

Samir Saran | Sonali Mitra | Sarah Hasan

June 2014

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# Attitudes towards Water in India



Observer  
Research  
Foundation



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By

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# Achnowledgments

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The Attitudes towards Water report is a culmination of 165 qualitative interviews of key stakeholders of the water scene in India under a collaborative research project between the Observer Research Foundation, India and Chatham House, United Kingdom. The project was part of a larger research initiative carried out by partner organizations in four other countries of South Asia, namely the Bangladesh Enterprise Institute, the Nepal Economic Forum, the Peace Training and Research Organization (Afghanistan) and the Jinnah Institute (Pakistan). The four organizations were responsible for conducting research on perceptions towards key domestic and transnational water issues in their respective countries, in keeping with the broader research objectives of the project.

The Observer Research Foundation would like to thank the Department for International, United Kingdom for its generous financial support for this project and Chatham House for the comments on draft versions of this report. Special thanks to Izabella Koziell and Tom George for their support. We are also thankful to all those people who gave their time to be interviewed. This report draws on their views and insights. Above all, the Observer Research Foundation would like to thank Gareth Price, Senior Research Fellow, Asia Programme, Chatham House for his considerable expertise and encouragement towards the completion of this project.

## Acronyms and Abbreviations

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CGWB	Central Ground Water Board
CWC	Central Water Commission
ERM	Environmental Resources Management
FAO	Food and Agriculture Organization of the United Nations
IWT	Indus Water Treaty
MoEF	Ministry of Environment and Forests
MoWR	Ministry of Water Resources
NGRBA	National Ganga River Basin Authority
NRLP	National River Linking Project
NWP	National Water Policy



## Executive Summary and Recommendations

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**T**he water debate in India has increasingly become a contested and inchoate space. Disputes are extant between India and its riparians, among its internal provinces and competitive claims on water usage abound from different sectors namely, industries, farmers and household consumers. Millions of people are also facing growing water stress<sup>1</sup> as a result of over-exploitation, population growth, changing climatic conditions and the rapid pace of urbanization in the country. But even as the lack of access to water remains a pressing issue, one which holds the power to sway the electoral fortunes of governments, a coherent 'water approach' and a remedial action plan are yet to emerge in the policy narratives of India.

Within the larger water discourse in South Asia, there is no sense of a common 'water vision' informed by shared challenges of countries in the region. In fact, heightened attention is being placed on the subject of 'water wars' wherein conflict over water is being touted as the next imminent threat to peace and cooperation.<sup>2</sup> Such a view, although far from widely accepted, has managed to gain traction, in part due to the 'emotive' appeal of water in the subcontinent and the myriad communal, religious and nationalist associations attached to it in each country and in part due to the zero sum proposition that has framed water sharing between riparians thus far.

In such a scenario, understanding the water conversations prevalent in individual countries of South Asia and their unique perceptions towards water is the crucial first step in understanding how water is managed, distributed, and negotiated over. Should water be treated purely as a commodity, a human right or a zero-sum proposition? For these questions to be answered, it is important to anatomize the manner in which attitudes towards water have a bearing on policy outcomes. For a country like India and its complex nature of water demand, perceptions are important for getting at the root of its numerous problems of water governance and, in turn, addressing them in a mindful, efficient and cooperative way.

This was the aim of the Attitudes towards Water project undertaken by the Observer Research Foundation in collaboration with Chatham House, United Kingdom. The report is the outcome of this research, based on 165 extensive interviews conducted with key stakeholders of the water scene in India, i.e. Government Officials including Secretaries, Advisors from several Ministries of the Government of India, Ambassadors and Diplomats, Personnel from Governmental Water Resource Management Organizations, researchers, academics and NGO employees/experts on water. The research was conducted with a view to study the key drivers, incentives and traditional nodes of influence that shape the policy process and public discourse around water management in India.

Since similar research exercises were conducted by partner organizations in Nepal, Pakistan,

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1. Upali A. Amarasinghe, Peter G. McCornick and Tushaar Shah, "India's Water Demand from 2025 and 2050 : A Fresh Look", International Water Management Institute Research Report 123 (CGIAR, 2006)
  2. Brahma Chellaney, *Water : Asia's Next Battleground* (Washington, DC., Georgetown University Press (September 2013), 1.

Afghanistan and Bangladesh, a vital aim of this report is to reframe the opportunities for constructive debate on India's transboundary matters, based on differing approaches towards water in the subcontinent. It is important to emphasise that differences and schisms in transnational water perspectives need not be viewed in wholly negative terms and may in fact contain the answer to transboundary collaboration in the region. Unique perceptions and knowledge systems (real or imagined) regarding weather variability, climate change, agricultural practices, migration and urbanization abound in the region that can be combined to enrich the water vision of each country and collectively into a common 'South Asian approach'.

The research managed to yield vital insights into effective governance strategies of water within the country and with riparians. For instance, the competing paradigmatic understandings of water- common pool resource, unit of basin, unit of state, human right, economic good- creates water priorities that remain unclear and devoid of a 'domestic water vision'. A strong water governance approach that takes into account the several interconnected linkages of water: food-water-energy and accommodates its definitional challenges was deemed paramount.

The research also revealed water shortages and scarcity as conditions created by domestic mismanagement, rather than actions of upstream countries, a conclusion that could significantly lower the threat perception induced by India among its neighbours and have a transformative impact on transboundary relationships in the

region. Another effective way of broadening the framework for transboundary engagement from the narrow focus on water security would be to highlight shared challenges of demographic growth and urban expansion and their impact on water demand, specifically in the case of India and Pakistan. Threat perceptions could be further dismantled with confidence building measures such as data-sharing and civil society exchanges based on common water issues such as floods and droughts and baseline practices of local water management that would help foster a sense of shared ownership. Given these suggestions, the scope for cooperation in South Asia seems to be wide and the potential for leveraging innovative methods for efficient domestic management, immense. Recommendations based on the findings of the study are given below.

### **Recommendations:**

#### **1. Devise a strong water-management approach**

- Focus on better coordination between relevant ministries dealing with water management, such as Ministry of Power, Ministry of Environment and Forests (MoEF), and Ministry of Agriculture in order to tackle water governance in a multi pronged way.
- Emphasize the food-water-energy nexus to ensure a holistic approach to water.
- Strengthen the decision making capabilities of panchayat bodies in rural areas to address the centre-periphery gap.

- Consolidate the powers of the Centre towards matters of provincial water governance, for instance, adjudication and resolution of water disputes between different states
2. **Increase water efficiency**
    - Encourage agricultural practices that are water efficient via means such as pricing
    - Incentivize the usage of less water intensive crops
    - Promote cost-efficient irrigation technologies
    - Incorporate methods such as rain-water harvesting and indigenous water storage modes into urban planning."Invest" in technologies for waste water reuse to boost supply
  3. **Consolidate water conservation measures**
    - Water pricing be administered as a way of curbing wastage of water. This would also foster the idea of water as a finite resource and an economic good, which is an effective, long term method of promoting water conservation.
    - Stringent water audits for industries to strengthen pre-existing environmental conservation laws
    - Community efforts that co-opt small-scale conservation methods be supported.
  4. **Mainstream gender concerns in water management**
    - Recognizing that water collection is usually carried out by women, improve the access to water in rural areas by ensuring better transport, roads and last mile connectivity
  5. **Follow a bottoms-up approach to water management**
    - Enhance legal, decision-making capacity of women with regards to resource planning in rural areas.
    - Integrate gender perspectives into the planning, implementation and evaluation of all nation-wide policies and practices related to water management
  5. **Follow a bottoms-up approach to water management**
    - Community participation must be strengthened, especially when it comes to micro-conservation techniques that are effective but not scalable. Their implementation requires community initiatives that can support mainstream government efforts.
    - Laws related to water and its conservation be made available in local languages to facilitate greater local involvement.
  6. **Improve quality and accessibility of data**
    - Real-life performance assessment data on dams and large-scale projects is critical. In particular data on individual water projects and their impact on the overall economic development be made available.
    - Supply data, which would entail proper metering records; basin data on rivulets, smaller rivers and data on industrial consumption be facilitated.

- Data-sharing be made the cornerstone of water diplomacy. Information on transboundary water bodies like aquifers, groundwater and rivers; and data on real-time flow of river be made more accurate and accessible.
- Data-sharing on floods be enhanced as a means of building basin-wide collaboration
- New assessment models which move beyond quantitative assessments, stringent economic principles and structural values.
- Integrated and multidisciplinary data be made available, in order to assess water issues not alongside with broader questions of socio-economic contexts, livelihood dependence, agriculture, land, ecology, effects of industrial expansion and climate change.
- Ensure broader access to technical data by using a discourse that is comprehensible to a wider population, in order to bridge the gap between technocracy, science and policy.
- Reduce transboundary threat perceptions by collaborating on areas such data-sharing, early warning systems for floods and droughts, joint hydropower projects, joint storage capacity, groundwater and aquifer mapping
- Ensure public access to data on transboundary water issues and existing treaties
- The capacity and networks of non-state actors be strengthened to supplement the negotiation process. Track II dialogues and more active cross-border collaboration of civil society organizations and academics involved in water issues be fostered to supplement intergovernmental efforts.

#### 7. Modify methods of transboundary water-sharing.

- Statist control over policy processes and negotiations in transboundary water dealings be reduced, to include the interests of multiple stakeholders from both sides of the border.
- The river basin, not the state, be made the center of water negotiations.
- Collaborations on shared water management interests such as watershed management be facilitated

# 1. Introduction and Overview

## Water Challenges in India

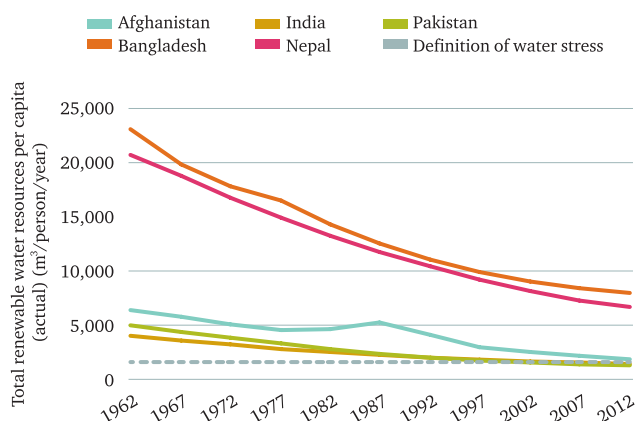
This section contains the dominant trends and perceptions that seem to have emerged in the Indian water narrative, drawing forth from the views of the interviewees. The next section will contain detailed responses to the questions asked under the headings of 'Domestic Water Challenges' and 'Transboundary Water Challenges'.

### Overview

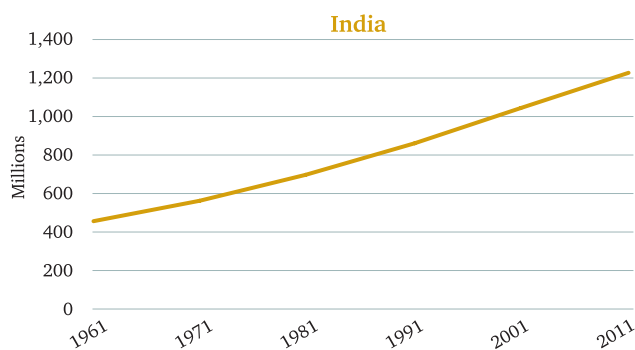
India possesses abundant water resources and a complex river system<sup>3</sup> comprised of the Himalayan rivers in the north i.e. the Ganga, Indus and Brahmaputra – which are perennial and glacier-fed, the rivers of the Peninsula like Narmada, Godavari, Krishna and Cauvery that are dependent on the monsoons, the coastal rivers on the west coast and rivers of the inland drainage basin in western Rajasthan. All of the major rivers of the country are inter-state in nature insofar as they originate in one state and flow through another state before reaching the sea. However in spite of this, India is fast projected to be reaching a 'water stressed' situation with its per capita availability of water at 1588 cubic meter per year ( $m^3/yr$ ) as against the international desired standard of  $1700 m^3/yr$  per capita for basic human needs. Interestingly, while the total utilizable potential of water resources in India is 1123 BCM, the present utilization is only 605 BCM indicating that while spatio-temporal factors might have contributed towards this state, the 'water stress' or scarcity could be man-made.

3. "India's Water Wealth," Water Resources Information System of India, [http://indiawris.nrsc.gov.in/wrpinfo/index.php?title=India%27s\\_Water\\_Wealth](http://indiawris.nrsc.gov.in/wrpinfo/index.php?title=India%27s_Water_Wealth)

## Falling per capita water availability



Source : FAO, Aquastat  
The line for water stress is defined as less than 1,700 cu m per year.

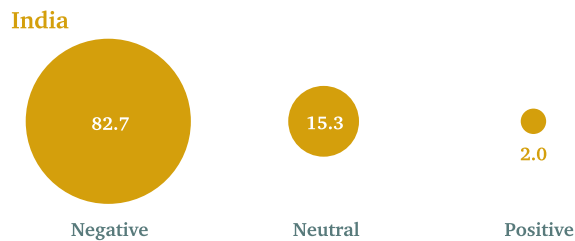


## Population growth since 1960

**Water Management:** The dominant view among water thinkers and specialists, recurring in this study, was that the water management paradigm as it exists in India has to be overhauled. Respondents were of the opinion that the total quantity of water in the last ten years has remained the water available in same, and it is in fact issues of accessibility, population pressure, failure to manage the competing demands of water and lack of water efficiency that have decreased the per capita availability of water.

In fact, views of interlocutors were overwhelmingly negative towards the current situation of water management and policies. 82.7% of the respondents were unhappy with water management and emphasised issues of misgovernance in India's water scene.

### How do you rate current water management?



Notably, respondents who were key decision-makers, government employees or policy experts displayed a clear awareness of the high priority water challenges for the country, and conceded that the gap between knowledge and implementation existed because of a lack of political will. The highest degree of criticism with regard to water management therefore came from within the government sector itself.

At the institutional level, respondents identified a lack of coordination and transparency among government organizations. 'Lack of political will' to implement projects was considered to be hugely detrimental in the sector. Differences of opinions between government officials and civil society respondents were striking- as highlighted in the latter sections - (especially those concerning issues of regional cooperation) in order to reach a balanced approach to water measures.

Water as enshrined in the Constitution of India, is a state subject, and except in cases of inter-state water disputes, is the responsibility of the state to plan, implement and manage water related projects.

While the apex body responsible for water management and planning is the Ministry of Water Resources (under which the Central Water Commission, the Central Groundwater Board and the National Water Development Agency provide technical support), it is the local government institutions such as municipalities and panchayats that are mandated to provide drinking water supply.<sup>4</sup> For ensuring water quality, the pollution control boards that operate under the ministry of environment and forests (both at the central and state levels) are responsible. This nature of unclear jurisdiction of water and the possibility of little coordination between the numerous bodies, with regards to management was duly highlighted.

**Inter-State Water Disputes:** Even in the case of the sharing of interstate rivers, a strong central water management approach was thought to be vital.. Because India is a federal democracy, and rivers cross state boundaries, disputes between states on river sharing have been a persistent phenomena since Independence.<sup>5</sup> There have been disputes between Delhi, Haryana and Uttar Pradesh over the use of the Yamuna river, there is a longstanding dispute between Karnataka and Tamil Nadu over the waters of the Cauvery and between Punjab and Haryana over sharing the Beas river. The lack of a balanced division of power between the centre and states when it comes to water management, it was believed, leads to problems such as protracted inter-state water conflicts, inequitable access to water across different states and unevenly administered methods of conservation. It was felt that, given the

4. Piyush Tiwari and Ajay Pandey, "Water: Policy and Performance for Sustainable Development," India Infrastructure Report (Oxford University Press, 2011).
5. Ramaswamy Iyer, "Resolving River Water Disputes in India : Reflections," in River Water Sharing- Transboundary Conflicts and Cooperation in India, ed. N. Shantha Mohan, Sailen Routray and N Sashikumar (New Delhi : Routledge, 2010), 66-81

regional, cultural and geographical variations in India, a method of management that is both centralized and takes into account the needs of each state needs to be evolved. Therefore, constructing efficient and equitable mechanisms for allocating river flows, has long been an important legal and constitutional issue.

Respondents commonly voiced the view that the water management methods need to be reshaped in a holistic way, by viewing water as intrinsic to food security, energy security, economic growth and social equality. Such a view of water would ensure that it receives immediate primacy in policy-making and no longer be seen as an abstract resource. It was also felt that this would also create better coordination between ministries connected to water, such as those of power, forest and agriculture and thereby strengthen water governance.

**Urbanization and the Changing Demand for Water:** The growing urban demand for water and its management was also emphasized in the findings. India is poised to face the largest urban expansion in the next fifty years- involving 497 million people. This will lead to a very different kind of demand and consumption patterns. The International Water Resource Management Institute (IWMI) estimates that the water demand in India will increase by 32% in 2050.

In order to meet this demand, there are two methods commonly available: demand side management and supply side management. Adaptive demand-side management strategies include regulating water for agrarian use, making water distribution across sectors more equitable, water pricing and restricting over extraction of groundwater.

Similarly, adaptive supply-side strategies can be designed to augment supply by building dams, increasing the volume of water that is transferred among basins. Respondents were of the opinion that demand-side management was a vital issue for the water scene in India, especially in a situation where only 85% of the urban population has access to drinking water<sup>6</sup> and rural areas considerably less so.

It was thought that the sectoral distribution of water was unreflective of the rise in urbanization. The nature of sectoral usage of water is relevant to understanding where the country's water priorities lie and how they can be managed better. The main share of water resources are consumed for agricultural purposes with 80%, followed by 7% for industry and 13% for domestic consumption.<sup>7</sup>

#### Water usage in India by agriculture, industry, households (2008)



Source: <http://www.fao.org/docrep/016/i2809e/i2809e.pdf>.  
Note: Figures for consumption data vary widely. Data on extraction from groundwater is scant. The comparative figures for Bangladesh, India, Nepal and Pakistan are sourced from the FAO for 2008. According to the Indian Ministry of Water Resources, agriculture accounts for roughly 80% of overall water consumption with domestic consumption using 13% and industry just 7%.

This indicates that water usage needs to be made more efficient across sectors and the urban demand

6. National Institute of Hydrology, Roorkee, India, "Drinking Water," Hydrology and Water Resources Information System for India, <http://www.nih.ernet.in/rbis/rbis.htm>  
7. Food and Agriculture Organization of the United Nations (FAO), "Water Resource Issues and Agriculture," FAO Corporate Document Repository <http://www.fao.org/docrep/003/t0800e/t0800e0a.htm>

for water needs to be adapted to. It was also widely felt by respondents that the 'Western Model' of water provision had failed and this had led to increased indigenous, off-grid storage methods and localised community initiatives to supplement governmental efforts. An inclusion of traditional, indigenous methods into the urban planning mould of cities, it was commonly thought, would lead to more sustainable usage of water.

**Gender and Water:** Mainstreaming gender concerns in water planning was seen as important challenge for India. Last mile connectivity and connectivity of rural pockets in India was deemed vital to improve access of water for women. Lack of sanitation facilities and safety of women was another issue that respondents thought should be countered. But solutions for better access to water for women and disempowered communities appeared to be lacking in concrete ideas – with the majority of respondents choosing decentralization and empowerment via legal rights to water as the solution, without paying heed to social factors that nuance the rural and urban picture.

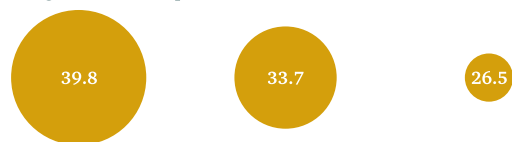
**Pricing and Privatization:** Surprisingly, a large majority displayed keenness for private players to handle the service delivery of water to households, particularly in urban areas. The implications of deeming water as an economic good for a developing country like India were not deeply explored by those who subscribed to this view. There was also consensus that turning water into an economic good by levying water prices based on differential usage, would be the most viable method of curbing water inefficiency and promote conservation. Conversely, a small number of respondents remained committed to the belief that water in India should continue to be framed as a common-pool resource, as the Indian state, given pre-existing inequitable and hierarchical access to

water, is not ready to step back from its responsibility to provide water services – regardless of its inefficient track record.

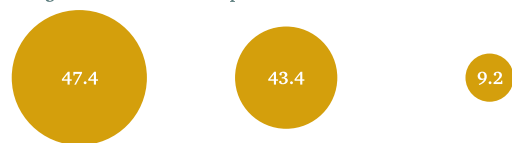
**Religion and Rivers:** The religious and cultural value of Indian rivers remained an interesting and contentious issue among respondents. While interviewees, particularly those from the government, seemed cautious and hesitant as regards the sacred nature of rivers (even if they personally differed from the 'sacred' view), they also seemed open to leveraging this religious and cultural aspect to foster a better ethic towards water conservation. Thus, while most respondents seemed aware that the dangerous view of water as an 'infinite' resource stems from a religious/cultural perspective, they also seemed to think that religious myths surrounding water are not fundamentally incompatible with water governance, as these could be made a part of effective water management policies. It was thought that tapping into the religious appeal of water was the most effective way of educating large swathes of the rural populace of India, without access to formal education, about the resourceful use of water.

### Religion and water

Should religion be used to promote water conservation?



Should religion be used to tackle pollution?



**Data:** With regard to data, it was evident from the responses that data sets that feed into policy-making

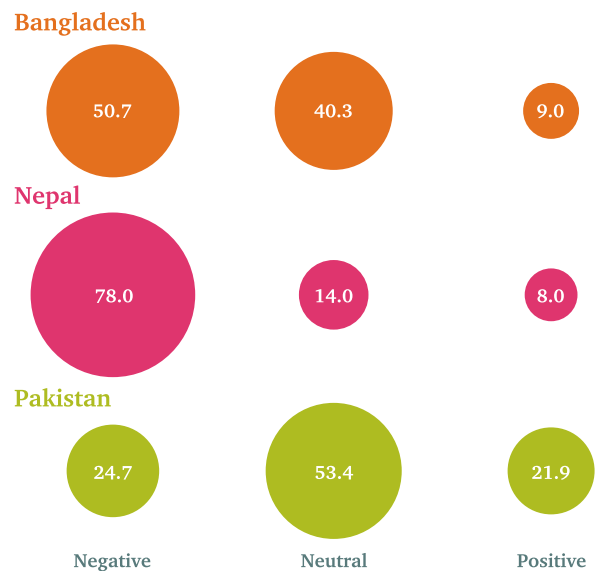


were inadequate and in need of urgent review. It was felt that the most effective way of studying the problem of water management would be by focusing on making integrated and multidisciplinary data available, in order to facilitate assessment of water issues not just in isolation but also alongside broader questions of agriculture, land, ecology, the effects of industrial expansion and climate change. New assessment models that can move beyond quantitative assessments and factor in stringent economic principles and structural values should be worked on to enable sustainable choices. It was also thought that an effort to build newer 'languages' that could piece together different technical data sets into a widely comprehensible narrative would go a long in removing knowledge gaps regarding water issues, doing away with a technocratic approach and bridging the gap between science, social dynamics and policy.

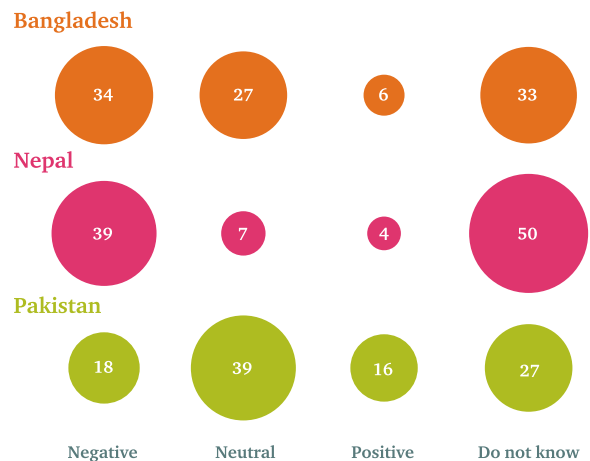
**Transboundary Rivers and Conflicts:** Water has also been a serious point of tension between India and its neighbours i.e. Pakistan (lower riparian), Nepal (upper riparian) and Bangladesh (lower riparian). There is an atmosphere of mistrust in these countries towards India and an expectation that India's dealings will be unfair and hegemonic.<sup>8</sup> So far the Ganga Water Treaty with Bangladesh, the Mahakali Treaty with Nepal and the Indus Water Treaty (IWT) with Pakistan have all seen middling levels of success but the actions of upstream countries, in this case, India, continue to carry threat perceptions, much to the detriment of bilateral relationships with its riparians. For instance, India's efforts to build hydroelectric projects in Jammu and Kashmir have often been viewed with suspicion with its downstream

neighbour Pakistan. There is a discrepancy in the benign perception of Indian interlocutors towards their water dealings with neighbours and the negative terms in which respondents from neighbouring countries viewed India.

**India: How do you rate current levels of cooperation with neighbouring countries on water issues?**



**How do you rate current levels of cooperation with India on water issues? Comparative figures from Nepal, Bangladesh and Pakistan.**



8. "Water Security for India : The External dynamics," IDSA Task Force report 5, (New Delhi : Institute for Defence Studies and Analyses, 2010).

Source: Chatham House Report, 2014.

It was also thought that while the terms of several of India's water treaties with its riparians were considered outdated, ineffective and in need of review, respondents seemed to rate these treaties in a positive manner indicating that treaties were still considered a necessary confidence-building measure and a bilateral mechanism of continued relevance in South Asia. Respondents displayed inadequate knowledge of the intricacies of transboundary treaties, thus suggesting among interviewees a greater focus with, and interest in, the pressing domestic issues for India. This, particularly among state actors, could possibly explain the lack of innovative thinking as regards methods of transboundary negotiations, and the statist shape taken by cross-border water negotiations.

Crucially, however, respondents across all sectors (government, academia, NGOs and private sector) were able to convey a degree of awareness concerning India's image as a hegemon in the region of South Asia, suggesting both an openness to correcting 'misperceptions' of the country's regional image and a commitment to fair negotiations. It was overwhelmingly agreed that India's approach towards its co-riparians needs to be more basin-oriented and less statist or nationalistic. By this, it was meant that India must align its national water needs in terms of benefit-sharing with co-riparians, since the two cannot be mutually exclusive for regional water cooperation. India's tendency to foster suspicion on the part of its co-riparians, its lack of data transparency and the securitization of water dialogues in dealing with its neighbours were identified as massive impediments to cooperation.

Beyond this, hydro-diplomacy could be supplemented by Track II dialogues and more

active cross-border collaboration involving civil society organizations and academics engaged in water issues; these factors were seen as most effective in better enabling a cooperative understanding of each country's water needs that would ultimately filter into policy decisions. Additionally, it was thought that expanding these Track II processes to seek a new entry point for negotiations, and bringing other tradable benefits (besides water) to the table, would make water negotiations more encompassing with a better chance of success.

**Competing Paradigms:** An important conclusion that underlay all responses to water in this study was that there is a clear schism in the conceptual framework of the resource. Competing visions of water in India impede proper understanding on how to govern the resource, both in domestic and transboundary terms. For example, interviewees from the government as well as the private sector considered pricing and privatization of water a natural direction for the future, bringing with it efficient water usage and delivery. Academics and NGO workers on the other hand were much more critical; claiming that the country's deeply stratified socio-economic structure would crumble under such a move. They remained committed to the belief that water in India should be framed as a common-pool resource and the role of the Indian state should remain central in water service delivery to counteract the core inequalities that create hierarchical access to water. But water is not seen entirely as a 'common pool resource' either. While the National Water Policy does define it thus,<sup>9</sup> the term wields very specific implications for management, and begs the question of who is the 'pool' that water belongs to – the local community,

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9. "Draft National Policy 2012," (Government of India, 2012). <http://pib.nic.in/newsite/erelease.aspx?relid=79981>

the state, the nation, or the basin? Water management methods in India do not reflect any clear approach, it was thought.

The lack of a unified water view guiding the country's domestic management can also be seen as having deep implications for India's often mismanaged transboundary water dealings.

The interviews revealed the need for an integrated approach towards water and a fundamental shift in the way water is conceptualized for there to be any real impact on policy outcomes related to water governance. There was an urgent need to review the idea of water as an infinite, sacred and abundant resource; rather, it must be envisioned more expansively as a finite social, economic and strategic resource that demands high priority, because it is inexorably tied to our food and energy needs on the one hand, and our basic human requirements on the other.

Keeping all of these factors in mind, governments need to be encouraged to think differently about water its domestic, inter-state and transboundary matters. This study attempted to uncover some of these perceptions about water, in a bid to construct an ethos around water, or a 'water vision' so to speak, which would be mindful of the strategic, social and economic value of this limited resource in India and the South Asian region.



## 2. Domestic Water Challenges in India

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### Perceptions towards Water

#### Domestic Water Challenges

An overwhelming majority of the respondents- 75% of the people interviewed- identified the lack of a coherent water management strategy as the most pressing challenge for India, which, as a developing country, is in the midst of a resource crunch – compounded by the effects of immense population growth, urban expansion and rapid industrialization. Interlocutors from policy circles often indicated awareness of an imminent crisis wherein demand would fall short of supply, unless timely measures were taken to balance demand and supply. Given this scenario, most interviewees conveyed their belief that water management strategies in India were followed on an ad hoc basis – without any clear objectives or coherent plan that kept in mind optimum water efficiency. A respondent, echoing popular sentiments- deemed water management in India a 'headless, leaderless' process.

A general challenge to water management that was flagged by respondents is the country's dependence on the monsoon for its water needs, along with the spatial and geographical variability of the monsoon rain. Most of the precipitation in India is received in the months of July–October, and – spatially – the northern and eastern parts of the country receive the bulk of the rainfall, while the southern and western parts receive considerably less. India's inability to harness this natural abundance of water further contributes to its water inefficiency.

### Water Management

Central to discussions on water management is the sectoral distribution of water consumption in India, whereby agriculture takes up the bulk of water available and the domestic sector – i.e. households and their drinking water requirements – consumes a much smaller share. Therefore, it was felt that deeper systemic changes were needed to reduce India's economic reliance on the agricultural sector and to create more employment opportunities in the industrial sector.

It was widely believed among respondents that, in the long term, if these agrarian changes were not brought about, optimum water use would not be achieved. This was supplemented by the widespread notion among policymakers that agricultural usage of water incurs excessive wastage and that industry utilizes very little water compared with agriculture.

The high rate of urban expansion in India was seen as a vital area that was impacting water demand and its efficient usage. As one respondent put it, 'Councils like the National Research Council (NCR) and the National Intelligence Council (NIC) postulate that 60% of India's population is going to be in the urban areas by 2030/40. So by the time the economic growth starts peaking, the demands of water will be more urban than agricultural.' Common views included that 'urbanization is going to give rise to a very different kind of demand', and that 'urbanization patterns are going to be key to solving all our developmental issues, whether in terms of climate, water availability or sustainable

development and India is still groping towards that framework of development.'

While at least 80% of the total water supply is used for irrigation<sup>4</sup>, the municipal supply of drinking water in urban areas is irregular and inequitable, being almost non-existent in slums. In rural areas, despite commitments on the part of successive governments to provide full drinking water coverage, a large number of villages remained 'no source villages'.

Scarcity of water was believed to be 'a condition of poor management', which in turn creates 'inequitable access', rather than a natural shortage. In the words of another respondent:

Improved water management is of utmost importance because water is of a fixed amount. The availability is fixed and finite. The greatest concern would be to devise means of how to distribute water on a rational basis so that the wealthy as well as the poor can receive water at appropriate pricing.

[Ex-Member, Central Water Commission]

The primary reason identified behind this 'poor management' was the unclear division of power between the centre, the state and local bodies with regard to the water sector. While water is a constitutionally enshrined 'state subject', in rural areas the panchayat (village council) bodies require their institutional and financial strength to improve in order to provide drinking water in villages. Furthermore, it was felt that multiple levels of bureaucracy in the functioning of water

jurisdiction and government bodies added to the chaos and mismanagement:

There are eight different departments in the government that look after different facets of water, its use, supply, pollution level etc. There is no integration between these different departments. There is a need to reorganize the ministries so that information sharing and cumulative problem solving can take place.

[Retired bureaucrat, Ministry of Water Resources]

A commonly suggested solution to the lack of access to water was to make the right to water constitutionally guaranteed. However, this would entail changing the status of water as a state subject and including it on the Concurrent List (concerning relations between the Union and the states) by amending the constitution. Many respondents conceded that this would prove to be a long and tedious process which would need to be addressed with proper care:

While enacting Right to Water, the government should ensure proper mechanism in place to meet the growing demands of water and availability of water with equal emphasis on necessary infrastructure for water.

[Bureaucrat, Ministry of Water Resources]

Respondents felt that, thus far, water policies addressing the needs of the country were strong in letter. The most commonly cited example was the National Water Policy (2012). It calls for an improved water infrastructure, and highlights the

need to recognize 'environmental flows' as necessary to maintain the ecological health of the river and ensure clean and safe water supply for all. It was thus seen as a 'fairly comprehensive document, but – based on the socio-economic indicators and persistent gaps in water access and supply – one that was very poor in implementation. This was further indicative of a widening gulf between policy and practice.

It was felt that NGOs had done commendable work in promoting community-based water management programmes and off-grid water storage systems to supplement the gaps in the mainstream methods, and it was considered crucial that this should continue with more public participation.

### Methods for water conservation

Regarding measures for water conservation, many respondents pointed out that pre-existing laws such as the Environment (Protection) Act, the Water (Prevention and Control of Pollution) Act and the National Water Policy were strong in letter, but that their effectiveness was blunted by a lack of penalties and poor implementation. Many cited programmes such as the Ganga Action Plan, which was launched in 1986 but had to be withdrawn in 2000 because of ineffective results and increasing costs of approximately Rs 9,000 million.

Overwhelmingly, respondents demanded strict water audits for industries, in order for environmental conservation laws to have any impact. The responsibility of individuals and of civil society in supplementing government efforts

towards water conservation was also deemed paramount. In the words of one respondent:

There is no national or state level water conservation policy. There is a need for capacity building of the people in water conservation by sensitizing, incentivizing and galvanizing them about water conservation. Prizes such as Water Man/Woman of the Year and some rebate in water bill for a person who excels in water conservation campaign can be instituted to galvanize the people in participating in water conservation campaign and thus their support can be elicited in water conservation.

[President, India Water Foundation]

Beyond the 'supplementary' role of the wider population in water conservation, many respondents also felt that the ethic to conserve water would only follow once people started to think of water as an exhaustible resource, and it was only through such social awareness with regard to water that laws would become effective. As one respondent highlighted:

Water conservation is not something that the government can do or order. The government can only create awareness among the people and it's the people on the ground who have to do their work and we have lots of demonstrative projects and fund schemes like the Rehabilitation and Renovation of Water Bodies all over the country wherein we have tried to promote water conservation efforts. Earlier there used to be local water bodies

in the village like ponds and lakes, which have slowly been taken over for other land usages. So we need to encourage mass awareness programs to educate local people of the benefits of such local water resources and also encourage them to conserve water since it is no more a commodity that is freely available.

[Academic, TERI University]

With regard to community participation, a majority of the interviewees agreed that micro-conservation techniques – such as watershed treatment, rainwater harvesting, tanks and bunds (small stone dams) – were crucial to achieving water efficiency and needed to be promoted.

However, it was also clear to the respondents that these are not techniques that are scalable. Hence, community participation and rural initiatives are needed to complement the more scalable, mainstream efforts of the state with micro-conservation initiatives.

Several respondents mentioned the efforts of the Water Users Association in Andhra Pradesh as a good example of a participatory irrigation management system, especially given the passing of the Water Users Association Act of 1997, wherein the association worked in conjunction with the state and managed to impact policy outcomes.

A recurring issue in this respect, was the over-extraction of groundwater in order to meet irrigation demands and domestic consumption, which has led to an alarming lowering of the water table. Since legislation and controls

imposed by the state have so far been unsuccessful in ensuring the sustainable use of groundwater, it was felt that 'local community-based institutions that are adequately supported by scientific methods' would go a long way in curbing groundwater exploitation. This would also ensure respite from what respondents called 'votebank politics', employed by national political organizations and at local level, whereby politicians promised free electricity to farmers, in turn allowing them to run pumps and thus overuse groundwater to cultivate more water-intensive crops.

The emphasis on subsidies for farmers in rural pockets or 'politics of subsidies for votes' as a respondent termed it, was seen as being responsible for wasteful water usage patterns and groundwater table depletion in rural India.

### **Water pricing and privatization**

Following on from the debate on water conservation, an overwhelming number of respondents felt that allowing water pricing and market mechanisms to operate in the sector would be the most effective way of ensuring responsible use of water. Most commonly, it was believed that maximum wastage of water occurs in the agricultural sector, where water-intensive crops and irrigation subsidies for farmers have led to wanton use of water at very low prices:

Better usage can only be done through effective pricing of water. In India, the greatest problem is that we do not know how to value water both literally as well as figuratively. Pricing policy needs to be



regulated so that poor should not have to pay more and the wealthy pay less. The Farmers' lobby decides not to price water therefore leading to misuse and wastage of water. Therefore water use efficiency needs to be promoted.

[Researcher, think tank]

There was a consensus that water supply distribution in India needs a higher degree of reform and water prices need to be equitable.

Most respondents were also comfortable with the idea of the entry of private players to handle the water delivery system, as stipulated in the 2012 National Water Policy, if this ensured continuous supply. In the current scenario, it was agreed, the poor pay disproportionately high prices for water while the wealthy get continuous supply at a price, that compared to their income, was relatively low; this was seen as unfair, and differential pricing was seen as the best way to meet the water needs of the poor while also encouraging judicious use of water among the elite.

However, the benefits of water pricing were not weighed against the underlying implications of turning water into an economic good or its impact on the inequitable access, by majority of the respondents. The common thinking was that the moment water became an economic good, people's attitude towards it would become less wasteful and the market forces would ensure that water supply meets demand.

An alternative view among a small number of respondents – from the NGO sector – was to be

wary of treating water as an economic good and of leaving its governance to the market and economic instruments:

Water is practically free at the moment. But even then, the question that needs to be asked is, that even if water prices were to be hiked up, would that guarantee or ensure that water use and water management techniques would substantially improve because high prices are being levied? Or do we need to follow a different model?

[NGO head, New Delhi]

Similarly, critics of privatization suggested that water is a common-pool resource and should be viewed as such. Should the state start functioning simply as a regulator or facilitator, and the service delivery be handed over to the private sector, it would lead to more inequitable and hierarchical access to water, thus exacerbating the water crisis. Instead, options should be explored for making continuous delivery possible by strengthening the capacity of the public sector.

Many of the interviewees asserted that the manner in which the water management debate is framed needs to change. Whether seen through the lens of integrated resources management or the emerging 'food-water-energy nexus', water needs to be viewed in a holistic manner: as being intrinsic to food security, energy security, economic growth and social equality, as well as to health. This would go a long way to ensuring that water becomes a resource that is treated as a priority in policy-making.

Of the broader debates in water management, a recurring theme was the question of demand-side versus supply-side management. It was largely agreed by respondents that a management technique that includes control of both demand and supply would be the most balanced and productive. As one respondent put it:

With increased demand in water, there is increased wastage. Since supply is limited, demand needs to be managed.

[Government official, Ministry of Water Resources]

Therefore, there is a need for better pricing of water as well as promoting the use of water-efficient technology and, as mentioned above, encouraging water efficient practices. But in order to achieve this level, more income is needed on the demand side, so that people are able to afford such expensive water-efficient appliances or equipment. It was suggested that apart from domestic consumption, the usage of these technologies be encouraged in industry and agriculture as well where corporations and groups will set a precedent by implementing the new practices and purchasing the water efficient technology. Similarly, having an integrated water management system on the supply side, was seen integral to preventing aggravated dispute situations over supply at both state and district levels.

## Gender

As regards women and gendered access to water, it was felt that water collection was an entirely female domain in rural areas. It is for this reason

that the inaccessibility of water and the opportunity cost of trying to procure potable water was felt most keenly by women. This implies that in the time spent in searching for water, women would be unable to pursue goals like work and study. Better roads and enhanced last-mile connectivity in rural areas were thus seen as crucial steps in ensuring better access to resources.

As one respondent put it, 'Roads in India are the primary mode of mobilizing resources, be it food, water consumables or other goods'.

Concerning urban areas, it was thought that since low-income households and slums have no fixed source of water, they often have to rely on irregular and distant public or private water tanks or taps. Generally, such a struggle with collection and transport of water for daily use was seen to be undertaken by women from migrant labour families. This was also considered to have a direct impact on health and livelihoods of slum dwellers and low income families, who are mostly migrants from other places, in search of labour in the city.

Additionally, poor sanitation facilities were regarded by respondents as demanding quick redress in order by facilitating access to water for women for hygiene and safety reasons in rural areas. While women often have the primary responsibility for the management of household water supply, it was felt that they are rarely consulted or involved in its planning and management.

Many respondents felt that, theoretically the government's 2012 National Water Policy, as well as water policies of some state governments, did address the water needs of communities and women. However, most maintained that in the absence of consolidated data to this effect, it is difficult to say whether water management sufficiently takes into account the needs of communities, whether or not including women. It was felt that the water needs of women and marginalized communities, especially in rural areas, must be accorded priority in the relevant water policy documents, with a monitoring mechanism to oversee compliance with this provision.

### Quantity, quality and data

Concerning the quantity of water available in India, as highlighted above, 69 % of interviewees agreed that the quantity of water available remains the same, and it is in fact questions of utilization, access and management that determine the per capita availability of water.

None the less, among the environmental factors listed by respondents as affecting the quantity of water were:

- Silting, which decreases the carrying capacity of the rivers, and can also reduce the much-needed nutrient-rich sediment reaching river deltas where it is traditionally needed for agricultural purposes;
- Decreasing size of glaciers due to climate change, which alters patterns of glacial

melt, thus often creating flooding or water-logging downstream;

- Diversion of streams for river valley projects – whereby water quantity falls in the main course of the river, altering its flow pattern; and
- Extraction of groundwater that occurs at a rate more rapid than aquifers can be replenished.

On the subject of water quality, all respondents agreed that the quality of water had declined. This was mainly due to the effects of industrialization, or untreated industrial effluents and poor sewage disposal, which have caused water pollution on a large scale and have impacted the river bodies. Notably, respondents from all sectors (the government, media, the private and the NGO sector) were widely aware of the extent of pollution in the Ganga river, counting it among the 'most over polluted and over exploited' even while remaining mindful of its 'sacred' value. The decline in the water table and heavy pollution were seen to have huge environmental, social and economic costs and to be causing increased vulnerability for the communities of the Ganga basin.

Water pollution was also regarded as a major problem in rural areas, compounded by the network that links upstream and downstream villages. The pollution of upstream villages, in such a case, is then transferred downstream, leading to epidemics of dangerous diseases such as dengue. The availability of tap water leads to stagnant, standing water which in turn breeds mosquitoes and other health hazards.

There was a fair amount of discontent among respondents with regard to the government's lack of attention to water pollution and its ensuing health hazards. As one respondent put it:

The Government spent Rupees 15,000 crores<sup>6</sup> to clean up the Yamuna. What did they do with the money? They created sewage effluent plants at one end of the town without connecting it to the feeder drains. How do we manage sewage if we don't have the basic infrastructure? People who live in the marginal areas have no land, no sewage facility and there are a huge number of these people. We can not deal with the past baggage of sewage accumulation with the available technology, so we need to have a very different model of sewage treatment than what we are using now.

[Executive Engineer, Water Supply and Sewerage Board]

In terms of data, it was felt that the Indian government needed to make its hydrological data more accessible to the people. It was also felt that in order to have a sound development model, real-life performance assessment data on dams and large-scale projects was critical. Similarly, data on the impact of individual water projects and their impact on the overall economic development should be made available.

Other areas of data gathering that could improve water management include supply data, which would entail proper metering records; basin data on rivulets, smaller rivers and data on industrial consumption; information on transboundary

water bodies like aquifers, groundwater and rivers; and data on real-time flow of rivers.

Overall, it was none the less felt that there was no problem with the abundance and availability of data, with the Central Water Commission releasing data used regularly in mapping rivers. There was also thought to be a profusion of privately funded, quality research by premier institutions such as the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs), which have been assigned specific projects on the Indus, Ganga and Brahmaputra rivers in accordance with the National Water Mission.

However, the real problem as regards data – as in the general bureaucratic functioning of water management – was considered to be in the coordination of competing data sets and information from different departments. According to one respondent:

There should be proper mechanisms to promote inter-sectoral cooperation and coordination between different departments of the Central Government and states in sharing data/research about water quality, contamination of water etc. There is need for close cooperation between Water Pollution Control Boards and Department of Water Supply at the Centre as well as in the states in respect of water quality.

[Ex-member, Central Water Commission]

### On climate change

With regard to climate change, most respondents were of the opinion that although its effects would certainly wreak havoc on India's ecological system and water availability in the next 20 years, it was not high on the list of priorities of policy-makers at present. Nor was the impact of climate change on water availability clear, either among scientists or politicians, or among other respondents.

The country's current approach to climate change was deemed inadequate, even though India has pledged at the 2009 UN Climate Change Conference in Copenhagen to reduce its carbon emissions rate, and has also instituted a National Action Plan on Climate Change.

The need of the hour, as pointed to by several respondents, was to recognize the urgent need for adaptation strategies and a national climate adaptation policy. Such a strategy should emphasize river basin development, improvement of livelihoods and development of entrepreneurship skills of the people living in eco-fragile zones, along with increased national, regional and international cooperation in climate adaptation policy.

Furthermore, there was a need to understand fully the impact of climate change on water availability and access the potential of variability in rainfall processes, as well as provide for greater insurance measures – in terms of water storage and proper distribution systems – to protect India's water needs against the vagaries of climate change in the future.

A minority of respondents also felt that climate change should be prioritized because of its impact on transboundary water relations. In their view, a variation in the timing and intensity of monsoon rains would impact agricultural production and pose a threat to food security, thereby exacerbating tensions between countries over water access during the dry seasons.

### On provincial variation

Several respondents seemed to believe that there was a north–south divide when it came to assessing the urban service delivery record and water access, with the southern states scoring higher.; Respondents most commonly attributed this to a positive correlation between water adequacy and social indicators such as education, life expectancy and income.

Sanitation coverage, especially in rural areas, was regarded as poor, and mortality rates resulting from water-borne diseases were seen to be high. The perception regarding sanitation seemed to be linked with the levels of literacy: states like Tamil Nadu and Karnataka were thought to have the best track record on sanitation, while states such as Uttar Pradesh, Chhattisgarh and Bihar were generally thought to have the poorest record, depending on their literacy rate. As one respondent put it:

The only way to make health and sanitation a matter of priority is to ensure there is awareness via innovative means. There is much to learn from Karnataka's Integrated Rural Water Supply and Sanitation programme (IRWSS1993) and

Swatcha Grama Yojana which ensured the construction of storm water drains and provision of community toilets was achieved.

[Former member, Central Groundwater Board]

Similarly, as regards urban areas, particularly in the megacities, it was thought that the Urban Local Bodies (ULBs) needed more teeth in factoring both the safety and convenience of women into their provisions.

Linked to the idea of urban service delivery is the idea of last mile connectivity. A better network of transport facilities, linking rural pockets to main highways, was seen as vital for addressing inequitable access to water and promoting overall economic progress, the roadways were regarded as unevenly developed across regions.

While rural areas in the northeast, Rajasthan and Bihar were seen as poorly developed, states such as Madhya Pradesh and Kashmir, having some import because of their industrial or strategic value, were considered better linked, indicating that development of a region – and consequently its access to water – was completely dependent on the political will of the government.

This was seen as a 'vicious circle' as a respondent put it, where developed states, due to their economic potential continue to get better urban facilities and water access, while the under-developed ones continually fall behind due to a perceived lack of potential.

## Inter State Conflicts

Respondents pointed to an interesting phenomenon where inter state conflicts between India states are creating a pressing 'upstream versus downstream' water sharing crisis within the country itself. Inter-state disputes include those between Haryana and Punjab over construction of the Sutlej Yamuna Link canal link, the dispute over the Kaveri river water between Karnataka, Tamil Nadu and Kerala and the one involving Gujarat and Maharashtra over the river water of Narmada.

The lack of an effective dispute-solving mechanism for interstate conflicts was seen as further compounding the problem. As a legal consultant put it:

While there are tribunals set up as part of the Inter-state River Water Disputes Act, 1956 that will adjudicate conflicts between riparian states, the verdict of the tribunal becomes binding only when it is accepted by the Central government, which under pressure from state governments takes forever, as seen in the case of the Cauvery tribunal which carried forth interminably. [Lawyer, Supreme Court of India]

## Domestic Issues: Some Divergent Views

### Floods and droughts

Floods and droughts have been recurring environmental issues for India. However, there was no clear consensus among respondents to the

survey as to whether India's capacity to deal with floods and droughts had improved, declined or remained the same.

A large number of respondents felt that the frequency of floods and droughts, and their scale of devastation, had increased. The most commonly given reasons for this were faulty urban planning based on floodplain zoning (as in the case of Uttarakhand) and trying to 'stem the natural flow of water' by building dams which, according to many, created man-made floods and droughts.

Many respondents also felt that while India had a poor track record in respect of land use management, it had done well in flood forecasting and warning systems vis-à-vis both floods and droughts. Models also exist to reduce the impact of climate change. But the issues had not been completely addressed because, as one respondent stated, "We have done well in terms of retroactive measures, but haven't improved on the proactive measures."

Another set of respondents was of the opinion that floods and droughts are natural phenomena and will continue to occur as a part of the natural hydrological cycle. Therefore, in their view, flood-control policy should be devised in such a way that natural ecology is not tampered with, but, at the same time, an attempt is made to reduce people's vulnerability to floods. According to one respondent:

Droughts are a natural phenomenon as well and I think state and district level

officials are doing a good job trying to improve the situation.

[Journalist, Times of India]

Another divergent view claimed that damming rivers had resulted in better storage capacity and channelling of surplus water, leading to less frequent of flooding; at the same time, droughts had improved because of a better network of water diversion and channelling of water to places of drought and water scarcity.

While the capacity to mitigate disasters had increased, the patterns of urban settlements still need overhauling in order to minimize the threat of natural disaster. There was a general consensus that vulnerability of people to floods had increased. This is because rising population and consequent pressure on existing resources mean that people are being forced to occupy floodplains that should ideally be left unoccupied.

As regards droughts, likewise, people have now moved to the marginal areas of a region, where resources are scarce, thus rendering them vulnerable to the pressures of resource availability and environmental disturbances.

### **Religious and cultural value of rivers**

The religious value of rivers in India is a contentious, ideological issue and, accordingly, responses on this theme were the most divided. A large number of interviewees felt that the 'sacred' value of the Ganga river and its ensuing religious rituals were harmful because they contributed to the pollution in the river. However,, an equally large number of respondents felt that the value of

the Ganga was sacrosanct and therefore non-negotiable.

Some respondents even suggested that the scale of traditional rituals of immersion in the Ganga was so low that it “did not really upset the ecological balance or biodiversity of the Great River” and that immersion of dead bodies in the river had in “no way been found to hinder water management initiatives in the Ganga.”

Several interviewees also pointed to the widely believed myth of Ganga possessing self-purifying properties. The belief was that, as an interviewee points out, the Ganga's 'sacred nature' and its purported scientific ability of retaining oxygen, prevents the spread of diseases among the millions of Indians who bathe in it.

The political economy of India's rivers has a rich and diverse history. All of the respondents claimed a sense of pride in the intertwined spiritual and cultural space assumed by the Ganga and other rivers in India, even if they could not agree with its 'sacredness'.

Respondents often, for instance, compared the value of the Ganga river as being 'intrinsic to the Indian consciousness as the Nile is to the Egyptian one'. But, despite the multiple political, economic and cultural stakes involved in the management of the Ganga, respondents felt that there was a lack of responsibility to protect the ecology of India's rivers and their basins among its citizens and policy-makers. Opinions across the board were that the religious and cultural value of rivers could be successfully leveraged as

part of a drive to promote water conservation. As one respondent commented:

All rivers are sacred. Our culture, our nationalism if you will, is related to one river or the other. The problem occurs when people consider it holy but do not stop polluting it. There is a need for greater awareness program, especially among the youth not just in terms of environment and health but regarding every other facets of life revolving around the river.

[Private consultant, New Delhi]

Respondents pointed to a couple of cases in the recent past where protests – such as by a Hindu priest in 2011, against mining in the Ganga basin, or a fast-until-death campaign for a cleaner Ganga by an environmental activist the following year – had led to the government taking remedial action. and As one water activist put it, these protests had the effect of “refocusing [government] attention on the millions sanctioned for creating sewer networks, sewage treatment plants and community toilets”, and highlighting that government funds “were never an issue” but instead “need individuals to stand up and use their personal value of the Ganga to good use.”

### **National River Linking Project**

The Indian government's proposed National River Linking Project (NRLP) was a scheme that evinced polarized views. About half of respondents to the survey agreed with the logic of the project, bearing in mind that linking rivers



would allow inter-basin transfer of river water, which would in turn keep the surplus and deficit of water in check and reduce the unreliability of monsoons. On the other hand, a large number of respondents vehemently disagreed with the project, as they believed that 'tampering' with nature on such a large scale would be an ecological disaster. Other opinions declared the project to be legally and economically unviable.

In the words of one respondent:

Transferring water to areas of water scarcity may cause problems which were not anticipated (disturbing river ecosystem etc). But the question is how much water is really needed? Also, its operation and planning is too centralized, not taking same aspects into account as decentralized planning would.

[Senior journalist, New Delhi]

As a consequence, many respondents believe this scheme will invariably become mired in bureaucratic wrangling, adding to the cost and the time frame. The most important factor in the successful achievement of complex and controversial measures such as the NRLP is ensuring that the dialogue starts at the community level.

Other critics of the NRLP also pointed to the detrimental transboundary impact of the scheme on the lower riparian, Bangladesh, although this was not a popular concern – raising interesting questions about the lack of attention paid to transboundary issues as compared with domestic matters of water.

## Sectoral Divergences

Since the interview was conducted across different sectors i.e. government, NGO, private and academia, answers to key questions yielded interesting divergences. These divergences (principally between the government and civil society) reflected a marked divide between two competing water worldviews: one that sees water as a marketable commodity with vital technical dimensions and as the basis for urbanization patterns in the future; the second that seems to focus on the social underpinnings of water and the 'human' face of development (although these two world views were not seen as mutually exclusive in every case). Interestingly, there was often a convergence in the views of the government and the private sector.

## On Water Challenges

A recurring trope found in this study was the rural versus urban divide. The water measures and interventions considered most crucial by respondents were related to urban concerns of water management and consumption. Specifically, when asked to identify the most pressing water challenges, interviewees chose formulation of a strong water management strategy and tackling the pressures of urbanization as their priority.

However upon breaking this question down according to the sectoral identity of the respondents, this answer was most commonly voted for by public sector employees. In contrast, academics and NGO workers chose 'inequitable access to water' and 'exclusion of certain social

groups from access to water' as the biggest water issue for India. They felt that framing the water debate in wholly urban terms obliterates the urgency of access in rural areas. In the words of a respondent:

A country like ours has had a history of caste, class and religious exclusion, so it is not surprising that socio economic identities have created an exclusionary matrix for the have-nots. And this is most keenly felt when it comes to access to resources that are crucial for survival, particularly in rural areas. That we barely count this as a 'water problem' next to questions of efficiency and management shows us where our priorities are.

[Academic, Jawahar Lal Nehru University]

## Dams

The issue of dams brought up a lot of competing ideas of development. Respondents from the government as well as private sector believed that dams and large-scale infrastructure were crucial for meeting the water needs of any country, specifically to mitigate effects of natural water shortage and generate hydroelectric power, academics and even media persons seemed more cautious towards the logic of big constructions.

The enthusiasm for dam-construction in India, ever since Independence, has left in its wake a history of displacement, of choosing the concerns of certain interest groups over the welfare of citizens, of inter-state conflicts and of man-made scarcities. We have the Bhakra Nangal

Dam and the Sardar Sarovar Dam as the biggest illustrations of this. Dam constructions do have their benefits so the answer is not this or that, but a more thoughtful consideration of the ecological measures we take for 'better water results' and at what costs?

[Journalist, Indian Express]

Respondents from the non-governmental sector and researchers pointed to their experiences of witnessing rural populations increasingly opt for localised and "off-grid" water storage options. Bundts (stone wells), ahars and pynes (rural canal systems in Bihar) were some of the oft-quoted indigenous methods for the same as an interlocutor put it.

At a certain level it is about making ends meet in the face of the failure of the modern state, whether it's the duty to provide basic facilities, or man-made scarcity created in part by large constructions and diversions.

In a sense these are indigenous, tried and tested "pre-colonial" methods that have served the people long before the developmental drive began. But the fear is, we may make the rural populace more dependent on such measures, rather than include them in the basic framework.

[Researcher, Jawahar Lal Nehru University]

## Common Pool Resource versus Economic Good

There was a clear schism in the conceptual framework of water. Interviewees from the government as well as the private sector

considered pricing and privatization of water a natural direction for the future, bringing with it efficient water usage and delivery. Academics and NGO workers on the other hand were much more critical; claiming that the country's deeply stratified socio-economic structure would crumble under such a move.

They remained committed to the belief that water in India should be framed as a common-pool resource and the role of the Indian state should remain central in water service delivery to counteract the pre-existing hierarchical access to water.

Water and sanitation so often become controlled by rural power hierarchies. Marketisation or privatization or any form that takes us away from addressing these core inequalities first will lead us not to efficiency but to scarcity and a later stage, maybe even conflict.

[Academic, Jawahar Lal Nehru University]

## Data

Suggestions on improving data provided for an interesting divide along the 'technical' versus 'holistic' views on water. Respondents from the media, NGOs and think-tanks emphasized the need for making integrated and multidisciplinary data available, in order to assess water issues not just in isolation but along with broader questions of socio-economic contexts, livelihood dependence, agriculture, land, ecology, effects of industrial expansion and climate change. New assessment models which move beyond quantitative assessments, stringent economic

principles and structural values were thought essential to help make sustainable choices.

While government employees focused on the importance of technical improvements such as supply data, basin data and better quality information on transboundary water bodies like aquifers, groundwater and rivers, civil society respondents and academics called for a 'new language' to bridge the technocratic gap.

Since Independence the focus has been on technical and modern engineering solutions to water issues and this is reflected in the data that feeds into policy making as well. No doubt this approach is paramount. But traditional knowledge needs to be brought to the forefront along with new languages that are comprehensible to policy-decision makers must be invented to reduce the gap between science, social dynamics and policies.

[Environmental historian, New-Delhi]



### 3. Transboundary Water Challenges

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#### **Transboundary Issues: Baseline Findings**

Water conflicts and insecurity are all-pervasive in South Asia, but India's regional role in this regard is especially critical. India when compared to its regional co-riparians is the largest country (along with China) in terms of size, population and economy. It also shares contiguous borders with Pakistan, Nepal, Bhutan and Bangladesh, and is therefore crucial to any cooperation being achieved in South Asia.

In view of this reality, this section highlights expert opinions on India's transboundary water dealings. Issues related to hydro-diplomacy, treaties and methods regarding how to constructively improve transboundary water cooperation are set out.

#### **Lack of trust; and unequal partnerships**

A large number of respondents were of the opinion that India's conflicted relations with its co-riparians Pakistan, Bangladesh and Nepal were caused by a lack of trust in India on the part of its neighbours, as well as water-sharing terms and arrangements that were considered one-sided and not mutually beneficial.

Common perceptions indicated that India's tendency to act as a 'big brother' or a 'South Asian hegemon' when negotiating on water treaties and agreements was an impediment to cooperation, along with its often militarized, nationalistic approach to water. The fact that South Asia lacks a regional framework for ecological cooperation and water governance only magnifies such conflicts, as the countries have to depend entirely

on bilateral treaties whereby the larger party (in this case India) stands accused of using its power to set unfair water-sharing arrangements.

#### **India and Nepal**

India has had a relatively smooth relationship with Nepal, when compared with its conflict-ridden relations with its other neighbours. Nepal has enormous hydroelectric potential because of its Himalayan rivers, and the export of power has the ability to reap tremendous financial benefits for the country.

However, since Nepal lacks the capital and technology required for such an undertaking, and given India's rising power deficit, India has taken an interest in utilizing Nepal's rivers. This has been the basis of a host of treaties and agreements between India and Nepal, including the Koshi Agreement (1954), the Gandak Agreement (1959) and – most contentiously – the Mahakali Treaty (1996). This last calls for the integrated development of the Mahakali river, recognizes Nepal's prior water rights and provides for a joint Indo-Nepal hydroelectric Pancheshwar Project on the basis of an even cost-benefit split between the two countries. This treaty is a point of discontent in Nepal, as the popular perception, in the words of one respondents, that;

Nepal's own water needs are not being given adequate attention and [the treaty] is merely catering to India's needs. It is commonly thought that in all of our other treaties, we set unfair terms for the other country.

[Journalist, the Hindu]

### Perceptions concerning Indo-Nepal relations:

Dominant views on the Indian side conceded that while India may have acted out of its own interests in negotiating power-sharing arrangements with Nepal, the relationship is still crucial to the progress and water needs of both countries. According to one respondent:

Nepal has huge potential no doubt but the general opinion (not entirely unfounded but still unfair) is that India might behave like a 'big brother' and hurt their interests. These insecurities have made Nepal unwisely shun India and approach expensive international consultation from Japan, Canada, US and Norway. But since this has proved to be a costly affair, it isn't sustainable.

[Senior journalist, Times of India]

There is a lack of trust and political will with regard to India in Nepal that was, in the opinion of many respondents, exaggerated and managed to outweigh the mutual benefits that could be accrued from transparent dealings between the two countries. This anti-India stance was consolidated under the erstwhile Maoist government in Nepal, which had taken a tough position on water issues. In the words of one interviewee:

The Mahakali treaty may be a great opportunity for Nepal to take advantage of but a lot more needs to be done because there are misgivings on the part of Nepal since the Leftist groups are taking a hard stance on water sharing issues but even if

you factor in the hard political line, in certain areas there is a feeling that there is a need for a certain degree of transparency in terms of dealing with each other. The same kind of sentiment is true between India-Bangladesh and India-Pakistan. The good thing however is that there is continuing dialogues between countries.

[Academic, Galgotia University]

### India and Bangladesh

Since the formation of Bangladesh in 1971, India and Bangladesh (in contrast with the atmosphere of suspicion that pervaded Indo-Pakistan relations after Partition in 1947) have largely been seen as having a cordial mutual relationship. Taking account of the fact that the two countries share 54 common rivers, a friendship treaty was signed with a view to achieving greater cooperation with regard to sharing the waters of the Ganga river.

Agreements were reached over the newly constructed Farakka Barrage, which would be used to augment water flow in the lean season, to be shared by both countries. However, this issue became a bone of contention between India and Bangladesh and by the 1980s this agreement was a cause of discontent on both sides. Fresh trouble has erupted over sharing of the Teesta river, which remains an emotive issue both for the Indian state of West Bengal and for Bangladesh. In the context of water-sharing arrangements, it was only as late as 1996 that the Ganges Water Treaty was signed between India and Bangladesh, addressing the problem, facing both

countries, of the seasonal variations in flow in the Ganga river. The treaty guarantees Bangladesh a minimum of 35,000 cusecs in the lean season. Only if the Ganga has more than 75,000 cusecs can India divert 40,000 cusecs and allow the rest to flow to Bangladesh. However, if there is a flow of 70,000 cusec or less, both sides will share the water equally. India and Bangladesh have also agreed to enter into treaties regarding other common rivers.

### **Perceptions concerning Indo-Bangladesh relations:**

The major issues with regard to the river-sharing arrangements of the Ganges Waters Treaty that were pointed out are that they do not address the ecological concerns, flood management of the river Ganga, or how to apportion shared responsibility to deal with water pollution. In regards to the latter, a lot of respondents cited the case of successful water sharing over the Danube as an example where ecological concerns as well as fair sharing of river waters was achieved.

While many respondents accepted that there may be a fear in Bangladesh that India secretly diverts a portion of the flow of the Ganga upstream during dry months, causing water shortage in Bangladesh in the dry season when the flow is low, most respondents believed that this was a false belief, and that the Farakka waters are much more critical to India for its water needs and the survival of the Kolkata port than they are for Bangladesh.

It was felt that water was such 'an emotive issue that nobody wants to budge an inch from their

stand'. Respondents unanimously agreed on the constructive role of civil society organizations from both sides facilitating the exchange of ideas on basin management and flood control.

In general, it was the opinion of respondents that the relationship between India and Bangladesh was marred by suspicion and asymmetrical power dynamics. In the words of one respondent, "98% of Bangladesh's waters come from India and therefore Bangladesh is not unreasonably threatened by its relationship with India."

However, it was also mostly felt that India has "largely been generous about sharing of water", but that what undoes its efforts is the tendency of the Indian government to be secretive about its future plans, data-sharing and water storage projects, which fuels suspicions in Bangladesh. As one respondent put it:

After the break-up of Bangladesh from Pakistan in 1971, there is a feeling in Indian circles that Bangladesh was instigated against India by other riparians into a state of paranoia about Farakka and India's so-called nefarious motives regarding it. While this 'conspiracy' against India ceased to exist, yet now every source of discontent within Bangladesh is because of Farakka. So our relationship with Bangladesh got caught up with politics.

[Senior academic, TERI University]

### **India and Pakistan**

Arguably the most tense relationship in South Asia, India and Pakistan have a long history of

conflict over sharing of the Indus basin, with its origins in the pre-Partition era with the tussle between Punjab and Sindh over diversions on the Sutlej river. After Partition, tensions between the two countries escalated greatly over the Dipalpur Canal and India's construction of the Bhakra Nangal Dam.

In 1960 India and Pakistan signed the Indus Waters Treaty (IWT), after eight years of negotiations to resolve the dispute over the Indus basin, under the terms of which the three eastern rivers of the basin – the Sutlej, the Ravi and the Beas – were allocated to India and the three western rivers – the Jhelum, the Indus and the Chenab – were apportioned to Pakistan.

The treaty was mediated by the International Bank for Reconstruction and Development, and included resolutions to disputes over water usage for irrigation and hydropower by both countries.

### **Perceptions concerning Indo-Pakistan relations:**

The IWT was frequently considered by respondents to the survey as a prime example of a successful water-sharing arrangement, with the commonly held belief that it has 'survived four wars' and 'withstood the test of time'. However, this view was offset by the equally strong belief that the terms of the IWT need to be revised in line with the times, especially given the string of hydroelectric projects in the Indus basin that have caused friction between India and Pakistan.

The two most contentious projects in this regard have been India's Baglihar hydroelectric project,

located on the Chenab river, and the Kishenganga project on the Kishenganga/Neelum river. These projects were viewed by Pakistan to be in direct contravention of the IWT; while India claimed that they were not violating the treaty since these plans did not involve storage of water of the western rivers, and the power generated would benefit the local people.

The Baglihar project is further complicated by the fact that it is a venture of the state of Jammu and Kashmir, which is part of a contested territory between India and Pakistan. Moreover, Jammu and Kashmir has also been opposed to the IWT as representing a denial of its own water rights, and respondents were of the opinion that the Baglihar project would help redress this grievance and meet the energy needs of the state.

Other respondents felt that the IWT had been successful in fulfilling its role as a 'symbol of cooperation' between India and Pakistan, but, as one respondent put it, 'the fine print of the treaty reads more like a divorce settlement than a true water-sharing arrangement'. This is because instead of the Indus river basin and river waters being shared equitably between India and Pakistan, each country has been 'awarded' three rivers apiece.

The common consensus among respondents was that water cooperation between India and Pakistan since independence had been affected by historical tensions and a pervasive feeling of mistrust and suspicion on both sides. This had been further fuelled by Pakistan's security concerns, which may be based on the fear that India's hydroelectric projects are not in fact to



address the water concerns of Jammu and Kashmir, but are geopolitical moves to make its presence and control felt across the border. As one respondent said:

The treaty is a good one especially when one hardly sees any functional international treaties between tense neighbours. The treaty is still being implemented on the ground, so in that sense it is a good treaty but there are loopholes being exploited by Pakistan to stop India from developing the permissible usages, and that is a drawback. But otherwise the treaty calls for mutually beneficial cooperation in the river system, so if Pakistan wants, they can easily benefit from it by allowing India to construct some storage dams so that during the drought period, water can be released from here and they can avail of the water.

[Member, Central Water Commission]

### **Desecuritization of the water discourse**

It was felt among respondents that too often issues of transboundary water management and hydro-diplomacy between India and Pakistan, and India and Nepal, take place in a manner whereby matters of national security and high politics are grafted on to water concerns. Themes of war and national security have dominated the scene in the last decade to such an extent that issues of ecology and the environment have taken a back seat, and issues of water have in turn assumed a militaristic, statist and hierarchical shape.

The Kishenganga and Baglihar projects in Jammu and Kashmir were commonly interpreted by respondents as being 'motivated by India's geostrategic concerns vis-à-vis Pakistan.' Similarly, in the context of Nepal, India's actions – for instance its decision to station its troops at Kalapani (a disputed territory), at the headquarters of Mahakali, or its construction of the Koshi and Gandak barrages – have become irritants regarded as a sign of India 'protecting its national security at the cost of Nepal's sovereignty'.

Such actions were regarded as promoting dissatisfaction among India's co-riparians, and as deflecting attention from important areas of water cooperation and power generation on which India might genuinely require collaboration.

The majority of the Indian respondents to the survey themselves saw the lack of transparency in data-sharing and dam construction plans as needlessly contributing to the long-standing suspicion held by co-riparians towards India in its water dealings.

India favours a bilateral approach to water issues, whereas as Nepal and Bangladesh would, as one respondent put it, prefer a 'more regional approach, being as they are wary of India's big brother role and bulldozing actions when it enters into bilateral arrangements'. Therefore, one way for India to counter some of the charges leveled against it would be to 'inspire confidence' on the part of its co-riparians by entering into more multilateral agreements in the region.

The dominant critique among respondents was of the tendency in India to remain more focused on internal water issues and conflicts – not just in diplomatic circles but also in civil society groups, which pay far less attention to transboundary rivers – and to view water problems through a 'nationalist' rather than a South Asian lens.

A balanced approach to transboundary cooperation is what we need. India should cooperate with China and Nepal on all issues from national dam-building to water sharing to floods to aquifer mapping, without sacrificing its strategic stakes and on the principles of equity, reciprocity and good neighbourliness.

[Ex-member, Indus Water Commission]

### **Best method for regional cooperation: a basin-oriented approach**

On the question of the best method for South Asian cooperation for India, respondents were largely united in the belief that while India's national water interests needed to be safeguarded, basin-level cooperation between co-riparians was paramount to meeting water needs and achieving stability in the region.

While many were of the opinion that a national approach to transboundary water management could not be completely abandoned, it was crucial to reach a decision-making process that balanced the views of the centre, the affected state and concerns of the basin. Many respondents cited the example of the Teesta river, over which India and Bangladesh were unable to achieve cooperation because of conflicting opinions

between the state of West Bengal, the central governments and civil society organizations in West Bengal.

Since a river is a shared resource, regardless of the mode of governance carried around it, it is only natural that water use in one part of the basin will have external effects in another. Therefore, the most sustainable method of cooperation was considered to be benefit-sharing models that do not promote unilateral actions, but rather bilateral coordination and multilateral agreements between nations sharing transboundary river waters – with the river basin as the centre of negotiation. Basin states, many felt, needed to be made aware that water, as a scarce resource, cannot be managed in isolation and by one country alone. Many respondents cited the examples of the Mekong River Commission, the Nile Basin Initiative and the intra-European cooperation over the Danube as successful cases of river-sharing and basin management from which India could benefit.

There were also suggestions to use pre-existing regional frameworks such as the South Asian Association for Regional Cooperation (SAARC) to bolster transboundary coordination with countries like China, and to use tradable benefits aside from water to strengthen the process of water negotiations.

### **The role of civil society organizations**

Ultimately, in the view of respondents, an equal interplay between states, private interests and civil society groups is what will make transboundary water governance successful.

While legal water-sharing arrangements and treaties are undoubtedly key formal mechanisms, civil society organizations were regarded as essential in helping the state better understand its riparians' water needs, which in turn would also filter into policy decisions.

The role of civil societies in sharing knowledge systems about the basin, irrigation practices and flood cycles, as well as in holding Track II dialogues, were considered key to demystifying the 'riparian curtain' between borders. What was decisively rejected was the tendency in India to militarize the diplomatic conversations about water; this, according to one respondent, 'obfuscates and ultimately derails any real collaboration on water between states and inhabitants of the same basin across borders'. As the respondent stated:

Lately there is a positive attitude among policy makers and intelligentsia for need for trans-boundary cooperation and a need for exchange of information and building trust. The reason for this development has the realization that trans-boundary water sharing issues are of critical importance and no nation now can remain in isolation. The awareness and the desire are positive but a lot more needs to be done because there are misgivings in some part of Nepal towards India and a feeling that there is a need for transparency in terms of dealing with each other. The same kind of sentiment is true between India-Bangladesh and India-Pakistan. The good thing however

is that there is continuing dialogues between countries.

[Senior fellow, think tank]

### Areas of cooperation

It is interesting to note that development of early warning systems for floods and droughts, together with joint disaster responses, were regarded by respondents as important measures that could galvanize India's collaboration on water issues with each of its two upper riparians – i.e. China and Nepal. Based on this view, it may be possible to extrapolate that people regard the issue of floods and droughts as one that impacts all countries of South Asia in a similar way and therefore has the maximum potential for cooperation on water issues with China and Nepal, ahead of proposals for joint hydropower and storage projects. In the words of one interviewee:

There is nothing more beneficial than two countries affected by the same rivers, coming together to prevent calamities. There cannot be an easier method of cooperation.

[Government official, New Delhi]

For India to move beyond the water stalemate with its lower riparian nations – Pakistan and Bangladesh – it was recommended that the emphasis should be shifted towards smaller and less controversial projects of joint interest. A 'benefit-sharing' model, which divides external costs equally between nations, should be considered. Given that official negotiations and dialogues tend to accrue hydro-politics and

indecision, a sizable number of respondents (mostly civil society actors) argued that, in each case, a parallel network of continual communication should be established between hydrologists, sociologists, water experts and professionals, creating a new entry point for negotiations. As one respondent pointed out:

If we all remain stuck in a reductionist and statist mentality, our water future and stability in the region is doomed. A sense of commonality, responsibility and joint ownership needs to be brought in place for transboundary rivers management.

[Senior researcher, think-tank, New Delhi]

It was thought that a good way of dismantling threat perceptions generated between upstream and downstream countries would be to build confidence on issues such as:

- Data-sharing
- Early warning systems for floods and droughts
- Hydropower projects
- Joint storage capacity
- Groundwater and aquifer mapping

# Appendix 1: Methodology

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## 1. Research Method and Instruments

For this study, a social survey method was adopted. Many have described a survey method as a means for producing information to describe, compare and predict attitudes, opinions, values and behaviour of a large group of people.<sup>1</sup> One of the most compelling arguments for using survey methodology for this study is its ability to describe what exists, in what amount and in what context.<sup>2</sup> Moser and Kalton (1971) proved that survey research is much more versatile, cost-effective and less time consuming<sup>3</sup> than other research methods.

Since survey research methodology is more than a data collection technique, it can be designed to include a range of research goals.<sup>4</sup> Therefore, an innovative mix of carefully calibrated survey design was preferred for this project.

According to Ackroyd and Hughes (1981), social surveys are generally categorized into factual, attitudinal, social psychological and explanatory.<sup>5</sup> While the factual and attitudinal surveys are designed to achieve practical ends, social psychological and explanatory are meant to deal with theoretical underpinnings. For this study, we will focus on both attitudinal and factual survey for finding out what the respondents think about general and specific issues related to water.

Critiques of survey research have attacked on its limitation of 'variable analysis.' According to Blumer 1956, variables in survey research can't be generalized beyond the specific context and therefore might not offer any insight into the interpretive processes through which social reality is constructed. Other critiques have questioned the efficacy of the surveys. Creswell 2003 claimed that "surveys cannot overcome the problem of the reactivity of research instruments, because they are by their very nature a crashing intrusion into the normal flow of social life".<sup>6</sup>

Interviewees, self-consciously behaving as respondents make added efforts to appear consistent with the desired research outcomes such that their beliefs and opinions seem more coherent than they actually are. Keeping in view such limitations and critiques of survey research, this study employed a multi-method approach<sup>7</sup> to triangulate data i.e. variety of tools to test the validity and reliability of our findings. Good design of the survey instruments such as questionnaires, interviews and case studies is crucial to the success of this endeavour. This includes careful construction of questions and appropriate consideration of attitude measurement scales (next section).

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1. Pinsonneault and Kraemer (1993), Fink (2003: 14)
2. Isaac & Michael, 1997 p. 136
3. Moser, C.A.&Kalton, G. (1971) Survey methods in social investigation (2nd Ed). Aldershot: Gower
4. Robert L. Miller & John D. Brewer 2003, A-Z of Social Research, Sage Publication, London.
5. Ackroyd&Hughes 1981, Data Collection in Context, Longman Inc.New York

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6. Creswell, J.W. (2003) Research Design – Qualitative, Quantitative, and Mixed Methods Approaches. Thousand Oaks, CA: SAGE.
7. <http://ftp.mcgraw-hill.co.uk/openup/chapters/0335202403.pdf>

## 2. Elements of the Survey

This study focuses on the two major river basins originating in Northern India and flowing through the north-western and eastern provinces of India. These rivers were primarily chosen due to their trans-boundary flows, high population density, macro-economic characteristics and inter-provincial disputes. While the Kabul-Indus basin caters to Afghanistan, Pakistan and north-western part of India, the Ganga Basin is the largest deltaic plain in the sub-continent and serves as a perennial source of water (and conflict) for Nepal, India and Bangladesh. Population density in both the basins is among the highest in South Asia in order of 165 people/km<sup>2</sup> and 400 people/km<sup>2</sup> respectively.<sup>8</sup>

### Site Selection

The question under focus in this research typically shaped the selection of the areas and populations to be studied. As Fetterman (1989) cogently stated, “if site selection does not match the research question to be studied, or if such a construed match does not seem credible, the entire research endeavour loses its worthiness.” Given the relatively centralised nature of Afghanistan, Nepal and Bangladesh, the survey in these states prioritises the capitals; in India and Pakistan, besides the capital cities, the survey focuses on relevant states/provinces.

**Sample:** The focused on policy makers, bureaucrats, academicians, media professionals and the private sector influencing the policies and practices in these two basins. A brief analysis was

conducted to identify and shortlist key stakeholders.

This project was a survey focussing on government, academics, media and industry. The sample size was decided in a systematic manner and then randomized within the categories in figure 1.2 to gain consistency and uniformity across different sections of the elite society and avoid sampling errors.

Sampling for the in-depth interviews were done primarily based on profession of the interviewee and secondly on their social and political contexts. Such predefined structure of groups might be criticized for restricting the range variation and developmental space of the theory.<sup>9</sup> However, this procedure of selection was considered suitable for further analyzing, differentiating and testing assumptions around water issues within specific categories mentioned in figure 1.2.

## 3. Preparation of the Survey & Questionnaire Design

The questionnaire design involved a multi-stage process. First, at the stakeholder meeting in Delhi, partner organisations discussed the key issues relating to water in each country. This produced a broad list of questions, many of which over-lapped between countries despite the existence of divergent dominant discourses regarding water.

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8. WWF

9. Uwe Flick 2009, *An Introduction to Qualitative Research*, Edition 4, Sage Publication. India

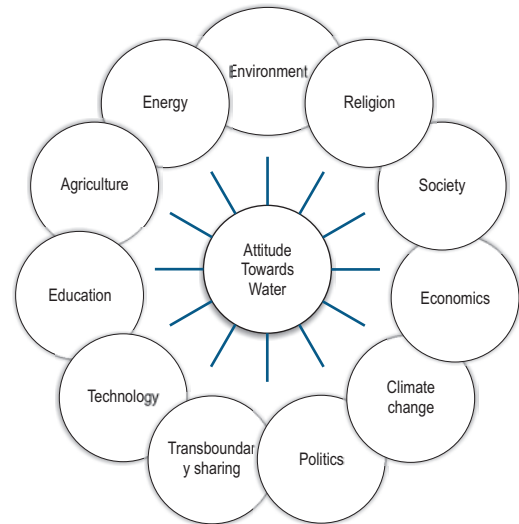
Among the wide range of issues identified were the following:

- A securitised discourse about water;
- Concern over which institutions (incl. donors) drive water policy;
- A focus on large-scale infrastructure as the solution;
- The problem of water storage;
- The issue of water data (lack of; disinterest in collecting; secretive approach towards);
- Seasonal challenges of too much/too little water (and droughts/floods);
- Concern over upstream riparians;
- Concern over ecology/salinity;
- Concern over pollution;
- Challenges of water management;
- Concerns about climate change/extreme weather;
- Issues relating to municipal water supply and drinking water availability;
- Dam construction or the lack thereof;
- The religious connotations of some rivers in South Asia
- Water as a necessity (human right) for agriculture, industry and individuals and issues relating to payment for water;

Divergent attitudes towards the importance of water conservation and better usage of water in agriculture, industry and by domestic consumers;

Second, we produced an exhaustive set of questions relating to the issues identified. These were then refined through an iterative process with partners and other stakeholders to focus on the key issues for the survey.

Figure 1.3: Survey Radials - Themes



Inherent to this process was a review of existing literature. This review was conducted with the broad aim of, firstly, identifying entry points in the larger discourse of debates and discussions around water. Secondly, the review was intended to discern narratives around the issues of critical importance in regional and trans-boundary water debates. Thirdly, it was used to identify important stakeholders and dominant constituencies in water management processes and practices.

The preliminary search words used were basic in nature yet specific to South Asia. For instance, search words like water resource management, water security and water scarcity were used to make a list of exhaustive references. These included: academic journals, scholarly articles, opinion pieces, books and other media sources. Certain patterns emerged while compiling the bibliography which guided more specific, inclusive and targeted literature review. Once, this preliminary outline was drawn, a broad set of issues were spotted through scrutiny of expert opinions from the above mentioned sources. In

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effect, issues were shortlisted based on their frequency of occurrence in the literature and thereby relevance to contemporary debates; these were then compiled under broad themes (see figure 1.3).

The streamlining of this process to produce 30 questions – most of which are open - was done on the following basis:

- Given limited time available to conduct an interview, those issues to which prevailing attitudes are widely known were rejected;
- Those issues to which attitudes may be known or strongly suspected but which will prove useful for the base-line element of the survey were included;
- Those issues to which attitudes may not be known but which would be less useful for the baseline element and which are unlikely to elucidate useful responses were rejected;
- Those issues to which attitudes are not known but which will elucidate useful responses were included;
- Those issues about which interviewees may not be aware but which were deemed worthy of exploration as a means of suggesting fresh thinking to interviewees were included;
- “Test questions” were rejected; interviewees may feel uncomfortable if they feel they are being tested on their knowledge of their subject;
- There are no right or wrong answers and there are no leading questions;
- Within different countries there are different discourses within each set of

issues; the questions are framed at a higher level and we expect the sub-themes in each country to be reflected in the responses;

- For each country we have taken the opportunity provided by this survey to explore attitudes to specific issues such as, in India, the river linking debate.

Next, pilot interviews were conducted to ensure that the questionnaire was both workable and elicited useful and informative responses. The survey was then finalised with a series of structured and semi-structured questions.<sup>10</sup> To take a specific example, the religious aspects of South Asia's rivers are under-explored, at least in the context of water management and trans-boundary water. In the case of India, we explored a range of different issues which we could address before finally deciding on two questions, one of which should elucidate a broad response exploring interviewees' attitudes towards religion, and another yes/no question which will demonstrate interviewees' assessments of pollution in the Ganges.

The email survey was formulated with the same set of questions. Unlike the interview, in most cases a set of possible responses (along with other) is provided. The email survey will be finalised after the interview process has begun; this is to ensure that the list of possible responses maps the types of responses provided by the first set of interviewees.

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10. Bernard, Russell H. 1995. Unstructured and semi-structured interviewing. In *Research methods in anthropology: qualitative and quantitative approaches* (2 Edition), pp.208-236. Walnut Creek, Ca: Alta Mira Press.



## Appendix 2: In-depth Interviews

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The original aim of conducting in-depth interviews was to provide a basis for interpreting statistically significant findings on the impact of converging and contrasting approaches in perceptions towards water. With a view of comparing the existing objective data with the subjective notions of water issues among the wide range of interviewees, a list of 165 respondents was catalogued. The pattern of questions was intentionally kept non-directional by using several forms of questions.<sup>11</sup>

Informal, semi-structured interviews, which served as verbal approximation of questionnaires, were systematically used throughout the interview process. Some questions asked were short and simplistic, keeping in mind the purview of the study, while others were open-ended so as to allow the respondent ample scope to include information that provided unanticipated findings to the researcher. Depth and personal context of the interviewees were kept in mind, acknowledging that emotional responses in the interview go beyond simple assessments.<sup>12</sup>

Interviews were conducted with a range of people from civil society, politics, academia and the private sector.

Acting or retired officials from the following institutions were interviewed, providing an indicative list of the broad cross-section of people

working on water-related issues who were consulted:

AECOM  
Alternative Futures  
Asia Foundation  
Asian Paints  
Central Ground Water Board  
Central Water Commission (CWC)  
Center for Policy Research  
Delhi Science Forum  
Environmental Resources Management (ERM)  
Ford Foundation, India  
Hazard Centre  
The Hindu  
IIM Kolkata  
IIT Delhi  
IIT Guwahati  
India Water Foundation  
Indian Association of Social Science Institutions (IASSI)  
Indian Council of Agricultural Research  
Indian Environment Law Offices  
Indian Environment Law Offices  
Indian Express  
Indian Institute of Public Administration  
Indian Law Institute  
Indian Law University  
Institute of Defence and Security Analyses  
Institute of Peace and Conflict Studies (IPCS)  
INTACH (Indian National Trust For Art And Cultural Heritage)  
Jawahar Lal Nehru University

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11. Merton and Kendell 1946

12. Casley, Dennis J. and Krishna Kumar. 1988. Introduction; Qualitative interviewing of individual informants; Conducting group interviews; and Participant observation. In *The collection, analysis, and use of monitoring and evaluation data*, pp. 1-53. Baltimore, Md: The John Hopkins University Press.

King's College London

Members of Parliament, Government of India

Ministry of Environment and Forests

Ministry of Power

Ministry of Water Resources

National Advisory Council

National Ganga River Basin Authority  
(NGRBA)

National Research Development Corporation  
(NRDC)

Observer Research Foundation

Parmarth Samaj Sevi Sansthan

Planning Commission, India

Punjab Agriculture University

Rajyasabha TV

River Research Institute

Tarun Bhagat Sangh

Telangana Vignyana Samithi

TERI University

Times of India

United Nations Framework on Climate Change

University of Delhi

University of Sussex



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# Attitudes towards Water in India



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