraged. The overflow of rivers which was a natural phenomenon became sudden, ferocious and one that comes without any warning signals. People have been experiencing the changing behaviour of the river on whose banks they have lived since generations and attribute this to human-made policies like construction of dams and to climate change.

> वर्तमान में सदानीरा नदियों का स्वरूप बिगड़ता जा रहा है। घरों का कचरा, पूजा पाठों का कचरा, हम नदियों में फेंक रहे हैं। एक तरफ आस्था के संग हम छठ व अन्य पर्वों पर नदी की पूजा करते हैं। दूसरी ओर दूसरे दिन ही हम नदी में विभिन्न अपशिष्ट को डालने में तनिक भी संकोच नहीं करते। नदी का संरक्षण अविरलता एवं निर्मलता आज समय की मांग है। इस सन्दर्भ में नदियों के किनारे बसे लोग ज्यादा जानकारी रखते हैं। वे अपनी सहभागिता को बांटते नदी को बचाने हेतु साझा प्रयास करें।
>
> जल की धाराओं को बांधना प्राकृतिक आपदाओं को न्यौताः
> श्री राजेन्द्र सिंह*
>
> * http://hindi.indiawaterportal.org/node/49243

River bank erosion has played an important role in displacing communities from their original place of habitation. River bank erosion is creating a situation of 'Internal Displacement of People' as many villages located on the river basin face regular inundation and flooding. Riverine people thus face multiple displacements and are losing their land and livelihood and are being forced to migrate. There seems to be little future for them as

there have been no measures to protect these displaced communities. There is a serious issue of slow disintegration of such unique riverside communities.

Constant fear and reality of multiple displacements creates tensions and trauma amongst all but especially among women and children. Women become the main caregivers in these situations, while there are no facilities for the care of women themselves. This impacts livelihoods, food, agriculture and livestock chain which has the potential to create major shortfall in livestock patterns nationally.

The local opinion is that construction of barrages and big dams destroys the flow of the river and negatively impacts people living on its sides. People have traditional knowledge about the river and impact of construction on it, but this is not used at policy levels.

The very approach to manage the river has been a structure based water management system which ignores holistic river basin approach. Water problems result largely from poor water management especially when there is either direct hostility between the countries that share the river on transboundary or even in cases where competitive nationalism shapes the discourse on river water sharing. Gandhian environmentalist Anupam Mishra rightly observed that "the river flows down very steep peaks of the Himalayas, has a lot of current and carries a lot of sediments. It will not be wise to try containing the river either through embankments or a high dam." He suggests a simple solution of investing in boats and training fishermen in rescue operations. "This region has a lot of fishermen and boat makers."[53]

Women bear multiple levels of burden and exploitation in public and private spheres of their lives. Social relations of power are skewed in favour of men even within the HHs, while both men and women face exploitation and the wrath of river disasters collectively. Women have little or no say in policy making neither at the HH nor at the public level.

Treaties and agreements between countries control river water and impacts community life settled on the river bank but the study shows there was barely any awareness amongst people on this and they were hardly consulted.

It appears that local people whose everyday life depends on the river have not been adequately informed or even apprised by the local/state/national authorities about the situation. Instead they are left to defend themselves and their communities. This strengthens caste/religion/community dependency since the government lags behind in sharing information and support in relief and rehabilitation. Thus, data related to irrigation, drinking water, flood control project and data related to hydropower project should be shared with the people as all of them are supposed to be public purpose projects. All information that is necessary for assessing and understanding cost benefit, social and environment impact assessment of hydropower projects, dams, diversions, information necessary for assessing and understanding disaster management plans including dam break analysis and such kind of information should be in public domain.[54]

Recommendations

i. Rights of Rivers

Rivers must be understood as harbingers of civilisations and allowed to flow freely. The flood plain should not have constructions. This is for protecting the socio, economic, cultural and religious rights of dependent communities and all living beings at large.

Survival and rights of aquatic creatures must be ensured as reduced/dried up flow kills many species. This affects their breeding ground resulting in the extinction of some varieties. Steps should be taken to ensure the protection and survival of all such aquatic life.

Ecological flow and environmental flow of the rivers must be well defined, and information on such flow needs to be shared with the community and maintained in all rivers throughout the year.

There is a need to check the pollution level of the river to keep it free from effluents to make it suitable for the consumption of both humans and livestock. The impact of pollution is more intense as it reaches downstream.

Transboundary rivers that connect South Asian countries and the problems faced by communities that live across borders must be recognised just as the rights of rivers are recognised by the law of the land.

There is a need to facilitate transboundary community interaction for healthy relationship and cooperation on water commons. Efforts should be made to strengthen the existing cross border community alliance. Such connectivity will ensure a strong community based safety net for people to cope with disaster.

ii. River Governance

People's traditional knowledge on water governance systems must be understood and given importance while working on river water management plans.

[53] Engineered flood, Not excess water, but neglected embankment caused the flood, Sep 30, 2008, Down to Earth, http://www.downtoearth.org.in/node/5038

[54] India's transparency move excludes Transboundary Rivers, March 2013, http://www.thethirdpole.net/transboundary-rivers-largely-out-of-indias-water-transparency-move/

Water needs to be managed efficiently and equitably. Additional water must be available for the community not necessarily through storage only.

Women play an important role in water collection and storage for HH consumption; hence, they should be treated as the primary stakeholders. All their expertise, experience and difficulties must be considered as an input to water and river policies.

Government must have a policy in place to address ownership over newly formed char land as and when it is formed. Ownership must be with families taking into consideration their vulnerability and loss of land.

iii. Treaties & Agreements

Any intervention or agreements on transboundary rivers has to be multi-lateral not bi-lateral, so that all countries through which the rivers travel are involved.

Old treaties or agreements need to be reviewed looking at the present need of the river and dependent communities.

People must be consulted through – 'Free, Prior Informed Consent' before going ahead with any treaty or understanding between countries that would impact the river water flow and dependent communities. Community consultation must be held before developing the agreement.

Active participation of women and people from vulnerable communities must be ensured in the process.

iv. River and Changing Climate

Adequate preparedness at all levels must be in place to face climate challenges and impact on river flow. This must include a proper early warning system, community preparedness and adequate rescue and safety measures in place.

Women and children must be involved in the community capacity building process to deal with climate change related disasters on the river bank.

Climate resilient agriculture/ horticulture practices must be promoted on river banks to address change in livelihood pattern and massive migration.

v. Disasters and Response

Governments must take measures to check river bank erosion and protect communities through natural measures, especially women and people from vulnerable communities. Women, the minority community and poor people are the most affected and have least access to resources and need to take specific measures to build the ability to influence local and national action for addressing their concerns. The government must have policies in place to foster regional development and ensure proper rehabilitation for the affected communities.

Displacement due to floods (created due to water mis-management upstream) and river bank erosion needs to be recognised as 'internal displacement of people' (IDP) and provide required support. Also ensure proper rehabilitation on time.

River based traditional livelihood support system has drastically reduced forcing dependent communities to be manual labourer. Thus, priority should be on revival of lost livelihoods of community especially for women to survive with dignity.

Government need to strengthen safety net for river bed communities to reduce further marginalisation and starvation.

River bank erosion must be considered as natural disasters in relief codes and due compensation must be provided to affected families.

Post disasters, the government needs to reach out to people on both relief and rehabilitation, which is lagging behind in the current situation.

The state must make all efforts to reach out to women and people from vulnerable communities on a priority basis. Those who are already vulnerable suffer unequally because of social structures.

Emphasis must be given to people's traditional knowledge and governance system of river water. This will help in coping with floods and erosion.

Disaster information sharing links between the local people and the authorities needs to be addressed urgently. Measures are required for ensuring access to information, technology, resources and public participation to deal with disaster.

It is noticed that all 'water sharing' agreements are based on volumetric allocation of river flows. In the absence of a basin-wide river management regime, it is bound to exacerbate underlying issues such as historical grievances, unaddressed concerns over flooding, lack of data sharing and a political relationship based on mutual mistrust. This can only be addressed if an institutionalised system of genuine community participation and political will for 'river sharing' is in place. This needs to be positive, inclusive and having an approach for dignified survival of river and riverine communities. Thus, there is an urgent need to take appropriate actions to protect river, river valley ecology, human security of vulnerable groups, taking gendered aspects into account.

REFERENCES

1. Ahmed, Imtiaz. (2013) Water Futures: A Dialogue for Young Scholars and Professionals Ecosystems for Life: A Bangladesh- India Initiative.
2. Akech, Migai. (2009) Transboundary Freshwater Governance and the Environment: An Overview, United Nations Environment Program, Bangkok, Thailand.
3. Arthington, A.H., Pusey, B.J., Brizga, S.O., Mc Cosker, R.O., Bunn, S.E. and Growns, I.O. (1998) Comparative Evaluation of Environmental Flow Assessment Techniques: R&D Requirements. LWRRDC Occasional Paper 24/98. (http://www.eflownet.org/downloads/documents/Arthington%26Zalucki1998.pdf)
4. Bandyopadhyay, Jayanta. (2013) Water Futures: A Dialogue for Young Scholars and Professionals Ecosystems for Life: A Bangladesh-India Initiative.
5. Briscoe, John. Usmon, Qamar. (2008) Pakistan's Water Economy: Running Dry", Water P-Notes, issue, 17.
6. Bunn, S. E., and Arthington, A. H. (2002) Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. Environmental Management 30:492-507.
7. Burbank, D. W. & Anderson, R. A. (2001) Tectonic Geomorphology. Blackwell Science.
8. Cariou Alexander. (2003) Water, Conflict and Cooperation, Canada: institute of Peace and Conflict, p.54.
9. Cuffe, Sandra. (2015) Claiming & protecting water, Other Worlds (http://otherworldsarepossible.org/claiming-protecting-water).
10. D'souza, Rohan. (2007) Water as Dispute and Conflict' in Economic and Political Weekly 42(16) April 21 - April 27, 2007, pp.1431-2.
11. D'souza, Rohan. (2011) The Indus Water Treaty and Climate Change: An Environmental History of Hydro politics', Journal of International Relations, 9 (I &II), 2011 (ISSN: 2218-7391), pp.104-115.
12. D'souza, Rohan. (2013) Damming Politics: India, China, and a Trans-Border River', India in Transition, Centre for the Advanced Study of India (CASI), University of Pennsylvania.
13. D'souza, Rohan. (2013) 'Time to bridge this river divide', The Hindu, 13th September, 2013. (http://www.thehindu.com/opinion/lead/time-to-bridge-this-river-divide/article5120925.ece).
14. Dellapenna, Joseph W. (2006) The Berlin Rules on Water Resources: The New Paradigm for International Water Law. Villanova: University School of Law.
15. Dinar, S. (2007) International Water Treaties: Transboundary River Negotiation and Cooperation. London: Routledge.
16. Dinar, S., A. Dinar and P. Kurukulasuriya . (2007) SCARPERATION: An empirical inquiry into the role of scarcity in fostering cooperation between international river riparians. Paper presented at the AERE Session (Environmental Conflict and Cooperation) of the 2007 ASSA Winter Meetings, Chicago.
17. Dixit, Ajaya. (2003) "Rivers of Collective Belonging," Himal South Asia.
18. Flavia, Loures, Alistair, Rieu-Clarke, Marie-Laure, Vercambre. (2009) Everything you need to know about the UN Watercourses Convention, WWF.
19. Gleick, H Peter et all. (2012) The World's Water, The Biennial Report on Freshwater Resources, Volume 7, Island Press.
20. Global Environmental Flows Network. (2007) Environmental flows are essential for Freshwater Ecosystem Health and Human Well-Being, The Brisbane Declaration. (http://www.eflownet.org/viewinfo.cfm?linkcategoryid=4&linkid=64&siteid=1&FuseAction=display).
21. Government of India. (2012) Draft National Water Policy, as recommended by National Water Board in its 14th meeting held on 7th June, 2012, Para 1.1
22. Government of India. (2015, 10th April – accessed on) Ministry of water resources, The India-Nepal treaty, (http://wrmin.nic.in/index3.asp?sslid=369&subsublinkid=288&langid=1).
23. Government of Jamu & Kashmir. (2015, 5th May - accessed on) District wise water resources, Jammu & Kashmir, (http://jkenvis.nic.in/water_resources_district_wise.html).
24. Gupta, Alok, Datta, Arnab.(2008) Engineered flood, Not excess water, but neglected embankment caused the flood, Down to Earth, (http://www.downtoearth.org.in/node/5038).
25. Gupta, Jaydeep. (2013) India's transparency move excludes Transboundary Rivers, The third pole, (http://www.thethirdpole.net/transboundary-rivers-largelyout- of-indias-water-transparency-move/).
26. Institute for Defence Studies and Analyses. (2010) Water Security for India: The External Dynamics, Taskforce Report, New Delhi.
27. International Environmental Flows Conference. (2007) The Brisbane Declaration, Australia.
28. Iyer, R. Ramaswamy. (2014) How to misunderstand each other So far, India and Nepal have provided a textbook case, Indian Express, July 26, (http://indianexpress.com/article/opinion/columns/how-to-misunderstand-each-other/).
29. Iyer, R. Ramaswamy. (2005) The Notion of Environmental Flows: A Caution NIE/IWMI Workshop on Environmental Flows, New Delhi, March 23-24.
30. Khalid, Iram. (2012) Transboundary Water Sharing Issues: A Case of South Asia, Journal of Political Studies, Vol. 1, Issue 2.

31. Knights, P. (2002) Environmental flows: lessons from an Australian experience. Proceedings of International Conference: Dialog on Water, Food and Environment. Hanoi, Vietnam. 18 pp.
32. Kumar, Hari. (2010) Water Dispute Increases India-Pakistan Tension, New York Times.
33. Lane, E. W. (1955) The importance of fluvial morphology in hydraulic engineering. Proceedings of the American Society of Civil Engineering 81, paper 745, 1–17.
34. Le, Quesne, T., Kendy, E., and Weston, D. (2010) The Implementation Challenge: Taking stock of government policies to protect and restore environmental flows. WWF and the Nature Conservancy.
35. Maplecroft. (2010) Water Security Risk Index, (https://www.maplecroft.com/about/news/water-security.html)
36. Maude, Barlow. (2012) Water as a Commons: Only Fundamental Change Can Save Us, The Wealth of the Commons; A world beyond market & state, Levellers Press.
37. Mishra, Anupam. (2005) Interview with Anupam Mishra, Infochange India (http://infochangeindia.org/agenda/the-politicsofwater/ruraldistressurbangreedinterview-with-anupam-mishra.html)
38. Mishra, Anupam. (2008) Tairne wala samaj dub raha hai, (http://www.indiawaterportal.org/articles/taral-darpane-samajermukh-joya-mitra-bengali-translation-anupam-mishras-booklet-tairne,2008)
39. Mishra, Dinesh Kumar. (2004) Story of a ghost river and engineering witchcraft, Barh Mukti Abhiyan.
40. Moore, M. (2004) Perceptions and interpretations of environmental flows and implications for future water resource management: A survey study. Master's Thesis, Department of Water and Environmental Studies, Linköping University, Sweden.
41. Nilsson, C., Reidy, C. A., Dynesius, M., and Revenga, C. (2005) Fragmentation and flow regulation of the world's large river systems. Science 308:405-408.
42. Postel, S. and Richter, B. (2003) Rivers for Life: Managing Water for People and Nature. Island Press, Washington, D.C.
43. Rudra, Kalyan. (2014) Charting rivers beyond borders, The Hindu. (http://www.thehindu.com/news/national/chartingriversbeyondborders/article6713407.ece)
44. Schumm, S. A. (1993) River response to base level change: Implications for sequence stratigraphy. The Journal of Geology 101, 279–294.
45. Shantha Mohan, N. (2010) Locating Transboundary Water Sharing in India, Routledge.
46. Singh, Richa. (2010) Transboundary Water Politics and Conflicts in South Asia: Towards 'Water for Peace', Centre For Democracy And Social Action (CDSA) (http://in.boell.org/sites/default/files/downloads/water._Final.pdf).
47. Sinha, Uttam Kumar. (2011) Himalayan Hydrology and the Hydro politics", Water Hegemony: Examining China's Hydro behaviour, Institute for Defence Studies and Analysis, India.
48. Stanford, J. A. & Ward, J. V. (1993) An ecosystem perspective of alluvial rivers: Connectivity and the hyporheic corridor. Journal of the North American Benthological Society 12, 48–60.
49. Subba, Bhim. (2001) Himalayan Waters, Kathmandu, Nepal: Panos South Asia, p. 49.
50. Terje, Oestigaard. (2009) Water, Culture and Identity: Comparing Past and Present traditions in the Nile Basin Region, Nile Basin Research Programme, BRIC Press.
51. The World Economic Forum. (2008) UN secretary general Ban-ki- Moon Address to a gathering of business leaders, at Davos, Switzerland.
52. Timothy Riley. (2003) Transboundary River basins: a discourse on water scarcity, conflict, and water resource management, University of North Texas.
53. United Nations. (1992) Dublin Statement on Water and Sustainable Development, Dublin and Rio conferences.
54. United Nations. (2008) Water Thematic Paper Transboundary Waters: Sharing Benefits, Sharing Responsibilities. (http://www.unwater.org/downloads/UNW_TRANSBOUNDARY.pdf).
55. United Nations. (2015 accessed in). Online user guide, frequently asked questions UN Watercourse convention (http://www.unwatercoursesconvention.org/faqs/).
56. United Nations Environment Programme. (2002), Atlas of International Fresh water Agreement.
57. Walljasper, Jay. (2008) Water for all, About a common revolution, On the Commons.org
58. Wolf, Aaron T. (1998) Conflict and Cooperation along International Waterways', Water Policy, 1 (2), Department of Geosciences, Oregon State University, Corvallis, Oregon.
59. World Water Council. (2009) Water at a crossroads", Dialogue and Debate at the 5th World Water Forum, Istanbul, pp: 50.
60. World Wild Fund for Nature. (2006) WWF Report, Free-flowing Rivers: Economic luxury or ecological necessity? Global Fresh Water Programme. (http://www.freeflowingriversreport.pdf).
61. Wouters, Patricia. (2014) Considering China's approach to the UN Watercourses Convention-Time to revisit, International Water Law. (http://www.internationalwaterlaw.org/blog/2014/07/).

www.actionaid.org/india

actionaidindia

ActionAid Association,
R - 7, Hauz Khas Enclave,
New Delhi – 110016
Phone: 91-11-4064 0500