



**SHIFTING LANDS, FLOWING WATERS :  
TRANSBOUNDARY COOPERATION FOR WATER  
And  
RELATED ISSUES IN SOUTH ASIA**

**INTERNATIONAL RoundTable**

**PROCEEDINGS AND ABSTRACTS**



**ORGANISED by**  
**TATA INSTITUTE OF SOCIAL SCIENCES (TISS)**  
**Oxfam India**  
**AND**  
**NATIONAL INSTITUTE OF DISASTER MANAGEMENT (NIDM)**



**National Institute of Disaster Management**  
Ministry of Home Affairs, Government of India







# Proceedings and Abstracts

## SHIFTING LANDS, FLOWING WATERS: Transboundary Cooperation For Water And Related Issues In South Asia

### International Roundtable

**Date 16<sup>th</sup> - 19<sup>th</sup> March 2021**

**Contact : [roundtable2021@tiss.edu](mailto:roundtable2021@tiss.edu)**

### Organized by

**Tata Institute of Social Sciences (TISS)**

**Oxfam India**

**and**

**National Institute of Disaster Management (NIDM)**



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# **SHIFTING LANDS, FLOWING WATERS : Transboundary Cooperation For Water And Related Issues In South Asia**

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# INTRODUCTION

Ever since the beginning of civilization, water has been the essence of life on earth. It has sustained activities related to agriculture, energy, industry, and several modes of livelihoods. However, the increasing population across the world, burgeoning domestic priorities, and multiplying developmental demands are placing growing pressure on water resources. Added to the already existing challenges of managing the water resources are the risks posed by climate change.

In specific regional context of South Asia, the management of water resources and water governance are interlinked with geopolitics, demography, and challenging socio-cultural and economic constraints. Understandably, the past, present and future of the countries of South Asia are rooted in the equitable sharing of resources. The governance and utilization of transboundary rivers of South Asia pose growing risks for water scarcity, degrading quality of water, floods, and inequitable access to water for the riparian communities. It is to be noted here that transboundary rivers are complex to govern because they often involve concerns related to national security, sovereignty and territoriality. The decision-making with regard to transboundary waters is dominated by a group consisting largely of leaders of the countries involved, politicians, bureaucrats, and engineers. In such discussions, we tend to lose perspective of communities whose lives and livelihoods are dependent on these rivers.

Duly informed by such concerns, the International Roundtable Conference on Shifting Lands, and Flowing Waters: Transboundary Cooperation for Water and Related Issues in South Asia emphasized the need for more efficient and transparent risk-informed water governance across South Asia. Policy implications and recommendations for improved equitable water access for riparian communities were key thrust areas on the conference. Special focus rested on river basins in the region. Aspects beyond water resources reflected the issues of transboundary governance such as forests, flora and fauna and impacts of disasters and climate change. Further, deliberations and discussions shed light on the experiences and efforts in enhancing the participation of various national governments and civil society organizations and local communities across the borders to work towards adopting a common framework in order to reduce extant friction.

The following text provides an executive summary of the proceedings of the four-day conference which acknowledged that policies in South Asia need to deepen their agenda towards just and equitable sharing of water resources across the riparian regions, with an inclusive and people-centred approach of decision-making. It also includes the abstracts of the papers presented.



# THE ORGANIZERS

## Oxfam India

Oxfam with their flagship project Transboundary Rivers of South Asia has worked extensively in India, Bangladesh, Bhutan, Nepal and Myanmar on the issue of risk informed governance with multiple stakeholders. Oxfam India in collaboration with CSOs in India and Bhutan is already working on strengthening people-to-people ties for progressively building trust and confidence for improvement in ecosystem management and conservation, early warning systems and evidence-informed dialogues with riparian communities in India and Bhutan as envisaged in the Kokrajhar Declaration of 2019.

**Organizing Team: Ms. Poonam Mishra, Mr. Shobhit Chepe, Mr. Andrio Naskar and Ms. D. Saran Prakash**

## Tata Institute of Social Sciences (TISS)

TISS with nearly 70 years of experience in the social sciences has worked on several projects on water governance, ecosystem management, disaster policies and risk informed planning in recent times in different countries.

**Organizing Team: Prof. Janki Andharia, Ms. Saumya Kumar and Ms. Lavanya Shanbhogue, Jamsetji Tata School of Disaster Studies (JTSDS), TISS, Mumbai**

**Contact: [secretariat.jtcdm@tiss.edu](mailto:secretariat.jtcdm@tiss.edu)**

## National Institute of Disaster Management (NIDM)

The National Institute of Disaster Management is a key governmental institution working towards bringing disaster risk reduction to the forefront of the national agenda with a focus on capacity building in India and in the South Asian region

**Organizing Team: Major General Manoj Kumar Bindal VSM, Prof. Surya Prakash and Dr. Harjeet Kaur, Dr. Raju Thapa and Mr. Anil Kathait**



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## SCHEDULE

### DAY 1

16<sup>th</sup> March, 2021

Tuesday

### INAUGURAL SESSION

#### 02:00 PM – 03:30 PM

|              |                                                                                                       |
|--------------|-------------------------------------------------------------------------------------------------------|
| 02:00-02:10  | Welcome Note: Ms. Saumya Kumar, Assistant Professor, JTSDS and Ms. Umang Vats, Student, JTSDS, Mumbai |
| 02:10- 02:15 | Background and Context Building: Dr. Janki Andharia, Prof & Dean, JTSDS, TISS, Mumbai                 |
| 02:15- 02:15 | Prof. Shalini Bharat, Director, TISS, Mumbai                                                          |
| 02:15- 02:30 | Mr. Amitabh Behar, Chief Executive Officer, Oxfam India, New Delhi                                    |
| 02:30- 02:45 | Dr. Surya Prakash, Professor, NIDM, New Delhi                                                         |
| 02:45-02:55  | Mr. Raphael Glémet, Senior Programme Officer, Water and Wetlands, IUCN Asia, Bangkok                  |
| 02:55- 03:20 | Dr. Dipak Gyawali, Nepal Academy of Science and Technology, Kathmandu                                 |
| 03:20- 03:25 | Vote of Thanks: Dr. Harjeet Kaur, NIDM, New Delhi                                                     |

### SESSION I

#### THEME: DEVELOPING THE CONTEXT OF TRANSBOUNDARY GOVERNANCE IN SOUTH ASIA

#### 03:30 PM –04:25 PM

**CHAIR :** Mr. Raphael Glémet

*Senior Programme Officer, Water and wetlands, IUCN Asia*

**CO-CHAIR :** Mr. Vishwaranjan Sinha,

*Program Officer, Natural Resources Group, IUCN Asia Regional Office*

### PAPER PRESENTATION

|                     |                                                                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1. 03:40 – 03:50    | The Symphony of cooperation: Understanding Principles, values and ethics of Transboundary Risk Governance - Mukunda Upadhyay |
| 2. 03:50– 04:000    | A New Direction in trans-Boundary River Water Governance in Brahmaputra-Mahakali River Basin – Bidisha Roy                   |
| 3. 04:00– 04:10     | Water Governance Network & Alliances in South-Asia – Sunanda Das                                                             |
| <b>04:10– 04:25</b> | <b>DISCUSSION</b>                                                                                                            |

## SESSION II

### THEME: DIPLOMACY IN TRANSBOUNDARY GOVERNANCE

**4:30 PM –5:50 PM**

**CHAIR :** Dr. Santosh Kumar

*Professor, NIDM and Former Director, SAARC Disaster Management Center*

## PLENARY SESSION

04:40–04:55      Dolphin Diplomacy: A Paradigm Shift in Modernizing Water Governance in the Transboundary Ganges Basin  
Mr. ShwahiQ Siddiqui, Lawyer

## PAPER PRESENTATION

1. 04:55– 05:05      Seven times deeper and divided into three: Re-identifying the lost focus of the Indus Waters Treaty – D Saran Prakash
2. 05:05–05:15      Diamber Basha Dam – Rising Conflict and Cause of a Potential Disaster – Katyayini Sood and Srijan Pant
3. 05:15–05:25      Importance of India's Resolving Transboundary Issues with China – Muhammad Salih PK Iyyad
- 5:35–05:50      DISCUSSION**

**DAY 2**  
**17<sup>th</sup> March, 2021**  
**Wednesday**

## SESSION I

### THEME: RESOURCE MANAGEMENT: RISK-INFORMED WATER GOVERNANCE

**02:00 PM-02:05 PM** Recap of previous day, Overview of the Day  
 JTSDS-TISS, Students – Rapporteurs

02:05 PM- 03:45 PM

**CHAIR** Mr. KJ Joy  
*Senior Fellow of Society for Promoting Participative Ecosystem Management*

## PLENARY SESSION

02:20–02:40 Dr. V. Thiruppugazh, IAS, AS (Policy and Plan), National Disaster Management Authority

## PAPER PRESENTATION

1. 02:40 – 02:50 Identifying and Managing Water-Related Risks Along the Indo-Nepal Border (with focus on the border area in Bihar state of India) in the Smaller River Systems - Eklavya Prasad, Aparna Uni and Trinaynai Sen
2. 02:50-03:00 ICJ on Transboundary Harm: Policies on South Asian Transboundary Water Governance – Saumya Kumar
3. 03:00 03:10 Farakka, Riverbank Erosion and a Barrage of Transboundary Issues – Soham Chakraborty and Suranjana Mullick
4. 03:10 03:20 Collaborative Water : Managing risks by drawing on Australian experiences, including failures - Melita Grant and Cameron Holly
- 03:20 – 03:45 DISCUSSION**

## SESSION II

### THEME: DEVELOPMENT PROJECTS AND TRANSBOUNDARY GOVERNANCE

03:55 PM –05:00 PM

**CHAIR** Dr. Surya Prakash  
*Professor, NIDM*

## PAPER PRESENTATION

1. 04:00 04:10 Creating Inclusive Spaces for Riverine Communities in the Transboundary Waterways of Brahmaputra - Veena Vidyadharan, Dipanwita Chatterjee and Saurabh Kumar

- 
2. 04:10-04:20 Damned for the Dam: Mapping the Political Economy of Indo-Bangladesh riparian communities. – Shilpa SP Singh
3. 04:20-04:30 Sundarban: Transboundary Conflict on Water Governance, Development and Socio-Cultural Impact on Inhabitants – Bateswar Das and Meghna Guha
- 04:30 – 05:00 DISCUSSION**

**DAY 3**  
**18<sup>th</sup> March, 2021**  
**Thursday**

**THEME: WATER GOVERNANCE : SECURITY AND PROTECTION**

02:00 PM – 02:05 PM Recap of previous day, Overview of the Day  
 TISS, Students – Rapporteurs

02:05 PM – 04:00 PM **CHAIR :** Mr. Mukunda Upadhya, Oxfam India

**PLENARY SESSION**

02:20–02:40 Transboundary Governance of Water in Disaster Contexts: Political Economy, Debates and Contestations Dr. Janki Andharia and Ms. Lavanya Shanbhogue Arvind

**PAPER PRESENTATION**

1. 02:40 - 02:50 Riparian communities on Peace over conflict- in relation to Transboundary water Governance - Abhisikha Das
2. 02:50-03:00 Approaching Trans-Boundary Perspective on Water in South Asia from a Security Perspective – Nitin Sathe
3. 03:00-03:10 Living with Uncertainties: Life, Livelihood and Location in an Inter-State Border – Momin and Gorky Chakraborty
4. 03:10-03:20 Making of the Brahmaputra: Its Conflicts, Dynamics and Geopolitical Status in Relation to its Riverine Communities – Rituparna Choudhury
5. 03:20 - 03:30 An Analytical Study of Trans-boundary Cooperation for River Water in the Context of India and its Neighbour Countries – Shani Jaiswal and Ashutosh Jaiswal
6. 03:30 - 03:40 Pandai: Small Rivers, Riparian Rights and Transboundary Conflict – Jacquleen Joseph and Shobhit Chepe
- 03:40 – 04:00 DISCUSSION**

**DAY 4**  
**19<sup>th</sup> March, 2021**  
**Friday**

**THEME: TAKING TECHNOLOGY TO THE COMMUNITIES**

02:00 PM –02:05 PM    Recap of previous day, Overview of the Day  
                                          TISS, Students – Rapporteurs

02:05 PM - 03:35 PM    **CHAIR :** Dr. Jacquleen Joseph, Professor, JTSDS, TISS

**PLENARY SESSION**

02:20–02:40            Citizen Science Approaches in Transboundary Early Warning Systems: Is Technology the Sole Determinant of Effectiveness in South Asian Milieu? - Pankaj Anand and Animesh Prakash

**PAPER PRESENTATION**

1. 02:40- 02:50        Hydro-social dynamics of Transboundary Flood Risk Management: A case for community-based solutions -Neera Shrestha Pradhan, Vijay Khadgi, Shailendra Shakya
2. 02:50 -03:00        Citizen Science in Escalating Flood Risk Preparedness - Ravinder Dhiman
3. 03:00- 03:10        Application of ICT in Addressing Trans-Boundary Water Related Challenges Affecting Public Health - Nelly Saiti
4. 03:10 03:20        Citizen Science Water Observatories for Trans-Boundary Water Cooperation: Mahakali, Asia – Rajan Subedi
5. 03:20 03:30        Understanding the Flood Early Warning System: A Case Study of Trans-Boundary Water Governance of Gandak Basin - Shams Tabrez
- 03:20 03:35        DISCUSSION**

**CONCLUDING SESSION**

03:40 PM –04:30 PM

- 03:40 – 03:50        Keynote Address: Mr. Sanjay Srivastava, Chief, Disaster Risk Reduction, UNESCAP, Bangkok
- 03:50 - 04:00        Valedictory Session: Mr. Pankaj Anand, Director - Programme& Advocacy, Oxfam India
- 04:00-04:15        Valedictory Session: Major General M. K. Bindal, Executive Director, National Institute of Disaster Management.
- 04:15-04:20        Closing Remark: Ms. Saumya Kumar, Assistant Professor, JTSDS
- 04:20 – 04:25        Vote of Thanks: Shreya Gurang, Student JTSDS

## Shifting Lands, Flowing Waters: International Roundtable Conference on Trans-boundary Cooperation for Water and Related Issues in South Asia

**16-19 March 2021.**

Other than inspiring myths and human ingenuity, rivers have not only given birth to civilizations, but they have also sustained them for ages. However, in recent years, they have become a potential source of conflict. Natural resources, in general, pay no attention to political boundaries. Transboundary rivers, in this regard, are indifferent to national borders as they transgress boundaries and territories. Thus, water conflicts result from a situation where water demand is more than its supply, or there is an asymmetry between competing users or co-riparians.

In the context of South Asia, the intrinsic linkages between the countries rooted in geopolitics, demography, socio-economic and cultural ties suggest that dynamics in one country often lead to cascading impacts in the neighbouring countries as well. These may adversely affect the entire geographical region and the riparian communities. While South Asia is well-endowed with natural resources, it is also exposed to the highest levels of disaster risks, including floods and droughts, thus exercising a significant impact on the population and the ecosystem in many different ways. In this light, transboundary water governance assumes significance which includes the management of various risks and hazards. With the growing threats of climate-induced disasters, the consequences of an ill-prepared nation or weak transboundary governance processes are likely to be unprecedented and cumulative across the region, which in turn may aggravate fragilities in peripheral and vulnerable geographies. Therefore, water governance must be inclusive and responsive to the community's needs and demands, keeping in mind underlying socio-political and economic conditions for practical and efficient water management.

Understanding different stakeholders' perspectives is significant for bridging gaps and facilitating a constructive dialogue for the betterment of the marginalized and vulnerable water-dependent groups. With the same purpose, Jamsetji Tata School of Disaster Studies (JTSDDS), Tata Institute of Social Sciences (TISS), Mumbai; Oxfam India; and, National Institute of Disaster Management (NIDM) organized the International Roundtable Conference on 'Shifting Lands, Flowing Waters: Trans-boundary Water Governance in South Asia, from 16th - 19th March 2021.

### **The broad objectives were:**

1. To critically examine the state of governance of shared waters and co-operation through compliances of International conventions.
2. To critically review Risk Informed water governance policies with Transboundary implications in the Mahakali and Brahmaputra River Basin To explore the various national and state level laws and conventions on water governance in Arunachal Pradesh, Assam, Uttar Pradesh and Uttarakhand in relation to the various vulnerabilities and risks the regions are exposed to.

The conference saw extensive and enthusiastic participation from a range of interested professionals who are committed to disaster risk reduction and allied fields including but not limited to state officials, research organizations, non-governmental organizations, students, and other learners from

the social sciences. The 4-day Conference was structured into six thematic sessions. Several papers were contributed to this Roundtable authored by professionals from various institutes in India and abroad. The following sections provide a detailed account of the conference.

## INAUGURAL SESSION

The conference began with the Inaugural Session on 16<sup>th</sup> March 2021, at 2:00 pm. **Dr. Janki Andharia**, Dean and Professor, JTSDS, TISS Mumbai introduced the event to the audience.

She provided a brief context elaborating on the theme and how the title - Shifting Lands and Flowing Waters was arrived at. It implying that the waters from the rivers and the fluidity of the land around it, which submerges and rises – often results in what we know as floods and disasters.

She highlighted that a river needs ample place to flow- and trying to restrain it can only cause havoc! The Dutch “room for river” approach- implied going back to basics, contrary to the modernist engineering approaches, that unfortunately remains the pre dominant mode of development! Data suggests that Transboundary water bodies exist in 153 states, serving 2.8 billion people, covering 62 million square kms and account for 54% of global river discharge.

**Prof. Andharia** explained that the sharing of Water from the great river systems such as the Indus, Mekong, Ganga and the Brahmaputra has also been the source of tension and disagreement at different levels, affecting the vulnerable communities the most. Further, there was considerable evidence of riparian communities being caught in cycles of poverty induced by different kinds of risks and vulnerabilities.

South Asia as a region, housed several transboundary rivers and she pointed out that Oxfam has worked on TROSA involving 4 countries - Nepal, India, Bangladesh, and Myanmar to foster co-operation at multiple levels, in particular their work has focused on recognising and respecting collective rights of the shared water resources. While the region was rich in natural resources, and communities had a shared culture, there were numerous issues that produced conflict or co-operation. Besides, good governance and positive practices around transboundary waters are critical for water security, regional development, peace, and stability- and so is gender mainstreaming.

She pointed out that the South Asian region is also exposed to the highest levels of disaster risks including cyclones, floods, droughts, forest fires and so on, impacting the population and the ecosystem adversely.

The growing threats of climate induced disasters, the consequences of an ill-prepared nation or weak transboundary governance - are likely to affect the entire region adversely, which in turn may aggravate fragilities in peripheral and vulnerable geographies. This concern underlined the significance of this Roundtable. As countries evolve their strategies to manage and respond to these climatic changes and disasters, experience and situation on ground demands that intergovernmental regional platforms like SAARC and ASEAN needed to develop greater convergence on transboundary issues of livelihoods,



Figure 1: Inaugural Session

trade, use of natural resources, disaster response and recovery. In addition, these approaches need to be risk-informed! Prof. Andharia stressed that it was here that NIDM could play a significant role. She mentioned that over 50 abstracts were received, of which about half were selected with the intent of sharing, discussing and reflecting on many of these issues with a critical lens.

**Prof. Andharia** concluded by emphasising that there was a need for policies in South Asia to deepen their agenda towards just and equitable sharing of water resources across riparian regions by orienting administrative approaches towards water security of local communities.

She thanked the partners for the collaboration and all the authors and plenary speakers who had worked hard to make it to the Roundtable.

**Professor Shalini Bharat**, Director, TISS Mumbai delivered the welcome address.

She appreciated that the School of Disaster Studies along with NIDM and Oxfam India were able to bring diverse groups- government officials and civil society working along the borders of India, Bangladesh, Bhutan and Nepal, together for a collaborative academic discourse. She hoped that the interaction would help forge a collective, coordinated, and collaborative approach in transboundary water governance in order to ensure that the affected communities are included in the governmental schemes, programmes, dialogues and decision-making systems.

While offering her best wishes, she expressed that she would have liked to have hosted all the speakers and participants physically on campus, but the pandemic and the rising numbers in Maharashtra precluded such a possibility. She was confident that there would be more such opportunities in the future and she looked forward to it!

Thereafter, **Mr. Amitabh Behar**, Chief Executive Officer (CEO), Oxfam India, in his inaugural address, brought to focus the need of people-centred approach to transboundary water governance, stating, “Indus, Ganga, Brahmaputra & Meghna basin have more than 850 million people dependent on it. The implications of what we are discussing here is significant and vital.” He specifically highlighted three significant points of concern in socio-political and economic contexts: the marginal ability of women (who are seen as primary managers of water in the domestic space) to influence the governance of water system; the lack of decentralized decision-making with regard to river-conflicts which renders local communities, which are very organically linked to the river system, with little say; and, the rising concern of climate change and its impact on the communities living in the command areas of the transboundary rivers.

**Dr. Surya Prakash**, Professor, NIDM, then highlighted the indispensable vitality of water and the significance of preserving river systems by understanding and establishing the linkage between humans and the river systems. He indicated that it is important for humans to value the resources that we are getting directly from the nature.

Following this, **Mr. Raphael Glemet**, Senior Programme Officer, Water and Wetlands, International Union for Conservation of Nature (IUCN) Asia, Bangkok, underlined the dire requirement of cooperation among the countries sharing river basins. He further emphasized the need for nature-based solutions to enhance mutual benefits to all the parties through mechanisms of joint planning and conflict sharing.

The keynote address for the event was delivered by **Dr. Dipak Gyawali** from Nepal Academy of Science and Technology, Kathmandu (Nepal), offering powerful and incisive words on the theme titled: “Disasters as the Unfinished Business of Development”. He set the tone for the discussion stressing on the critical associations between disasters, bureaucracy and developmental interventions

as paramount to conceptualizing robust solutions and enabling community well-being.

## DAY I SESSION I

### Developing the Context of Transboundary Governance in South Asia

The first session was themed “Developing the Context of Transboundary Governance in South Asia”. This session elaborated on the economy, society and culture in transboundary resources sharing. Highlighting the nature of challenges in everyday dynamics, the discussions brought to light the issues of justice and rights of the riparian communities.

The session was chaired by **Mr. Raphael Glémet**. The first presentation of this session was delivered by **Mr. Mukunda Upadhyay**, who detailed the nature of complex cooperation in the transboundary river basin, as a result of the struggles faced by the geo-political actors in managing hazards, risks and vulnerabilities. This happens to be an outcome of lack of proper commitment in ensuring the basic principles and values of inclusive governance, which was one of the concerns pointed out by Upadhyay. Then, **Ms. Bidisha Roy** focussed on the conflicts which arise because of transboundary river treaties, critically analysing the national and international fronts of Brahmaputra and Mahakali river(s)-based frameworks. **Ms. Sunanda Das** spoke on the prospects for developing governance arrangements in the Ganges-Brahmaputra-Meghna (GBM) and Salween Basin that can lead to better outcomes in terms of livelihoods of the communities, while at the same time, conserving natural resources. **Mr. Vishwaranjan Sinha**, Program Officer, Natural Resources Group, IUCN Asia Regional Office, as the Co-Chair for the session concluded by providing the audience with a brief recap of all the presentations of the session and asking each presenter to sum up their message in one line.

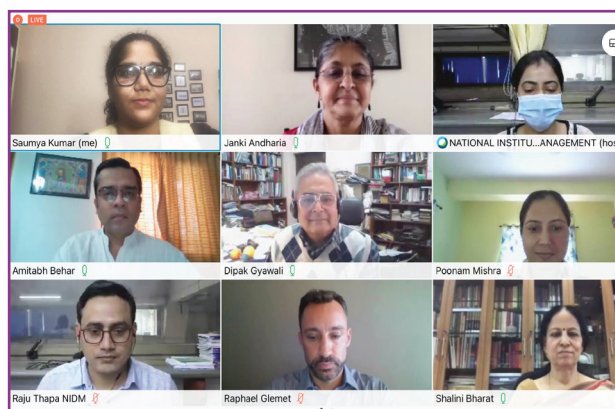


Figure 2: Panellists wrapping up the inaugural session.

## DAY I SESSION II

### Diplomacy in Transboundary Water Governance

The second thematic session was on “Diplomacy in Transboundary Water Governance”. In the recent years, ‘water diplomacy’ has attracted popular attention across several disciplines and professions. Focussing on disagreements and conflicts, water diplomacy aims at bringing in regional cooperation, peace and stability, which may further improve policy decisions.

Diplomacy in transboundary context also includes the participation of water users at various levels of governance. All these points were elaborated via different case studies, in this session.

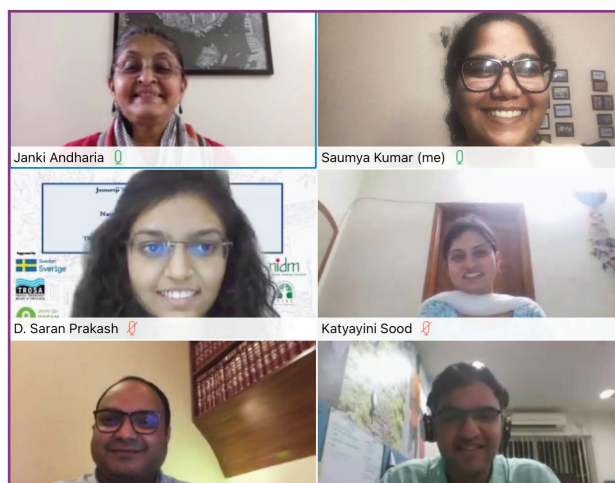


Figure 3: Day 1 Session II- Diplomacy in Transboundary Water Governance

The session was chaired by **Dr. Santosh Kumar**, Professor at NIDM. The session started with a plenary address by **Mr. Shawahiq Siddiqui**, Founding Partner, Indian Environment Law Organization (IELO) offered the plenary address. “The framework of Dolphin Diplomacy & animal aphorism, if applied to the South Asian context where ‘middle power diplomacy’ plays a key role, has useful lessons for future cooperation that could pave the way for transformational environment” he said. He provided a comprehensive overview of the projects and paradoxes in the context of legal history of water cooperation in the Ganges basin and delved into the legal pathways and strategies to modernize water governance by mainstreaming participatory hydro-diplomacy based on iconic species such as the Gangetic Dolphin. **Ms. D. Saran Prakash** followed with her presentation on understanding why, despite its ‘bilateral’ water treaty with Pakistan, India is perceived as a ‘hydro-hegemon’; also, pointing out the pitfalls of the Indus Water(s) Treaty and the possible way ahead in this regard. Next presentation was by **Ms. Katyayani Sood** and **Mr. Srijan Pant** who focused on Diamer Bhasha Dam- a China-Pakistan project. They assessed the controversies and the vulnerabilities around the project, critically addressing India’s position and its role in the project. The last paper presentation of the day was made by **Mr. Muhammed Salih PK Iyyad**, whose paper focused on why it is important for India to resolve transboundary concerns with China- underlining two significant points in this regard- the origin of Brahmaputra and the Ganges in China, the economic and technological growth of China. He cited active participation and regional cooperation as tools for resolving issues with China. The session was summarized by the chair **Dr. Santosh Kumar** who spoke about existing frameworks and policies for disaster interventions in South Asia. He emphasized that diplomacy should be based on consensus and multilateral cooperation focusing on development of critical infrastructure. He talked about the importance of data sharing between the South Asian countries and the role of SAARC in it, thereafter, ending the session on Day 1.

## DAY II SESSION I

### Resource Management: Risk-Informed Water Governance

The second day of the Conference started with a keynote address by **Dr. V. Thiruppugazh**, Additional Secretary, National Disaster Management Authority (NDMA), India. He spoke on Water Governance and Disaster Risk Reduction (DRR). He informatively brought to light the growing concerns on the global trends of disasters in a transboundary view.

Two of the several significant points covered by him were: the need of risk information for efficient governance; and, a requirement of rethinking the approach to disasters risk reduction in the policy frameworks in order to go beyond just the usage of water to DRR in a transboundary water course.

The further event covered two sub-themes. The first of these was titled: Resource Management: Risk-Informed Water Governance. The session advocated moving away from ‘one-size-fits-all’ approach, in essence, thus taking into consideration the importance of localized solutions to increasing risks. Discussions in this session highlighted the significance of identifying the role of local stakeholders in vulnerability assessment, but also on supporting their

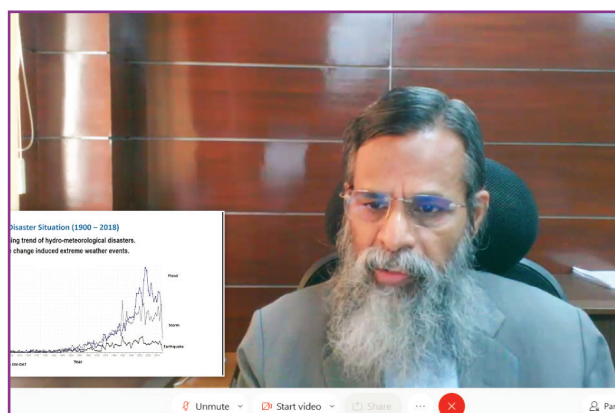


Figure 4: Dr. V. Thiruppugazh, Additional Secretary, NDMA, speaking on the global trends of disasters in a transboundary view.

capacities to address their water management challenges.

The first presenter, **Ms. Saumya Kumar** examined the scope of considering prevention of transboundary harm with respect to global policies on transboundary water governance in South Asia. She focused also on opportunities and the gaps in some agreements in South Asia on water sharing in the context of legal principles on transboundary harm in international law. **Mr. Eklavya Prasad** followed with his presentation on large and small transboundary rivers between India and Nepal, which flow downstream into India. He used examples from the border areas in Bihar and the Terai region in Nepal to elaborate on the dynamic water-related issues demanding greater attention. With the help of his examples, he was able to highlight that quite often the floods occur in much smaller river systems shared between Nepal and India while the focus of the governments of the two countries is essentially on the larger river systems. In the next presentation, **Ms. Melita Grantthen** underscored the significance of collaborative transboundary water governance as the basis for risk-informed approaches bringing in examples from Australia. She explained the reason why the planning of Murray-Darling Basin was a failure, thus calling for an inclusive governance as a mode of better engagement with people of a concerned region.

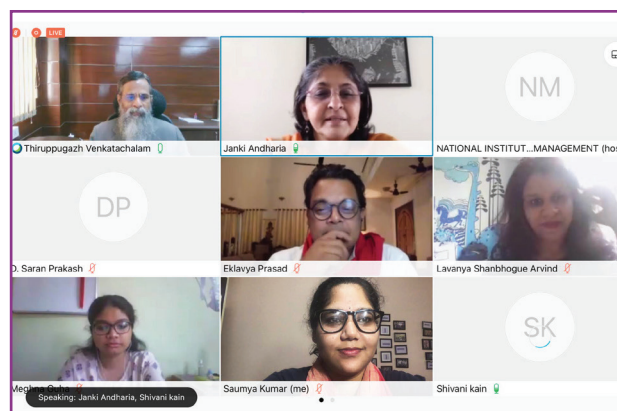


Figure 5: Concluding discussions of Day 2 Session I.

## DAY 2 SESSION II

### Development Projects and Transboundary Water Governance

The second session had the theme: Development Projects and Transboundary Governance. The decisions taken with regard to large-scale development projects are several times divorced from the realistic opportunities and risks that exists in the concerned river basins. Also, while development projects serve various purposes like navigation, hydropower generation and water supply for irrigation, there are several facets to these projects, which influence the outcome of their execution, and their impact on the riparian communities. This session brought to light such considerations.

The session started with a welcome address by **Dr. Surya Prakash** highlighting the issue of interlinkages between politics and governance. The address was followed by paper presentation by **Dr. Veena Vidyadharan** who spoke about creating inclusive spaces for cross-border trade for riverine communities in the transboundary waterways of Brahmaputra. In her presentation, she explored the commercial angle of water in transboundary context and issues thereof. In the following presentation, **Mr. Soham Chakraborty** and **Ms. Suranjana Mullick** spoke about issues like siltation and riverbank erosion, salinization and groundwater depletion. Though riverbank erosion was the key issue highlighted in their presentation, the authors also looked at the cyclic problems



Figure 6: Day 2 Session II: Development Projects and Transboundary Governance.

faced in India due to the Farakka Barrage. The next presentation was by **Mr. Bateswar Das** and **Ms. Meghna Guha**. They explained the socio-cultural impacts of development on the local inhabitants of the Sunderbans, from the perspective of transboundary conflict. The last presenter of the day - **Ms. Shilpa SP Singh** talked about the issues arising out of construction of large dams by citing the example of Tipaimukh Project in Manipur. In her presentation, she highlighted the critical perspectives of water management activities between India and Bangladesh and advocated different measures which can uphold community participation in riparian concerns between India and Bangladesh.

## DAY 3 SESSION I

### Water Governance, Security and Protection

Transboundary waters can be considered as a security concern especially in scenarios of any alteration in the allocation of water resources or disasters. Such situations can lead to political tensions and social unrest across the borders. For that matter, constructing of any infrastructure for water storage is also considered to be a concern of national security.

With the theme of “Water Governance, Security and Protection” the third day of the event was chaired by **Mr. Mukunda Upadhyay**, Programme Officer- Disaster Risk Reduction, Oxfam India. “*When we are speaking of international policies and practices, we cannot ignore the aspect of capitalism, which plays a significant role*”, noted **Mr. Upadhyay**. **Dr. Janki Andharia** and **Ms. Lavanya Shanbhogue Arvind**, Assistant Professor, JTSDS, TISS, Mumbai, spoke at the plenary session about transboundary water governance from a theoretical perspective of political economy. They shed light on how the lives of riparian communities interface with the ecosystem. Juxtaposing that with neoliberal frame, they problematized the manner in which the lives and livelihoods of such communities are looked at. They argued that while the International Relations perspectives are necessary, they remain inadequate, if not redundant. The speakers opined that the idea of transboundary water governance requires a multi-pronged understanding which is located in the values of social and environmental justice. They concluded by flagging the key issues of sustainability in the context of transboundary water governance.

Further, **Ms. Abhishikha Das** in her following presentation advocated moving beyond geo-hydro political issues and hegemonic rule of power. She advocated for adopting of an agile approach to management and policy making while promoting traditional knowledge sharing and making space for scrutiny and checkpoints. Bringing in a security perspective in the context of shared water basins of India with Pakistan, Bangladesh and Nepal, respectively, Air Commodore Nitin Sathe shared his insights on the role that China is playing in the current times to neutralize India’s influence among its riparian neighbours. The speaker tried to analyse the issues of water relations and water security in South Asia within the larger ambit of bilateral relations and national security in the region. He attempted to trace and analyse the growing importance of water security with the national security developments in South Asia and how improved bilateral relations can lead to better security cooperation and improved water sharing. Sathe put on guard the concern that large scale migration of refugees across borders might lead to ‘water’ wars in

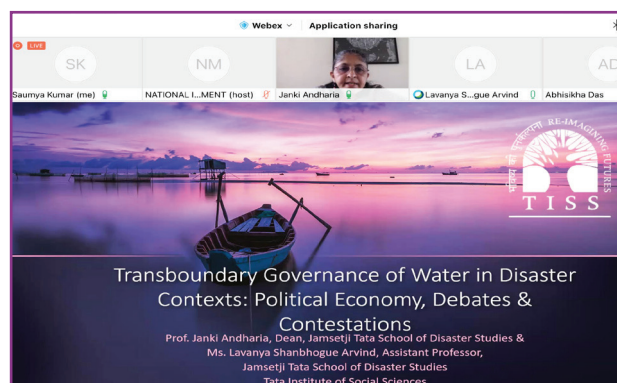


Figure 7: Presentation by Dr. Janki Andharia and Ms. Lavanya Shanbhogue Anand.

future. Further, he noted that bilateral relations shape the perceptions in international affairs. Issues like transnational water sharing and security cooperation which form a part of bilateral relations depend on the relationships between states. In this context, the speaker engaged with the question on the role of India in uniting South Asian countries to avert major wars that may be triggered by unresolved minor points of contention. This, Sathe said, has to be further explored while studying bilateral cooperation in tandem with transboundary water governance.

Then, with a detailed analytical study of trans-boundary water cooperation, **Mr. Ashutosh Jaiswal** highlighted in his presentation the key issues that persist in the transboundary water treaties of India with China, Nepal, Bhutan, Bangladesh and Pakistan. Presenting next was **Ms. Rituparna Choudhary's** paper which focused on how, at times local communities take charge of governance in the form of 'nodi baithak' in the context of Brahmaputra floods. **Professor Jacqueleen Joseph's** and **Mr. Shobhit Chepe's** presentation highlighted the requirement and importance of small river management, riparian rights and social justice for the livelihood(s) of the communities in the context of Pandai Transboundary water conflict. **Mr. Hasan Momin** and **Mr. Gorky Chakraborty's** presentation echoed the importance of focusing on livelihood issues of riparian communities. **Mr. Mukunda Upadhyay** ended the session with a thought-provoking point- *"whatever happens in the upstream, has an impact in the downstream and our transboundary policies should be formulated accordingly"*.



Figure 8: Concluding Day 3 Session II.

## DAY 4 SESSION I

### Taking Technology to the Communities

Technology can add to making transboundary water collaboration activities more risk-informed via sharing of data and information. Not just that, bridging the digital gap may also reduce the vulnerability of the riparian communities by ensuring their access to updated and real-time data on weather conditions (for example)- thus, helping them to be prepared for any potential extreme event scenario.

With the theme- "Taking Technology to the Communities", the session on the last and final day of the 4-day roundtable was chaired by **Dr. Jacqueleen Joseph**, Professor at JTSDS, TISS, Mumbai. Talking about the technology which is being used in water-related transboundary cooperation especially in the flood plains of Bihar and Assam, Professor Joseph shared that tremendous amount of work has been done with the help of technology for participatory processes in the areas where transboundary water cooperation is needed on the ground level. She highlighted that technology has enabled professionals to capture local knowledge and community-based issues.

Then, **Mr. Pankaj Anand** and **Mr. Animesh Prakash** offered their presentation at plenary



Figure 9: Day 4, Session I- Taking Technology to the Communities.

session. They explored the gaps in end-to-end Early Warning System (EWS). *“There is a tremendous scope to improve on community dissemination [of early warning], and communication and early action”,* noted Mr. Animesh Prakash, in context of understanding why, despite a significant improvement in the capacity of early warning forecasting system, the number of casualties of lives lost in floods has been exponentially high in the past few decades.

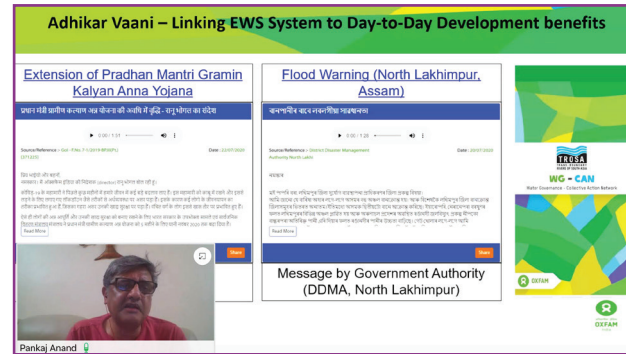


Figure 10: Presentation by Mr. Pankaj Anand, Director-Program and Advocacy, Oxfam India.

**Mr. Vijay Khadgi** then walked the audience through the hydro-social dynamics of transboundary flood risk management. Talking suggestively about community-based solution, the presenter found that community-level partnership is extraordinarily strong across the border region in Indo-Nepal border region, Inter-Governmental Organizations (IGOs) and International Non-Governmental Organizations (INGOs), and likeminded institutions provide direct and indirect communication across the border. In this light, informal cooperation is non-restrictive and is more efficient for sharing flood related information in local language so that the local communities also can understand.

**Dr. Ravindar Dhiman** followed with his presentation in which he spoke about the tools of the trade for disaster management like GIS mapping, simulation, emergency management system including communication and warning to address issues related to disaster management. Backed with various examples, the presenter shed light on citizen science to resolve complicated problems with integration of indigenous knowledge and community perspective, to minimize the error of uncertainty. In this relevant and poignant presentation, the speaker emphasized the significance of human insight, artificial intelligence and real time communication in disaster response and disaster management.

**Nelly Saiti** from the Kenyan Red Cross spoke about the challenges in public health in a transboundary perspective with the stress on water as the primary concern. The speaker reminded the audience that with an increase in the population of South Asia and the resultant imbalance in the supply of water, the strain on Public Health sector is increasing. Saiti surmised that the application of ICT is considered as one of the major gaps that can help address a wide range of public health challenges. She recommended enabling the access to ICT for the communities and healthcare providers in the transboundary regions, the adoption of updated ICT tools and telemedicine, providing of data for the immigrants, and collaborative work among the healthcare organizations, meteorology department, government and ICT industry.



Figure 11: Presentation by Mr. Rajan Subedi and Mukunda Upadhyay.

Explaining the concern regarding the quality of river water as a transboundary issue, **Mr. Mukunda Upadhyay** provided a brief overview of Mahakali river, addressing its unique geomorphological

features and cultural value. The presenter credited the bad quality of river water to the water governance in the region. Unsystematic waste management in the upper stream, and industrial and faecal matter in the lower stream have posed various challenges to the riparian population and its fishing practice. “A Science by the people, for the people and with the people” is how Citizen Science is defined by Upadhyay. He enlists major concerns that people have about the data collected without skills and education required for the same. In the context of the Lohaghat commitment, the speaker addressed the involvement of Civil Society Organizations (CSOs), academicians and water experts of India and Nepal. **Mr. Shams Tabrez** focused his presentation on understanding the flood EWS in Gandak basin. His work takes into account the major factors which lead to floods in the region.

Duly noting that Gandak is one of the most devastating transboundary rivers in Indo-Nepal region, Tabrez explains that political tensions, inequitable economic development and imbalanced decision-making authority are the causes of floods and related issues in this region. He recommended that EWS should be people-centric, as mentioned in the Hyogo Framework for Action (2005-2015). Despite the various development in the EWS, there still are failures in dissemination in the communities. Transboundary conflicts and lack of coordination between India and Nepal were identified as the reasons for this failure, by the presenter.

## CONCLUDING SESSION

At the concluding session, **Mr. Sanjay Srivastava**, Chief of DRR, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) delivered the keynote address. He highlighted the need for cooperation in dealing with inequality in the communities and empowering them, also in the context of the rising concern of climate change.

**Major General M.K. Bindal** VSM, Executive Director, NIDM concluded the event with the following words: “instead of the current pre-occupation with conflicts, both water professionals and policy-makers are likely to focus their attention on cooperation and collaboration between the countries, not only with respect to water but also in terms of a whole spectrum of development issues, such as agriculture, energy, industrial development, intermodal transportation (including navigation), which will invariably result in a very significant win-win situation for all the countries concerned.”

Transboundary rivers tend to have complex governance regimes and often involve issues of national security, territoriality and competition. The roundtable was designed to provide a platform for actors from the academia, civil society and the government to come under a common roof to understand trends and analysis to reduce transboundary water risks. It was an endeavour towards inclusive



Figure 12: Day 4- Concluding session.



Figure 13: Major General M.K. Bindal concluding the Conference.

water governance through policy influencing to achieve the larger aim of poverty and marginalization reduction among riparian communities. Through it we intended to critically examine transboundary water governance through the lens of equity, justice and water rights. The various panellists and presenters of the event provided us an excellent base to build upon, through the ideas and knowledge that they have created. The organizers now aim to follow this up with a book publication based on the papers submitted.

## Key Takeaways

- Nature-based solutions to enhance mutual benefits to all the parties through mechanisms of joint planning and conflict sharing need to be prioritized.
- There is a need of collaboration among the countries of South Asia on their future strategies to manage and respond to climatic changes and disasters. Experiences and situations on ground demands that intergovernmental regional platforms like SAARC and ASEAN develop greater convergence on transboundary issues of livelihoods, trade, use of natural resources, disaster response and recovery. In addition, these approaches need to be ‘risk-informed’.
- There is need to strengthen risk information for efficient governance; and, rethink the approach to disaster risk reduction in the policy frameworks in order to go beyond just the usage of water to DRR in a transboundary water course.
- Both water professionals and policy-makers are likely to focus their attention on cooperation and collaboration between the countries, not only with respect to water but also in terms of a whole spectrum of development issues, such as agriculture, energy, industrial development, intermodal transportation (including navigation), which will invariably result in a crucial win-win situation for all the countries concerned.
- There is a need for policies in South Asia to deepen their agenda towards just and equitable sharing of water resources across riparian regions by orienting administrative approaches towards water security of local communities.
- Collective, coordinated, and collaborative approach in transboundary water governance needs to be forged in order to ensure that the affected communities are included in the governmental schemes, programmes, dialogues and decision-making systems.
- Strengthening the people-centred approach to transboundary water governance, starting with “Indus, Ganga, Brahmaputra & Meghna basin which support the lives and livelihoods of more than 850 million people.

# Abstracts

## INAUGURAL SESSION

### Disasters as Unfinished Business of Development: why pluralizing the natural and social aspects of transboundary waters may help

*Dipak Gyawali*

Mal-development (as opposed to apt or good development) has been more responsible for resilience depletion of vulnerable communities than natural hazards. This, as Cultural Theory argues, is also due to development programs decided by hegemonic institutions without sufficient “Toad’s Eye Science”, i.e., a rather top-down approach that filters out “uncomfortable knowledge” of conditions at the grassroots level. Exacerbating the situation is, in the larger scheme of the overall water cycle, a narrow focus on Blue (river) water ignoring White (‘sky rivers’ atmospheric) and Brown (underground) waters. The basic argument being made is that pluralizing the discourse, giving voice at the policy table to all three social solidarities of market individualism, agency hierarchism and activist egalitarianism together with their different perspective on risk and justice, responding to them in a spirit of constructive engagement, and seeking not consensus but compromise would lead to resilience enhancement during disasters.

#### About the Author(s)

**Mr. Dipak Gyawali** is a hydroelectric power engineer (Moscow Energy Institute, USSR) and a political economist (UC Berkeley, California USA) who, during his time as Nepal’s Minister of Water Resources in 2002 and 2003, initiated reforms in the electricity and irrigation sectors focused on decentralization and promotion of rural participation in governance, including community electricity. He also initiated the first national review and comparison of Nepali laws with the guidelines of the World Commission on Dams. Gyawali has been a visiting professor at the UN University in Japan as well as a research scholar at the East-West Center in Hawaii, the Queen Elizabeth House in Oxford, the London School of Economics, and the International Environment Academy in Switzerland. His research focuses on the interface between technology and society as related to water, energy and natural resources issues.

Gyawali has served on several government commissions related to Himalayan water and energy resources development; has served as a member of the panel of experts for the Mekong River Commission reviewing its basin development plan; has been an advisor to the Myanmar government in its water institution reforms; has published extensively both academically and in the popular press on water resource, environment and development issues. He was the founding chair of the poverty alleviation focused NGO, Rural Self Reliance Development Center; the founding chair of Nepal’s first liberal arts college, the Nepal School of Social Sciences and Humanities; and chaired Nepal Water Conservation Foundation till recently. In addition, he is a guest senior research scholar with the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, and a member of the Global Forest Expert Panel on Forests and Water set up by the International Union of Forest Research Organizations (IUFRO). In addition, he serves as advisor to Nepali associations such as Biogas Support Program, National Federation of Irrigation Water Users Association,

Nepal (NFIWUAN), National Association of Community Electricity Users-Nepal (NACEUN), and to international organizations such as The STEPS Center/University of Sussex and UN World Water Assessment Program (Perugia, Italy). He is currently lead researcher of an IDRC/Canada supported NWCF research on water-induced disasters, climate change and “those left behind”.

## THEME: DEVELOPING THE CONTEXT OF TRANSBOUNDARY GOVERNANCE IN SOUTH ASIA

### The Symphony of co-operation: Understanding Principles, values and ethics of Transboundary Risk Governance

*Mukunda Upadhyay*

Since antiquity, states have been altering the geo-social spaces of civilization(s) in a competitive manner. Therefore, it is inevitable that conflicts at any cross-sectional point in time on shared resources be understood through the historical lens of governance. Since risks are ubiquitous, it is important that the larger framework on governance of shared resources has visible components of risk planning, management and evaluation of fragile and scarce elements. In the context of a transboundary river, it involves the efficient and participatory involvement of all stakeholders functionally operating at different tiers of planning and management. In this, however, it is inevitable that the approach of basin level poly governance is adopted wherein the fundamental principles of transparency, accountability, integrity and ethics are given due consideration. These principles, if adopted properly can strengthen the structural pillars thereby securing the most pertinent values of justice, equity and rights, at a regional level. Riparian communities therefore require a more inclusive status in an agreed upon polycentric horizontal structure which, at one hand can transform their perspectives on risk governance and on the other, can boost up their potential so that they can bring phenomenal and transformational changes in their local spaces with global significance.

Transboundary regional geo-political actors are facing struggles at various levels in managing hazards, risks and vulnerabilities due to lack of proper commitment in ensuring the basic principles and values of inclusive governance. And hence, evidential consequences are visible in the form of unprecedented disasters, depleting water resources, contaminated rivers and demographic loss in vulnerable geographies. In the context of a transboundary river basin, framework governing risks should be inclusive, comprehensive and sustainable and be imbibed in the policies of nations sharing common water resources. Along with this, the consideration of culture and traditional wisdom in the overall structural and the functional aspects should also be reflected in risk policies.

Regional co-operation initiative should also welcome innovation through knowledge production and research for the evaluation of existing framework and involvement of stakeholders on managing risks at a unit level governance. Transparency on the part of the transboundary nations not only include flow of information but also on the commitment to make it more participatory at a basin level. Polycentric horizontal form of community-based risk and resilient governance could reduce hazards created by bureaucratic hassles and help lessen the impact of many risks at a more refined and organic level. Therefore, risk governance should always be read along with the principles of sustainability and policies should be framed through the very delicate threads of lived realities.

This paper is an endeavour to propose a framework for regional co-operation between nations sharing common property resources including rivers, wetlands, mountains, reserve forests and

other forms of valuable natural assets under the larger ambit of principles, values and geo ethics in risk governance. For a more pragmatic understanding, arguments and discussions shall be based on the findings from field in few transboundary river basins in South Asia.

### About the Author(s)

**Mukunda Upadhyay** is Programme Officer-Disaster Risk Reduction, and Animesh Prakashis Theme Lead, Transboundary Rivers of South Asia, Oxfam India.

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## A New Direction in Trans-Boundary River Water Governance in Brahmaputra–Mahakali River Basin

*Bidisha Roy*

A river is a part of any natural drainage system. Every natural drainage system has its own boundary. Anthropogenic actions often disrupt this system; just as they disturb other parts of an ecosystem. A river ecosystem boundary cannot be divided by nationalities, cultures, countries or states' borders and politics. However, it has been observed in different parts of the world that trans-boundary river systems suffer in many forms of conflicts. The Brahmaputra- Mahakali River Basin is not exception in terms of indiscriminate use of water resources and mismanagement of water governance. These lead to many conflicts in which, the sufferers are not only the riparian communities, but the ecosystem(s) as a whole too. More the conflict between riparian communities, higher the stress on river ecosystems. As a result, the concerned region in entirety tends to experience depressed economy, social injustice and inequity in water rights.

The geographical position of India is critical, especially with respect to some of the states like Assam, Sikkim and Uttar Pradesh which lie in the Brahmaputra – Mahakali River Basin, thus making these states even more conflict-prone. After the independence of India, many treaties were signed between India and its neighbouring countries with the aim of river water resources management. However, many of those treaties need improvisation to manage water resources sustainably.

This paper will address the conflicts which arise because of these treaties. It will critically analyze the national and international fronts of the Brahmaputra and Mahakali rivers- based water governance framework.

### About the Author(s)

**Bidisha Roy** is continuing with the environmental consultancy as QCI/ NEBET accredited empaneled functional area expert in AQM. She holds an experience in the environment sector across environmental consultancy, research institutes and NGO. She has did a PGDM (Post Graduate Diploma in Management) in environment management (2 years full time) from IISWBM (India Institution of Social Welfare in Business Management), Kolkata in 2010. She completed her graduation from university of Burdwan in 2006.

She worked with UNICEF, Odisha as the State Expert- safely managed 'rural water system Consultant. She had been associated with NEERI (National Environmental Engineering Research Institute) from February 2011 to November 2013. Further, she received an accreditation for Water pollution (WP), Air Pollution (AP) and Air quality modelling (AQM) from QCI/NABET (National Accreditation Board for Education and Training is a constituent Board of Quality Council of India) as a Functional Area Expert in 2016. She has hands-on experience preparing EIA/EMP reports for assigned projects, CSR program, including watershed management and water conservation program's behalf of industries. She has designed and coordinated field visits for the environmental sample collection for the assigned projects. Further, she has also performed sample analysis for different parameters of water, air, and soil and noise samples. She did statistical data analysis

for various research & development, EIA and other projects. She also has an experience in work supervision of pipe water supply schemes to provide safe drinking water to the communities. She was involved in developing the laboratory ranking system to assess water quality testing laboratories to strengthen the water quality monitoring and surveillance program for the state.

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## Water Governance Network and Alliances in South Asia

*Sumanda Das*

In South Asia, water governance networks are linked with social, political, economic and administrative constraints. After analyzing various private sectors' investments in the Ganges-Brahmapura-Meghna (GBM) and Salween Basin, their impacts on the river ecology and communities are monitored. Building on the evidence, we convene multitask holder dialogues with the investors and infrastructure developers to promote more responsible and inclusive business practices.

The gap between governance and 'government' has widened (Mathur2009) as other actors have acquired stronger roles in the allocation of water resources. The locus of water policy-making has moved from the state, to include other actors: partly through the dynamics of (formal and informal) markets, the private sector and civil society, which have created greater space for themselves (Narain et. al.2014). South Asian water resource scholarship has thus, recently experienced an upsurge (Mollinga2008). Governance thus refers to the institutional systems and processes through which decisions are made and implemented. It constitutes the processes through which control and authority are exercised in the allocation of water resources. The likely trends and outcomes in water governance with a particular focus on cooperation and conflict are over the management of water resources in two regions: South Asia and Southern Africa. In South Asia, the focus is on the governance of three very large-scale shared river basins- the Indus, Ganges and Brahmaputra, inhabited by nearly a billion (mostly) poor people. The Ganges and Indus basins are under growing stress in the context of a lack of appropriate water governance arrangements. South Asia has struggled to find ways to co-manage water resources to benefit everyone equitably in a context where there is much potential benefit to be achieved. Southern Africa is considered an example of relative success in developing ways to cooperate; but the implementation is incredibly complex in systems that are smaller in terms of size and population, but experience more water scarcity than the South Asian basins. So, the critical question is: what are the prospects for developing governance arrangements in the two regions that will lead to more positive outcomes in terms of sustainably improving people's livelihoods while conserving natural resources than achieved so far versus further deterioration and rising conflict?

We examine this question through three 'lenses' which we characterize as 'beyond disciplines', 'beyond scales' and 'beyond institutional hardware to human' software'. 'Beyond disciplines' addresses the question of how to mobilize the diverse types of expertise productively to solve problems. It is based on the recognition that no single discipline is sufficient to address the emerging challenges of water resource governance and management. Addressing the governance challenges facing the water sector requires a diverse range of scientific expertise combined with a wide spectrum of actors– represented by the state, civil society and the private sector. Further, no amount of technical and scientific ingenuity is adequate if the solutions generated are not relevant to the specific socio-political and socio-economic contexts in which they are applied (Jacobs 2012).

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## THEME: DIPLOMACY IN TRANSBOUNDARY GOVERNANCE

### Dolphin Diplomacy: A paradigm Shift in Modernizing Water Governance in the Transboundary Ganges Basin

*Shawahiq Siddiqui*

The rich water endowments of the Ganges River Basin shared by Nepal, India and Bangladesh have been the cause of conflict and cooperation over a period of six decades. In all, there are four bilateral project-centric agreements/treaties on the four large tributaries of the Ganges. The Mahakali Treaty (1996), the Gandak Agreement on Irrigation and Power Project (1964) and the Kosi Project Agreement (1966) govern the management of barrages and canal infrastructure between India and Nepal; whereas the Ganges Treaty (1996) between India and Bangladesh governs the sharing of seasonal flows of the main stem of the River through the Farraka Barrage. Therefore, barrages rather than the River or its people are at the heart of water governance in one of world's most densely populated, water dependent and poverty-stricken basins. The project-based transboundary cooperation in the Ganges basin has been disproportionately influenced by inward looking political dynamics that has disallowed constructive engagements and technical discussions on ecological integrity of rivers, emerging challenges of climate change, water rights and growing consumptive uses in the basin. The cumulative impact of unsustainable physical and skewed legal infrastructure has had deleterious and irreversible impacts on the river ecology and people directly dependent on it and remains to be studied and understood completely.

Dolphins- an iconic aquatic species native to the transboundary Ganges Basin are the reliable indicator of the health of the entire river ecosystem. These are also legally protected throughout the span of the Ganges basin. Their declining numbers are directly related to the fragmentation flow regime due to barrages and irrigation/embankment infrastructure in the Ganges tributaries. Thus, ensuring return of the dolphins and their healthy habitat by restoring fragmented flow regime to its original throughout the span of the Ganges basin shared by Nepal, India and Bangladesh could lead to an unconventional river centric cooperation that stays away from conventional hydro-diplomacy of cusecs and megawatts.

The paper provides a comprehensive overview of the projects and paradoxes in the context of legal history of water cooperation in the Ganges basin and dwells upon legal pathways and strategies to modernize water governance by mainstreaming participatory and unconventional hydro-diplomacy based on iconic species such as the Gangetic Dolphin.

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## Seven times deeper and divided into three(s): Re-identifying the lost focus of the Indus Waters Treaty

*D. Saran Prakash*

The dearth of water is a rising matter of concern in many countries. The pivotal role that rivers play in energy generation, industries and environment preservation have made rivers more crucial. For those South Asian countries which are largely driven by agricultural activities, the impact of environmental degradation and poor management of water resources sometimes lead to conflict. In this context, water treaties have exercised an important role and responsibility in peaceful resolution of water-related conflicts. The Indus Waters Treaty (IWT) between India and Pakistan is one example of major international river basin treaty. It is, in fact, quoted as the most successful water-sharing mechanism in the recent times.

In 1960, the IWT signed between India and Pakistan, midwived by the World Bank, gave India three eastern rivers (Sutlej, Beas and Ravi), whereas Pakistan received the control of the three western rivers (Indus, Chenab and Jhelum). The treaty is considered to have stood up to all its descriptions of being a mechanism providing a moderately reliable framework for the peaceful resolution of water-related dispute. However, the treaty defines absolutely no mechanism to encounter the present-day challenges and concerns, like that of the climate change adversaries.

Water-related issues here can be addressed only when treaty-related issues are addressed. This requires collaboration and trust among countries sharing water resources of a river basin. However, the IWT in particular does not seem to encourage frequent interactions among the riparian countries owing to various reasons. In 2010, Pakistan accused India of choking its water supply consistently. And, in 2018, Pakistan again alleged India of violating the IWT with regard to the Kishanganga Dam, and lodged a complaint with the World Bank.

In this context, the paper proposes to begin with an understanding of why, despite its 'bilateral' water treaty with Pakistan, India is perceived as a 'hydro-hegemon'. Following an elaboration on IWT, the paper will talk about what is the survival of IWT dependent upon- the political interests of the two riparian states, or the needs of agricultural and irrigation communities that are affected by the decisions taken in relation with IWT. This paper will then attempt to identify the current challenges in the IWT and the ways in which the tensions can be eased. Here, we understand the importance of democracy for cooperation in transboundary river treaties, in order to shed light on whether or not the Treaty is catering to the changing social and economic issues.

In 2018, PM Narendra Modi made the statement: "blood and water cannot flow together". With a history of protracted rivalry, the IWT is a rare example of compromise and cooperation between India and Pakistan. This paper will conclude with some questions for discussion with regard to whether IWT is an example of successful conflict resolution or a tool for conflict management; and, in the wake of the abrogation of Article 370, if India does withdraw from IWT, what impacts

are to be anticipated for the riparian communities?

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## Diamber Basha Dam - Rising Conflict and Cause of a Potential Disaster

*Katyayini Sood  
Srijan Pant*

The Indo-Pak rivalry is not new to the world. Since the time of partition the countries have been claiming their right on land and water. The major issue is sharing the water of Indus as it is the lifeline of Pakistan most of the population resides at the banks of Indus but all the headwaters are in Kashmir. Realising the intensity of conflict the World Bank intervened and a water sharing treaty was signed between India and Pakistan in the year 1960. Even then the tensions between two countries could not deescalate. The hydrological project on either side fumed the geopolitical relations and also threatened the ecology and safety of their citizens. The blame game between the countries is never ending.

Diamber Basha Dam is one of the most recent hydro projects which has been in controversy since the time it was proposed. The project was not funded by either the World bank or Asian Development Bank because India did not provide NOC thus the project is funded by China. India claims it to be a cause of potential disaster for Ladakh as the water levels may rise any time and areas under Indian territory might get submerged. The then Prime Minister Musharaff claimed this project to be a way to cope up with the lagging development. The project is problematic to India not just for its location but also because it poses various threats to the people living in Ladakh and Kashmir. The region because of difficult terrain, low economic development and terrorism becomes more vulnerable to the consequences of this project. Abbas (2017) states various incidents in the history where dam failure has led to immense loss and same would be the case if hydel projects are constructed at Indus. Both the countries have been trying to impose supremacy over each other by building hydel projects on the river Indus but at the loss of lives of people inhabiting the area. The political conflict combined with climate change, susceptibility to earthquakes and landslides makes this hydel project a controversial one. The aim of the paper is to analyse the increased vulnerability after the completion of the project and what are the various DRR strategies that the governments can follow to reduce the risks and hazards created.

Development is important but there are sustainable ways to achieve the aimed level of growth and development. Pakistan and India are tropical nations and have immense potential to develop solar energy rather than hydel projects. The more the techno fixes are applied to fulfil the demand more will be the number of people being affected by disasters by 2030 which does not comply with the SFDRR. The trajectory of development is not possible by suppressing each other but by building trust and cooperation between the nations.

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## Importance of India's Resolving Transboundary Issues with China

*Muhammed Salih pk iyyad*

Water remains a politically contested issue in much of South Asia. The situation is further aggravated by the India's water disputes with its neighbours. The region is facing water shortage and agrarian difficulties, and it will continue to face increasing demands on energy and water with rapid industrialisation. Current scenario between India and china is very worst in the transboundary river issues. Both Brahmaputra and the glaciers that feed Ganga originate in China. As an upstream riparian region, China maintains an advantageous position and can build infrastructure to intentionally prevent water from flowing downstream. Owing to previous tendencies where the Chinese have been reluctant to provide details of its hydro-power projects, there is a trust deficit between the two neighbours. China's dam-building and water division plans along the Brahmaputra (called YarlungZangbo in China) is a source of tension between the two neighbours, despite the two having signed several MoUs on strengthening communication and strategic trust. Both Brahmaputra and the glaciers that feed Ganga originate in China. As lower riparian countries, India and Bangladesh rely on the Brahmaputra's water for agriculture. China, now has plans to build four more dams on the Brahmaputra in Tibet. Both India and Bangladesh worry that these dams will give Beijing the ability to divert or store water in times of political crisis. India, for its part, has built dams on the Teesta River, a tributary of the Brahmaputra, to utilise the flow of the Teesta during the dry season. Everyday policy concerns like water sharing and usage often receive less attention, are combined with larger security or border concerns, or are dealt with only when natural disasters occur. Yet water politics has far-reaching consequences for the prosperity and security of countries.

The economy, as of 2019, ranked as the second largest in the world by nominal GDP and since 2014 the largest in the world by purchasing power parity. China has the world's fastest-growing major economy, with growth rates averaging 10% over 30 years. While this transboundary issue is integral to the national development policies of these Two countries, it needs better analysis and understanding on the part of the countries involved in transboundary water sharing agreements.

Near-term hydro diplomacy in south Asia could start with less sensitive areas like managing flooding by sharing forecasting data collaborating on navigation, electricity generation, and water quality. If successful, these types of less formal cooperation might eventually make countries more willing to consider an official multilateral forum, which (despite some limitations) could help them further build trust, resolve grievances, and manage shared waterways. The biggest way to improve India's ties with China is to avoid the river problem. With the advent of artificial intelligence and 5G, China is sure to become a world power. India must resolve river disputes with China, which has become a major economic power, as soon as possible. If India does not solve its own problems, it will be a major setback.

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## An Analytical Study of Trans-boundary Cooperation for River Water in the Context of India and its Neighbor Countries

*Shani Jaiswal  
Ashutosh Jaiswal*

With about 4% of the water resources of the world, India should have been a water-adequate nation. However, in 2011 India turned into a water-stressed nation. India is currently ranked 120 among 122 countries on the Water Quality Index, as per a report by NITI Aayog. Water remains a politically contested issue in much of South Asia. The region is facing water shortage and agrarian difficulties, and it will continue to face increasing demands on energy and water with rapid industrialization. Over-extraction of groundwater is of particular concern, with an estimated 23 million pumps in use across Bangladesh, India, Nepal and Pakistan.

Under such circumstances, the increasing need for power and stable water levels could prompt reconsideration in bilateral water-sharing treaties in future. It is often seen in society that when water problem arises in our house, only its neighbors gives it water. But this does not happen at all during Asian international river water problems.

India is famous in the world for its generosity and along with its neighboring countries it also shows the same generosity in river water problems and the problems arising from them introduces the utmost readiness to overcome the water related problems of our neighbors.

Everyday policy concerns like water sharing and usage often receive less attention, are combined with larger security or border concerns, or are dealt with only when natural disasters occur. Yet water politics has far reaching consequences for the prosperity and security of countries. While this trans-boundary issue is integral to the national development policies of these countries, it needs better analysis and understanding on the part of the countries involved in trans-boundary water sharing agreements. The water disputes in South Asian subcontinent deal with the complex orientation of the rivers of the region that cut across some countries in the region complemented by a tense and uncompromising geo-political situation amongst the fellow riparian countries brings out the strategic role played by water in the region. Through some critical debates on these agreements and by the active participation of regional organization and mutual understanding among shareholders, these issues could be addressed in the light of experience.

Near-term hydro diplomacy in South Asia could start with less sensitive areas like-

- managing flooding by sharing forecasting data
- collaborating on navigation, electricity generation, and water quality

If successful, these types of less formal cooperation might eventually make countries more willing to consider an official multilateral forum, which (despite some limitations) could help them further build trust, resolve grievances, and manage shared waterways.

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## THEME: RESOURCE MANAGEMENT AND RISK INFORMED WATER GOVERNANCE

### Identifying and Managing Water-Related Risks Along the Indo-Nepal Border (with focus on the border area in Bihar state of India) in the Smaller River Systems

*Eklavya Prasad  
Aparna Uni  
Tirnayani Sen*

Nepal and India are closely interlinked by geography, with many of India's major and minor rivers originating in the mountainous catchments in Nepal. Well-known are the major river systems like Mahakali, Karnali, Gandak and Kosi. However, apart from the major rivers, there are an estimated 6,000 large and small rivers originating in Nepal, and flowing downstream into India. The dynamic water-related issues concerning these small trans-boundary rivers necessitates mention and greater attention. This paper attempts to illustrate these using examples from the border areas in Bihar with the Terai of Nepal.

One predominant water-based risk in these small trans-boundary rivers is of flash floods which have extremely localized impacts. Border areas of Bihar's districts like PashchimChamparan, PurbiChamparan, Araria and Kishanganj face repeated damage from flash floods from these pahadi (hilly) rivers. Furthermore, unlike riverine floods, flash floods can occur anytime in the year. A post-floods assessment in 2016 in three rivers – Chegraha, Amahawa and Pandai – by MeghPyne Abhiyan (MPA) showed how villages in PashchimChamparan's Gaunaha block faced between 30 and 60 instances of flash floods a year, between 2007 and 2016. The flash floods occur in any month between January and October.

Another shared water-based risk in the region comes from arsenic contamination of groundwater. A spatial and temporal heterogeneity in arsenic concentrations similar to that seen in the Gangetic Plain has been noted in Terai aquifers. This raises concern as rural populations both in Bihar's border districts as well as in Nepal's Terai region are chiefly dependent on groundwater for drinking. Nepal's districts like Nawalparasi, Rautahat, Parsa, Bara and Siraha were found to be the most arsenic-affected. The latter four are contiguous with districts in Bihar – notably PashchimChamparan and PurbiChamparan; both were identified by India's Central Ground Water Board (CGWB) to have arsenic contamination. Water quality tests conducted by MPA between 2013 and 2016 have also found arsenic beyond permissible limits in Pashchim Champaran.

Such a landscape – flash flood-prone from small transboundary rivers, and facing groundwater contamination by arsenic – requires a governance framework which will address these issues of water-based risk. Such a framework can then be extended to similar landscapes in other parts of the Nepal-India border.

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**Eklavya Prasad** is a social development professional, currently the Managing Trustee of MeghPyne Abhiyan. He has over 24 years of experience working on rural issues including natural resource management, flood rehabilitation, alternative and sustainable drinking water, secure and sustainable sanitation, participatory groundwater management and contextual agricultural practices. His approach has been a combination of research and advocacy, with a focus on localized solutions and community-based development, management and governance. He has also been actively involved in steering grassroots implementation agencies, and mentoring young professionals and future water leaders.

**Aparna Unni** is a print journalist by training and was interested in covering environment and ecology-related news. Having received her start reporting in Kerala, she decided to focus on understanding water and the multiple perspectives surrounding the resource. Upon completion of a post-graduate degree in Water Policy and Governance from Tata Institute of Social Sciences (TISS), Mumbai, she has been with MeghPyne Abhiyan. Over the past three years, she has been exposed to the drinking water and sanitation-related issues plaguing the flood-prone regions in North Bihar, and water quality-related challenges in different parts of West Bengal.

**Trinayani Sen** is a Program Officer with MeghPyne Abhiyan with a keen interest in environment and water. She has a background in Economics and Public Policy, and has conducted research on topics of social and environmental significance such as marine nature-based tourism, regulation of environmental impacts of festivals and financial inclusion and financial literacy amongst informal workers, during her academic pursuits. As a part of MPA, her focus areas have been water distress and water quality issues, with arsenic and fluoride contamination being the core of her research and advocacy activities.

## ICJ on Transboundary Harm: Policies on South Asian Transboundary Water Governance

*Saumya Kumar*

The issue of transboundary harm has been a matter of grave concern especially in cases of disasters like Chernobyl or the Sandoz Oil Spill. In both these incidents the absence of any jurisprudence at global level on transboundary harm created multiple challenges on assessing liability. These two incidents became the prime example of the challenges created by absolute territorial sovereignty in international law. The International Court of Justice has brought in considerable momentum to challenge this position with the Corfu Channel case and Threat or Use of Nuclear Weapons in the context of use of force, to provide a generic idea of transboundary harm which has been employed in the Gabčíkovo-Nagymaros Case specifically for transboundary water sharing. More recently, the Pulp Mills Case and Costa Rica v. Nicaragua has contoured and structures the jurisprudence towards expanding the purview of transboundary harm with due diligence to emphasize on procedural obligations and EIA within its framework. Considering the transition, the paper examines the scope of considering prevention of transboundary harm with respect to policies on transboundary water governance in South Asia. The paper focuses on opportunities and the gaps in some agreements in South Asia on water sharing in the context of legal principles on transboundary harm in international law.

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## Farakka, Riverbank Erosion and a Barrage of Transboundary Issues

*Soham Chakraborty  
Suranjana Mullick*

Riverbank erosion is the natural or anthropogenic process of gradual removal of materials from banks of rivers. However, riverbank erosion can also be a major contributor to the loss of life and livelihood for several communities across the globe, if they happen in areas where vulnerable communities exist. The Ganga-Padma river basin is one of the most ecologically vulnerable areas in today's time. Construction of bridges for light as well as heavy loads at river banks, "tilla" cutting and the process of sand mining are some of the common causes of riverbank erosion. But, when we take into account the Padma basin of Bangladesh, the Farakka Barrage (situated in West Bengal, India) becomes the main cause of riverbank erosion for the region. The barrage which is 2245m across the Ganga River, was built to divert 40,000 cusecs of water towards the Bhagirathi River (a tributary of Ganga) to flush out sediments. Adding to that a Rail cum Road Bridge is also constructed over it for easier accessibility and developmental purpose. Over the years, a handful of severe problems have been observed across the Indian boundary- in Bangladesh like - fishing and navigation and brought unwanted salt deposits into rich farming soil. It affected agricultural and industrial production, changed the hydraulic character of the rivers and brought about changes in the ecology of the region. Due to the fluctuating heavy flow of water caused by the operations of the Farakka Barrage, the alternate dry and wet phases along with the riverbank's triggers erosion. This study aims to look at the plethora of problems caused because of the Farakka Barrage and subsequent changes in the river basin in Bangladesh. Though riverbank erosion is the key issue highlighted through the study, the paper also looks at the cyclic problems faced in India due to the Barrage. The main tool used in the study is content analysis through a thorough review of the literature. The results show that there are multiple effects of the Farakka Barrage in Bangladesh which includes problems related to agriculture, industries, fisheries, navigation, salinity and ecology, etc. all of which amounted to the loss of more than 3 billion US dollars' worth in Bangladesh, two decades ago. There is evidence of a relation between the Farakka Barrage and the Bangladeshi migrant crisis in the state of West Bengal, India. It can be concluded that the main reason for the crisis is the riverbank erosion caused by Farakka Barrage leading to the displacement of people from Bangladesh.

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## Collaborative Water Governance: Managing Risks by Drawing on International Experiences, Including Failures

*Melita Grant  
Cameron Holley*

How can collaborative governance support risk informed planning in water resources management, drawing on international experiences including failures? Collaborative governance involves new coalitions among government agencies and civil society organisations, supported by guidelines, plans and nonbinding agreements (Holley, 2015). Increasingly, collaborative governance is understood to involve participation, integration, learning, adaption and region-based decision making (Holley, 2015). The emergence of collaborative governance in transboundary water management is in response to the confounding nature of water governance challenges (Holley, 2015), and a recognition that top-down processes have lost political legitimacy, and deliberative and bottom-up processes are needed (Akhmouch and Clavreul, 2016).

Some of the “failures” that Australia has experienced in its applications of collaborative governance (in a range of forms), have included: (i) political interference (ii) breaches of compliance and (iii) inadequate public/stakeholder engagement. By openly sharing, and understanding the mistakes and failures of other countries, such as Australia, risk informed planning and programming can be strengthened. While Australia has sophisticated and technologically enabled water governance systems, it has adapted these systems as a result of crises, failures, and community demands. Some of the challenges that Australia has experienced have related to compliance and enforcement. Major issues have arisen when these systems were underpinned by meaningful stakeholder engagement and buy-in, and/or where political interference has compromised these systems. Such failures, or “lessons learned” are important to share with other jurisdictions, so that governance risks can be foreseen and mitigated.

A case study will be offered from Australia, related to shortcomings in the New South Wales (NSW) water management compliance and enforcement system, and how this is relevant to risk informed planning in other jurisdictions. In 2017 it was revealed that large-scale water users tampered with water meters, and certain irrigators pumped water from the river system in periods when pumping was not permitted, and/or in quantities greatly in excess of their entitlements. Community concern about these compliance shortfalls was high and drove an independent investigation which resulted in a new independent regulator. Government directors/staff members involved in facilitating the acts of non-compliance were removed from the bureaucracy (NSW Department of Industry, 2017). This case study shows the importance of fostering “buy in from regulated actors (Holley and Sinclair, 2016), and the power of public pressure on adapting compliance mechanisms.

The chapter will consider a number of collaborative water governance models where ‘hard’ legal rules are combined with ‘softer’ collaborative approaches. These may vary from hybridity (both systems remain independent but interact in mutually supporting ways) to complementarity (two approaches are merged) (Holley, 2015). A more nuanced understanding of who is engaged and involved in collaborative governance will be discussed, with a focus on the need for an explicit

focus on gender equality and inclusion to build more equitable and resilient communities through decreasing inequalities. Concepts of participation and engagement with respect to intersectionality will be discussed (Grant, Willetts and Huggett, 2019).

A number of contemporary and practical tools developed to inform collaborative water governance will be identified and discussed in the chapter such as 'Guide for river basin planning in India' (Winfield, Harriss, Grant and Weber, 2019), Climate Risk Informed Decision Analysis (Mendoza et al, 2018), and UNDP's Risk-informed development From crisis to resilience (2019).

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## THEME: DEVELOPMENT PROJECTS AND TRANSBOUNDARY GOVERNANCE

### Creating Inclusive Spaces for Riverine Communities in the Transboundary Waterways of Brahmaputra

*Veena Vidyadharan  
Saurabh Kumar  
Dipanwita Chatterjee*

For a very long time, several societies in India and Bangladesh have been regular users of inland waterways of Ganga and Brahmaputra rivers for trade, transit and transportation. During the British colonial period, Brahmaputra river along with its several other small tributaries such as Teesta, Barak etc. were extensively utilized for economic and military transportation between North India and Northeast India and the ports in Calcutta and Chittagong.

Post-independence, the use of inland waterways for trade, transit and transportation declined substantially in India because developing road and railways infrastructure were on priority. The transportation of goods via inland waterways is environmentally friendly and relatively cheaper than railway and road. Over the past few years, the Government of India and Bangladesh have made several attempts to improve bilateral connectivity through Transboundary Rivers. The Protocol on Inland Water Transit and Trade (PIWTT) between India and Bangladesh designates specific routes for transit and trade. However, so far, the emphasis has been placed only on the movement of bulk cargo through bigger vessels.

Other than the organised sector of big steel hull vessels that ply along the Protocol Routes, mechanised boats of the capacity 10-50 tonne are quite popular in the international border areas of Dhubri, Assam and Chilmari, Kurigram, Bangladesh. These boats carry passengers and commercial goods to char (small islands) areas and ply within the borders of respective countries and are not allowed to cross the border. The area is socially and economically backward and the owners are also from the lower socio- economic strata of the society and represent a major portion of the riverine community.

Given this background, CUTS conducted a study in Dhubri and South Salmara of Assam (India) and Chilmari, Kurigram (Bangladesh) on the prospects of trading locally produced goods using small mechanized boats via transboundary waterways of Brahmaputra which also falls under Protocol Route-1. Prone to natural calamities like flood and erosion, the livelihoods of the riverine people in these areas are vulnerable compared to others who stay from river banks. Increased participation in economic activities can bring positive changes in their lives and in local economy.

The case presented here captures the findings of the study conducted under the programme Transboundary Rivers of South Asia (TROSA) and will look at the economic activities of the communities along the international border areas of Brahmaputra river with special focus on women. It will highlight the need for bilateral cooperation at subnational level and creating inclusive spaces for riverine communities in the governance regime of transboundary navigation.

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## Damned for the Dam: Mapping the Political Economy of Indo-Bangladesh riparian communities

*Shilpa S.P. Singh*

The abstract argues that the present river water distribution regime in India and Bangladesh does not take care of interests of the native people living and depending on the inter-state rivers flowing through the two boundaries. The study delves into the subject of IDP (internally displaced person) recognised by the U.N. and how this category of deprivation affects the tribal populations of North Eastern India as well as Sylhet, as the continuing “pro-development” neoliberal rhetoric for dam sets the political discourse of the ruling classes of India and Bangladesh.

The paper explores the problematic repercussions of building dams in a geologically sensitive, earthquake prone some like Assam - Bangladesh region by subjecting the example of the proposed Tipaimukh Dam as an example. The said Tipaimukh Dam has been a bone of contention between India and Bangladesh as many civil society and political activists have alleged with credible evidence that it will not only lead to future desertification of Sylhet and northern Bangladesh regions but at the same time it will hamper the lives of the Hmar tribal community in North eastern India. These tribal communities at the brink of democratic societies of populous states in question don't even fit the schema of Political society, where they can have access to democratic spaces to bargain with State. The exclusionary development policies prioritize the needs of urban classes and of industry towards greater expansion of economic activities to boost profit, production and consumption. The demand for electricity emanates from social groups who are stakeholder in contemporary development processes centred around consumption, whereas the tribal communities whose ideas of development contradicts the mainstream obsession of economic growth at this neoliberal juncture are at receiving end of this class violence.

The paper will explore these critical perspectives of water management activities between India and Bangladesh while debunking the pro-development anti working people agenda used by the ruling classes of India and Bangladesh, despite the latter being at the receiving end of economic expansionist policies of Delhi. At the same time, the paper will explore and uphold different measures which uphold community participation in riparian affairs between the two countries animating the theme of economic democracy.

### About the Author(s)

**Shilpa Singh**, a young researcher, worked as an Assistant Professor, Department of Political Science, Goa University. She is currently pursuing PhD in Political Economy at Goa University. She has keen interest International Political Economy. She has been awarded University Grant Commission's Junior Research Fellowship for pursuing Doctorate.

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## Sundarban: Transboundary Conflict on Water Governance, Development and Socio-Cultural Impact on Inhabitants

*Bateswar Das  
Meghna Guha*

The 'Ramsar site' of biodiverse enriched Sundarban region is spread over 10,000 km. with more than 2000 species which covers a large part of southern Bangladesh and southern part of West Bengal in India, the home to the world's largest mangrove forest, had been declared as UNESCO World Heritage sites in 1987 and 1997 in Bangladesh and India respectively. Such a unique biodiversity is however reeling under the threat of climate change. The marshy land faces recurring tides and frequent cyclone induced floods and storm surges. Such calamities along with a rise in the sea level is affecting the freshwater inflows and anthropogenic activities such as upstream dam construction, building embankments and overexploitation of the mangroves are adding on to the vulnerabilities of the unique culture-oriented people in both the countries inhabiting this land. These climate induced changes are affecting the forest dependent inhabitants of both the countries who happen to be one of the poorest and vulnerable communities of South Asia. However, none of the two countries have incorporated these concerns in the management protocols for the Sundarban. The reactions and response to these issues are different for the two countries and studies have shown that the impact of salinization on the quality and quantity of water resources are of critical importance.

Besides climate change and impact on environment of this mangrove region, developmental projects of India and Bangladesh have also been deteriorating the livelihood of river fishing based communities or economic groups and proved to be threat to their culture. Indo-Bangladesh friendship project of Rampal Thermal Power Plant (2012) led to a huge movement to save Sundarban. These activities are increasing the vulnerabilities of this region as deforestation, loss of salinity in upstream river flow due to glacier melting and increase in flow, decline of fish breeding are prevalent nowadays. Transboundary conflict over the water resource in this region has been through long years and common people get affected in complicated international legal procedures as there are many open border areas in this vast region. Transboundary conflict and self-esteem projects are destroying the cultural vibrant of Sundarban people especially tribal communities and there is need for sustainable resource management especially in the water sector. This study is focusing on the transboundary conflict in water resource management, development and its impact on livelihood and culture of the Sundarban communities.

### About the Author(s)

**Bateswar Das** is currently pursuing M.Sc. Disaster Management. He graduated from Jadavpur University with a B.Sc. in Geography. He used to write in the sector of development policies and socio-political, environmental aspects. He worked voluntarily in North Dinajpur (West Bengal) flood, 2017 and CoViD-19 pandemic situation in 2020. Das also published a reportage on Dams on Kulik River and Flooding in Raiganj, North Dinajpur in a magazine called 'Icarus'. He has worked during the Assam Floods for socio-economic assessment in Murgaboni tribal village, Birbhum.

**Meghna Guha** is currently pursuing M.Sc. Disaster Management. She graduated from University of Calcutta with a B.Sc. in Geography. She did an internship on 'Fire and Thermal anomalies in West Bengal', under the Department of Environment, Government of West Bengal. Her area of interest rests in the connection between development aspects and disasters. She has worked on the impact of CoViD-19 in Kolkata, flood situation in Assam and in assessing the socio-economic conditions of Rinchenpong village, Sikkim.

## THEME: WATER GOVERNANCE: SECURITY AND PROTECTION

### Transboundary governance of water and disasters: International Policies, laws and practices

*Janki Andharia  
Lavanya Shanbhogue Arvind*

The world's transboundary river basins link countries in a common future. They support the socio-economic development and well-being of humanity and are home to a high proportion of the world's biodiversity. River basins cross international borders and serve as a primary source of freshwater for approximately 40 % of the world's population. These basins are home to over 70 % of the world's population and supply water for roughly 60 % of global food production. About 30–50 % of the world's population depend on groundwater source from 608 transboundary aquifer systems (IGRAC and UNESCO-IHP 2015).

**Colonial legacy, approach to rivers:** The political calculations of capitalism combined with the colonial and post- colonial legacy that privileges structural measures- or “engineering fixes” on rivers for irrigation and creation of hydro-powers, need attention. The idea that livelihoods of the poor, their food security are reliant on ecosystem services is often missing in policies and laws that regulate waters and aquifers without adequately locating the needs of the most vulnerable or marginalized communities.

**Confronting the heterogeneity of actors, geopolitical risks:** Simultaneously, it is observed that international water disputes witness greater complexities and sometimes can turn into geopolitical risks. As water actors become heterogeneous, transboundary water governance goes beyond water diplomacy involving governments. It extends to include other non-state actors and large corporations who are often legal entities in their own right. How are policy processes shaped by different actors' interests, strategies, and access to resources within multiple governance levels and domains, needs reflection and analysis. However, equitable water sharing arrangements may also serve as a catalyst for peace. Peace initiatives concerning water can thus facilitate robust water diplomacy. Institutionalizing people-to-people ties amongst this diverse and heterogeneous group can enable harmony in water regions.

**Climate Change & Water Governance:** Climate change impacts have direct consequences for water and its management. Thus, water governance must make judicious provisions for climate change impacts. A modern and futuristic approach to water governance that takes into account imminent and impending hydrological threats is the need of the hour.

**Workings of capitalism:** As neoliberalism takes newer forms, capital seeks new terrains for profitable investment as argued by Naomi Klein in her book *The Shock Doctrine: Disaster Capitalism*. How then do power asymmetries influence inequitable outcomes among riparian communities, the ones that are most vulnerable and most dependent on water for survival? Water risks are diverse and varied and therefore water responsibilities must be shared through

prolonged and sustained cooperation between communities, regions and nations that share common water resources. It is in this context that community-led cross-border sharing of resources assume significance. A nation's sovereignty is intrinsically embedded in questions of resources shared across the border. This brings into question water rights of communities settled along national borders. What then would be the role of the international community in responding to such rights? The paper will discuss these aspects.

**Risk informed transboundary approach:** The paper argues that transboundary governance, therefore, must integrate an iterative risk-informed approach that identifies and mitigates water risks at all stages of policy planning and implementation while being cognizant of the roles of water users and water actors in the region. An analysis of risk fitted into transboundary water governance will strengthen community resilience and positively contribute to building adaptive capacities of the community in a changing world. Further, it will serve as a tool to alleviate the woes of the water poor.

Unbridled pursuit of environmentally insensitive, water-wasteful mining and agricultural practices, exploitative industrial practices have brought us to the sixth mass extinction. These, combined with the newer challenges of global climate change, has defined the “water challenge” of the twenty-first century. We are also clear that developments in water sciences and engineering alone have not delivered adequately to engage this challenge, and there is a strong need to consider the social dynamics, culture and heritage issues towards more holistic and solutions- which combines local knowledge and scientific advancements in hydrology and biodiversity and also addresses diverse transboundary challenges.

### About the Author(s)

**Professor Janki Andharia** is the Dean, School of Disaster Studies at TISS, Mumbai. Her areas of work focus on gender issues, environmental concerns, social planning and participatory development, addressing diverse forms of marginalization and vulnerability. Possessing a doctoral degree from the School of Environmental Sciences from University of East Anglia, Norwich, UK, she has over 37 years of experience in the field of social development and community organization. She has participated in over 20 national disaster response activities and has worked closely in the area of post disaster relief and rehabilitation.

Her current research work focuses on policy accountability to ‘at-risk’ population. Prof. Andharia's recent book on “Disaster Studies: Exploring Intersectionalities in Disaster Discourse” published in 2020 by Springer, Nature, is gaining wide readership.

Professor Andharia was accorded the “Best Professor in Disaster Management Award”, by National Education Leadership Awards, of Lokmat in 2014. This was in recognition of the critical leadership she provided to the establishment of a multidisciplinary Centre for Disaster Management which introduced a new Masters programme in the subject in 2007 focusing on concerns of social and environmental justice. Prof. Andharia is also the recipient of an award for outstanding contribution to education at the World Education Congress Global Awards for Excellence in Education, Leadership and Teaching, held in 2015 at Mumbai. She has also successfully led several international missions to forge collaborations between TISS and other

Universities and offered special lectures. Prominent among these is – a partnership with the International Federation of the Red Cross and Red Crescent Societies, Geneva which now offers an on-line Certificate course in disaster management with participants from over 90 countries enrolling for this course. Professor Andharia serves on the Board of several organizations.

### About the Author(s)

**Lavanya Shabhogue Arvind** teaches at the Centre for Disasters and Development, Jamsetji Tata School of Disaster Studies, Tata Institute of Social Sciences, Mumbai. Her research interests are in the areas of gender and development, gender in disaster settings, sustainability, vulnerabilities in the context of disaster risk reduction, social exclusion & social protection, and gender & climate change.

She has Master's degrees in Women's Studies, Business Administration and Fine Arts. She has also completed an M.Phil in Women's Studies and is currently pursuing her PhD in Women's Studies from the Advanced Centre for Women's Studies, Tata Institute of Social Sciences, Mumbai.

She was awarded the Best Student Prize and the Institute Gold Medal for academic performance in M.A in Women's Studies by TISS. She has published academic papers in reputed journals and presented papers in both national and international conferences. Most recently, she has published a paper on "Gender in Disaster Settings" in the United Nation Encyclopaedia for Sustainable Development Goals. She was awarded the Dr. Avabai Wadia & Dr. Khurshedji Wadia Fellowship for Archival Research by Research Centre for Women's Studies, SNDT Women's University, Mumbai. She has also been awarded the Writers in Immersion and Cultural Exchange (WrICE) Fellowship by Royal Melbourne Institute of Technology (RMIT University), Melbourne, Australia.

Additionally, she is the winner of the Commonwealth Short Story Special Prize (2011). Her writings have been published in both Indian and International presses. She also writes creatively and is a published novelist.

## Riparian Communities on Peace Over Conflict- In Relation to Transboundary Water Governance

*Abhisikha Das*

Water has been an integral paradigm for our civilization to even exist. There has been an amalgamation of culture, introduction to livelihoods and the notion of existence per se.

Historically, water has been a medium of communication and transport for many communities residing on the banks of the water basins for exchange of economy and building the same. This medium has brought inclusivity, adaptability, governance and also uncalled variation on advantages of control on one nation over another.

In South Asia alone, there are 3 major river basins- the Ganges, the Indus and the Brahmaputra. The Brahmaputra and the Ganga connect countries like China, Bhutan, India, Nepal and Bangladesh; whereas the Indus shares borders between China, Afghanistan, India and Pakistan. This brings us to the transboundary water governance system for solidarities and keeping peace over water conflicts.

The paper will start with an introduction to these major river basins, continuing with the riparian communities living on the either side of the nation inclusive of their conflicts and how these riparian communities are managing and accelerating their reliance through community governance and collective efforts. The South Asian transboundary issues have been linked to these nations' geopolitics, undefined power over unequal size of the countries which has rendered them in a state of conflict for more than six decades. The paper will focus on the lens of livelihoods carried out by the riparian communities in the mentioned river basins. This paper will be highlighting the aspects of risks, impacts, management of natural resources, sustainability and how communities use their rational and traditional knowledge to overcome challenges of floods and failure of governance especially in India and Bangladesh. The paper continues with the utilities of power resting on youth and women of these riparian communities to rise for equity, justice and water rights to manage better the critical transboundary water governance.

The paper will conclude on the grounds of how risk informed transboundary water governance is important for riparian communities to elevate their lives and well-being. In this section, innovation in frameworks will continue with consideration to manifest active participation of government, treaty and local community to aid on holistic advantages.

### About the Author(s)

**Abhisikha Das** is a postgraduate in Social Work with specialization in Livelihoods and Social Entrepreneurship, from Tata Institute of Social Sciences (TISS), Guwahati. She hails from Assam. Her interest rests in sharing the mission of contributing her experiences working in the social development sector and making use of the learning to welcome the chance of contributing to the success of the defined mission of social development. Currently, she is working as a Livelihood Expert in Haritika organization, executing water-related projects.

## Approaching Trans-Boundary Perspectives on Water in South Asia from a Security Perspective

*Nitin Sathe*

Water – an absolute requirement for life and diminishing in availability – is poised to become the next cause for global conflict. In world geopolitics today, it can safely be considered the ‘centre of gravity’. From being a source of life, water has increasingly displayed its fury as the destroyer in recent times, especially when climate change and global warming have unleashed a number of water-driven natural calamities. These water-centric calamities – floods, tsunami, droughts or famines – and water-borne diseases, account for the maximum number of casualties and losses, especially in the third world.

As online communication and speed of travel shrink the world, boundaries are blurred – a small occurrence anywhere travels at lightning speed leading to catastrophic consequences across borders. Since water, like air, is not restricted by political boundaries, it links nations connected through water bodies more visibly and innately than anything else. While laws governing seas and their use have evolved over time, those defining the use of other water bodies – glaciers, rivers, lakes or springs – stretching across frontiers are archaic, to say the least.

In the process of evaluating trans-boundary challenges faced by governments and governance around water, we need to understand the existing relationships between nations/states and carry out a threat/risk evaluation. This will give us a fair idea of how one nation will treat the other in all inter-boundary aspects. Deeper understanding of cross-border ‘attitudes’ and relationships will make for better comprehension and prediction of how laws, policies, judgements and actions by governments would pan out in future.

As an Air Force Officer, I would present an ‘environment scan’ of South Asia through the lens of the complex and shifting idea of “boundaries” from a security perspective of a nation and how they shape international relationships. The aim is to improve understanding of cross-border security issues linked to water and create better cross-border dialogues around the key water challenges at hand. This perspective will also inform future laws, policies and practices around cross-border political discourses.

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Air Commodore **Nitin Sathe** is a helicopter pilot of the Indian Air Force with 36 years of commissioned service to his credit. During his career, he has been a part of many life-threatening and life-saving missions, both in India and abroad. He has flown almost all the helicopters on the IAF inventory and has a total of 5500 hours of flying experience. Sathe is presently posted as the Senior Instructor at the Defence Services Staff College at Wellington (Nilgiris) where he is in-charge of training of more than 500 middle level seniority officers of the three services, paramilitary, administrative services and also officers from friendly foreign countries. He is also the author of several well acclaimed books.

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## Living with Uncertainties: Life, Livelihood and Location in an Inter-state Border

*Hasan Momin  
Gorky Chakraborty*

A text bookish understanding on 'land' often suggests that it 'lies outside the terra firma', i.e. what is not water is land. A binary is therefore inevitably thrust between land and water. In such a scenario, one wonders what has been behind the thought process of ascribing e.g. Bengal as a 'riverine land'? Is it a reflection of a hiatus in conceptual understanding of land and water in Anglo-Saxon vis-à-vis South Asian knowledge systems? Or, a difference too, in methodological understanding between positivist and heterodox systems of knowledge production?

In other words, land and water, if not looked through a prism of water tight compartments may help us to analyze the continuity between land and water beyond a binary framework. As impermanence of both land and water is accompanied by a continuous transformation between them, lived experiences of people and communities inhabiting such milieus become interesting and challenging as well. Above all, if such shifting lands lay among flowing waters as a border between two states, the situation gets further complicated. The paper discusses a similar scenario of impermanent land and changing water course, as markers of state boundaries between Jharkhand and West Bengal.

It is understood that river channel migration is a natural process in the life span of a river as it evolves over time. It naturally influences life of people inhabiting these areas. Under such circumstances, if the river (Ganga) also happens to be the border between these two states, what uncertainties emerge in terms of transboundary relationship between governments, governance and the 'governed'? The paper discusses such a scenario of a shifting riparian boundary between Jharkhand and West Bengal, the lived realities of the people inhabiting such spaces. The critical aspects of life, livelihood and location are discussed in analyzing such a changing border.

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## Making of the Brahmaputra: Its Conflicts, Dynamics and Geopolitical Status in Relation to its Riverine Communities

*Rituparna Choudhury*

The Brahmaputra, better known as the Tsangpo in Tibet has its own significance in the making of the geopolitical consciousness of Northeast India. It is recognised as one of the longest and biggest river bodies in South Asia, a region which is an abode to many ethnic and religious groups. The river, having shared its course with several political boundaries and contributed to the formation of the region, has also however been the source of conflicts and tensions and also contributed to the development of community relations across its beds.

This paper will try to understand the making of the river by focusing on people's/ communities' engagement in the process of meaning-making of the same where water-sharing and identity making is of great concern (data will be tried to be drawn from secondary literature mostly but open to possibilities of engaging in primary data collection through different stakeholders like riverine communities, civil society etc.) For primary data collection purpose, interviews and focus group discussions will be considered to be conducted to gain rich narratives and first-hand information for compilation of the concerned paper.

### About the Author(s)

**Rituparna Choudhury** is a postgraduate in Sociology with a Gold Medal from Tezpur University (2018). She is a graduate in Social Sciences with a Bronze Medal from Tata Institute of Social Sciences (TISS) Guwahati (2016). She has worked with organisations like SEWA Bharat Delhi (Communications Intern), Krishna Kanta Handiqui State Open University (Content Writer, Self-Learning Materials), Tezpur University Centre for Open and Distance Learning (Author, Self-Learning Materials), The 4th Wheel (Research Associate), C4ED (Field Research Assistant), Gauhati University (Guest Faculty) and Kaziranga University (Assistant Professor). Her career highlights also include the fact that she is a NET Awardee (2017 and 2019) and also a Zubaan Sasakawa Fellow (2018). Her writings have been published as Book Chapters as several Self Learning Materials (KKSHOU and TU-CODL) and also journal publication (Eclectic Northeast, October 2019). Also, she has publications over online platforms like Eleventh Column, Countercurrents.Org, and Centre for Economic, Strategic and Political Discourse. Currently she has joined Borthakur's IAS Academy as Education Counsellor. Her work will include handling overall students' issues that come within the purview of the institution concerned.

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## Pandai: Small Rivers, Riparian Rights and Transboundary Conflict

*Jacquleen Joseph  
Shobhit Chepe*

India shares about 1850 km of its border with Nepal, out of which 640 km is marked by rivers. And then there are also rivers that do not define the border but cut across it from Nepal into India. The Mahakali/Sharda, Ghagra, Gandak, Bagmati, Kamla, Kosi and Mahananda are few among the larger rivers. Three of these – the Kosi, the Gandak and the Mahakali are currently governed by agreements between the countries. However, there are numerous smaller rivers and streams that flow between Nepal and India, which are not governed by any agreements between the countries. These rivers form the backbone of the local economies at the border. Pandai is one such river. A tributary of the BurhiGandak, it marks a small part of the India-Nepal border at BhikhnaThori in India/Thori in Nepal. It is this river that is the major source of water for all purposes because the local terrain is rocky and groundwater extraction is difficult and expensive. The rocky terrain makes the region prone to water scarcity. The Pandai is also a source of woe it carries the threat of flash floods and riverbank erosion with it. The threat can be attributed to natural factors such as geography as well as anthropogenic activities.

The water of the Pandai has been shared through a traditional system of distribution in the past. But this system now faces a breakdown as the demography of the border villages is changing and the system is no longer able to cope with the pressures. Over the last two decades or so, a conflict has erupted over the Pandai. Both upstream and downstream residents have been trying to assert their riparian rights over the river. Upstream in Nepal, the residents claim territorial sovereignty over water while downstream in India, the residents claim territorial sovereignty. Using their claim to riparian rights, the upstream villages have started to divert the streams of the Pandai for their own use. This leaves the residents of BhikhnaThori and beyond with a diminished flow of the Pandai. So much so that the river just trickles down the stony bed. And although the BhikhnaThori residents do not wholly contest the riparian rights of their upstream neighbours, they lament the decline of the traditional sharing arrangements. Coupled with the water scarcity during summers, the breakdown of the historical arrangement (and subsequent diversion of water upstream) becomes a double whammy for the BhikhnaThori citizens. The population pressures and the resultant divergence in beliefs on riparian rights have triggered the collapse of the local water-sharing arrangement, which point towards the need for the inclusion of rivers like Pandai in transboundary negotiations between India and its neighbours.

### About the Author(s)

**Jacquleen Joseph** is a professor at the Jamsetji Tata School of Disaster Studies (JTSDS) in Tata Institute of Social Sciences (TISS), Mumbai where she also served as the founding dean of the school from 2015-17. She has an MPhil and PhD in Psychiatric Social Work from the National Institute of Mental Health and Neuroscience (NIMHANS), Bangalore. Her research, field action and teaching at the school are around Psychosocial Care and Support in Disaster

and Humanitarian Contexts. The Indian Ocean Tsunami (2004), Mumbai Terror Attack (2008), AMRI hospital fire (2011), and Nepal Earthquake (2015) are some of the recent disasters where she continues long term engagement through research and field action in the psychosocial domain. Her other areas of interest and work focus on quality institutional care for children, disaster resilience leadership, civic engagement, tobacco cessation interventions, measurement, indices, disaster risk, vulnerability and recovery. She is also a member of the Maharashtra State Disaster Management Authority since 2015.

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## THEME: TAKING TECHNOLOGY TO THE COMMUNITIES

### **Citizen Science Approaches in Transboundary Early Warning Systems: Is Technology the Sole Determinant of Effectiveness in South Asian Milieu?**

*Pankaj Anand  
Animesh Prakash*

With abrupt and erratic weather patterns as the new normal, disasters are becoming unmanageable. The monsoon floods of 2019 has engulfed as many as nine states at the end of August month. The reported human casualties, thus, are alarmingly high. Talking of floods, India accounts for one-fifth of global deaths. This situation warrants adoption of the principles of “zero casualties” deep within the system.

The need of the hour is a much stronger adoption of two critical elements of prevention and mitigation within the disaster management framework. This calls for innovative approaches in disaster management establishing a continuum in entire spectrum from humanitarian response to disaster prevention and mitigation.

Examining the state of flood forecasts and the loss of human lives. Between 1986 and 2008, India relayed 145349 flood forecasts with 95.35 percent accuracy. During the same period at least 34674 human casualties were reported in floods. Poor early warning dissemination is attributed as one of the major reasons for high casualties in disasters. The evolution of systems for dissemination of early warning to the local communities has not kept pace with the development of forecast technologies.

Oxfam India’s 2015 early warning gap assessment highlights that, the ‘last mile’ connectivity to the ‘at risk’ communities still largely depends upon manual systems. On the side of community, the trust on accuracy of EW messages and the time of warning dissemination plays a critical role as well. The experiences of exclusion of the marginalized social groups plays a role in the reluctance of such social groups to evacuate leaving the already meagre livelihood assets that they possess. The fear among the least possessed of getting further dispossessed also play a role in rendering EW messages ineffective. Technology is an important determinant of EW systems but the less acknowledged socio-economic factors too are important determinants in the success of early warning efforts.

This paper talks about Oxfam India’s learning from implementing citizen science approaches in early warning systems on Transboundary rivers between India-Bhutan and India-Nepal. The model draws from Cultural Sustainability Framework of Agenda 21 and builds on a premise that culture that connects transboundary communities together and therefore citizen science approaches in Transboundary Early Warning Systems can be built on the foundations of strong people to people ties. Paper draws learnings from the EWS systems developed by Oxfam India and its partners on transboundary rivers of Saralbhangha on Indo-Bhutan borders and Sharda

on India-Nepal border. The paper discusses alternative models including CSO cooperation frameworks contributing towards effectiveness of end to end early warning system.

### **About the Author(s)**

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## Application of ICT in Addressing Trans-Boundary Water Related Challenges Affecting Public Health

*Nelly Saiti*

South Asian populations as well as others in the world grow towards useful natural resources mostly surrounding water. Currently the pressure exerted on these resources remains a challenge for people, their generations to come and for the environment. Some of the currently existing challenges include: scarcity and overuse of water for drinking and agricultural purposes; inequitable access to water by all; over-exploitation and fast depletion of groundwater; vulnerability to frequent environmental hazards such as floods, impact on climate changes; and, pollution and contamination of surface water resources. These challenges directly affect health resulting in high incidence of diseases and deaths. Most discussions about Trans-boundary water challenges focus on the impacts it has on the political, social and economic environment in general and little is mentioned about the immediate innovative solutions to health for beneficiaries. The vision of UHC is that all people can obtain the quality health services they need. It is also an essential part of the Sustainable Development Goals (SGDs), to ensure access to quality essential health care services for all. It is evident that the use of ICT is fundamental in Trans-boundary water cooperation and is currently adopted in water resource management to improve water availability, efficiency, accessibility and sustainability. The adoption of ICT in addressing the impact of Trans-boundary water challenges on health will provide effective solutions and as such a positive move towards achieving Universal Health Care. This paper uses desktop reviews to analyse effects of these challenges on health and the application of ICT in addressing them to achieve universal health coverage. It provides evidence-based recommendations for adopting ICT strategies in areas within these waters to address health concerns. Among the notable challenges include the high morbidity and mortality rates emanating from pollution and water related diseases. ICT applications include: mobile application software developed to strengthen community engagement and dialogue to handle their health related needs and provide timely feedback, developed databases of diseases among the inhabitants and linking these diseases to possible trans-boundary water related causes, creating monitoring tool for immigrants coming from a region with a possible disease outbreak and generating alert messages in the event of rising levels of pollution and outbreaks in the region. Intensify use of social media to facilitate awareness campaigns on impact of trans-boundary activities on health and adoption of open source applications to enhance sharing of solutions that address negative impact of trans-boundary waters on health.

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**Nelly Saiti** is a Kenyatta University Master's in Health Management Alumni, currently working for Kenya Red Cross in one of the largest refugee camps in the world, "Dadaab Refugee Camp". She is known for her work as a public health specialist with a passion in humanitarian work having contributed in NGO innovations to include among others: Focal person for recycling project of wastes generated from relief aid plastic products, creating disease surveillance databases of immigrants and analysing data to inform decisions. She is actively involved in flood and drought response missions in the North Eastern region of Kenya.

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## Citizen Science Water Observatories for Trans-Boundary Water Cooperation: Mahakali, Asia

*Rajan Subedi*

### Introduction

Riparian communities applied citizen science water observatories approach in Mahakali basin and generated evidences on water pollution, decreasing water level and water scarcity status. These data are used for the effective dialogues that helped in decision making among the communities and local government of Nepal and India.

### Intro and objectives

The analysis of transboundary water cooperation in the Mahakali basin (a shared basin between Nepal and India, Asia) through Water Cooperation Quotient (Strategic Foresight Group, 2015) shows satisfactory level of cooperation (58%) however riverine communities faced challenges of the flood, water scarcity, water pollution. The tenth Water Cooperation Quotient indicator, “cooperation mechanisms are functioning with active participation from the riparian’s,” scored less score though there are few examples of their involvement. In this situation, the research was conducted to understand the importance of the citizen science approach in transboundary cooperation.

### Methodology and approach

The study was conducted in the Mahakali basin to understand the importance of citizen science approach in transboundary cooperation. The same basin is taken as the research site to understand its application. The time frame of three-year project period was taken to understand the effectiveness of citizen water observatories in transboundary water cooperation. The major analysis of 10 Mahakali dialogues, 30 lobby meetings, 1030 reflect class were studied including key informant interviews, field observations and focus group discussions. The effectiveness of knowledge production by riverain communities in decision making was observed to understand the importance of citizen science water observatories in transboundary water cooperation.

### Analysis and Results

The analysis of the data before and after the application of citizen science water observatories trough TROSA project in Mahakali basin provided evidence of the significant contribution of citizen science in water cooperation. Riverine communities were able to generate data on water pollution, flood situation, sand mining, fisheries and solid waste easily despite its so-called sensitivity. These data were referred in lobby meetings with the local governments. Such lobbies with evidence helped to support the local government for developing sand mining guidelines, fish management guideline and created pressure on local governments to share early warnings information’s.

There were more than 50 directly related research conducted in the Mahakali basin in the research period however communities were unaware in the absence of access and language barrier. The dialogue conducted without evidences were not successful in effective decision making. The research showed the significant contribution of citizen water observatories in

Water Cooperation Quotient (WCQ) increasing the value to 76% (increase by 185 compared to previous). The significant contribution resulted from effective dialogue with the use of evidence generated by riverine communities.

### Conclusions and recommendations

The study shows Transboundary cooperation is mostly state-level cooperation and communities are less considered. Even considered for a few meetings, these communities were not able to share their problems in the meeting in the absence of evidence. Citizen science water observatories approach applied in the Mahakali basin has helped for effective dialogues, and lobby meeting between the communities and local governments of Mahakali basin.

The application of citizen science water observatories in any basin provides a platform for riverine communities to interact and develop a joint action plan based on their findings and helps in decision making. It increases the overall WCQ leading to increase in cooperation.

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**Rajan Subedi** is leading as a River Basin Manager in Asia for USD 20 million Transboundary Rivers of South Asia (Nepal, India, Bhutan Bangladesh, and Myanmar) project (2017-2022). Closely working with Federal, provincial and local government of Nepal, and India, private sectors, Academia, Civil Society focus on risk reduction, resilience to natural hazards, humanitarian emergencies, transboundary water governance, Monitoring, Evaluation and Accountability fully meeting the compliance procedures. He worked cross diverse team on Post Earthquake Reconstruction Projects (GBP 24 million), Building Resilience and Climate Adaptive Planning in Urban Centres of Nepal (GBP 5 million), Disaster Risk Management and Humanitarian Preparedness Project of Nepal (GBP 2 million): Safe water for pro-poor communities of Terai (GBP 2 million), Covid-19 response on Hygiene Behaviour Change Collision (GBP 1.9 million).

He was instrumental in fundraising (USD more than 50 million) as a consortium in partnership with Care, Mission East, Mercy Corps, WHO, ICIMOD, WWF, UNICEF, PEI, Oxfam Affiliates, Academia, private sectors, local NGOs of South Asia with diverse donors.

Further, he also contributed to the formation of Model Strategy for Resilience Local Communities (MSRLC)- 2016/17, Core working member to revise LDCRP for Government of Nepal, DRR Toolkits, Emergency WASH preparedness plan of Hub hospital, Disaster Preparedness and Response Plan and Local Humanitarian Leadership plan. Also, led Humanitarian sector, local humanitarian capacity development, Cash for work, Cash Voucher Assistance, Child Protection, Safeguarding, risk program planning. His key competencies include project management, fundraising, technical knowledge on DRR and resilience acquired through 10 years of professional experience handling multicultural, multisectoral, and multi-country program and master's degree in Environmental science.

## Understanding the Flood Early Warning System: A Case Study of Trans-Boundary Water Governance of Gandak Basin

*Shams Tabrez*

Flood is one of the most widespread and common disasters in the world. It is caused by natural factors and as well as by human factors. (Tingsanchali, 2012) . Climate change, tsunami, cloud bursting, poor river management, silting of the river, etc. are the causes of flooding and its impacts heavily on the lives and economies of the affected region. (Mirumachi, 2015) .

South Asian region during the three decades period of 1976-2005, 943 natural disasters were reported out of which one-third were caused by floods, primarily in the Indus, Ganges, and Brahmaputra basins. People killed annually by floods in this region. Experience shows that there are problems such as lack of information and proper dissemination system etc.

In this paper my case study at Gandak, which is the most devastating rivers in Indo-Nepal region. Most of the master drain river originates from the Himalayas and Gandak also flows from Nepal. Gandak is a transboundary river which has to face issues like political tensions, economic development and power of decision making have stressed the trans-boundary issues between India and Nepal.

Over the period of time flood risk reduction concentrated on the construction of embankments and retention by reservoirs. But attempt to decrease the vulnerability has given minor importance. Early Warning System should be people-centric as mentioned on the Hyogo framework. Flood Early Warning System has evolved significantly but the warnings still fail to disseminate or fail to reach the communities. Being a transboundary river, it has to deal with various transboundary conflict, as lack of coordination seen between India and Nepal while disseminating the information.

In this paper, it gives information about how information is shared between Indo- Nepal and further how this information reaches to the ground level on which there is exploration the interface between formal and informal early warning system and identified various strategies for improving the systems which are existed by reviewing the policy document signed between India and Nepal.

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Shams Tabrez holds a Master's degree in Disaster Management from Tata Institute of Social Sciences (TISS), Mumbai with specialization in Disaster Policy and Action. His research involves exploring flood early warning system in Transboundary Water Governance at Gandak River Basin. Recently, he presented a paper on National Conference cum workshop on Disaster Management and Climate Change: Perspectives from India's North East. He has also done BA in Geography from Jamia Milia Islamia, New Delhi.

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