BRAHMAPUTRA:
TOWARDS UNITY

Scholars from Bangladesh, China and India explore the way forward for international cooperation in the Brahmaputra basin

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thethirdpole.net was launched in 2006 as a project of *chinadialogue.net* to provide impartial, accurate and balanced information and analysis, and to foster constructive debate on the region's vital water resources across the region. thethirdpole.net works in collaboration with partners across the Himalayas and the world to bring regional and international experts, media and civil society together for discussion and information exchange, online and in person.

We aim to reflect the impacts at every level, from the poorest communities to the highest reaches of government, and to promote knowledge sharing and cooperation within the region and internationally.

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thethirdpole.net
UNDERSTANDING ASIA'S WATER CRISIS

Brahmaputra: Towards unity
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Brahmaputra: Towards unity
Introduction

Isabel Hilton, thethirdpole.net editor

The Brahmaputra, or more accurately, the Yarlung Tsangpo Brahmaputra-Jamuna river, begins in the high glaciers of the Tibetan Himalaya and executes a dramatic turn to plunge through the world's deepest gorge. For 400 kilometres, the river twists around the mountains, dropping more than 2,000 metres in altitude and giving up huge energy potential as it goes. Hydropower experts see it as an Eldorado of energy potential. From the gorge, it bursts through to the northeastern corner of India. From there the river descends into the Assam valley of India and then the vast deltaic lowlands of Bangladesh to rendezvous with the Ganga, before reaching its final destination in the Bay of Bengal, having crossed three of the world's most populous countries – China, India and Bangladesh – along its journey.

Everything about this river system is on a majestic scale: as Bushra Nishat points out, it carries a volume of water greater than the combined flow of the 20 largest rivers in Europe, a greater volume than any river bar the Amazon and the Congo; it carries vast volumes of silt, the curse of dam builders, but life giving to farmers and fish, from the high Himalaya to the tropical seas of the Bay of Bengal. For thousands of years, millions of people have lived along its banks, dependent on the mighty river's pulse for the rhythms of their lives. It has inspired music and dance, stories and legend, tributes to the unchanging presence that is the foundation of their livelihoods.

Today, though, as the essays in this volume explore, this great river is under threat: climate change will alter its flow over the long-term, as glaciers and monsoon patterns and ground water reserves react to rising temperatures and changing patterns of use. More urgently, and potentially more catastrophically, the race to exploit the river's potential to produce energy, to establish the competitive claims of prior use, to build dams, diversions and barrages to harvest the river's power, risk destroying not only the Brahmaputra's unique character, but its wider economic, cultural and ecological value.

In October 2013, a group of experts from all three countries came together to examine the dangers that this rush to develop the river represents and to explore alternative approaches to the Brahmaputra. Their reflections and conclusions are contained in this volume.

In one of the most illuminating reports in this volume, Yang Yong, who has spent decades studying and observing the river in its Chinese reaches, points out the instability of the geology of the Himalaya – the landslides exacerbated by human activities and the earthquakes that shake these young mountains. He describes the alarming pace of degradation already evident in these upper reaches – the worsening desertification due to drought and dams, visible in wide swathes of eroded land, sand dunes and desert, with abandoned villages pointing to the loss of human habitat and livelihood.

This ecological degradation continues, under the pressure of human activity, threatening the ecological balance and the security of China and South Asia. In his book *Spoiling Tibet, China and resource nationalism on the Roof of the World*, Gabriel Lafitte warns of the impacts of the mining boom currently underway on the fragile Tibetan plateau:

"Today all of the environmental services Tibetans protected are threatened. Extensive land use is giving way to the inexorable logic of intensification, concentrating capital, technology and labour in enclaves designated for resource extraction, feedlot animal production or tourist gratification; leaving huge areas largely depopulated, surplus to the requirement of modernity.

Mining is rapidly turning the Tibetan Plateau from a cost centre, swallowing huge sums for infrastructure construction, into a profit centre focused on the 80 million tonnes of extractable copper, and 2,000 tonnes of gold proven by Chinese geological teams...China's new mines are set to operate in Tibet for decades, benefiting greatly from state investment in the roads, railways, communications, hydro dams, pipelines and urban infrastructure needed for profitable extraction enclaves to eclipse the old extensive ways."

It is on these already damaged upper reaches, Yang Yong reports, that eleven hydropower stations are planned, three from Sangri to Gyaca, and nine on the gorge up to the Great Bend, with a total generating capacity of 60 gigawatts. Work has already started on the *Zangmu Dam* on the Sangri-Gyaca section of the river; the dam is expected to be generating electricity this year.

The risks of these developments are manifold: this is one of the world's most seismically active regions, and many of the authors in this volume point to hazards of building large dams

in such unstable environments. Beyond that, the unknown impacts of dam building on the pulse and flow of the river and on its sediment load create the potential for catastrophic, long term effects downstream.

China is not the only country that is eyeing the Brahmaputra for its energy potential. The lack of a cooperative framework for managing the whole river systems has left it vulnerable to short term, competitive exploitation as rival neighbours race to stake pre-emptive claims. In India, 168 massive dams are proposed on the upper reaches of the Brahmaputra River and its tributaries in Arunachal Pradesh and Assam, both states rich in flora, fauna and cultural diversity. These plans, as in China, are made with little concern for the wider health of the river system or the interests of the millions of people who depend upon it. It is a race in which everyone risks becoming a loser.

This is not an argument against development, but a concern that the wrong kind of development, pursued in competition with neighbouring riparian states, risks destroying vital ecosystem that we only partially understand. Prem Shankar Jha, in his thoughtful contribution to this volume, proposes an alternative to hydro-development in advanced solar technologies, an alternative that is not only cheaper but that carries minimal risks to other economic, environmental and human systems.

Above all, the experts here are unanimous in their recommendations that the great treasure of the Brahmaputra urgently demands the greater knowledge that can only come through collaborative research, and through listening to a much wider cross section of voices, including affected communities, civil society, ecologists and environmental experts. (Teresa Rehman vividly describes the protests and resistance that dam projects in India have engendered, and points to the importance of the protester' claims to inclusion.) With better understanding of the complexities of the river's entire system, the need for cooperation becomes more evident, and the risks of competition to all those who currently share the benefits of the Brahmaputra, more manifest.

Governments, to date, have not been the Brahmaputra's friend, prioritising narrow, short-term developments ahead of the long-term health of the river and the economic and other security of their peoples. As Rohan D'Souza has powerfully argued, a river must be seen as a "collection of pulses, not a quantum of water flows." The "hydrocracy" – the water bureaucracy – that has dominated official discussions, he argues, is like the blind person who touches an elephant's tail and thinks he knows the entire animal.

It is high time we looked at the whole elephant, an effort that demands that we widen the circle of discussion beyond the narrow concerns of state-directed water bureaucracies and hydropower interests. Inter-state rivalry is as blinkered and dangerous an approach as is the predominance of narrow engineering interests over the larger concerns of livelihoods and ecological security. It is not too late to change tack, and Prem Shankar Jha, in his conclusions, points to some immediate steps that might be taken on the road to a new approach. This volume offers powerful and urgent arguments in favour of a new approach, and calls on all who value this vital and extraordinary river to raise their voices in its defence.

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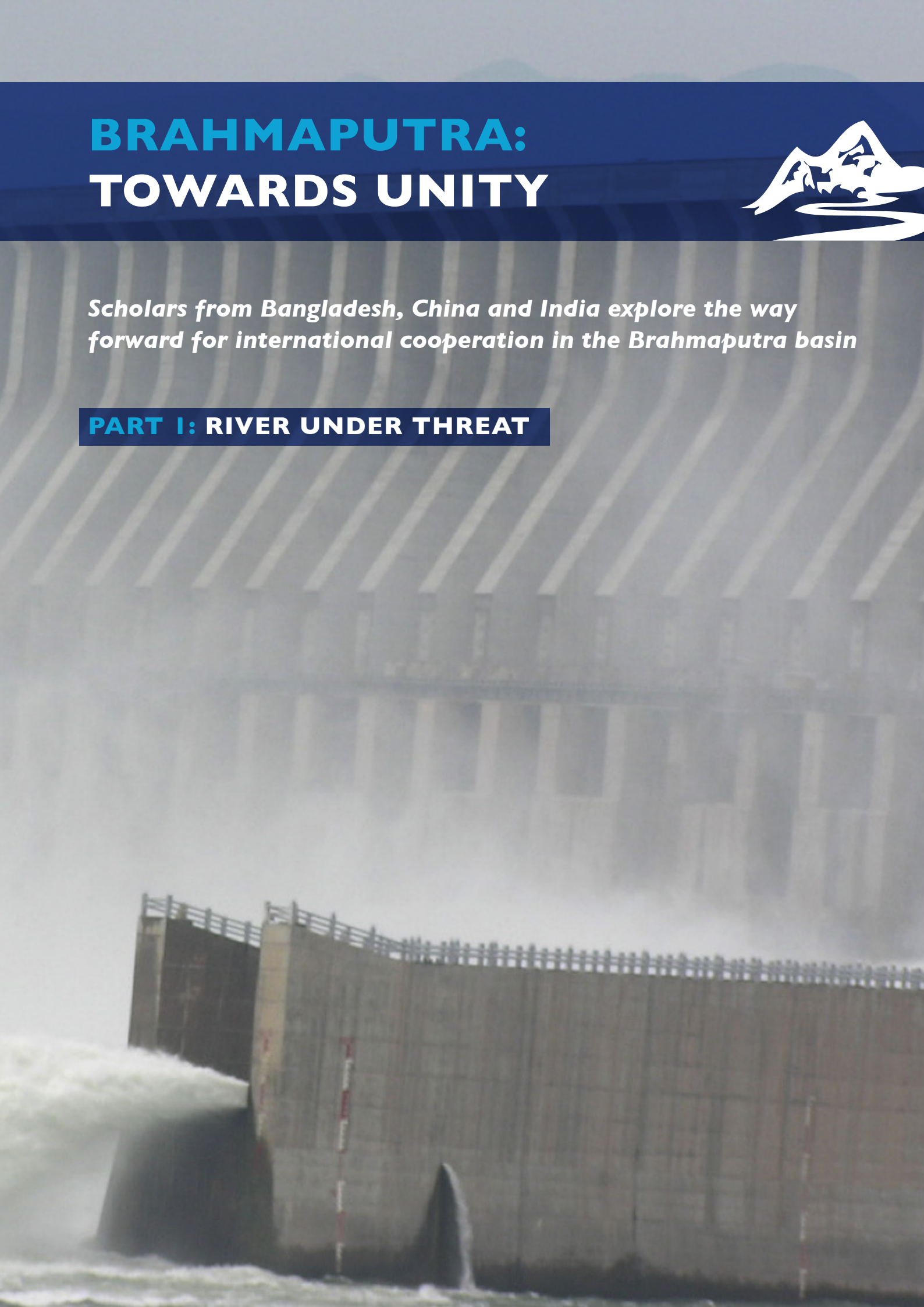
PART I: RIVER UNDER THREAT



Part 1: River under threat
Contents

Hydropower challenges for the Brahmaputra: a Chinese perspective

Yang Yong[1]

The Tibetan Plateau, the world's third pole, gives birth to many of Asia's major rivers. As the key for maintaining the continent's ecology and one of the world's most important ecosystems in its own right, it is of huge strategic significance.

The Brahmaputra (known as the Yarlung Tsangpo in Tibet), which runs alongside the majesty of the Himalayas, is the world's highest river. It runs west to east along the rift created by the impact of the Eurasian Plate, cutting through the Tibetan Plateau until it meets the point where the Himalayas, the Nyenchen Tanglha and Hengduan mountains join. Here it forces its way between the Gyala Peri and Namcha Barwa peaks to form the world's deepest gorge, then makes its way to South Asia where it joins the Ganga and flows to the Indian Ocean.

The Brahmaputra rises at a high altitude, in a geologically complex area. The river's powerful flow, long course and large drop in altitude give it great potential for development.

> *"Eleven hydropower stations are planned on the river, three from Sangri to Gyaca, and nine on the gorge up to the Great Bend, with total generating capacity of 60 gigawatts."*

Chinese scientists have been studying the Brahmaputra Gorge since the 1970s, and the basic surveys have mostly been completed: research into the evolution and geophysics of the lithosphere, investigations into the depths of the gorge and the mechanisms by which it was formed. The *Qinghai-Tibetan Plateau Survey Team at the Chinese Academy of Sciences* has also made significant progress in the study of the geology, topography, flora and fauna, climate, hydrology and glaciers of the region.

Between August and December 1998, I led a survey team on a trip down the Brahmaputra and the gorge, adding to the sum of human knowledge of this area.

Even so, progress in study of the Brahmaputra is urgently needed in a number of areas. Some are of global importance, and key to resolving the problems of development and preservation of the Tibetan Plateau.

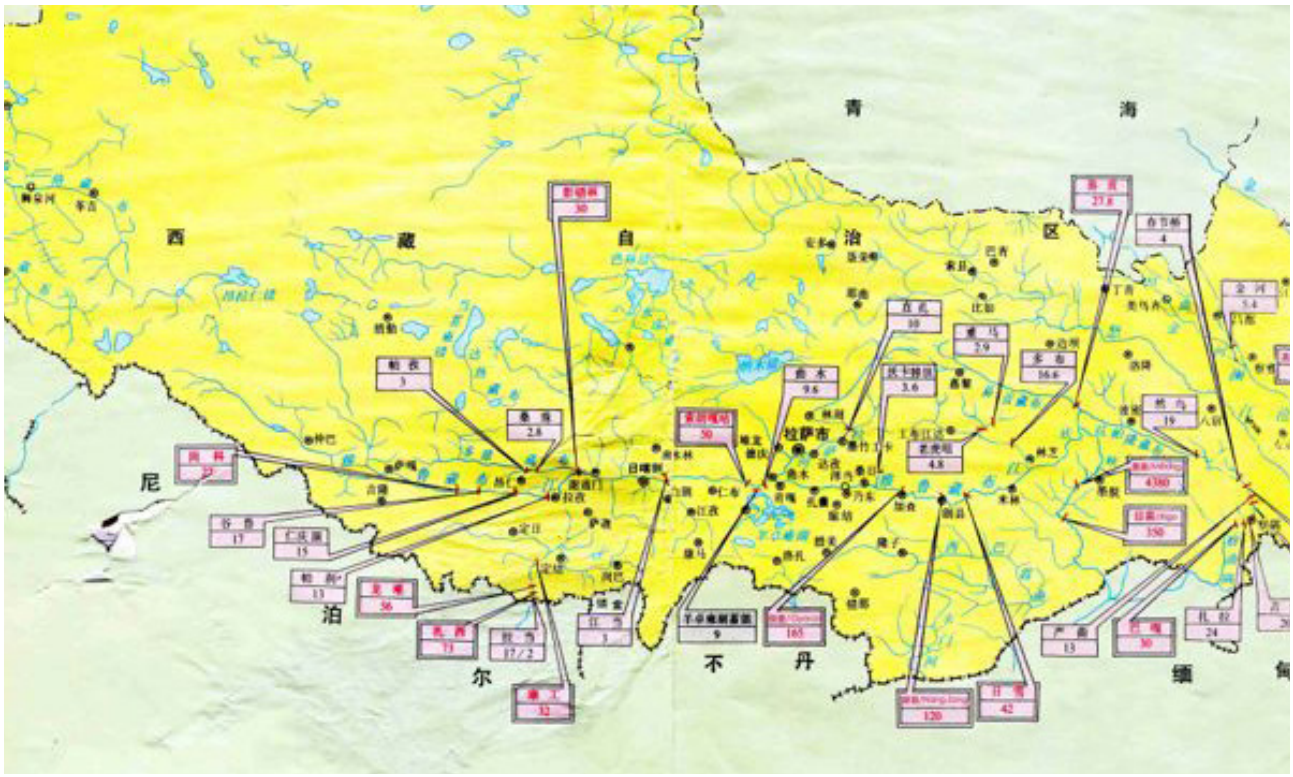
1. Yang Yong is director of the Hengduan Mountain Research Society. He has spent over 20 years rafting on China's rivers, exploring the network that drains the Tibetan Plateau. Yang was one of first rafters to navigate the perilous upper reaches of the Yangtze and the Yarlung Tsangpo to investigate the geological and hydrological conditions of the river basin.

After decades of studying the Brahmaputra, we are only just beginning to understand it – we do not yet have enough knowledge to support scientific policy decisions and sustainable development. Many scientific and technological issues need concentrated research: on resources and the environment, on patterns of geological activity, on climate change and disaster prevention, on river basin planning and development goals, on ecological security and international cooperation, and on regional stability and prosperity.

The temptations of hydropower

Upstream of the Great Bend of the Brahmaputra, after it is joined by the Nyang River, annual runoff reaches over 80 billion cubic metres; on the middle stretch of the gorge the river meets its major tributaries the Parlung Tsangbo and the Yi'ong Tsangbo, which drain a basin of 28,900 square kilometres with annual runoff of 37.22 billion cubic metres. Annual runoff where the Brahmaputra enters the Assam valley is over 150 billion cubic metres.

China has carried out hydropower development surveys of the river in the early 1990s and 2003, as shown in the map below:



Hydropower plans for the Brahmaputra and tributaries (as shown in the China Water Resources and Hydropower Atlas)

The Brahmaputra Gorge has been the focus of most interest. In the late 20th century, this gorge was recognised as the world's deepest. In the 400 kilometres from the top of the gorge (not the mouth) the river twists around the mountain of Namcha Barwa and loses more than 2,000 metres in altitude, forming several waterfalls and giving up huge energy potential as it goes. Hydropower experts say a tunnel that cuts the river's natural loop could carry

2,000 cubic metres of water a second, with a drop in altitude of 2,800 metres – enough to power a 50GW hydropower station that could provide 300 billion kilowatt hours of electricity a year.

Hydropower on the Brahmaputra

Planning for this hydropower project, the largest in human history, started in 2000, but little has been revealed of how that planning has progressed.

According to a 1991 China Water Resources Atlas, published by the Hydropower Development Department of the then Ministry of Energy; and the findings of a survey of China's hydropower resources, published by the General Institute of Water Resources and Hydropower Planning and Design in 2003, plans for the Brahmaputra are as follows:

Eleven hydropower stations are planned on the river, three from Sangri to Gyaca, and nine on the gorge up to the Great Bend, with total generating capacity of 60 GW. Work started on the *Zangmu Dam* on the Sangri-Gyaca section in 2010, and this is expected to be generating electricity in 2014.

Hydropower on the major tributaries of the Brahmaputra

Yi'ong Tsangbo: 280MW
Parlung Tsangbo: 190MW
Nyang River: 300MW, including 100MW from three dams already built at Bamsomtso
Aoka River: 50MW over three dams
Lhasa River: 200MW, a 100MW dam at Zhikong has already been built
Myang Chu River: 300MW
Dokzhung Tsangbo: 600MW
Between Dinggye and Pengqu in Gamba, almost 2,000MW
In the Zayu basin, almost 1,500MW

Plans for hydropower development on the Brahmaputra within China's borders total about 65GW.

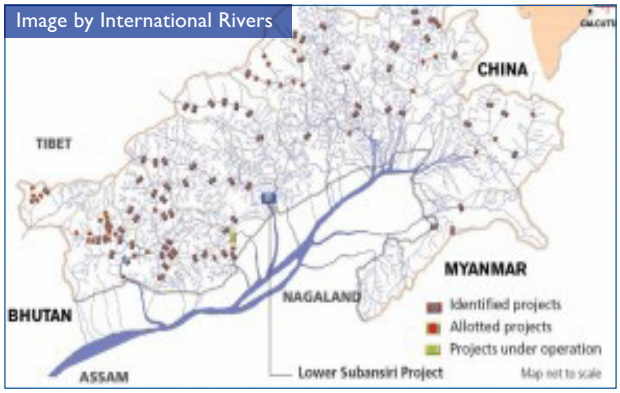
Hydropower on the Lower Brahmaputra

India has also been planning hydropower development along the Brahmaputra and its tributaries on a huge scale; public and private companies have proposed *168 massive dams*, to produce 57,000MW of hydropower in the country's northeast.

Risks and challenges

Desertification in many parts of the Brahmaputra watershed is worsening, with many grasslands on the upper reaches no longer fit for grazing, due to drought and dams. In many

places, there are wide swathes of eroded land, with stretches of sand dunes and desert in Shigatse, Qusum and Tsetang. The climate is becoming that of an arid valley and sand is encroaching on grazing land. The worsening environment has created a vicious circle, and the many abandoned forts and villages show the prosperity that has been lost.



The Brahmaputra Gorge was the greatest geographical find of the 20th Century and is known as a storehouse of genetic diversity, a transporter of moisture, and a rich potential source of hydropower. But my travels along the gorge made me realise that despite its grandeur and beauty there is no cause for optimism for the natural environment here. This is a young and still active geological formation, and coupled with the vulnerable ecology, development projects will be very difficult in this region. Any interference could have disastrous knock-on effects, from which the ecosystem may not be able to recover.

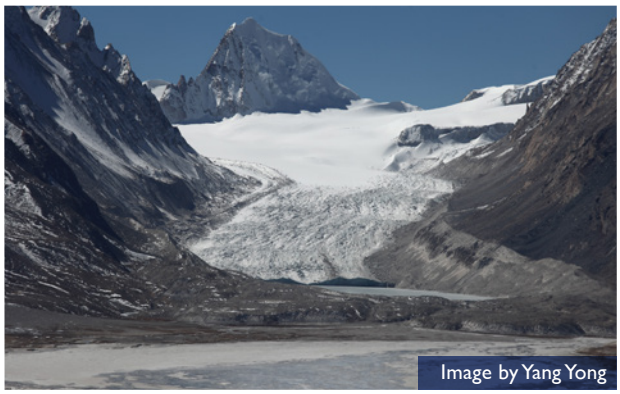
There are powerful geological stresses here, and seismic activity and landslides are common. The gorge is still taking shape, and in my studies I found over one hundred active landslips or mudslides which may in the future exacerbate any earthquakes. In the *early 1950s an earthquake* of magnitude 8 on the Richter scale caused many secondary landslides, which resulted in sustained flooding downstream. In April 2000 I personally witnessed a huge landslide at Yi'ong, which created a 4 billion cubic metre barrier lake. Sixty days *later the barrier*

Desertification on the upper reaches of the Yarlung Tsangpo

failed. The resulting floods affected millions and paralysed transportation. There is a high incidence of natural disasters of this type here.

The April 2000 massive landslide blocked the Yi'gong river, a tributary of the Yarlung Tsangpo, causing a massive flood downstream

The ecosystem of the gorge region is aging and in decline. The primary forests made up of tall trees are now over-mature and large swathes of forest over 2,500 metres in altitude are dying. Secondary growth is mono-cultural – the forests are failing to regenerate themselves. Meanwhile the Monpa and Luopa people who live deep in the gorge continue slash-and-burn methods of farming – the forests on many steep slopes have been torched to provide farmland, with a resulting rapid spread of soil erosion and landslides.



The Maquanhe glacier at the source of the Yarlung Tsangpo River

Much of the area's wildlife is facing extinction. The ecosystem of the gorge and surrounding areas have become fragmented, meaning animals have smaller areas in which to roam. This leads to imbalances in food chains and populations, while the mono-cultural secondary forests prevent populations growing and surviving. The biggest threat, though, is from hunters. On a forty-day trek through the gorge I often came across hunters, and deep in the forests there are many hunting families who decorate their homes with furs and bone ornaments, and who serve meat from their catch to guests. At one point we were about to run out of food, but were saved from hunger when we stumbled upon four Monpa hunters and their catch at the base of a cliff.

I have always believed that the Tibetan Plateau and the Brahmaputra should be developed for their ecological,, rather than economic, value. We should seek a route to development that draws on that ecological value, reducing environmental harm and the problems that result from it.

The Tibetan Plateau is home to the source of many of Asia's rivers and mountain ranges. The state of its natural environment directly affects the ecological balance and security of China and South Asia, and even the world. Its worsening environment is a major factor in the degradation of the ecologies of the Brahmaputra and other rivers, and interference from human development will only add insult to injury. If this continues, the glaciers and snowlines of the Himalayas will recede, depriving the rivers of a source of water, and the plateau's waterways will be cut off or even dry up – and the land become a desert.

Glaciers that feed the Brahmaputra have melted rapidly to form a glacier lake

Urgent issues to address:

1) Research on the impact of climate change on the Tibetan Plateau – rising snowlines, shrinking glaciers, changes in river systems, hydrological changes, expanding desertification, etc.

2) Research on the ecological value and role of the Tibetan Plateau. Set development and industrial targets which account for the degrading grasslands, desertification, and drying up of river sources.

3) Research the patterns of earthquakes and other geological disasters, and the risks of engineering projects, and ways to prevent extreme climate disasters; establish cooperative disaster prevention and relief mechanisms.

4) Achieve the research necessary to inform scientific policy making on development on the Tibetan Plateau and Brahmaputra River.

5) Establish cooperative mechanisms in the fields of science and development between countries concerned, undertake planning at the river watershed level.

6) Face disputes over territorial sovereignty, avoid conflict and controversy over development, and maintain peace and stability in border regions.

Dialogue of the deaf

Teresa Rehman[2]

Civil society is up in arms over plans to turn northeast India into a hydroelectric powerhouse. But a lack of data on ecological and cultural impacts is stalling the debate

A new "powerhouse" is emerging in the frontier state of *Arunachal Pradesh*, northeastern India. Public and private companies have proposed *168 massive dams*, to produce 57,000MW of hydropower, in this strategically important region, which borders Myanmar in the east, Bhutan in the west and China in the north.

Big money is involved. Arunachal Pradesh amassed 168.7 crore Indian rupees (nearly US$34 million) from hydroelectric project processing fees and developer premiums alone, in the year 2010 to 2011. Apart from the micro hydroelectric projects, mega-schemes have been planned on the five major river basins of the state, Kameng, Subansiri, Siang, Dibang and Lohit.

Image by International Rivers

> *In the belts inhabited by the Adi tribe 43 massive dams are coming up. Our language, forest, rivers, culture, tradition and identity will perish.*

All of these dams are proposed for the upper reaches of the *Brahmaputra* River and its tributaries in Arunachal Pradesh and in Assam, the next state downstream. The Brahmaputra – known as the *Yarlung Tsangpo* in Tibet, where it originates, and the Jamuna in Bangladesh – is one of the world's largest rivers. Together with the Barak River, it ties together much of northeastern India, a region known for its flora, fauna and cultural diversity.

The issue of big dams in northeast India is getting more complex every day. Resentment against the projects has already led to a series of agitations, mostly in Assam. The epicentre of the controversy now is the *Lower Subansiri Dam*, a 2,000MW hydroelectric project being built by the state-owned *National Hydroelectric Power Corporation* (NHPC). The project is located

2. Teresa Rehman is Managing Editor of the www.thethumbprintmag.com, based in Assam, north-east India.

in Gerukamukh on the lower reaches of the Subansiri, a tributary of the Brahmaputra, on the border of Assam and Arunachal Pradesh, and is the largest dam now under construction in India.

But, since *December 16* 2012, work on the project has been almost at a standstill, thanks to opposition, led in Assam by a farmers' organisation called *Krishak Mukti Sangram Samiti* (KMSS). The protesters say the dam will affect the flow of water on the Brahmaputra, which will impact irrigation downstream, and increase the danger of sudden floods in an area that is already highly flood-prone. The protesters have clashed with the police many times. On one occasion, the police opened fire, injuring many protesters.

Dissent is also growing over the proposed 1,750MW Demwe Lower Hydroelectric Project, positioned barely 800 metres from *Parsuram Kund*, a sacred Hindu site on the Lohit River in Arunachal Pradesh. Reports say the 13,000-crore rupee (US$2.6 billion) project will likely involve the felling of more than 43,000 trees, and threaten endangered wildlife species including the *Bengal Florican* and the *Ganges River Dolphin*.

Discord over the dam has triggered animated debates on television and in public forums; protests; motorcycle rallies; road blockades; and even violence. Activists hold that engineers and technocrats alone cannot determine all aspects of the impact of dams on people downstream. They argue the authorities must also involve social scientists, who will understand how the identity of certain ethnic communities will be lost forever if they are uprooted from their homelands.

Ethnic minority communities like the Lepchas of Sikkim and Idu Mishmis of Arunachal Pradesh have expressed apprehension about the multiple mega-dam projects on their native soil. But at the same time, some of the 20-odd major tribes in Arunachal Pradesh have supported the dams. Environmentalists say that the support is coming from tribes with a stake in the state's ruling Congress party, while those who would be displaced by the dams are from smaller tribes, with fewer votes.

Raju Mimi, a young activist from the Idu Mishmi tribe of Arunachal Pradesh, explained how his community of around 12,000 has been protesting against construction of the 3,000MW *Dibang hydroelectric project* in the Lower Dibang Valley: "The whole dam-building process has been going on without taking the people into confidence or their participation. Most of the local people are dependent on agriculture and are not ready for such big dam projects. They will be further marginalised culturally, economically and politically." Mimi also said that powerful tribes have been promised money or other benefits from the projects and see them as a route to power and riches.

The NGO Forum for Siang Dialogue has been leading the movement against the 2,700MW Lower Siang Dam in Arunachal Pradesh and a 10,000MW dam on the Upper Siang. (The Yarlung Tsangpo is called the Siang as it enters Arunachal Pradesh from China; it becomes the

Brahmaputra further downstream.) The forum's spokesperson Vijay Taram said: "In the belts inhabited by the Adi tribe [which has a population of over 150,000], 43 massive dams are coming up. We are on the verge of being annihilated by all these developmental activities. Our language, forest, rivers, culture, tradition and identity will perish.

"This land belonged to our forefathers and today we are being asked to vacate it. The compensation offered is meagre – just 1.5 lakh rupees [US$3,000] per hectare." He added that their village elders have repeatedly pleaded for the Siang to be able to "flow of its own free will". The forum supports the construction of small dams.

The proposed dam sites are ecological hotspots. Wildlife biologist, Firoz Ahmed, said: "A dam kills the river and its ecosystem over a period of time, putting at risk all flora, fauna as well as human beings. Wildlife species like the river dolphins, elephants and tigers will be affected." Fish and other species in the rivers are also likely to be drastically impacted by the flow regime, which will artificially change the river flow in line with electricity generation needs.

Developers point out that state and federal governments approved each hydro project only after a detailed *Environmental Impact Assessment* (EIA). Under the law, open consultations with affected people – called public hearings – are supposed to be integral to an EIA. Activists and local residents argue that these public hearings were not held in a transparent or inclusive manner.

There is little sign so far that either the state authorities or India's central government are going to agree with the opponents of the dams. Apart from the hydroelectric potential of these projects, security analysts in India point out another reason why they would like the dams to be built. Medha Bisht, of the influential think-tank the Institute for Defence Studies and Analysis, wrote recently, "The urgency of dam building in Arunachal Pradesh on the part of the Indian government can also be gauged from the strategic importance that water rights have for states sharing transboundary rivers. Diversion of the Brahmaputra by China has received much attention in the past few months. The spate of dam building in Arunachal Pradesh therefore has to be situated in this broad context of establishing 'prior use' on Brahmaputra waters."

There is serious concern in India that the Chinese government is planning to divert the waters of the river to the parched regions of northern China. This is the western route of the *South-North Water Transfer Project*, which Beijing says it has dropped because it is not feasible. But alarm bells ring loudly in India every time someone in China says something in support of the diversion plan, and the Chinese government is repeatedly forced to deny that there is any such plan. According to the authorities in Beijing, there is only *one hydroelectric project* being built on the Yarlung Tsangpo before it crosses into India, and that is a "run of the river" project, which does not involve holding back water behind a dam. The unease in India persists despite these assurances, and those researching the subject say it would be better for

everyone if China and India were to enter into a transparent and fair water sharing pact on the Brahmaputra.

One major problem surrounding any debate over the dams is lack of data. "Very little scientific information and documentation on which a good debate can be held is available," said Partha Jyoti Das, senior scientist at the NGO *Aaranyak*, who has been studying the Brahmaputra basin and local dam projects. There is little data in the public domain on seasonal changes in the current water flow in the various rivers, let alone how dams will affect that flow. Similarly, the lack of data makes it difficult accurately to predict the effects of the dams on the ecosystem.

There are also serious data gaps when it comes to the many tribes and communities who live in this part of India. Right now, project supporters use these gaps to justify describing criticism as "mere emotional outbursts". But in future, such gaps can be major obstacles to the rehabilitation of people displaced by the dams.

Apart from the committed supporters and opponents of the dams, public opinion in northeastern India is veering in favour of a consensus based on scientific opinion. But both physical and social scientists are working in largely uncharted waters. There is an immediate need to study the hydrology, ecology and society of the entire Brahmaputra basin in far more detail than has been done to date.

China-India water cooperation tough without border resolution

Wang Yan[3]

Border disputes continue to overshadow China-India cooperation over the Brahmaputra, but a more positive approach from China will help

On a visit to India in May, Chinese premier Li Keqiang said that the two countries would no longer avoid talking about their differences – everything, including border disputes and water sharing issues, was up for discussion. In October, those talks bore fruit, with long awaited progress on river issues. Li and his Indian counterpart Manmohan Singh, meeting in Beijing in their second summit of the year, signed a *Memorandum of Understanding* (MoU) on strengthening cooperation on trans-border rivers, one of nine different agreements reached.

China and India are both planning a slew of large-scale dams along the Brahmaputra in disputed territory

> *Gathering data during the monsoon season is difficult, there is a lack of trust between the two nations, and scientific data is subject to national security considerations.*

Under the agreement, both parties recognised that "trans-border rivers and related natural resources and the environment are assets of immense value to the socio-economic development of all riparian countries" and agreed to cooperate through the existing expert level mechanism on flood-season hydrological data and emergency management. China also agreed to provide India with monsoon-season hydrological data for the Yarlung Zangbo[4] (known in India as the Brahmaputra) for an extra two weeks every year, from May 15, rather than from June 1, to October 15.

The agreement made frontpage news in the Indian papers. A headline in *The Hindu announced* that "China will be more transparent on trans-border river projects" while the *Indian Express wrote* that "China's acceptance of downstream rights is without precedent,

3. Wang Yan is a journalist at NewsChina Magazine, the English edition of China Weekly, covering environment issues.

4. The river is known as the Yarlung Zangbo in Chinese, and the Yarlung Tsanpo in Tibetan.

and this is to date China's only written agreement with a neighbour on these issues." But Indian academics expressed disappointment, complaining the deal did not cover the real problem: China's hydropower development and dam building on the Yarlung Zangbo.

Stony silence from Chinese officials

The MoU did not make so much of a splash in the Chinese papers. When asked about the significance of the deal, the International Rivers Office at the Ministry of Water Resources' Department of International Cooperation, Science and Technology, waited a week before declining to comment.

Development of the Yarlung Zangbo has always been a *sore point in relations* between China and India. India worries that Chinese hydropower dams will affect downstream flows. *Brahma Chellaney* of the Centre for Policy Research, an Indian think-tank, has even said, "China seems intent on aggressively pursuing projects on the Yarlung Zangbo and employing water as a weapon." A spokesperson at the Ministry of Water said China had no plans for any hydrological projects at the *Great Bend of the Yarlung Zangbo*, before the river flows into India. Meanwhile, China would see any Indian development further downstream as threatening its claims over Arunachal Pradesh, which it refers to as South Tibet.

Li Zhiwen, a deputy researcher at the *Chinese Academy of Social Sciences' (CASS) Institute for Asia-Pacific Studies*, said that China was firmly opposed to any attempt by India to strengthen its de-facto control of the region by developing the Brahmaputra, while India holds that development would not weaken that control. "So real progress in talks on trans-border river and water allocation issues is unlikely, as the negotiations cannot avoid the status of South Tibet."

Li argued the strategic significance of the new agreement was clear, but that China-India cooperation in this field is still just getting started, and has not yet dealt with the real issues – and so the problems cannot yet be solved. Although the two parties have opted to work together, any discussion of river development will inevitably run into questions of territory. Talks on sovereignty have decided to maintain the status quo, meaning that neither party will make any concessions. "So it can be expected that cooperation on trans-border rivers will go no further than these early exchanges of hydrological and flood-control information."

But some Chinese academics have expressed confidence in future trans-border river cooperation. Yang Xiaoping, deputy researcher with the *National Institute of International Strategy at the Chinese Academy of Social Sciences* (CASS) specialises in Chinese-Indian relations. She pointed out that the timetable for provision of flood-monitoring data on the Yarlung Zangbo had not changed since the agreement was first signed in 2002, more than a decade ago. "It might have changed by just two weeks, but even that is a big step forward." Yang added that, "gathering data during the monsoon season is difficult, there is a lack of trust between the two nations, and scientific data is subject to national security considerations."

Commenting on the outlook for the future, Yang said there can be further progress on institutionalising cooperation. So far there have only been MoUs, but in future a working group could be set up to improve cooperation on flood warnings, environmental protection and biodiversity.

"For Chinese academics, trans-border rivers are not the decisive factor in relations with India. But if China takes a more positive approach, it will improve its image among neighbouring countries."

Why India and China should leave the Brahmaputra alone

Prem Shankar Jha[5]

In October 2012, Indians learned that China had begun to construct a 700 megawatt (MW) capacity dam on the Brahmaputra river (Yarlung Tsangpo). The news aroused dormant fears that China intended not only to generate power from the river but also divert some of its waters to the arid northern regions of the country. This possibility was first mentioned at the first international conference of the *Global Infrastructure Fund in Anchorage, Alaska*, in 1986. Although Chinese officials rubbished the idea as being impossibly expensive to implement, they did not rule out the possibility of constructing dams on the river to generate power. This ambivalence raised *understandable alarm* in Bangladesh and India, but Beijing sought to allay their fears by assuring them that it intends to build run-of-the-river dams that will redirect, but not stop, the flow of its waters into India and Bangladesh.

> ***The 1934 earthquake devastated parts of the Indian state of Bihar and eastern Nepal, and killed at least 30,000 people. This was the death toll when there were no dams in the mountains.***

These reassurances have not, however, prevented China and India from entering into an undeclared race to capture the hydroelectric potential of the *Brahmaputra river basin*. Chinese writers began to air plans for *harnessing the Yarlung Tsangpo* in 2005, but it is possible that the Indian government had already begun to formulate its plans after the *publication of a book* by Li Ling in 2003 entitled *Tibet's waters will save China*. As the downstream riparian, India is hoping to establish first user rights to stake its claim to an uninterrupted flow of the Brahmaputra's waters. In international law, first user rights start upon the completion of a project, so the number of projects that India has signalled it will take up in the Brahmaputra basin has risen rapidly – from 146 announced in a 10-year hydroelectricity plan unveiled by India's *Central Electricity Authority* in 2007, to about 200 today. What is more, a scramble has developed to start as many of these as soon as possible.

The pace of planning and implementation has also picked up in China. Citing the need to cut down carbon dioxide emissions, the *12th Five Year energy plan*, unveiled in 2012, shifted its emphasis back onto giant hydroelectric projects once more. One of its most important goals is to harness the hydropower potential of the Yarlung Tsangpo basin. In all, China intends to build 40 dams on the river and its tributaries. Of these, 20 dams on the Yarlung Tsangpo will generate 60,000 MW of power, while 20 smaller dams upon its tributaries are expected to generate another 5.000 MW. Eleven of the 20 projects on the Yarlung Tsangpo will be located

5. Prem Shankar Jha is an author and journalist based in New Delhi

between its source and the Big Bend where the Brahmaputra turns northwards, executes a huge 'U' turn and falls from 3,500 metres on the Tibetan plateau to 700 metres in the undulating hills of Arunachal Pradesh in India. These will generate 20,000 MW of power. The balance, of 40,000 MW, will be generated at the Big Bend itself. The plan for doing this has been put forward by ex-Premier Li Peng's family-dominated corporation, the Three Gorges Dam Company. It envisages building a vast tunnel under the ridge that separates the two arms of the Big Bend to divert 50 billion cubic metres of water a year from the northwestern flowing arm of the river to the south-eastern arm over a succession of nine cascading hydropower dams that will generate 40,000 MW of power. India, for its part, plans to generate 22,000 MW from two large dams on the Brahmaputra in Arunachal Pradesh and 10,000 MW from dams on its tributaries. In all, therefore, the two countries plan to generate 97,000 MW of power from this tiny region of their respective countries.

Such ambitious but conflicting plans were bound to have political repercussions. The first was a *statement by the Chinese ambassador in New Delhi*, just days before President Hu Jintao paid a state visit to India, that China considered the whole of the northeastern state of Arunachal Pradesh to be a part of Tibet. This was a reversal of its earlier position, developed in a succession of bilateral negotiations since 1994, that China was prepared to settle for a substantial modification of some parts of the existing temporary boundary, called the Line of Actual Control. The announcement took the Indian government by surprise and was followed by three years of rising tension along the border. China began to refer to Arunachal as "South Tibet", and to its principal monastery at Tawang as Tibet's second most important monastery after Lhasa. It also began to deny visas to Indian officials who were serving in Arunachal Pradesh. The tension was not defused until there was a *meeting between Premier Wen Jiabao and Prime Minister Manmohan Singh*, at Hua Hin, Thailand, in October 2009, designed specifically to prevent its *spilling over* into military conflict.

Calamity waiting to happen

These plans are engineers' dreams run amok. If they have their way, up to 360 dams will be built on slopes with a gradient of as much as 60 degrees, at the meeting point of three of the youngest and most unstable mountain ranges of the world. But neither the Chinese nor the Indian government have made even a rudimentary assessment of the impact that gouging out billions of cubic metres of rock and earth to build dams, tunnels and roads, and store millions, in some cases billions, of cubic metres of water, in will have on the stability of the earth's crust in this region.

This is turning a blind eye to nature with breathtaking insouciance. Both governments cannot but know that the *Himalayas have regularly experienced the most powerful earthquakes on land* in recorded history. Four of these, measuring 7.8 to 8.9 on the Richter scale, have occurred within a span of 53 years between 1897 and 1950. The first and last occurred just in the region immediately south and west of the Big Bend in the Brahmaputra. The 1897 earthquake measured 7.8 on the Richter scale (equivalent to the explosion of 7.6 million tonnes of

dynamite, or a medium sized hydrogen bomb) and caused widespread damage and loss of life in what was then called Upper Assam. It was caused by the build up of pressure as the Indian (tectonic) plate pressed against the Shillong Plate, a part of the far older Eurasian Plate.

The 1950 earthquake was the severest ever recorded in the Himalayas. It occurred at Rima, in Tibet, not far from the site of the 1897 'quake. Measuring 8.7 on the Richter scale, it is one of the 10 most severe earthquakes in recorded history. Its epicentre also lay on the fault line where the Indian continental plate smashes into the Eurasian plate. Survivors from the region reported mudslides damming rivers and causing giant floods that brought down sand, mud, trees, giant boulders and all kinds of debris when these broke.

These were neither isolated nor exceptional events. Earthquakes in the Himalayas regularly cause landslides that block rivers, causing them to rise till the pressure of the stored water breaks through. The result is a flash flood downstream that causes havoc among the villages and towns that lie in its path. The avalanches caused by the1950 earthquakes blocked several of the tributaries of the Brahmaputra. One such dyke in the Dibang valley broke quickly and caused relatively little damage. But another, *at Subansiri*, broke only after water had collected behind it for eight days and unleashed a seven-metre-high wave that submerged several villages and killed 532 people. Geological studies, including the radio carbon dating of sand found on the surface, have uncovered at least one other giant earthquake in the same area in 1548, and two others in the central region of the Himalayas that were severe enough to rupture the earth's surface. The first of these occurred in 1255. The second was the devastating Bihar earthquake of 1934.

The 1934 earthquake, which measured 8.1 on the Richter scale had its epicentre about 10 kilometres south of Mount Everest. It devastated the northern part of the Indian state of Bihar and large parts of eastern Nepal, and killed at least 30,000 people. This was the death toll when there were no dams in the mountains. The dykes that the landslides created were made of mud and boulders, and they broke in a matter of days. But earthquakes of this magnitude will almost certainly crack concrete dams as well. The Richter scale is a logarithmic scale.

An 8.1 magnitude earthquake releases three times as much energy, and an 8.7 magnitude releases 23 times as much, as a *7.8 magnitude 'quake*. Should any of the giant dams being contemplated by the two countries crack during an earthquake, the colossal wave of water, mud and boulders that will be released will kill millions of human beings and devastate tens of thousands of square miles of the downstream areas of Tibet, India and Bangladesh. The overwhelming majority of deaths will take place in India and Bangladesh.

India got a foretaste of what a flash-flood upriver in the Yarlung Tsangpo basin could do when one wiped out an entire island in the Brahmaputra, killing nearly all who lived on it. Chinese hydrologists knew that the flood would occur, but did not warn their Indian counterparts. India got another taste of it in June 2013, when a landslide caused by three days of incessant rain blocked a tributary of the Bhagirathi river, one of the two main tributaries of the Ganga,

in mid-June 2013. When the dyke it had created broke on the third day, the resulting flash-flood destroyed the entire pilgrimage town of Kedarnath and killed between 5,000 and 10,000 pilgrims in a matter of hours. Had the hillsides overlooking the Bhagirathi not been ravaged by the construction of dams and tunnels for the *Tehri hydroelectric project*, this catastrophe might not have happened.

Boulders brought down by the collapse of a mudslide dam created a flash flood in the Bhagirathi River destroying the Vishnuprayag power station in Uttarakhand, India. June, 2013

The Tehri project is a pygmy compared with the nine-cascade project proposed for the Big Bend, as its generating capacity is only 1,000 MW. The death toll from the fracture of even one of these dams will, therefore, run into millions. If the two governments go through with their plans for the Brahmaputra–Yarlung Tsangpo basin, the entire region will become a calamity waiting to happen.

Solar alternative

The two countries are prepared to take such a terrifying risk because they believe that they have no other alternative. This might have been true 10 years ago, but is no longer true today. Solar power has finally come of age. Today, it can do everything that coal based and hydropower plants can do. In Spain, for instance, a solar thermal power plant that began to supply power to the national grid in 2011, celebrated the second anniversary of its commissioning on October 2, 2013 by providing uninterrupted day-and-night power to the grid for 37 days.

The plant is *Terresol's 19.9 MW Gemasolar Thermosolar* plant at Fuentes de Andalucia. It is the first solar plant in the world that is designed to provide power throughout the day in exactly the same way as coal fired plants do. To do this, it concentrates the sun's heat, collected from 2,650 heliostats, and stores it in a mixture of potassium and sodium salts to generate power for 15 hours a day in the sun's absence. It is not possible for a solar photovoltaic plant to deliver round-the-clock power because of the high cost of storing electricity. But it is possible for a solar thermal plant to do so, because this combination of molten salts loses only *1% of the stored heat in a day*. The Gemasolar plant therefore guarantees, and has been supplying, power for 6,500 hours a year, thus achieving a plant load factor of 75%. Of this, in an average year, stored heat generates 5,475 hours of power, while direct sunlight is required for only the remaining 1,025 hours, or barely three hours a day.

Gemasolar uses the latest, most economical, solar heating system-- the central tower (CWT) system. Allowing for the land needed by the generation plant, the CWT system requires little less than a square kilometre for every 10 MW of generating capacity. Thus, 97,000 MW of generating capacity that China and India hope to establish in the Brahmaputra basin can be set up on 9,500 square kilometres of land. However, the total amount of power that these

projects will be able to extract can be had from half this amount of land, an area less than 50 kilometres by 100 kilometres in size. This is because, while hydropower plants in the Himalayas, like the *Bhakra Nangal project* in Punjab and *Nathpa Jhakri plant* in Himachal Pradesh, have not provided more than 3,300 hours a year (even the Three Gorges dam has never exceeded 4,360 hours), Gemasolar has been delivering power for 6,500 hours.

Spain's Gemasolar solar thermal plant uses molten salt storage to run 24 hours per day

Solar thermal power has a second vital advantage: it saves precious time. While the Bhakra Nangal storage dam and the *Three Gorges dam* complex in China took 12 years to complete, and the Nathpa Jhakri project took 15 years, the Gemasolar plant came into operation in only two and a half years. Apart from their other advantages, therefore, solar thermal plants will provide the needed power at least 10 years sooner than their hydroelectric counterparts. In those 10 years, it will generate additional GDP, additional investment and additional jobs.

Comparing true costs of energy from various sources

How does all this stack up when it comes to economic viability? Using the 'bare' capital costs of different types of power plants in the US in April 2013, and plant load factors and running costs found in China, India and (for Gemasolar) Spain, the table below compares the private and social cost of power delivered to the national grid from coal-thermal, hydro, nuclear and solar thermal plants. It shows that the true economic cost per megawatt hour (MWh) of solar thermal power is one- seventh of the cost of hydropower and one third that of coal based power. All of its other benefits – benefits that can save human beings and most other species on the planet from extinction – are additional to the economic benefits calculated above.

Comparison of economic cost of alternative power sources

	Thermal	*Nuclear*	*Hydro*	*Solar*[1]
Capital cost/ MW capacity (US$m)	3.246	5.530	2.936	7.314[3]
Plant Load Factor (hrs/yr)	6400[2]	7884[2]	2893[2]	6.500[4]
Cap cost per MWh (US$)	507	701	1014	664
Variable cost per MWh (US$)	60[5]	60[5]	20[5]	32[5]
Total cost per MWh (US$)	617	761	1034	694
Construction period (years)	5	8	10	2.5[6]
Net saving foregone[7]	1350	2970	4050	0
True Capital cost per MWh ($US)[8]	**1967**	**3731**	**5084**	**694**

1. Capital cost based upon the technical specifications of the Gemasolar 19.9 MW central tower CSP set up at Fuente de Andalucia in Spain, which came into operation in May 2011.

2. These PLFs are the actual experience in India. The PLF for nuclear power plants is that achieved in plants that have not experienced difficulties in obtaining uranium.

3. Based upon price of heliostats prices quoted by Chinese suppliers (US$120 per sq.m) and the assumption that these account for half of the total cost of the solar thermal plant. One American supplier is also offering these at US$126.

4. PLF based on 15 hours of supply per day from stored heat and three hours from direct sunlight being delivered by the Gemasolar plant.

5. Estimated as 2% of capital cost, plus cost of consumed raw materials. In the coal thermal plant it is assumed that 700 kilogrammes of coal are needed per MWh. It is priced at US$35 per metric tonne plus cost of handling and delivery at the plant. For want of precise data it is assumed that the cost of uranium consumed is the same as of coal.

6. Actual construction period at Fuentes de Andalucia was 2 years, 3 months.

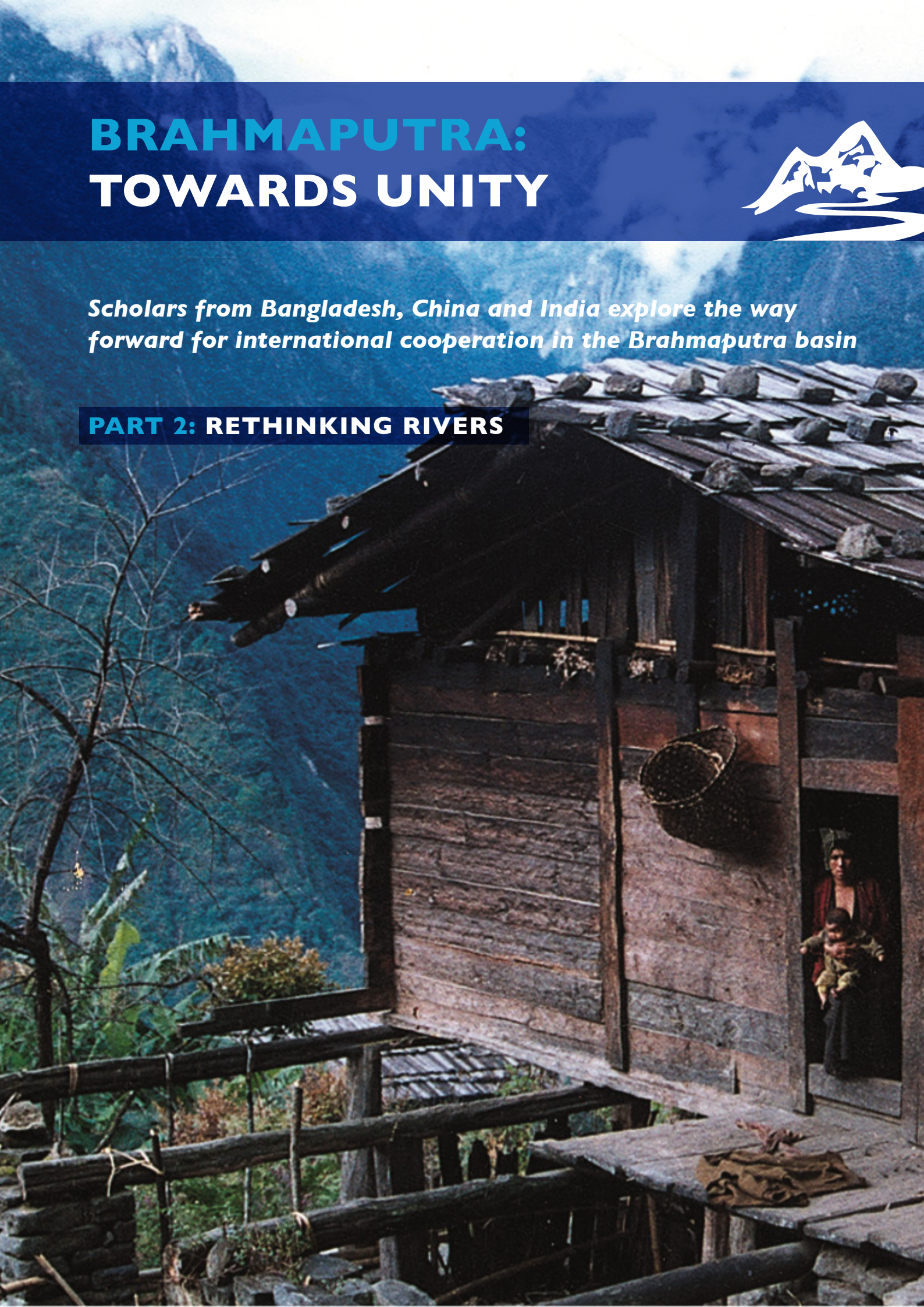
7. This is calculated as the saving out of additional GDP that is foregone during the longer gestation period of the project. In India, the GDP in 2011-12 was US$1.5 trillion and the saving rate was %. These ratios have been applied to all the four types of plants

8. This is row 5 + 7.

BRAHMAPUTRA: TOWARDS UNITY

Scholars from Bangladesh, China and India explore the way forward for international cooperation in the Brahmaputra basin

PART 2: RETHINKING RIVERS



Part 2: Rethinking rivers
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View the Brahmaputra as a living ecosystem

Joydeep Gupta[1]

The India-China row in Ladakh has eclipsed unresolved water-sharing issues along the Brahmaputra. But for any agreement to work, it must involve the people who depend on the waters

When India's prime minister, Manmohan Singh, and China's president, Xi Jinping, held their first meeting on the sidelines of the *BRICS summit in Durban last year*, the one specific item on Singh's agenda was the need for a joint mechanism to look at China's hydropower projects on the Brahmaputra, the river called the Yarlung Tsangpo in China.

Clearly aware of the many fears these projects raise in India, Xi was quick to assure Singh that China was aware of its responsibilities towards lower riparian countries, and that he would ask his officials to consider a joint mechanism.

> *"the "hydrocracy" – the water bureaucracy – that has dominated official discussions, is like the blind person who touches an elephant's tail and thinks he knows the entire animal."*

The conversation has now been eclipsed by the row over Chinese soldiers building a structure 10 kilometres into what India considers its territory in Ladakh, near the western edge of the border between the two countries. Multiple meetings between military officials have failed to resolve the standoff at the disputed border, though both countries have so far been careful not to let the matter escalate.

Meanwhile, Manmohan Singh and India's water resources minister, Harish Rawat, have repeated that the Chinese projects will not reduce water flow in the Brahmaputra, as they are run-of-the-river hydropower projects. But the Indian government's own panel of experts has expressed worries that the projects will reduce water flow in the Brahmaputra, especially in the lean season.

A few weeks before Singh's meeting with Xi, the expert panel asked the government to intensify the monitoring of construction projects by China on the Brahmaputra. It also expressed the fear that similar projects may come up at the "Great Bend" the Brahmaputra takes just before it flows from China to India.

1. Joydeep Gupta is South Asia director of thethirdpole.net

Fears and old habits fester

Such fears are becoming more accentuated, but they are not new. Independent experts studying the Brahmaputra as well as other transboundary rivers around the world, are now convinced that any agreement based on fears of what the upper riparian country may do, can be a zero sum game at best. The way policymakers look at a river and a river basin must change, they argue.

Rohan D'Souza of New Delhi's Jawaharlal Nehru University, says a river must be seen as a "collection of pulses, not a quantum of water flows." Sociologists who study the people dependent on the river waters, ecologists who study fish and other forms of life in the river, all say that the "hydrocracy" – the water bureaucracy – that has dominated official discussions, is like the blind person who touches an elephant's tail and thinks he knows the entire animal.

Policymakers in both India and China defend their own projects in the Brahmaputra basin, saying they are run-of-river hydroelectricity generation projects that will not affect the total water flow – a part of the river is being diverted to run past electricity generating turbines, and then the water is going back to join the river.

But a river is not a uniform flow of water. It flows in pulses that change during the day and during the year. For a dependable electricity supply, engineers have to smooth out the pulses and change them to suit power demand during the peak hours.

But the fish downstream need those pulses, and any change affects them adversely, says Sangeeta Boruah of the University of Dibrugarh, on the banks of the Brahmaputra. Independent economists point out that this has a devastating effect on the fishermen downstream, an effect already being seen in the lower reaches of the Brahmaputra in Assam, as the first of *India's 168-odd projects* in the upper reaches are being built.

Rivers are ecosystems not water pipes

The essential problem, say the independent researchers, is that the "hydrocracy" sees a river as a water pipe, whereas it is actually so much more, a complete living ecosystem. D'Souza says, "rivers are full of muscle, skin and cartilage, which makes a definite case against pure engineering solutions. The transaction cost between megawatts and protein must be computed." Traditionally, fish has been the main source of protein for people in this, and many other parts of the world.

These arguments appear incomprehensible to the majority of hydrologists, power engineers and policymakers. For them, the silt carried in river water is a major nuisance that breaks turbine blades and should be filtered out. For farmers downstream, this silt provides fresh soil. For the fish, it carries their food. Neither has entered official cost-benefit calculations in China, India or any other country.

After long agitation by NGOs, the Indian government has now agreed to keep parts of the water flow unaffected as "environmental flows", but on average that is no more than 20% of the flow.

Independent experts say the only thing that will work, is a paradigm shift in how a river is viewed. "Treat the Brahmaputra as a heritage integral to cultures and identities," says D'Souza. "It's a civilizational question. Negotiations between two governments will not work, because they deal with only a part of the river. What we need, are debates and discussions about civilization, heritage, and lived knowledge in the entire river basin."

Old rhetoric proves hard to shift

None of this has entered the consciousness of Indian policy makers, whose main worry is that China is right now *building and planning* a number of hydropower projects on the main stem of the Brahmaputra, upstream of the Great Bend. Two run-of-the-river projects are under construction at Zangmu and Jiexu and another is planned at Jiacha.

In a report to a committee of secretaries, the Indian government panel has said these may be followed by projects at three other sites where the kind of construction that is usually related to hydroelectric projects is gathering pace, including four new bridges.

The panel's report adds that India has noticed heightened industrial activity at Nangxian, along with constant improvements in the Bome-Medog road that passes through the Great Bend area. The panel members felt that Dagu and Jiexu, along the main stem of the river, were likely to become industrial centres. All this will need more electricity and water, both in short supply in Tibet. Indian officials complain that there may be about 30 other projects in the Brahmaputra basin, about which China declines to share any information.

Officials in India's water resources ministry are now studying riparian treaties to decide what they should recommend, first to the rest of the Indian government and then to China. Officials in the ministry said they were exploring options on the basis of bilateral and multilateral environmental treaties and conventions around the world.

Demands downstream in Bangladesh

A major problem the bureaucrats have, is that the Brahmaputra does not end in India – it flows on to Bangladesh. India is now building and planning the same kind of projects on its stretch of the Brahmaputra as China is doing upstream. So, if India can demand a joint mechanism with China, Bangladesh can demand the same with India, something that bureaucrats in New Delhi are loath to concede. In fact, due to this fear, India is now hastening construction in the 800-megawatt *Tawang 2* hydroelectric project on the Brahmaputra, plus many smaller projects in the basin.

India's way of assuaging fears in Bangladesh is to offer the lower riparian country a share in the electricity generated by a project, in one case even offering a shareholding in the firm set up for the project. Indian officials have also been taking their Bangladeshi counterparts upstream on the Brahmaputra, and showing them how these projects are supposed to reduce the prospect of flooding in both countries. They have also been discussing how they can do some joint dredging in the river and build embankments together.

But Bangladesh will continue to press for a multilateral agreement, as its visiting commerce minister, Mohammed Habibur Rahman Khan, made clear during his recent visit to India.

So at the level of politicians and bureaucrats, all countries are stuck in the old rhetoric. It is now clear that unless the farmers and the fishermen, the factory owners and the workers, those who row the ferries and those who ride them, are all involved in the conversation, there is little chance of getting any meaningful agreement. And the situation will keep getting worse as long as rivers in the basin are seen as water pipes rather than living ecosystems.

Independent experts see only one way out. As D'Souza puts it, "The principles and premises of riparian treaties need to be re-organised. River basins must be seen as interconnected and integrated ecosystems where all stakeholders must have a say."

Damming politics: India's Brahmaputra as a trans-boundary river problem

Rohan D'Souza[2]

By refusing to acknowledge the Brahmaputra as the critical source for millions of subsistence livelihoods, Indian negotiations have instead opted to be embroiled in the narrow politics of damming

More than three million people live on tiny islands along the Brahmaputra River in Assam.

In recent years, whenever India and China have met at the highest level, the issue of water has been prominently put *on the negotiating table*. Much of the unease has been over a truculent temperamental trans-border river, the *Yarlung Tsangpo-Brahmaputra-Jamuna* (YBJ) system, which exhausts its full watery course only after having traversed three sovereign nations: China, India, and Bangladesh.

In part, India's exasperation follows from the latter's inability to commit China to a river treaty, or even a *water-sharing agreement*. Additionally, all efforts for a water commission, or even an institutional arrangement for an inter-governmental dialogue on rivers, has similarly come to grief.

Meanwhile, as India sits troubled on a slippery slope of anticipation, it is only too aware that China, as the upper riparian to the Brahmaputra, also decides on the hydraulic facts. In effect, getting regular and reliable information on flows is another active cause for such liquid worries. Not surprisingly, the Indian side pursues with robust urgency even the half-light afforded by the existing "*flood data agreement*" with China.

In the *first ever visit* of the new Chinese Premier Li Keqiang to New Delhi on May 20, 2013, the previous arrangement on river data sharing was renewed, with China restating its decision to provide hydrological data twice a day during the flood season between June and October.

Another *Memorandum of Understanding* (MoU) was also signed between the Indian Ministry of Water Resources and China's National Development and Reform Commission, to enhance

2. Rohan D'Souza is Associate Professor, History Department, Shiv Nadar University

bilateral cooperation by "ensuring water-efficient irrigation," with a focus on agriculture. In the same spirit of bilateralism, the MoU also committed the Indian side to informing China about how the latter's "data" served India's own flood forecasting and mitigation abilities.

Lastly, the icing on the cake: the MoU would be followed up with the signing of an Implementation Plan of Hydrological Information (IPHI) under which China would inform of any abnormal rise or fall in water levels or discharge which might lead to a sudden flood in the Brahmaputra. These varied understandings, wrestled in a spirit of cooperation, were further tweaked following Dr. Manmohan Singh's official visit to China in October 2013. The concession this time around in the MoU was an even more gracious extension of the reporting/sharing period, which henceforth involved sending hydraulic data from May 15th (instead of June 1st) to October 15th.

Reasons for scepticism

But, lurking in the shadows of the handshaking, bonhomie, and general sense of goodwill, are the many dark and real fears that easily defeat Indian half smiles. China allegedly plans to *build and commission* up to eleven dams across the main stem of the Yarlung Tsangpo. In one estimate, nine of these will be cascade dams and the remaining two will have reservoirs. By this infrastructural reckoning, with all the structures placed just before the *Namcha Barwa* bend (The Great Bend), the Chinese aim to generate 40,000MW of electricity, even while claiming that they will only temporarily impound before releasing flows.

India's hydro-dollar power house

However, the Indian government's expected alarm is somewhat stifled by the latter's own half-mentioned but detailed strategy for turning the mighty Brahmaputra stretch into a *hydro-dollar power house*. By some estimates, close to 168 potential hydro-electric projects have been identified within the folds of the region's innumerable hills and mountainous drops. According to the Central Electric Authority of India's estimates, this region could potentially yield as much as 58,971 MW of hydropower. The state of Arunachal Pradesh alone has been marked for generating 50,328 MW of this hydro-electric hope. This eastern arm of the Himalayas, for many of India's hopeful planners, has thus become a giant electric socket from which the rest of the country's energy needs can be drawn.

Put differently, the region's many mountains, rolling hills, and thick, lush vegetation are to be turned into an interrupted geography: a crossed-over-topography made intermittent with sequenced pylons smoothly humming away while transferring captured fluvial energy to the densely populated and energy starved flat flood plains of the Ganga region. But even before these voltage and megawatt desires have been fully dreamt up, the hard troubling realities of dissent and challenge have already set in.

Loud anti-dam protests have reverberated across a previously inconspicuous corner of India's northeast region. The Lower Subansiri district, straddling the border of Assam and Arunachal

Pradesh, has become the site of a dramatic and unprecedented popular upsurge against the under construction run-of-the-river Lower Subansiri Hydroelectric Power Project (LSHEP). Such has been the intensity of the opposition, that the government of Assam was compelled to set up an expert committee in December 2006, tasked with "studying the downstream impacts" of the dam.

The expert committee was made up of professors of civil engineering, environmental science, geography, geology, life sciences, and zoology, all drawn from three of Assam's most prestigious academic institutions: Guwahati University, Dibrugarh University, and the Indian Institute of Technology in Guwahati. *In their report*, submitted in June 2010, these experts unexpectedly concluded that what worried them was not the absence of data, but the dangers of ignoring existing knowledge about the river and its people.

Rivers as living ecosystems

Findings of the detailed report observed that the Brahmaputra river system was not characterised chiefly by quantities and volumes, but that the river's ecological integrity actually rested on variable flows and fluctuating pulses. The communities dependent on the Brahmaputra system based their livelihood strategies on harnessing the river through a mix of fishing, flood recession agriculture, drawing upon diverse resources from surrounding wetlands and harvesting a vast array of aquatic flora and fauna. In effect, they crafted their livelihood strategies around the river's many different fluvial moods and temperamental currents.

By seeing the Brahmaputra through the eyes and interests of these innumerable riverine communities who populate the region, the expert committee was in fact acknowledging the fresh scholarly turn, since the late 1980s, that argued for a paradigm shift in how rivers were to be understood and managed. Notably, by focussing on the centrality of the "flood pulse" and flow variability, the river could be grasped as a set of critical ecological relationships and interactions between floodplains, wetlands, swamps, and estuarine zones. Put differently, the river and the floodplain, through a flooding regime, create and sustain a living ecosystem.

This living-ecosystem-river can conceptually be posed as the dissimilar other to the engineering metaphor of treating the river as merely the sum total of standardised volumes, data sets, and statistical averages. Herein lies the crux of what afflicts and weakens India's difficult hydraulic bargains with China. By refusing to acknowledge the YBJ as the critical source for millions of subsistence livelihoods, Indian negotiations have instead opted to be embroiled in the narrow politics of damming. For a lower riparian, the dice are overwhelmingly stacked against those who choose simply to pursue a singular quest for data. Rather, a new and brave compact to save the YBJ is possible by foregrounding the significance of the riverine communities and in particular, their unique livelihoods strategies for the ecology and sustainability of the region.

This article first appeared in India in Transition (IiT), a publication of the Center for the Advanced Study of India (CASI) at the University of Pennsylvania. All viewpoints, positions, and conclusions expressed in IiT are solely those of the author(s) and not specifically those of CASI.

The Brahmaputra through song: rebuilding a people connect

Sanjoy Hazarika[3]

Celebrated through music, song and poems, ballads, drama and film, folklore and tradition, weaving and handicrafts, the Brahmaputra has been the leitmotif for the Assam valley in northeastern India, and for a complex weave of cultures, rooted in equally diverse ecosystems.

Image by Yang Yong

> *O mighty Brahmaputra, Pilgrimage of great confluence, Through the ages you have taught the lessons, Of co-existence*

Over the past decades, this fabric of stories and legacies, contemporary and otherwise, has been best represented by the colossal cultural figure of Bhupen Hazarika, singer, lyricist, musician, writer and filmmaker, who passed away in November 2011.

The folklorist, Prabin Chandra Das of Guwahati University, wrote of the Brahmaputra and Bhupen Hazarika, as 'iconic identity markers of the notion of being Assamese'.

The challenges before ordinary people, their struggles for identity and survival, are portrayed with sensitivity and antagonism, with reverence and in anger, reflecting popular feelings at different times towards the river:

'O mighty Brahmaputra,
Pilgrimage of great confluence
Through the ages you have taught the lessons
Of co-existence'
Yet, the bard rails with anger at the river, too, for unleashing a path of destruction:
'If you are the son of Brahma,
Or only its namesake
Where is your inspiring zeal?'

And there is sadness in the lines for the peasant who loses his life while fishing, trying to feed his family and earn a livelihood. Spanning the centuries, generations, the hills and valleys between, Bhupen Hazarika's words remind us of the need not just to understand the river and

3. Sanjoy Hazarika is Director of the Centre for NE Studies and Policy Research at Jamia Millia Islamia, New Delhi, and founder of C-NES, which works in health and governance sectors of the north-east of India

its myriad systems, but also the conditions of people who live 'on either bank, the breath of so much hope and despair' – and also in the lands beyond borders and natural barriers.

He wrote a stirring victory song when Bangladesh became free in 1971, 'Joi Joi Naba Jato Bangladesh, Joi Joi Mukti Bahini,' and was loved and honoured both there and in Nepal; his iconic Nepali cap with the khukri emblem symbolized his South Asian identity, as did his music.

Like its bard, the Brahmaputra, too, is Asian; it flows across three nations and touches many cultures. While the Ganga-Brahmaputra-Meghna region has often been identified as one of the world's poorest regions, with some of its richest natural resources, it is important to review what binds the people here together, and not just what divides them. Thus, music has the power to transcend boundaries and barriers, physical and political. Innovative initiatives that have worked to benefit the lives of large river-based populations or mountain communities, can serve as learning tools and opportunities to push social change forward.

Thus, in Bangladesh, one can think of numerous such examples in different sectors that have brought about social and financial inclusion: for example, in the field of micro-credit, the best known is the *Grameen* model, which has been extensively studied, but there are others too, such as *BRAC*. There are examples of health care, education and also early warning systems along the riverscape of the country.

There are many other areas in which the people along the Brahmaputra and its myriad tributaries can work together, irrespective of political boundaries.

- One area on which transnational researchers can collaborate is the way the non-government sector has worked with governments, and in some cases led extensive efforts for relief and sustainable care for the vulnerable during floods. Throughout the Bangladesh experience, there has been a constant and definite effort by activists, scholars and researchers to link field experience to policy initiatives and implementation. This is surely something that can be learned in the Indian context, especially with regard to the Brahmaputra; specialists on the river are members of various think-tanks and committees relating to policy development but processes are slow.
- On the Indian side, the health care programme through the extensive work of the boat clinics[4] on the Brahmaputra developed by the *Centre for NE Studies and Policy Research* in partnership with the *National Rural Health Mission of India* could be regarded as a game changer on the health front (having reached one million persons with sustained basic healthcare in 13 districts of the Assam Valley, with a focus on women and children) and could be studied along with similar interventions in Bangladesh. These are enriching experiences which should be shared. Poverty levels and the failure of earlier government

4. One of my favourite stories of the boat clinics, which reach thousands on a daily basis, was told to me by a doctor: An old man had come to a medical camp and watched for the whole day without saying anything. One of the doctors asked if he needed a check-up and was surprised by the response. "No, I'm fine – I've just come to see what a doctor looks like, I've never seen one."

efforts have meant that Assam has the worst Maternal Mortality Ratio in India (381 per 100,000 births), although this is visibly improving as a result of several initiatives.

- Work on climate change impacts and how it is changing river flow patterns and the livelihoods of ordinary people in all three countries is important: ongoing research on this could be shared and disseminated, for example, at the International Conference (II) on The Eastern Himalaya: Climate Change, Gender and Livelihoods at Jamia Millia Islamia in Feb, 10-11, 2014.
- Another area where people-to-people contacts and research could be encouraged is on the scale, profile (changing patterns) and impact of riverbank erosion in three locations: Tibet, North-East India and Bangladesh.
- A fifth could be socio-economic profiles of people living on sandbars and islands of the Brahmaputra, and in upstream and lower riparian areas.
- Finally one could work together on compiling a project on River Cultures of music and lyrics, poetry and plays – and what the river has meant to those who live along its course in three countries and on either bank, through the words and voices of some of the most inspiring icons of the regions through which it flows, as well as the ordinary.

Things can change and we can make a difference.

The key lies in reflecting and calmly studying core issues, identifying the key areas out of many possibilities, learning from others through listening and, finally, pressing the buttons which can have maximum positive impact through a simple intervention or a series of innovative steps. These would need to be rooted in good research and science, but also in common sense and the inclusion of public views and experiences, as well as stakeholders.

It would also expand the quality and quantity of research work on water issues in the region, especially on the Brahmaputra. Initiatives by, for example, the Indian government to build river water collaboration among the states of the northeast region, have been infructuous, with states objecting to a proposal by Prime Minister Manmohan Singh to develop an umbrella North Eastern Water Resource Authority.

The effort was aimed at controlling floods, among other issues. The Prime Minister dropped the idea after stiff opposition from a number of states, which felt the idea either favoured upper riparians, or sought an unacceptable level of central control.

The northeast of India has 96% of its borders with China, Myanmar, Bangladesh and Bhutan. It is an immensely diverse region, inhabited by at least 220 ethnic groups who speak almost as many languages. Still, it has just three percent of India's 1.2 billion population, most in Assam, which itself is bisected by the Brahmaputra.

For decades, outsiders have known the region as a place where small insurgent groups have fought New Delhi in a quest for independence or greater autonomy. Over the decades, these movements are abating, as the fatigue of the public and the rebels has grown.

Meanwhile, water from Tibet and Arunachal Pradesh continues to sweep into the Assam valley, before debouching into the flatlands of Bangladesh. The regular flooding that takes place on the Brahmaputra has shown once again the inadequacy of the system to handle the region's most powerful entity, which respects neither borders nor barrages. Assam has the country's third largest length of river embankments, despite its relatively small size. Yet these regularly fail to stem the deluge.[5]

Experts like Professor Dulal Goswami of Gauhati University have consistently contended that the embankments are poorly designed and maintained and end up as human shelters, since they are among the few patches of dry land, instead of flood control measures.

Others, like Chandan Mahanta of the Indian Institute of Technology at Guwahati, favour an inclusive approach through a proposed Brahmaputra River Conservancy Commission, which would take a regional approach to issues, based on the river basin.

"We need to know what is happening in this little area between Tibet and Bangladesh, and how we can sustainably use the waters without losing them forever," Mahanta said. "We need not just a reservoir-driven approach, but a hydraulic one, where you assess both inflows and ground water aquifers, which are recharged by floods."

Such a broad-based approach could mitigate the opposition of anti-dam groups, but it wouldn't resolve their concerns. The groups have long battled projects for a network of dams, arguing that such policies are environmentally unsound and harm farmers' rights.

Indeed, river water sharing remains one of the longest and most entrenched of disputes between states in India, including debates and discussions going back over a century in Southern India (e.g. the Cauvery river dispute between Tamil Nadu and Karnataka) with powerful political repercussions in a country where agriculture continues to support a majority of the population.

Few political parties and leaders can afford to alienate their constituencies and it is an issue that plays into public fears and spills over into bilateral and international concerns, for example, in Assam over plans for Chinese dams on the Yarlung Tsangpo in Tibet. This issue has been raised by India at different levels with China, including at the heads of government level. Chinese assurances have not mitigated concerns at the regional level.

This is where people to people contacts, conversations and dialogues can help with joint research and collaborative efforts. Such people to people based approaches have been exemplified in earlier initiatives involving the Centre for Policy Research in New Delhi and the Centre for Policy Dialogue in Dhaka, and institutions in Kathmandu. It is time for a new generation of scholars, field practitioners, policy analysts and opinion makers to

5. July 9, 2012, India Ink, Sanjoy Hazarika, New York Times blog: this and the following five paragraphs are extracted and edited from this article

move the process forward, to build better understanding, generate wider knowledge and diminish concerns.

Bhupen Hazarika composed and sang of these issues nearly 50 years ago, in an anthemic song/poem, *Manuhe Manuhor Babe – If man does not think for man* – that he wrote to calm raging riots and sentiments in Assam:

If man wouldn't think for man
With a little sympathy
Tell me who will comrade.
… If the weak
Tide across the rapids of life
With your help
What do you stand to lose?
If man does not become man
A demon never will
If a demon turns more human
Whom shall it shame more, comrade

Influence of the Brahmaputra - beyond the basin and into the sea

Bushra Nishat[6]

15-year old Ayesha points to the place her village once stood along the Jamuna River

The *Yarlung Tsangpo Brahmaputra-Jamuna* river rises in the northern side of the Himalayas, takes a tumultuous decent through the mountains into the far north-eastern corner of India and, after traversing through the valleys of Assam and braiding into the vast deltaic lowlands of Bangladesh, finally meets with the Ganga. The combined flow of the Ganga-Brahmaputra,[7] known as Padma, reaches the confluence with *Meghna* and pours into the Bay of Bengal as the Lower Meghna. While stories of most rivers start in the mountains or a great lake and end at another body of water, the influence of large river systems like the Brahmaputra extends to a much larger area, often driving the hydro-meteorological interactions, dynamics and processes of a much greater spatial extent.

> ***"The flow is exceeded in the world, only by the mighty Congo and the Amazon, and is greater than the combined flows of the 20 largest rivers in Europe."***

The *Brahmaputra region* constitutes an interactive mountain-plain-sea system that is home to a large population, nearly half of whom live below the poverty line, with the number of poor on the rise. To harness the opportunities of this river, across the region, development is driving investments in roads, dams, diversions, irrigation schemes and power facilities, with constructions and interventions intruding into the hydrological flows. The river is being seen in terms of irrigation, transport or hydropower potential. The main problem is that benefits are seen through very localised and sectoral lenses. But, in dealing with a river like the Brahmaputra, the pressures and risks are likely to be complex, wide ranging and far reaching, beyond the boundaries of its banks and even the basin itself.

The combined outflow of the Brahmaputra, Ganga and Meghna system is truly one of the most intriguing, vigorous and imposing fluvial systems to flow across South Asia. The flow

6. Project Manager, Ecosystems for Life: A Bangladesh-India Initiative, IUCN Bangladesh

7. The river has many names as it crosses different geographical territories, Yarlung Tsangpo in Tibetan language at the river's origin, Siang in Arunachal Pradesh, India, Brahmaputra in the Assam Valley, India and Jamuna as it enters Bangladesh. Since Brahmaputra seems to be the most well known, this paper will use the name Brahmaputra.

is exceeded in the world, only by the mighty Congo and the Amazon, and is greater than the combined flows of the 20 largest rivers in Europe. The Brahmaputra-Jamuna contributes 60% of this combined flow. Each year, especially in the monsoon, the river carries a huge amount of water and sediment towards the Bay of Bengal. In fact, peak flows of up to 102,535 m^3/sec (cubic metres per second) are reached between mid June and early September, making the Brahmaputra the fifth strongest river in the world in terms of flow rate – the amount of sediment carried by the river is also huge.

The Tibetan part of the Brahmaputra carries clear water with little sediment, but entering into India's Assam state, it flows with a huge load of sediment acquired from the rain-soaked Himalayan tributaries. In fact, with a suspended sediment load of 13 million tonnes per day during the flood season, the river is considered to be one of the most heavily sediment-laden large rivers of the world. As the ultimate carrier of freshwater and sediment in the region, the Brahmaputra plays a crucial role in regulating the hydro-morphological conditions and biological processes of the Bay of Bengal, and ultimately the entire region. The following case studies show some examples of how the flows of the Brahmaputra influence and shape process at a larger extent.

Influences on the summer monsoon:

The *Bay of Bengal* plays a central role in the tropical climate system of the Indian subcontinent. The interaction between sea surface temperature, wind strength, oceanic near-surface stratification or separate layers with variable salinity regimes and atmospheric convection (atmospheric movements) are important factors in sustaining monsoon winds and associated rainfall. Of all these, the most critical is sea surface temperature which is usually higher than the threshold value of 28 degrees Celsius. Again, sea surface temperature is a function of salinity stratification and, according to *recent studies*, the occurrence and stability of the upper layer depends on the large amount of freshwater received by the bay. Continental run-off from the Ganga-Brahmaputra system accounts for about 40% of the total freshwater *received by the Bay of Bengal*. If we do the maths, estimates will show that flows from the Brahmaputra-Jamuna play a significant role in modulating the hydro-climatic processes that bring summer monsoon rainfall in the South Asia region.

Regulating the bio-chemical processes of the Bay of Bengal:

The lives, livelihoods, income and food security of people living in the coastal areas of the bordering countries of the Bay of Bengal are dependent on coastal and marine resources. The highly dynamic freshwater and saline water interface, coupled with nutrient and sediment fluxes from the different rivers, especially the Ganga-Brahmaputra system, mainly support primary productivity, and maintain the biological hotspots in the Bay of Bengal. These hotspots are mostly concentrated in areas of strong intermixing. Scientists believe the sharp changes in the salinity of the surface waters encourage plankton productivity. These are sensitive to the changes in salinity and saturation state induced during peak river discharge periods. The Bay of Bengal is thus home to one of the *most productive ecosystems* of the world, providing nursery

grounds and habitat for diverse fisheries, including sardine, anchovy, scad, mackerel, snapper, emporer, grouper, tuna, shark, shrimp, seaweed.

Flow implications for the Sundarbans:

During monsoons, the salinity of the coastal waters of Bangladesh and India (West Bengal and Odisha) is also influenced to a lesser degree by the fresh water flows of the Ganga-Brahmaputra. The anti clockwise oceanic currents during monsoon push the freshwater towards the west; as a result, the salinity in the sea reduces considerably. Salinity increases almost linearly from the beginning of October, and this rise generally continues until the start of the monsoon. Tides carry this freshwater into the *Sunderbans*, the largest mangrove forest in the world, and situated in both countries. This freshwater supply, coupled with the increased monsoon flow of rivers directly feeding into the Sunderbans, sustains the growth of the Sundri, the dominant tree species of this mangrove forest.

Sediment circulation and morphodynamics:[8]

The Brahmaputra is one of the most heavily sediment-laden large rivers of the world, exceeded only by the Yellow River of China. At Pandu in Assam, the river carries an average annual suspended sediment load of 400 million metric tonnes. Daily sediment discharge rates as high as 26 million metric tons are recorded during exceptionally high peak flows.

A diagram showing the sediment budget of the Ganga-Brahmaputra is shown in Figure 1. Around 55% of this load is deposited in the rivers, floodplains and deltas. The remaining sediment is circulated in the bay and acts as a source of alluvial delta development across the Bay of Bengal. This process is important for land building in the coastal region Bangladesh and East India.

The sustainability of the physical system of the bay and the bordering coastlines is shaped by a complex pattern of interactions between the discharge of water, the sediment load, tidal forces and estuarine circulation. With 95% of its sediment load being delivered during the monsoon, the system is extremely sensitive to any changes in flows and sediment loads especially near the Himalayan part of the basin. So sediment transport in these rivers is of great concern with regard to maintaining the morphology and development of the floodplains; delta and variations would subsequently alter the present erosion/deposition scenarios.

From these examples, we can see huge inputs of sediment, nutrients and freshwater deposited by the Brahmaputra-Ganga-Meghna river systems, which play an important role in the hydro-morphological conditions and biological processes of the Bay of Bengal and ultimately the entire region. With the largest flow and sediment load, the Brahmaputra clearly dominates.

From origin to point of submergence into the sea and even beyond, this river signifies diversified processes and multiple interactions. Integrated water resources management (IWRM), a well-

8. describes the shapes of river channels and how they change over time.

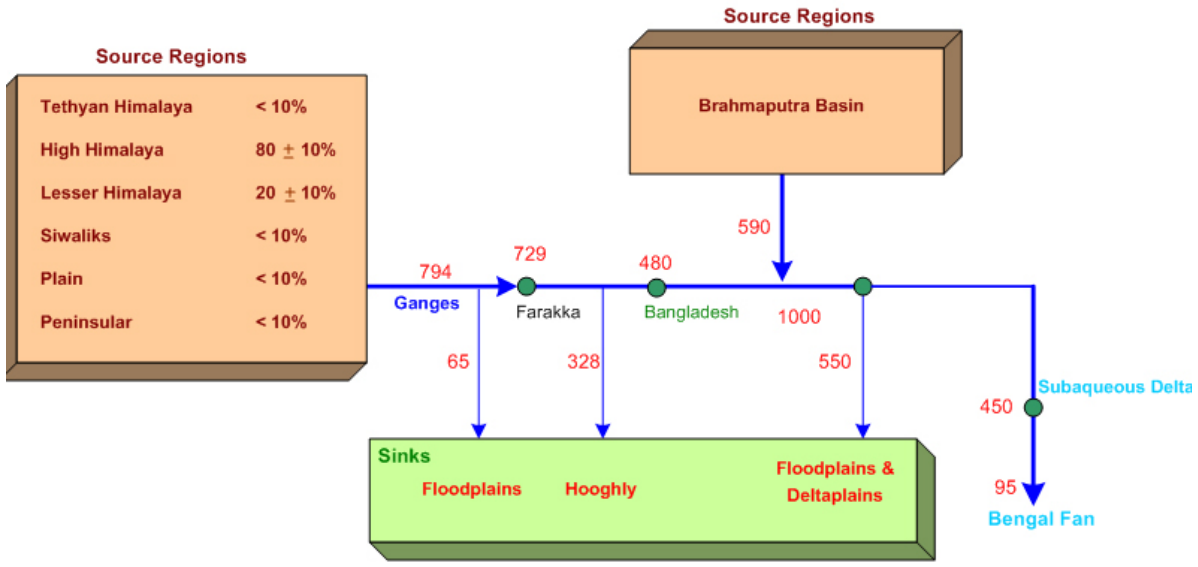


Figure 1: Schematic diagram for suspended sediment budget for the Ganga-Brahmaputra Basins. Total sediment flows are in 106 tonnes per year. (Source: Wasson, 2003)

established and widely accepted concept, advocates the concept of the basin as the unit of planning and management so as to address cross-sectoral and multi-dimensional issues related to water resources management. But the magnitude of flows of the Brahmaputra demands that we look beyond upstream-downstream riparian issues, and also take into account processes that have been described in this paper. Thus, we need a paradigm shift when we are trying to understand this river, not just across borders but also across the interface of land and sea.

The biophysical complexity of the Brahmaputra River and basin is further accentuated by the lack of adequate data and knowledge of the processes, and limited understanding of the triggers or pressure points with respect to the changes that occur in the flows of the river. It is encouraging to note the availability and access of innovative analytical and modelling tools, technologically advanced geographic information systems, remote sensed data and decision support systems to scientists, planners and policy makers. Emerging technologies and modern estimation algorithms are becoming more reliable and accurate and used increasing in the riparian countries of the region. Researchers are increasingly trying to understand the river-sea interaction and modelling tools such as ocean general circulation model and salinity models. These assessments are encouraging but are still only done at a country level, segregated and piecemeal. These need to be integrated into regional models, to understand the river as a whole.

Basin level planning supported by holistic scientific assessment of the rivers is imperative. So when we want to understand the impacts of any decision, any activity, we cannot just look at local level impacts, we need to broaden our focus to upstream or downstream areas and indeed to the entire influence area. Most importantly, the scale and pace of the associated challenges demand urgent, regional cooperation. The countries in the region must rise above their political fault lines and embrace the challenges, opportunities and interconnectedness that this river offers.

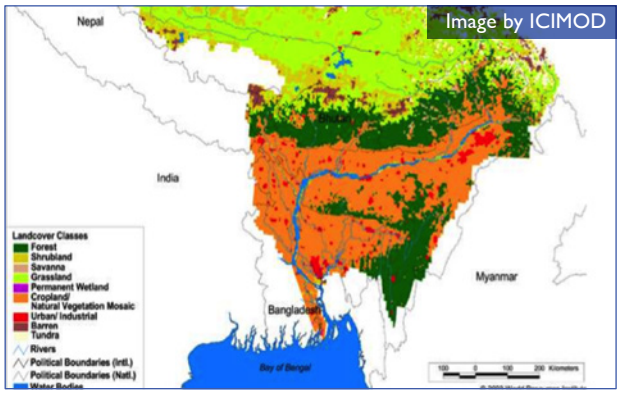
Resolving conflicts in the Brahmaputra River basin by promoting scientific collaboration and information sharing

Partha Jyoti Das[9]

The Brahmaputra is one of the largest rivers in the world in terms of the water and the sediments it carries, as well as the size of the drainage area created by the main stream and its numerous tributaries. The river traverses three countries, China, India and Bangladesh, during its journey from the origin in the glaciers of Tibet to the Bay of Bengal in Bangladesh, joining two other big rivers – the Ganga and the Meghna – on its way.

> *State control of data on the Brahmaputra and its tributaries, makes it difficult for researchers to get data even from their own country, let alone from other countries.*

Its drainage area is spread over four countries – China, India, Bhutan and Bangladesh – while many of its tributaries are also transboundary rivers. The Brahmaputra river system has sustained diverse environs, ecosystems, human habitats and cultures across its basin over thousands of years. Because of its huge water resources and hydropower potential and strategic importance as a transboundary waterway, the river and its tributaries have been used by the basin sharing countries to fulfil such national development needs as irrigation, drinking water and hydropower.

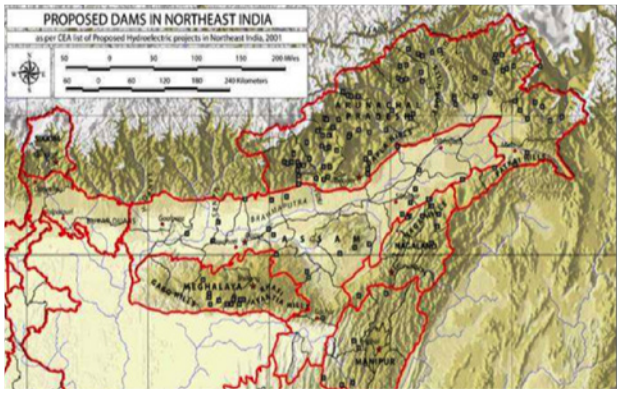


However, increasingly competing use of its water resources, especially large structural interventions such as dams, diversions and barrages being planned or implemented by the basin countries on the water courses of the basin that lie in their own political jurisdiction, have of late given rise to conflicts of various nature and intensity. Such discords have arisen out of fears of adverse effects on the river, and on the livelihoods of people in countries downstream due to upper riparian neighbours planning and executing such structures without consultation. Disgruntlement has also emanated sometimes from a party's non-adherence to an existing agreement on water allocations, data exchange and information sharing.

Since the national development goals, the livelihoods of millions of people, and life sustaining ecosystems in each country of the basin depend significantly on the resources and ecological

9. Partha Jyoti Das is Head of the Water, Climate and Hazard Programme at the Guwahati-based think tank *Aaranyak*

services of the Brahmaputra river, sustainable use and management of the surface and ground water resources of the basin by each country are essential to ensure long-term environmental, water and livelihood security in the whole basin.



While making use of the shared waters and the aquifers, countries must ensure that no significant harm is done to the quantity and quality of the transboundary water resources. Absence of such norms from river management practices in the basin may lead to discord between two basin sharing nations. There are conflicts between India and Bangladesh over water sharing of Ganga and the Teesta (a tributary of the Brahmaputra) and between India and China over unilateral and prior use of the flows of the Brahmaputra for producing hydropower.

With a positive and progressive outlook, conflicts can give way to bilateral or multilateral agreements. An effective way for resolving conflicts and forging cooperation among countries is to have a well-defined multilateral institutional mechanism created by an internationally bound agreement equipped with provisions to avoid and resolve conflicts amicably and mutually and a non-negotiable commitment that the agreement will be respected by all countries under any circumstances.

An appropriate river basin organisation with jurisdiction over the whole basin institutionalised through a charter of cooperation and conflict resolution established by the basin partner countries could be an essential outcome of such a multilateral arrangement. Every effort should be made by the Brahmaputra basin community to achieve this long-cherished goal for the sake of regional water security and political stability in this ecologically and ethnically diverse region of South Asia.

Proposal for a shared research agenda

Having stated the importance of co-management of the Brahmaputra River and its basin through a multilateral institutional set-up, this paper argues that existence of a comprehensive and holistic knowledge base on the river and its basin, encompassing all important aspects of the physical, biological, environmental and socioeconomic regimes, is a precondition to fully exploit the benefits of such cooperation agreement. In fact, joint scientific development of such a knowledge base, can in itself be the first step towards the coveted goal of establishing a basin level framework and institutions for co-management of the Brahmaputra basin waters in future.

A sound knowledge base, comprising reliable database and holistic understanding of the dynamics of interactive physical, biological, ecological and socioeconomic processes that determine coexistence of natural and human systems, is essential for all kinds of planning for

the basin's resources. Such a knowledge base for the whole basin, comprising reliable data and information on hydrology, meteorology, climate, geology, ground water, geomorphology, ecosystems, flora, fauna, land use and socio-economy can be developed, maintained and updated as a common pool of knowledge resource for all countries. Such a resource base is a must for promoting integrated river basin planning both within and among countries and across the transnational landscape of the basin.

A basin level understanding of the flow regime of the rivers and the resource dynamics is critical for assessing the impacts of present and future changes triggered by climate change and other human activities. This is absent from current scientific research initiatives and national level planning, mainly due to the lack of reliable information about the whole basin.

As a result, countries prepare plans and develop the water resources in their own land with inadequate knowledge about the whole basin, and without showing much concern about the upstream and downstream situations. Scientific studies on the Brahmaputra River and its basin have mostly been carried at sub-basin scales within a country's territorial jurisdiction.

State control of hydrological, topographic and meteorological data on the Brahmaputra and its tributaries makes it difficult for researchers to get data even from their own country, let alone from other countries. In some cases even if some data is available to some scientists from their national agencies, there are restrictions imposed on sharing with scientists of other countries.

To bridge such gaps in data, as well as in data exchange, concerned countries need to generate hydro-meteorological data using instruments and scientific manpower as a joint activity. This will help to grow a sense of common ownership of the data and do away with any misgivings about the quality of data when it is shared.

Generating and sharing information and knowledge could go a long way to ease the tensions between countries over transnational river management that grow out of the alleged lack of transparency, trust, and from attempts to demonstrate political hegemony. If China had proactively furnished detailed information about the dams it is building on the Yarlung Tsangpo River (as the main stem of the Brahmaputra is called in Tibet) to the government of India, and if the same were communicated to the public in India and Bangladesh, some of the mistrust, misperceptions, resentment and emotional reactions of the public in these two countries could have been averted.

The case of the ambitious *Indian Linking of Rivers Plan* (ILRP) is similar. It has made Bangladesh wary and aggressive in criticising and protesting against the project, due to the fear that it could lead to irregularity and drastic reduction of flows in several rivers that flow from India to Bangladesh, and thus severely impair agriculture in the country.

Taking a decision to execute the ILRP, without allaying apprehensions and doubts of Bangladesh through a consultative process and sharing required information in a transparent manner, was

considered a retrograde step on the part of India. It is another matter that the grandiose project has drawn severe criticism back home for lack of technical feasibility and concern for the catastrophic ecologic and socio-economic consequences that it could unleash at least in the Himalayan component.

Collaborative knowledge development will also help in assessing impacts of any country's structural interventions on the river on downstream areas in another country. In such cases the upstream countries need to provide reliable data to the downstream neighbour, so that it can be examined whether there is any reduction in transboundary river run-off, or significant depletion of transboundary aquifers. Having reliable and mutually endorsed databases for the estimation of impact or validation of stated impacts, makes independent assessments of such impacts possible. This is essential for balancing riparian bilateral relations on the principle of equity and no harm, and the negotiated settlement of conflicts.

For example, collaborative research and transparent data sharing can allay apprehensions in northeast India about any drastic detrimental downstream impacts of the Chinese dams being built on the Yarlung Tsangpo, and the 'Grand Western Route Plan' for diverting the river from the Great Bend to the northern part of China. Indian scientists should be allowed to investigate the probable impacts on their own, or in association with Chinese counterparts.

Gestures like these will help curb feelings of insecurity and bitterness brewing in the minds of people living in northeast India and in Bangladesh. If there is any adverse effect on the Indian side, the problem should be solved by bilateral discussions and cooperation.

Recommendations

This paper recommends some concrete measures as a way forward to promote cooperation in scientific research in the Brahmaputra River basin region.

Scientific and media exchange

The exchange of scientists amongst reputed national institutions of the basin countries for specific research from a common agenda should be started. Institutional collaboration should also encompass the exchange of doctoral level students to work on important problems of common interest, under joint supervision of experts from more than one country. This has happened to some extent between India and Bangladesh, but rarely between India and China.

Frequent interactions of researchers and media of the four countries can also help in improving and disseminating objective understanding of contentious issues, which will pave way for foestering public approval for all-round cooperation in transboundary river basin management.

Translating key papers

Much of the literature on the hydrology, meteorology, geomorphology, climate change and other aspects of the upper Brahmaputra river basin produced by Chinese scientists is available only in Chinese. Translating important research papers in Chinese journals into English will greatly benefit the researchers from other basin countries and the international research community too.

Joint monitoring of river flow

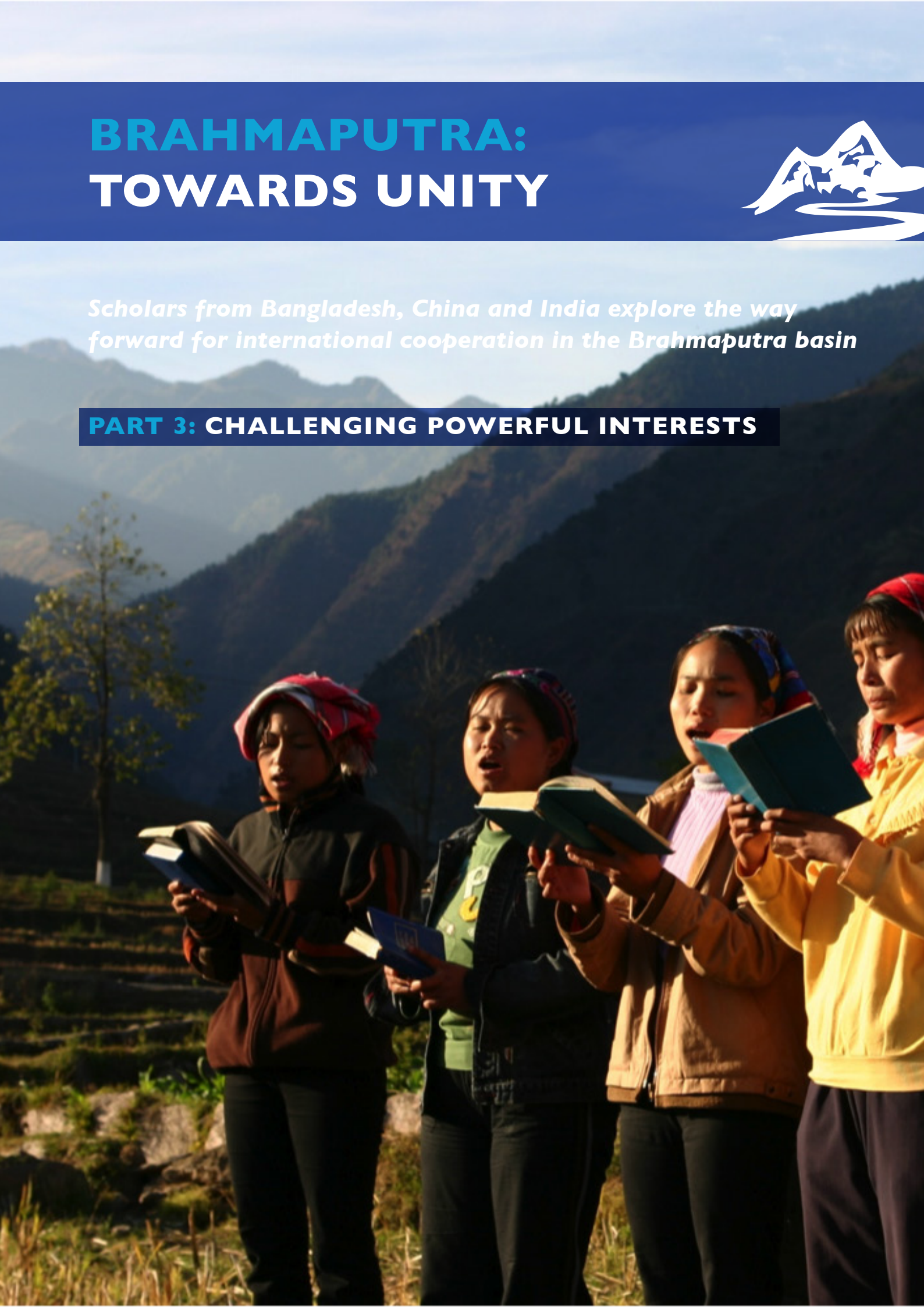
Joint monitoring of transboundary river flow and aquifer status will help to repel doubts regarding overexploitation or diversion of river water in upstream areas. By a *memorandum of understanding* renewed and slightly expanded in October 2013, China provides India with water flow data in the monsoon months. Similar exchange of hydrological and meteorological data round the year will help in improving the quality of flood and drought forecasting for all the four countries.

Real-time monitoring and early warning about potential glacial lake outburst floods and landslide dam outburst floods in the Himalayas in China and Bhutan will be useful in mitigating disastrous impacts of flash floods in the Indian states of Arunachal Pradesh and Assam.

BRAHMAPUTRA: TOWARDS UNITY

Scholars from Bangladesh, China and India explore the way forward for international cooperation in the Brahmaputra basin

PART 3: CHALLENGING POWERFUL INTERESTS



Part 3: Challenging powerful interests
Contents

More dialogue, less negotiation: searching for non-state approaches

Sagar Prasai[1]

Whose knowledge counts, whose interest matters and whose voice is heard have perennially mattered in policy processes. The politics of public policy is such, particularly in democratic states, that the framers of the policy cannot be seen to be partial to any particular interest other than what is widely believed to be the "common" interest. The moment a public policy fails this test, its legitimacy gets questioned. In practice, broadly accepted common interests are rarely identified.

> *A dominant policy voice in all South Asian water resources ministries comes from a singular discipline of engineering…disposed to think of extractive infrastructure in the language of diversions, dams, barrages, tunnels and turbines.*

On rivers, articulating "common" interest is often more difficult than in other instances. The river is a complex ecological system as well as a highly valued economic resource. It is tied to the broader ecology of the basin, affecting life and livelihood way beyond the confines of the basin drainage systems. It is concurrently a nutrient carrier and an effluent carrier, a resource for irrigation and source of floods, it can generate electricity when made to pass through tunnels and turbines but can remain a thriving fishery otherwise. Without dams and barrages, it can be used for navigation and with dams and barrages it can supply to urban economies afar. With development, a river brings jobs and infrastructure and without development it supports the ecological and cultural continuity. It is genuinely difficult to find a "common" interest in the use, abuse or conservation of rivers.

Residents fish in ponds in the dry riverbed of the Teesta River in Bangladesh

On a resource this complex, the regulatory arrangements set up by South Asian governments are remarkably simple. With some exceptions, there is usually a ministry of water resources with near-monopolistic control over three functional areas of water management and allocation: irrigation, urban-industrial consumption and energy. In Nepal's case, there are separate ministries for irrigation and energy; in India, Bangladesh and Pakistan, the ministries have a consolidated mandate. For the last two to three decades, depending on which country we pick, either an

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environmental agency or a ministry of environment with some regulatory voice over proposed developments have been set up.

A dominant policy voice in all South Asian water resources ministries comes from a singular discipline of engineering. The proverbial "hydrocrats" are by training, practice and professional aspirations predisposed to think of extractive infrastructure in the language of diversions, dams, barrages, tunnels and turbines. At the political level, these hydro-engineering imaginations become alluring symbols of modernisation and development. The combination of engineering enthusiasm and political sloganeering allows South Asian hydrocracies to think of water in its most simplified form of utility, and to ignore counter narratives of all other types with ease. While this has generated inherent representational deficiency in water policies across South Asia, the hydrocracies are structurally and politically predisposed not to notice it.

Meaningful representation in a policy process requires access to information. Although varying in degrees, South Asian governments have traditionally considered fairly innocuous hydro-meteorological data and details of hydro-engineering projects "state secrets". In the age of remote sensing and telemetry, the *Water Resources Information System of India*, for instance, still denies public access to data on its transboundary rivers. That affects the Indus, Ganga and Brahmaputra basins in their entirety. And, with three of the largest river systems in India excluded, the material value and meaningfulness of such a water resources information system can be judged for its own worth. Countries with functional right to information acts (RTI)—India, Bangladesh and Nepal—have of late witnessed increasing use of RTI filings by civil society organisations (CSOs) with the intention of bringing water-related information *to the public domain*. With supply-side commitment on RTI being stronger in India than other South Asian countries, obtaining notes and minutes from bilateral negotiations on shared rivers has become easier from India. CSOs in Nepal, for instance, have begun to partner with their Indian counterparts to extract notes from bilateral meetings when the Nepali government denies access to such information. While these developments are encouraging, RTI activism can only go so far as to compel governments to share information that the government intends to share. Unfortunately, the information that they do not intend to share is the information required to develop informed positions on policies.

When it comes to transboundary rivers, the aura of exclusivity in deliberations is further accentuated with protocol-laden, time-consuming and extremely formal negotiations, conducted away from the public eye. South Asian governments rarely call public consultations to determine what constitutes "national interest" on a particular bilateral negotiation before agreeing on the agenda. Providing a seat in the negotiating table to governmental consultative bodies such as the water and energy commission (or its equivalent) is about as far governments are willing to go in the name of widening representation. In bilateral negotiations, agenda-setting itself takes quite a bit of negotiation. Once the agenda is set, understanding each other's claims takes a long time, once each other's positions are understood, articulating each other's bottom-line position takes even longer. Eventually, taking the conversation to conclusion and signing an agreement takes a decade or more. A water sharing agreement on Teesta has been

four decades in the making and is still not signed. The more efficiently concluded treaties on Ganga and Mahakali also took a decade or more to finalise. The formal, single-track and state-managed negotiation process is inherently slow in nature and undeterred by any sense of urgency.

Negotiating parties are meant to "represent" their respective group (or national) interests at the negotiating table. When that interest is not robustly articulated and broadly accepted within the group, the ability of the negotiators to make dynamic adjustments to their positions and enter into *reasonable compromises begin to weaken*. When that happens, the negotiators either resort to iterative consultations within their group, or refrain from making even reasonable compromises on the originally articulated position. Both actions delay the negotiation process. The sluggishness of South Asian negotiations on shared rivers is attributable, in part, to the inadequate representation of broadly held interests at the negotiating table.

How this plays out can be described in two ways:

Effects of excluding powerful actors from the table - In South Asian foreign policy practice, bilateral negotiations on shared rivers involve negotiators from the ministry of water resources and ministry of foreign affairs (or their equivalents). On the Teesta agreement, this arrangement proved too narrow to drive the eventual agreement, even as negotiators on both sides had agreed to all details of the accord. After the groundwork was prepared at the 37th meeting of India-Bangladesh Joint Rivers Commission in March 2010, an agreement on Teesta was almost reached in September 2011. In a rather dramatic last minute breakdown, the prime ministers of India and Bangladesh were unable to preside over the signing ceremony of the accord, which was to be touted as a "historic agreement" that would open the way to share benefits on the six more transboundary rivers on which India and Bangladesh were co-riparians.

The person behind the sudden reversal of fate was not even party to the negotiations. As in all such instances, hydrocrats from New Delhi were assumed to represent her interests at the negotiating table. In this instance, however, what was determined to be in India's national interest was not in the interest of Mamata Banerjee. Banerjee had registered a resounding victory in the state assembly elections of West Bengal, overcoming decades of communist domination of politics in that state. She was the chief minister of the state and, at that time, a key ally in the prime minister's ruling coalition. Banerjee needed to consolidate her political base in north Bengal, a traditional stronghold of the communists, and to project her image as the new patron of north Bengal.

The Teesta river flows into Bangladeshi territory from north Bengal where an ambitious *Teesta Barrage Project* (TBP) is planned (and partially constructed at Galjaldoba) to irrigate 922,000 hectares of land and generate 67.5 MW of electricity. For the political elite in north Bengal, the TBP symbolises a promise of development that was never delivered to the region. North Bengal is also home to a sizable population of Hindu refugees from partition of India in 1947, who do not view Bangladesh favourably. Portraying a "no compromise" position on Teesta

would grant Banerjee much needed political currency in north Bengal; and, as a powerful ally in Manmohan Singh's shaky political alliance, she was able to put enough pressure on the government to withdraw from the negotiations at the 11th hour. Swiftly unfolding contestation between local and national political actors, in the end, thwarted the Teesta agreement.

But the broader lesson to draw from this episode is that the highly reductionist constructs of benefits of water — measured only in cusecs and megawatts — that South Asian hydrocracies are habituated to, coupled with the unreliable state-managed, single-track negotiations, is barely able to meet the representational challenges of complex interests around allocation and management of water. If we continue to rely on this practice, a different outcome on cooperation is perhaps not possible.

Effects of excluding legitimate interests from the table - I have already discussed how South Asian hydrocracies harbour a paradigmatic bias towards extractive usage of water. Even as water policies in South Asia have begun to admit that a holistic approach is desirable and participation matters, this approach is yet to be mainstreamed. In the meantime, the culture of limiting design parameters to the technical, and refusing to acknowledge the politics around hydo-engineering structures, continues. While simplifying constraint parameters is an essential engineering propensity that helps to optimise cost-benefit ratios, the approach fails miserably when a reliable and broadly-acceptable articulation of public interest is difficult. Unfortunately, mostly everything around water is of this nature. Cost of what and benefit to whom become important political questions, and once one interest is arbitrarily privileged over the other, the project immediately becomes controversial.

An interesting account of the contested field of public interests is provided by *The Asia Foundation* report on the political economy of the Teesta Basin:

> There is no jurisdictionally-integrated, basin-wide approach to conservation and management of the Teesta River Basin. In Sikkim, the state government plans to put the river, as well as its significant tributaries, through tunnels and turbines, to produce 5,000MW of electricity through a series of power plants. As the river enters the plains of West Bengal, there are barrages and canals planned to irrigate agricultural lands. Once the river crosses the border with Bangladesh, there are other irrigation and flood control structures in various stages of planning and construction. The basin as a unit of analysis rarely surfaces in bilateral negotiations. Sustainability of the river ecology is nominally recognised in the form of minimum flow or environmental flow. However, the content of negotiations is largely centered on technical discussions around the volume of water shared between both countries. This highly reductionist approach to negotiations has excluded a range of economic, cultural, and ecological interests from the discussion. The study team's survey asked respondents within the basin to assign values to their concerns regarding the river. When the team isolated locations where 50 percent or more of respondents assigned "high" ratings to a particular value or concern, it

found that 61 percent of respondents in Gangtok and Kalimpong assigned "high" ratings for the cultural value of the river; in Rangpur (Bangladesh) and Jalpaiguri (India), 59 and 54 percent valued the river for fulfilling their household needs; in the same locations, 52 and 51 percent expressed "high" ecological concerns for the river; and, in Gangtok and Kalimpong (India) and Chilmari (Bangladesh), 58 percent rated disaster as a "high" concern.

It is clear that the governments of India and Bangladesh, and within India, the state governments of Sikkim and West Bengal, are pursuing different set of interests on Teesta. When it comes to the people whose lives are intrinsically liked to the river, the interests pursued by their respective governments tend to diverge from their core concerns. One can well imagine that in a situation such as this, a single-track, state-managed and non-inclusive negotiation process, has minimal chances of bringing diverse interests into convergence.

Poor representation leads to poor implementation

A direct reflection of incomplete convergence of interests during an agreement can be found in the implementation process. As mentioned earlier, the handful agreements on shared rivers that South Asia has so far produced, have varying degrees of implementation problems. They range from no implementation (Mahakali), to limited implementation (Ganga), and troubled implementation (Indus, Kosi and Gandak). In this section, I will illustrate the nature of the implementation problems with reference to the Kosi, Gandak and Mahakali agreements. The implementation of the Kosi and Gandak agreements shows a general capacity deficit in the respective governments to implement the agreement, whereas the case of Mahakali underscores how weak convergence of interest (political will) affects agreement implementation.

The Kosi agreement was signed in 1954 and some revisions in the agreement were formalised in 1966. The Gandak agreement was signed in 1959. The agreements govern the Kosi and Gandak barrages and both have had lingering problems of inundation claims and land compensation unresolved till date. On a routine basis, both barrages generate claims and counter-claims on dry season allocations, flow control, river training, siltation and maintenance, and security breaches. Since 2001, a bilateral Joint Committee on Kosi and Gandak Projects (JCKGP) has been formulated to resolve these issues.

The *Mahakali treaty* was signed in February 1996. The Nepali government at that time had come under heavy criticism for ceding strategic and economic interests to India. Enough analysis has been done on that question. Successive governments in Nepal have chosen to move slowly on Mahakali, while the Indian side raises the implementation status from time to time. Some of the conversation around Mahakali treaty implementation can be captured through the minutes of the Nepal-India Joint Committee on Water Resources (JCWR) posted at the *Water Beyond Borders* website.

Content analysis of the JCKGP and JCWR minutes reveal the following:

Ineffective state - During the first JCKGP meeting held in December 2001, the Indian side had raised three specific security concerns on the Kosi project: continuing unauthorised fishing at the barrage area, theft of construction material and cables from the project site and vandalism at the canal facilities. When the committee met three years later, the same complaint was repeated; in 2006 again, the first agenda item remained the same. In each of the meetings, the Nepal side renewed its assurances with no material changes on the ground. It was not until the fourth meeting in 2009 that the committee to finally put in the minutes: "The Indian side appreciated the enhanced cooperation from the Government of Nepal on security issues." It appears to have taken some eight years for Nepal to meet basic law and order standards at the project site.

Also, in the first meeting in 2001, the Nepal side had raised the issue of the accrual of land taxes unpaid since 1987, that the Indian government owed to the Nepali government. Eight years later, in 2009, the JCKGP noted during its fourth meeting: "The Nepalese side stated that the land tax for Kosi and Gandak projects was still due. The committee decided that the records of land tax of the Kosi project will be verified by the concerned offices…" Ten years later, in the sixth meeting, the agenda was still not resolved - "The matter was discussed in detail. It was noted that preparation for the accounts of Kosi project is under process." At this level of efficiency and with this kind of response to problems, it is difficult to imagine South Asia getting very far on water cooperation, or India—as portrayed by some—being able to push unilateral outcomes on shared rivers with ease.

Entangled in bureaucracy - In February, when the dry season begins to peak, it was noted that barrage gates in the Gandak barrage were not operating properly. It was apparently established that the problem was with the quality of power supply from Surajpura Power House. At a point when demands on the barrage were perhaps at their highest, here is how the JCKGP meeting in February 2011 proposed to solve the problem:

> The Indian side conveyed the difficulties in operation of the barrage gate due to low voltage at Gandak Barrage site. They requested to shift the switch of the gate operation from Gate No. 36 to Gate No. 1. It was decided that the Executive Engineer, Mechanical, Valmikinagar will discuss the matter with the concerned officer of Nepal Electricity Authority, which will be arranged by the Department of Irrigation, Nepal and coordinated by Liason Officer, Water Resources Department, Government of Bihar, Kathmandu. The Department of Irrigation, Government of Nepal will facilitate an early resolution of these problems.

With two agencies in India and two agencies in Nepal involved in finding an appropriate solution to the voltage stabilisation problem at Gandak barrage and the department of irrigation in Nepal, which does not have a direct jurisdiction over Nepal Electricity Authority, entrusted with the responsibility of finding an "early resolution" of the problem, the likelihood

of the problem being solved in time to maintain lean season flows in 2011 was slim. Since the Water beyond Borders website does not have minutes of the 7th JCKGP meeting, and the minutes are not available on a proactive disclosure basis, it was not possible to discover the final outcome of this story. Nonetheless, as mentioned earlier, the bilateral arrangements for the negotiation and implementation of agreements are unwieldy, and bureaucratically entangled mechanisms rarely able to produce timely results.

Weak political will - Article 10 of the Mahakali treaty calls for the creation of a bilateral agency called *Pancheshwar Development Authority* (PDA) for the development, execution and operation of Pancheshwar Multipurpose Project, an integrated hydrological infrastructure system that is expected to deliver and regulate the shares of water and energy to both India and Nepal, as stipulated in the treaty. Between the signing of the treaty in February 1996 and the second JCWR meeting in October 2004, no significant progress on the creation of PDA occurred, even as some work on the Detailed Project Report (DPR) was being carried out. Four years later, or 12 years after signing the treaty, the third JCWR meeting in September 2008 decided to set up the PDA "at the earliest". It took the two countries some six months to get to the next stage where, as per the minutes of the fourth meeting of JCWR, the Indian side presented a draft Terms of Reference (ToR) to the Nepali side, Nepali side reverted the ToR with some modifications, and the two sides agreed to finalise the text in the next meeting of the JCWR. After another seven months, the fifth meeting in November 2009 noted in cryptic terms: "During the fourth meeting of the JCWR, it was agreed to finalize the terms of reference for Pancheshwar Development Authority at the fifth meeting of JCWR. The Committee discussed the issue." No concluding comments or next steps were provided beyond that statement. In the sixth meeting, two years later in November 2011, it was noted that the Nepal government had approved the ToR and that India was reviewing the amendments and it would be approved within three months. Thirteen months later, in January 2013, the seventh JCWR meeting was held in Kathmandu, at which time the Indian government was still reviewing the ToR.

One has to ask what is holding India and Nepal from making progress on some basic elements of the Mahakali treaty, 17 years after signing it? Neither the ToR on the Pancheshwar Development Authority nor the DPR on the Pancheswar Multipurpose Project ought to take 17 years to draft. In Nepali politics, the Mahakali treaty is not a celebrated achievement, which may be a reason for Nepali politicians to drag their feet on Mahakali. More interestingly, if India indeed emerged the net winner in Mahakali Treaty negotiations as *analyses* suggest, why is India, with all its economic and geopolitical advantages, unable to push the implementation faster? There appears to be a large gap between intentions and delivery capacity in South Asian states. While capacity deficits are fairly evident, the less evident cause must be political will.

Time to do things differently

The bottom-line conclusion is that the future of water security is completely usurped by the ineffectiveness of the states of South Asia, and glaring failures to manage flow variability,

climate-change threats, pollution, unsustainable extraction of ground water and underpriced allocations are all swept under the rug of securitisation. Meanwhile, the propensity to keep water and water governance away from public reach and insulated from public voice continues unabated. As Albert Einstein once said, "Doing the same thing over and over again and expecting a different result is insanity." Something needs to change and change urgently. I am of the view that unless we change the following three aspects of water governance in South Asia, a different result will remain as elusive as ever:

Dialogue first, negotiation second - Dialogue and negotiation are two distinctly different processes. During a dialogue, the idea is to understand and appreciate each other's position; during a negotiation, each side intends to exact as much benefit as possible from the other. The South Asian approach to transboundary water governance suffers from too much negotiation and too little dialogue. As long as we maintain our faith in negotiation alone, as I have discussed in this article, even in cases where a negotiated settlement has been reached on water-sharing, the residual discontent ultimately re-appears during implementation to make the accord ineffective.

No national interest beyond direct stakeholder interests - Rivers have a natural territoriality and an inherent geographic limit to human access and utility. People in India's southern state of Kerala, for instance, cannot and do not have much to do with the northern Ganga or Brahmaputra rivers. The fact that the two rivers flow within the territory of modern-day India is purely a coincidental matter. When the state of India articulates its national interests on Ganga or Brahmaputra, it brings to bear the "interests" of all people residing within its territory even as the majority of Indians have no way of being harmed or benefited by what happens in say the Brahmaputra (extremely imaginative secondary or tertiary economic linkages apart). Not to isolate India, the ways in which "national interests" on rivers are articulated are similar across South Asia and indeed beyond South Asia. Until we unbundle the legitimate claims of the direct stakeholders on rivers and dissociate them from the abstract "national" interest on rivers, the geopolitical and riparian politics of transboundary rivers will always come in the way of wiser governance of international rivers.

Civil Society Organisations in the midst - As I have argued in this paper, in spite of the colossal failures in water governance, South Asian states continue to distrust all other actors—ironically, with the exception of themselves—to become a part of the broader solution on water. While the states continue to insulate themselves from non-state efforts at improving the state of transboundary water governance, they tend blissfully to ignore the following:

1) non-state actors can operate beyond the confines of foreign policy mandates and are much more effective in dialogue than the state actors;

2) non-state actors can gain trust and obtain legitimacy across borders even when the states run into an impasse;

3) non-state collaboration can reach to the grassroots in a way that state cooperation, even at the best of times, cannot get to; and,

4) the eroding effectiveness of states in South Asia has rendered the non-state voices more credible on a range of issues including those pertaining to "national interests" on water. Even with all these assets, CSOs in South Asia have not been able to move water cooperation to better ends. This could be largely because their permeability or influence in the state institutions remains limited but also because their independence and internal governance has failed to generate the confidence of the broader public, particularly on issues of "national interest" where the traditional monopoly of the state still thrives.

Transboundary water law and the South Asian context

Ritwick Dutta[2]

Water is an essential natural resource – both ecologically and from the point of human civilisation. The impact of any activity along, or related to, water has multiple impacts. Rivers unite the ecosystem of the entire basin, irrespective of political boundaries and relationships between nations. Unfortunately, the "development" paradigm is myopic at best despite the constant and immediate need for an accepted set of rights and obligations governing transboundary water resources. The difficulty in arriving at universally accepted principles governing transboundary water resources stems from the fact that basins are, by nature, hydrologically, historically, politically, and culturally unique. Rivers, in particular, pose additional issues, in terms of fluctuations in terms of time, space, and the course of its flow.

The Atlas of International Freshwater Agreements identifies 400 water agreements adopted since 1820. Despite this, there is a conspicuous absence of a universally accepted international legal framework -- 158 of the world's 263 international basins lack any type of cooperative framework, and there is a common trend for states to adopt bilateral agreements within multilateral river basins. In the Asian context, of 57 transboundary river basins, 10 are covered by basin-wide agreements, 15 are partially covered and 32 are not covered by any agreement. Given that water is such a hotly contested issue, environmental and ecological concerns get sidelined altogether in such a fragmented system.

> ***"India, Nepal, Bhutan and Pakistan are engaged in a huge "water grab" in the Himalayas, [with] plans for more than 400 hydro dams, which, if built, could together provide more than 160,000 MW of electricity."***

This paper seeks to trace the development of the international legal framework governing transboundary watercourses – especially in terms of the rights and obligations of riparian states. It also looks at the evolving standards of international environmental law, and its application in the context of transboundary water agreements and disputes.

Transboundary water negotiations and the South Asian context

The rapid industrialisation and South Asia's development needs are compelling considerations, and riparian states are unwilling to relinquish their hardline positions on this.

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Political one-upmanship is a further complication in the context of transboundary watercourses, which not only results in the indiscriminate initiation of water projects to establish "prior use rights", but is also used as a justification for non-transparency in respect of access to information and the participation of affected populations in the decision-making.

In the South Asian context, there is a glaring absence of multilateral treaties governing transboundary rivers. The bilateral arrangements, where present, are largely inadequate. Due to regional imbalances in power among the South Asian countries, and the absence of a universally binding international legal regime, sharing transboundary rivers and simultaneously ensuring the health of the riparian ecosystem is a *particularly difficult challenge*. The region is particularly prone to unilateral activities without adequate transboundary consultation, and the institutional mechanisms, where present, are inadequate to absorb these changes. In fact, a UNESCO study identifies the Ganga-Brahmaputra basin as one of the 17 that have the potential for dispute in the coming five to ten years.

The principles governing transboundary watercourses have evolved significantly over time. The most widely accepted international consensus is reflected in the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses (*UN Watercourses Convention*). China voted against the Convention, India and Pakistan abstained and Bhutan absented itself. Only Bangladesh and Nepal voted in favour of it.

Principles governing transboundary watercourses

The legal principles on the issue of transboundary watercourses have evolved over a period of time, and shaped the general principles of customary law.

Initially, there were extreme and irreconcilable positions. On one end of the spectrum was the "doctrine of absolute sovereignty", which suggests that a state has absolute rights to water flowing through its territory. The downstream extreme position, on the other hand, is the "doctrine of absolute riverine integrity", which suggests that every riparian is entitled to the natural flow of a river system crossing its borders. Both these positions have been explicitly rejected.

The two positions have been reconciled in the "doctrine of limited territorial sovereignty", which reflects the right to reasonably use the waters of an international waterway, yet with the acknowledgment that one should not cause harm to any other riparian state. The two components of this are the "reasonable and equitable use" and the "doctrine of no harm". This is the largely accepted benchmark of water agreements. It is also within this space that environmental and ecological concerns find space and justification.

International rules and conventions

The *Helsinki Rules on the Uses of the Waters of International Rivers*, adopted by the International Law Association in 1966 is a landmark document in the area. It codifies the principle of

reasonable and equitable use of water, the obligation to prevent pollution in such watercourses, and outlines a dispute settlement mechanism.

Following this, the *UN Watercourses Convention*, a culmination of 31 years of deliberation, was adopted in 1997. Although the Convention is yet to enter into force, it has codified the basic principles and also contributed substantially to the development of a general international legal regime for environmental protection of shared watercourses.

The preamble of the treaty makes a reference to the *Rio Declaration*, *Agenda 21* and the UN Conference on Environment and Development. It is not entirely accurate, therefore, to state that environmental concerns have not been envisaged at all. The other components where environmental concerns can be interpreted, especially in light of evolving principles and standards of international environmental law are:

Principle of "reasonable and equitable use"

The principle of equitable and reasonable utilisation was primarily aimed at sharing freshwater flows for development purposes, and in terms of environmentally related outcomes. However, given the growing recognition that environmental concerns are integral and even essential, an argument can be made in favour of interpreting these provisions to include environmental concerns to a greater degree.

The notion of equitable and reasonable utilization, in effect, is an exercise in fairness and justice. In an environmental context, this can be understood in relation to environmental considerations and the need of nations to secure adequate amounts of freshwater for the environment. The more likely a use is to be sustainable, the *more reasonable the use becomes*.

"No harm principle"

The general obligation not to cause significant harm across an international border is a fundamental principle of international law and an important norm of international water law.

One of the earliest articulations of this principle was the transboundary air pollution *case between Canada and the United States*.

Article 20 of the UN Watercourses Convention requires the watercourse states individually, and where appropriate, jointly, to protect and preserve the ecosystems of the international watercourse. "The concept of the ecosystem is, and should be, a broad one, its main function in ecological thought being to emphasize obligatory relationships, interdependence and causal relationships".

Environmental Impact Assessment

Without the benefit of environmental impact assessment (EIA), the duty to notify and consult other states in cases of transboundary risk will in many cases be meaningless. Such procedures

can also be seen to give effect to the both the *precautionary principle* as well as the polluter pays principle.

The essential nature of EIA has been recognised in the decision of the International Court of Justice (ICJ) in the *Case Concerning the Pulp Mills on the River Uruguay*, where it was observed that:

> *"it may now be considered a requirement under general international law to undertake an environmental impact assessment where there is a risk that the proposed industrial activity may have a significant adverse impact in a transboundary context, in particular, on a shared resource."*

The ICJ also went on to state that that EIAs are not a one-time obligations but rather dynamic processes that can only be achieved through a series of assessments implemented throughout the life of the projects assessed.

The notion has also been incorporated into a number of important international agreements, most notably, in the UN Economic Commission for Europe's 1991 Convention on Environmental Impact Assessment in a Transboundary Context, also known as the *Espoo Convention*. The accord obligates all states to assess the transboundary environmental impacts of proposed infrastructure projects at an early stage of planning and to notify and confer with adjacent states about the possible impacts and potential mitigation measures across boundaries.

Other notable features of the Convention include:

- Regular exchange of data and information regarding the condition of the watercourse.
- A general obligation on states to cooperate "good faith in order to attain optimal utilization and adequate protection of an international watercourse".
- Environmental concerns are reflected in Articles 20 and 21, which talk about measures to be taken towards the protection of the ecosystem of the watercourse as well as marine environment. A shortcoming of these provisions is that it places this obligation primarily on states individually, and only where appropriate, jointly. Given the inter-connected nature of the entire river basin, joint and concerted action by all states is warranted, the obligation for joint action and responsibility should have been included in stronger terms.

Other international conventions and agreements

The UN Watercourses Convention has exercised considerable influence on subsequent watercourse agreements, such as the Revised Protocol on Shared Watercourses in the Southern African Development Community and the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.

The *2004 Berlin Rules* address in detail the protection of the aquatic environment, including ecological integrity necessary to sustain ecosystems dependent on particular waters, ecological flows, hazardous substances, pollution and water quality standards.

The *UN Economic Commission for Europe* (UNECE) Convention on the Protection and Use of Transboundary Watercourses and International Lakes (adopted in 1992 and in force from 1996) are more expansive than the Watercourses Convention. Among other things, the parties are obliged to take all appropriate measures to prevent, control and reduce any transboundary impact, and to ensure that transboundary waters are used with the aim of ecologically sound and rational water management and environmental protection.

The environmental provisions of the UNECE Convention also provide more minimum standards and guidelines than the Watercourses Convention.

Regional instruments have been more effective – both in terms of standard setting as well as acceptability. In a way, thus, a comprehensive regional arrangement of cooperation for equitable utilisation of freshwater resources in the South Asian context poses both a challenge and an opportunity. However, an assessment of the existing agreements in the region indicates that there is a long distance to traverse to achieve this.

Assessing treaties in South Asia

India has entered into bilateral agreements with Nepal, Bangladesh and Pakistan. However, they are extremely fragmented, and in most cases, very limited in scope and extent. The treaties between India and Nepal are restricted to specific projects or groups of projects like the Mahakali Barrage/Sarada Barrage. The agreements with Bangladesh deal primarily with the flow of water at a certain point – the *Ganga treaty* addresses the diversion of water at the Farakka barrage, and the proposed *Teesta treaty*, the flow of water at Gazaldoba, India. In fact, the Indus Water Treaty, between India and Pakistan, facilitated by the World Bank, is the most comprehensive in terms of scope, and deals with the entire river system as a whole, and not just parts or aspects of it.

On the positive side, all the treaties set up a joint mechanism, responsible for implementation of the treaty. The Ganga treaty and the draft Teesta agreement envisage the Joint Commission as the body responsible for collection of data on daily flows and transmitting it to the respective governments. The information exchange mechanism for Indo-Nepal treaties are, in comparison, weaker. The *Indus Water Treaty*, on the other hand, contains detailed provisions for exchange of data regarding daily flows, extractions, withdrawals, etc.

The obligation for consultation on planned projects along the watercourse is reflected to a limited extent in the Indo-Nepal and Indo-Bangladesh treaties. The Indo-Bangladesh agreements are altogether silent on any projects or works along the river. However, since they are based on the quantity of flows based on past data, any activity affecting the quantum of flows could escalate to a dispute. Indo-Nepal treaties have some requirement to consult

regarding development activity. Under the Mahakali treaty, for instance, each party can plan, survey and develop any tributary in its territory without any obligation to inform the other party. However, the treaty requires India and Nepal to enter into an agreement for any activity that would obstruct or divert the waters of the Mahakali river, adversely affecting its natural flow and level. The obligation of consultation can thus be inferred from this.

The most comprehensive requirement of consultation and sharing of information for proposed projects, again, is evidenced in the Indus Water Treaty. Article 7(2) states:

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

In all these treaties, environmental concerns find almost no mention at all.

However, the *arbitration award in the matter of the Indus Water Treaty* is instrumental in indicating that continuously evolving environmental standards are read into the interpretation of the treaties and their consequences by necessary implication.

The award, citing the ICJ decision in *Gabcikovo–Nagymaros*,[3] categorically held that a treaty, at any point in time, must be interpreted in light of the customary international principles for the protection of the environment in force at present. It quoted the Pulp Mills case[4], which states that in cases of industrial activities which have a significant adverse impact in a transboundary context, the duties of due diligence, vigilance and prevention, continue "once operations have started and, where necessary, throughout the life of the project". This is significant, because it lays down very clearly a continuous responsibility, which can be effective only with the cooperation of both parties.

Challenges ahead

The international legal framework governing transboundary watercourses is rapidly evolving. One of the main components shaping the evolution has been the increasing prominence of environmental concerns – in terms of standards as well as challenges.

3. Case Concerning the Gabcikovo-Nagymaros Project (Hungary/Slovakia), International Court of Justice, Judgment of 25 September, 1997

4. International Court of Justice, Case Concerning Pulp Mills on the River Uruguay (Argentina V. Uruguay), 2010

Logically extending the principles of international watercourses law and international environmental law, the sustainable use of the water of a river basin could arguably require conducting basin-wide studies to assess the viability of the proposed projects, individually, as well as cumulatively. In the absence of this, there is an unsustainable, and frequently economically and environmentally unviable race to establish "existing use", which is one of the factors of reasonable and equitable use.

Countries should resist the temptation to act in disastrous haste and go ahead with large-scale hydro-engineering projects that may result in irreversible harm.

India, Nepal, Bhutan and Pakistan are engaged in a huge "water grab" in the Himalayas, as they seek new sources of electricity to power their economies. Taken together, the countries have *plans for more than 400 hydro dams*, which, if built, could together provide more than 160,000 MW of electricity.

The proposed project of inter-linking rivers in India is another example. One of the components of the project is the Himalayan Rivers Development. This will entail the construction of storage reservoirs on the principal tributaries of rivers Ganga and Brahmaputra, and have an impact on Bhutan and Nepal. Not only is there no consultation with affected riparian states on this issue, or even recognition of obligations under international agreements, the *Supreme Court goes so far as to assert*: "Besides annuring to the benefit of the country, it will also help the countries like Nepal etc., thus uplifting India's international role. Importantly, they also point out to a very important facet of interlinking of rivers, i.e., it may result in reduction of some diseases due to the supply of safe drinking water, and thus serve a greater purpose for humanity."

Resolution of conflicts and issues are never easy and transboundary water issues in a way mirror the water related tension that exists within a nation. India's example of dealing with water related conflicts between states reflects the futility of many efforts to resolve the conflict. *Distinguished lawyer Fali S. Nariman*, who has appeared as counsel before many of the water dispute tribunals, observes:

> My experience is that none of the political parties in any of the complainant or contesting states (in interstate water disputes) are ever willing to concede a single point to the other state. For instance, in the Cauvery water dispute, the farmers and politicians in Karnataka, cutting across political party lines, have been (and are) in no mood to sacrifice the irrigation or drinking water needs of Karnataka to accommodate the people of Tamil Nadu. Likewise, the farmers and politicians of Tamil Nadu are unwilling to change their century old cropping patterns, and insist on an undisturbed flow of water, as mandated in the 1924 agreement… Neither of the states will yield an inch.

Water and rivers will continue to be a contentious legal issue in South Asia, as well as many other parts of the world. The various decisions of the courts and tribunals offer insight into

the legal path being adopted. Unfortunately, some of the most pressing environmental issues, as well as principles of environmental law, are conspicuously absent in most judicial decisions. As rivers are ultimately an ecological entity, legal and policy discourse needs to focus more on long-term ecological health and sustainability of river systems.

The role of civil society in China's anti-dam campaigns

Liu Jianqiang[5]

As we face a new wave of dam building on the Brahmaputra-Yarlung Tsangpo River, it is useful to reflect on the history of civil society resistance to dams in China. Some of the fiercest environmental battles in China in recent years have been over hydropower and I hope that we can learn some useful lessons for the Yarlung Tsangpo.

Image by Liu Jianqiang

> *"The campaign to protect Tiger Leaping Gorge, not only safeguarded one of China's most magnificent landscapes, but it also saved the homes of more than 100,000 ethnic minority peoples."*

Twenty-five years ago, people spoke out, for the first time against a major project in China, the *Three Gorges Dam*. Journalists, including the writer, Dai Qing, who was supported by many scientists, were among the people who disagreed with the Three Gorges Dam, but Dai Qing was put in jail after the Tiananmen protests in 1989 and, in the end, the Three Gorges Dam was built.

Even today, it is not easy to criticise the Three Gorges Dam in China. I have direct experience of this, as one of the first journalists to tell the public about the negative impacts of the dam on the environment and people. The company behind the project rang me to tell me that if I published this article, I would become an enemy of the state. I was working for the Southern Weekend at the time, so I turned off my mobile phone and we published the article.

For eight years, the strong momentum driving the development of China's hydropower sector was kept in check by fierce public opposition. Chinese NGOs, the media and people displaced by dams all played important roles.

The angry river

The proposed construction of 13 dams along the Salween River in 2004 sparked one of the *country's most heated environmental debates*. The Salween River – known as the Nu, or angry river – in China, flows through Yunnan province, close to Myanmar and India, and near the Mekong and the Jinsha (upper Yangtze) rivers. The proposed dams were to be

5. Liu Jianqiang is Beijing editor of *chinadialogue* and thethirdpole.net

built by companies dominated by former premier Li Peng's family, across a UNESCO world heritage site.

In an earlier era, they might have charged ahead unchallenged. But in February 2004, Premier Wen Jiabao *suspended the plans*, sending them back for more scientific study. And in October 2006, the Water Minister, Wang Shucheng, slammed the proposal, calling it a form of "predatory development."

But the campaign against the Nu River dams was not a full-blown environmental movement. The people most affected by the projects – the 50,000 residents of the river valley, mostly from minority groups, who faced resettlement if the dams went ahead – did not join the campaign. Many were unaware of the hydropower development plans.

In 2006, I published *two articles* about the Nu River dams on chinadialogue. In China, officials and hydropower companies always tell the public that building dams help pull people out of poverty, but this is a lie. In 2005, local officials brought two local people from the Nu valley to a meeting about the proposed dam in Beijing. Described as *"representatives" of the half million people* in the area, they supported the dam, accusing journalists and NGOs of wanting to keep the river for themselves and ignoring the interests of the local people, who wanted the project to improve their lives.

I went to Nu River to look for these so-called farmers' representatives. In fact, one was an official and the other explained that he disliked the project but had been forced to speak in support of the dams.

How Tiger Leaping Gorge was saved[6]

In another famous case, the *dam at Tiger Leaping Gorge*, on the Jinsha river (upper Yangtze), just 200 kilometres from the Nu River, local people along were better informed about the plans for their river and, more aware of their rights, they became active participants.

The campaign to protect Tiger Leaping Gorge, which ran from 2004 to 2006, not only safeguarded one of China's most magnificent landscapes, but it also saved the homes of more than 100,000 ethnic minority peoples, making the campaign one of the biggest success stories of the past decade for China's green defenders.

I covered this story for Southern Weekend. In 2004, news trickled out about plans to build an eight-dam cascade starting at Tiger Leaping Gorge on the middle reaches of the Jinsha River, on the first bend of the Yangtze. Local villagers suspected that construction work on the Jinanqiao dam (the fifth of the eight-dam cascade) was illegal and had begun without approval from the central government. My newspaper colleague, Cheng Rong, visited the construction site. The hydropower company had set up two security posts at the entrance, to block off any

6. This is an adapted excerpt from the new book *China and the Environment: The Green Revolution*

access, but with the help of local villagers, he walked along a horse caravan path used by the Lisu ethnic group to cross the mountain and bypassed the guards. When he got to the site, he saw trucks moving back and forth like ants, two of the dam's diversion tunnels starting to take shape, and the main building works, including the coffer dam, already under construction.

Cheng also discovered that the town of Lijiang would earn about 4 million yuan in tax revenues from the dam, and that this was why the local government had prioritised the project and given it a green light at every stage.

Back in Beijing, an official from the National Development and Reform Commission (NDRC) told me that this project had definitely not yet been approved, and that he was very surprised to hear that it had already been started. I telephoned an official from the State Environmental Protection Administration (SEPA, now the Ministry of Environment Protection), who also sounded shocked: 'That's a world-famous site of natural beauty. How could anyone build a power station there?' he exclaimed. We had our evidence: this project had broken ground illegally.

Our article was published on the front page of Southern Weekend on 29 September 2004, with the headline 'Emergency at Tiger Leaping Gorge'. It shocked the nation and focused public attention on the issue. Following our report, Chinese and international media began to cover the story.

According to the plan for the Tiger Leaping Gorge dam, an estimated 100,000 people would need to be relocated. When these people were moved, they would not have land as good as the land that they had been farming. Once prosperous villages would sink into poverty.

Moreover, our report confirmed two important points. First, that construction work on the Jinanqiao hydropower station was unlawful; secondly, the 100,000 local people had not been informed about what would happen to them, and were categorically opposed to being resettled.

Li Xiaoxi was an associate professor at the Air Force Command Institute, and knew an official in the office of the premier, Wen Jiabao. She called that official the day after our article was published and said that Wen should read it – and see that a dam was being built illegally at Tiger Leaping Gorge. The official replied: 'We've seen this article. It's a good story with solid facts.' Shortly afterwards, Premier Wen Jiabao ordered the project suspended while the NDRC investigated the situation.

A local scholar, the late Xiao Liangzhong, NGO founder Yu Xiaogang and filmmaker Shi Lihong all played important roles in informing residents about the dam plans, educating them about their rights and fostering the emergence of local peasant leaders. The local governments and hydropower companies, however, kept up the pressure to proceed. Two years later, on March 19, 2006, more than 10,000 farmers gathered to protest the dam plans.

The peasants' protest worked: The local government posted notices in villages throughout the area pledging not to build dams without the agreement of local people.

But seven other dams have now been constructed and the company is still looking forward to completing the last dam at Tiger Leaping Gorge. The local government and company will not give up since a dam there would be highly profitable.

What strategy for the Yarlung Tsangpo?

Journalists, scholars, local people and officials have all been involved in these campaigns against dams. But the same strategy will not be work for the Yarlung Tsangpo because the population along the upper reaches of the river is small: very few people will be directly affected and it is impossible to mount similar demonstrations.

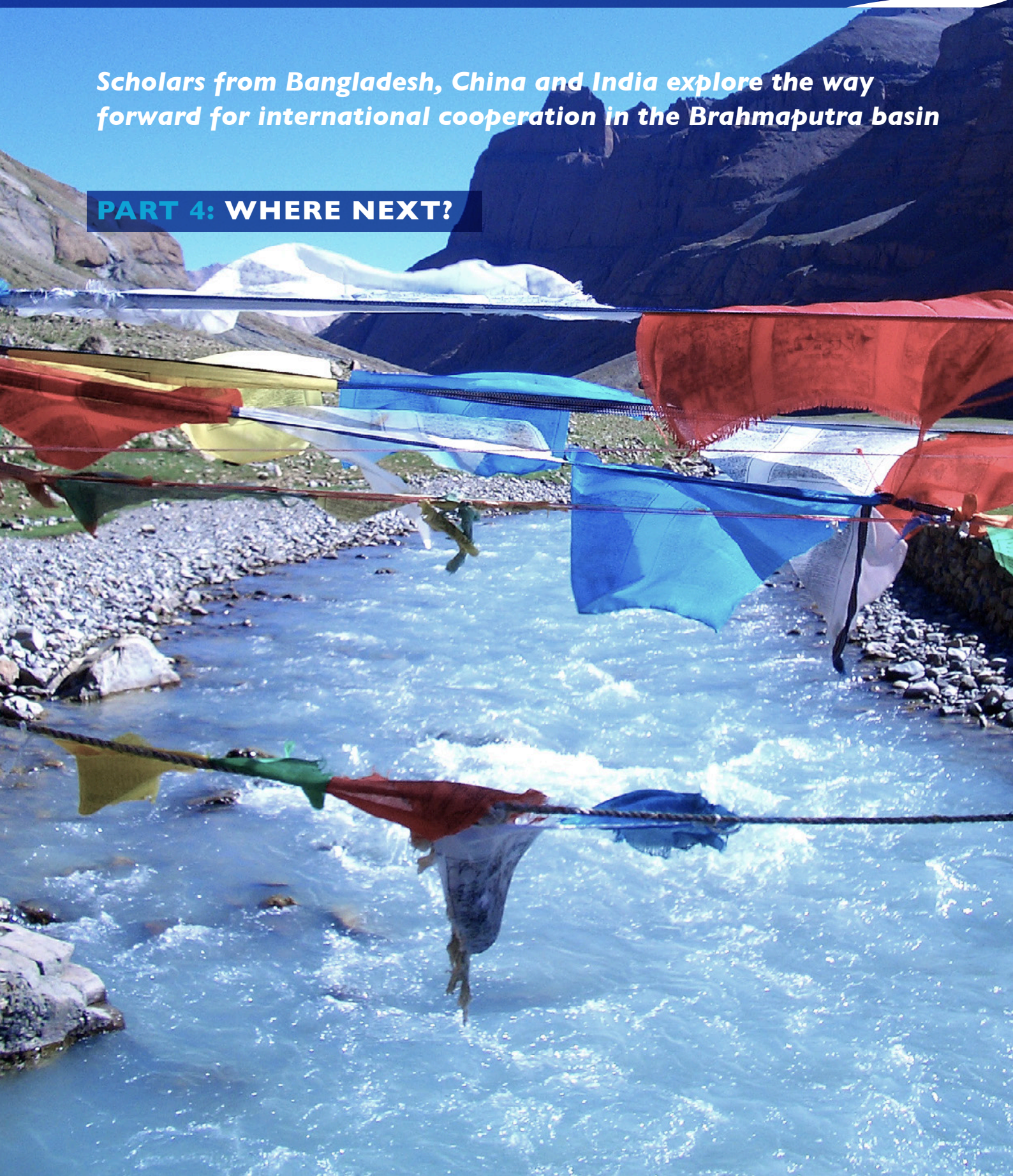
It is not only a question of population, but also of politics. Chinese journalists never cover issues related to Tibet, so while many journalists reported the story of the Nu and Tiger Leaping Gorge, I have only read one article about the dam projects on the Yarlung Tsangpo. It is also very hard for NGOs to work in this region, because it is remote and politically sensitive.

As Yang Yong has described – the Yarlung Tsangpo is probably the least researched river in the world and there is almost no media coverage of development along the river.

In 2011 Chinese journalist *Zhang Ke reported the diversion of the Yarlung Tangpo* to Xinjiang in the northwest. Most people paid little attention because it seemed like a joke, but I invited Zhang Ke to write for chinadialogue. Later, Indian newspapers covered this story and interviewed Indian government officials, who were angry at the lack of information from the Chinese government. The next day, when a foreign journalist asked the Chinese foreign ministry about these plans,a Chinese official said the plan was ridiculous, it didn't exist.

If a Chinese media campaign against dams will not work on the Yarlung Tsangpo, then perhaps reporting from India and Bangladesh can put more pressure on the Chinese government and ensure that the Chinese public hears civil society voices from other countries.

BRAHMAPUTRA: TOWARDS UNITY



Scholars from Bangladesh, China and India explore the way forward for international cooperation in the Brahmaputra basin

PART 4: WHERE NEXT?

Part 4: Where next?
Contents

China-India relations: from crisis to opportunity

Prem Shankar Jha

There is good reason for China to improve its relationship with India on all aspects including water sharing, and both countries need to move beyond the occasional crisis, says noted analyst Prem Shankar Jha

China hopes to strengthen cooperation with India under the auspices of the BRICS

By every account, both Indian and Chinese, Premier Li Kejiang's visit to India last May was an unqualified success. It had been preceded by a remarkably mature resolution of a confrontation in Ladakh that – if some accounts coming out of Beijing and hints given by a senior Chinese official before the visit are to be believed – had been engineered by the new President, Xi Jinping's rivals within the Peoples' Liberation Army.

Within minutes of arriving at Delhi airport Li Kejiang described his visit as "future-oriented", and emphasised that he had come to India to enhance mutual trust and friendship, and deepen China-India strategic and cooperative partnership. During his visit he described the Depsang valley intrusion as "an isolated incident", but said that it underlined the need to resolve the border demarcation issue as quickly as possible.

The 35-point joint statement of the two heads of government was unusually wide ranging, and Prime Minister Manmohan Singh made no secret of his satisfaction with the outcome of his talks. Yet doubts remain in the policy making community: If the Chinese are so keen to mend fences with India, why did their troops change the status quo in Ladakh so decisively — penetrating 19 kilometres into our part of Ladakh – now? Was it to force India to dismantle *the Chumar post* which overlooks the Karakoram pass? If this was the purpose then India has succumbed to China's stick-and carrot tactics yet again.

The sceptics buttress their criticism by pointing to the lack of any substantive commitments or concessions by the Chinese in the joint statement: According to one writer, S.D. Pradhan, India gave away too much but came away with nothing more than a repetition of old assurances. In particular, Manmohan Singh's agreement to "seek a framework for a fair, reasonable and mutually acceptable settlement (of the border issue) in accordance with the agreement on

political parameters and guiding principles" amounted to accepting a new framework for settlement that commits India to making compromises from the very outset.

Why does China want to improve relations with India now?

What is missing from their analysis, however, is an assessment of China's motives. Why should China want to improve relations with India now? Why does it want to speed up the timetable for the demarcation of the border now after having dragged its feet since 1996? Having already got an unequivocal reassertion from Manmohan Singh during the Brazil, Russia, India, China, South Africa (BRICS) summit in Durban this March that India regards Tibet as China's internal affair, what more does China need? And if all China wanted out of the Ladakh intrusion was to neutralise a small local vantage pointv in Ladakh that is of limited military and no economic value, why did China's new President Xi Jinping make it a point to tell Manmohan Singh at Durban that he wanted to resolve the border issue "as early as possible" and dispense with protocol to inform him that Li Kejiang would be visiting India on the new premier's first foreign tour?

Why, for that matter, did a senior Chinese official who visited New Delhi a week before premier Li Kejiang also stress that "The border question must not be put on the backburner" and, giving a veiled hint that the Ladakh intrusion had not been endorsed, let alone planned, in Beijing, urge that to prevent other such hiccups in relations in future, it was necessary to move "as quickly as possible" towards a resolution of the border issue?

> *"Chinese authorities are also keen to scotch that recurrent rumour that the waters of the Brahmaputra will be diverted to northern China."*

In the columns of the Hindu Srinath Raghavan, a noted student of India's foreign policy, has suggested that Beijing is keen to mend fences with its neighbours that the previous regime, somewhat arrogantly, broke down. This had allowed the US to revive a policy of containing China that had earlier found few takers among its immediate neighbours. "India" he says, "is a 'swing' power in the present strategic constellation. Its choices could alleviate or exacerbate China's problems. Premier Li was (therefore) seeking reassurance as well as reassuring India when he publicly stated that 'we are not a threat to each other, nor will we ever contain each other'."

Raghavan's insight into the change in China's motives is valuable, but probably incomplete. Were India to join the US' containment policy it would make little difference to China's military security. As for diplomatic overtures to its immediate neighbours, a country with three trillion dollars of sovereign reserves can find many 'softer' and more direct ways of getting them to respect its core security interests than by roping in India.

A stronger reason for wanting to raise the level of cooperation with India to a strategic relationship would be to deal more effectively and less confrontationally with the United States and Europe, in their new avatar as empire builders. It is here that India, with its strong democratic credentials, its lack of aggressive intent, and its deeply founded relations with

Europe and the US, can be a swing power in the strategic constellation. For, whether in their desire to assert the right of developing countries to a fair share of the 'carbon space' in the atmosphere or to ensure that the post -Westphalian international order remains multi-polar and democratic, China and India have consistently been on the same track.

It is this cooperation, which is taking shape under the auspices of the BRICS, that China almost certainly wished to strengthen. By changing the phrasing of its position on the border issue at the BRICS summit in Durban (before the Ladakh intrusion) Xi Jinping wanted to make it clear that he regards the border issue as a stumbling block that needs to be removed as soon as possible.

China's domestic concerns

However, the strongest reasons for wanting to remove hurdles to deeper cooperation with India may spring from its economy. While public opinion in the West continues to regard China as an industrial behemoth that will power its way inexorably to G-2 and even G-1 status within the next decade, the new Chinese leaders see daunting challenges arising in virtually every sphere of economic governance. By far the biggest challenge is that it is facing a sharp slowdown in economic growth and has run out of stratagems for raising its tempo once more.

What is worse, as the *Bo Xilai affair* showed, rising corruption in its ranks is posing a threat to its legitimacy that is being exacerbated by the social impact of the recession. This is because in China recession creates not only the familiar economic problems of unemployment and insolvency but, thanks to its unique form of 'cadre' capitalism, tends to erode the legitimacy of the Communist Party just when it can least afford to let that happen.

The roots of this destabilising interaction can be traced back to the winding up of central planning in the first half of the 1980s. This shifted the power to invest into the hands of more than 60,000 provincial and local government bodies and set off a race to invest that became the prime cause of China's breath-taking rates of growth in the 1980s and from 1991 until 1996. But this scramble to invest ended by creating huge excess capacities in virtually every major industrial sector that forced the Chinese economy into a steep – and only partially acknowledged – slowdown that lasted for six years until 2002.

The stresses this sharp "recession" created sowed the first seeds of disillusionment with the Communist Party. It dried up the revenues that local governments had garnered from more than seven million "collective" enterprises set up between 1978 and 1995 and forced them to fill the budgetary gap through unauthorized taxes, fees and fines levied upon the rural population. Since these did not suffice most local government authorities also set up rural credit societies that offered huge returns to depositors, who were mostly moderately well off peasants and small entrepreneurs. But by 2002 all but a few of these had lost their savings.

The cumulative impact of these measures was to transfer most of the burden of recession on to the shoulders of peasants, migrant workers and redundant state enterprise workers.

This happened even while the cadre capitalists who had invested and lost the public's money continued to fatten. The resulting resentment was reflected by a tenfold rise in mass protests against state authorities from 8,700 in 1994 to 87,000 in 2005.

Today Xi Jinping faces a repeat of this entire cycle. The Chinese economy has entered another sharp slowdown and the *number of protests has risen* to between 180,000 and 230,000 in 2010. Only this time he does not have the option of reflating the economy through a fiscal stimulus, that the Jiang Zemin government employed in 1997 and the Hu Jintao government in 2008.

This got used up when Hu Jintao announced a 4.3 trillion yuan (US$586 million) fiscal stimulus programme for 2009-10 but the provinces invested close to 12 trillion yuan in just 14 months. Not surprisingly, therefore, on June 15, 2011 the People's Dailywarned, "We absolutely cannot do another 4 trillion stimulus package". This was repeated by then premier Wen Jiabao in Jiangsu a month later. "The last stimulus programme", he said, "left us with excess capacity in 21 industrial sectors; a build-up of stockpiles; a reduction in investment efficiency; increased environmental costs; worse inflation; a build-up of local government debt; plus an asset bubble."

China may therefore be entering a long period of adjustment similar to what Japan entered in the beginning of the 1990s. This opens a vast new area in which the two countries can cooperate. India needs to invest US$1.5 trillion during the next five years to bring its infrastructure up to acceptable international levels. Chinese companies are cash rich, but in the current recessionary phase have run out of investment opportunities within the country. This opens up an obvious area of cooperation, from which both countries can benefit.

Promising signs for shared rivers

Another promising area is the development of the river basins that the two countries share. More specifically, China, India and Bangladesh can *cooperate on the building of hydropower projects on the Brahmaputra* – the river China calls the Yarlung Tsangpo.

Both President Xi and Premier Li were at pains to stress to Manmohan Singh that China would not impound the waters of the Brahmaputra by building a dam – its projects would be run-of-the-river, which would produce electricity but not hold back the water. China has not shown the same sensitivity with other downstream countries, especially on the Mekong. Chinese authorities are also keen to scotch that recurrent rumour that the waters of the Brahmaputra will be diverted to northern China. They keep pointing out that there is no such official plan – it was started by one paper by an academic in Nature, and the academic herself has said later she had made a mistake.

In sum, China has vast amounts of surplus capital but few profitable avenues for its investment. It also needs to find new markets for its exports. India, with its hunger for capital and fast growing domestic market, can help it do both. But it can only do so when the two countries have cleared the obstacles from the past that litter the road to the future.

Moving forward: key recommendations

Last year marked the *UN international year of water cooperation*. The larger questions of cooperation between nations have been spelt out. But we now need experts – NGOs, academics, business people, activists, environmentalists – that transcend all boundaries and the cooperation that we need is cooperation between all these different social solidarities.

Government cooperation is important, but it comes last, when all uncomfortable issues have been thrashed out between academic and civil society so that issues become ripe enough. If issues are not ripe enough – if data has not been agreed as fact or common understandings reached – then governments might become partial and paralysis will result.

It is important that meetings and publications like these put the issues on the table. There doesn't need to be consensus, but there needs to be an ethos of understanding other positions; why are business people, local governments saying what they're saying and how can we challenge traditional wisdoms.

Institutions that drive water and energy policy in the Brahmaputra basin are currently dominated by civil engineers and some economists. We need to reclaim space for other voices. There needs to be more collaborative research – across borders and across disciplines – that can persuade policymakers to pursue alternatives to hydropower and to change the way they see rivers.

During the October 2013 workshop in Kathmandu, participants identified key areas for future collaborative research, ways to strengthen advocacy and influence policy making processes along the Brahmaputra and across the Himalayan watershed. These are summarised below.

Key collaborative research areas

1) *Informal data collection:* There was a strong feeling that informal data collection is important to supplement formal collection, because governments are not willing to share information about seasonal variation of river flow. For example, the Indian NGO *Legal Initiative for Forest and Environment* (LIFE) works with local communities to collect river flow data using simple methods and this provides enough information to carry out effective advocacy. It is very difficult for an independent researcher or journalist to obtain water flow data on transboundary rivers from the Government of India This technique could be used to collect river flow data downstream from where the Brahmaputra leaves China, and where it leaves Assam and flows into Bangladesh.

2) *More information on the Teesta and Kosi rivers:* A vast amount of dam projects have been approved in a haphazard way in the Teesta basin and the Kosi is relatively wild and little understood.

3) *Information sharing for disaster reduction:* People to people information sharing about landslide threats and traumatic flooding due to cloud burst to help prevent disasters.

4) *Earthquake risks:* Research on major earthquakes that have happened in the past and landslides triggered by earthquakes which seem to have a hundred-year cycle. This cycle can be shorter in the southern Himalaya because of the more intense rainfall and so there is a need collect local memories to locate those vulnerable areas

5) *Dams for flood control:* At the big bend where the three mountain ranges meet along the Brahmaputra, glacial melt seems to be happening much faster and making the region more vulnerable to landslides. Dam builders do not have enough understanding about flooding. Currently the main purpose of these dams is to produce hydropower, but the role of dams as a form of flood control is ignored. Current design mitigates against flood control; for example, managers keep dams full for hydropower and often exacerbate floods by opening the gates and creating a massive water pulse downstream.

6) *Create a Brahmaputra transboundary conservation corridor:* Identify a transboundary corridor and collect data on climate and species to study the physical and social issues around water along certain points from south to north – for example, where the Brahmaputra meets the Ganga and go up through Assam to China.

7) *Harvesting and using rainwater:* How to better harvest and use precipitation – whether snow or rainfall – and how to use television and radio to share climate, precipitation and river flow data more widely.

8) *Connect science and communities:* Bring science to the grassroots and bring grassroots and indigenous knowledge up, by having an intensive programme on community and traditional knowledge before it is too late.

9) *Offer alternatives:* No amount of advocacy will prevail over the power of money and politics unless you can find strong, cheaper alternatives, such as solar energy.

10) *River navigation:* Navigation is another area that has been largely ignored in the Brahamputra – unlike along other large rivers such as the Ganga and Mekong. Navigation should be seen and promoted, both in terms of traditional or modern crafts. From a climate change perspective, river transportation is much cheaper and more energy efficient than trucks. But also from an environmental perspective, you have to leave enough water in the river for navigation to happen. So there is an environmental imperative for helping navigation to happen.

Identify issues that unite

1) It is water and culture that unite people in the Brahmaputra region. Different people celebrate river life and water in different ways, through diverse river and water festivals

across the whole region that we need to bring to salience by having an active research programme to map this across basin countries.

2) Along with the celebration of river culture we should investigate how communities cope with change along the river – by collecting oral histories – and mapping memories of landslides and other disasters.

3) We should also map the culture of fish and aquatic life along the river, because people have different mythologies of fish and aquatic life – even cooking and eating habits.

Find a new language to engage policy makers

Governments rarely want to listen to these criticisms– so there needs to be an effort to convert our language of confrontation to a language of constructive criticism – to engage the powers that be to listen and respond to concerns of environmentalists and social activists and most important of all, the voices of the people who live on or near the banks of this mighty river.

Network for Social Change

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