

IDSA

Backgrounder

China's Hydro Ambitions and the Brahmaputra

Shreya Bhattacharya

July 23, 2018

Summary

The backgrounder examines China's bid to achieve water security by harnessing trans-boundary rivers, without entering into any formal water sharing agreement or treaty with its downstream neighbours, as evident from its approach towards Yarlung Tsangpo/Brahmaputra River, and its likely implications for India.

Water covers almost 71 per cent of the earth's surface. Yet, only three per cent of that water is potable, out of which two per cent is held in glaciers and ice caps. Even this percentage is rapidly shrinking due to growing human population, increased economic activity and rapid pollution. When increase in population is read together with demands arising from prevalent consumption patterns, it presents a bleak future scenario. It has been projected that two out of three people in the world will live in water-stressed conditions by the year 2030.¹

The indispensability of water combined with scarcity creates a fertile breeding ground for potential conflict. The fact that rivers, which are an important source of fresh water, do not follow political boundaries and are more often than not trans-boundary in nature, makes the situation more complex. In fact, 46 per cent of the world's river basins are trans-boundary in nature.² While it is important for a nation to ensure water security for itself, yet it cannot be achieved unilaterally since rivers run through tricky terrains rife with issues of sovereignty and rights of usage and sharing with other nation states.

In this context, it becomes imperative to explore the unique advantage China has as a complete upper riparian power. China's bid to achieve water security as well as ambitions to establish itself as a hydro-hegemon in the region is examined here, through the case of mighty Yarlung Tsangpo/Brahmaputra River, especially focusing on the implications for India.

China's Inner Compulsions

Asia comprises 60 per cent of the world's population (4.4 billion in 2016) and also has the highest growth rate today, with its population almost quadrupling during the 20th century.³ However, Asia's water resources have remained constant. The two most populous countries of the world – China and India – comprising 20 and 17 per cent of the world's population, contain only seven and four per cent of the world's water resources, respectively.⁴

In 1998, then Chinese Deputy Prime Minister Wen Jiabao had stated that the very "survival of the Chinese nation" was threatened by looming water shortages.⁵ According to Barry Naughton, a leading expert on the Chinese economy, "China's greatest development challenges...are in the areas where a dense population pushes up against the limits of water and what the land can provide."⁶ Securing continued

¹ Uttam Kumar Sinha, *Riverine Neighbourhood: Hydro-politics in South Asia*, IDSA, Pentagon Press, New Delhi, 2016, p. 1.

² Ibid., p. 3.

³ ["Asia Population 2018"](#), *World Population Review*, November 14, 2017 (Accessed July 11, 2018).

⁴ Arnab Chakrabarty, "China as a Hydro-Hegemon: A Perspective from India", *World Focus*, February 2015, p. 113.

⁵ Uttam Kumar Sinha, no. 1, p. 118.

⁶ Barry Naughton, *The Chinese Economy: Transitions and Growth*, The MIT Press, Cambridge, MA, 2007, p. 30.

access, supply, and control over water resources has been a fundamental element of China's national interest. The country is faced with some crucial internal challenges which serve to explain its drive towards achieving water security through building of dams and water diversion projects.

First, the demand for water has been increasing given its large population size concomitant with economic growth and rising standards of living. China's per capita water supply is only 28 per cent of the world average, which is precariously below international standards for human sustainability.⁷

Second, China has been historically a water scarce country with uneven distribution of its water resources. The inter-regional disparity in water resources is stark. Four-fifths of the water resources in China are located in the south. The north, home to about half of the total population and the arable land, making it the centre of economic and agricultural activity in the country, contains only 20 per cent of China's water resources. This is exacerbated by the fact that the agricultural sector, which uses 70 per cent of China's water, and the coal industry, which utilises 20 per cent of the water resources, are both largely concentrated in the extremely water stressed northern China.⁸ While residents of the sparsely populated south have access to 25,000 cubic meters of freshwater per person annually, residents of the populous arid north, which includes China's biggest and fastest growing urban areas such as Beijing and Tianjin, have less than 500 cubic metres per person annually.⁹ The increasing pressure on water resources, particularly in north China, is of major concern to the Chinese Government. In 2011, China's vice-minister for water resources had declared that the country is facing an "increasingly grim" water scarcity situation.¹⁰

China's water resource challenge consists of both quantity and quality issues. According to the Chinese Government, nearly 60 per cent of its groundwater is polluted.¹¹ Reports from China's ministry of environmental protection (now, ministry of ecology and environment) have indicated that less than half of China's water can be treated to the point where it is safe for drinking, and a quarter of surface water is so polluted that they are unfit even for industrial use.¹²

Third, as per China's 12th Five Year Plan (12th FYP), hydropower is being promoted as the centrepiece of China's plan to expand renewable energy by 2020. Hydropower

⁷ Yunnan Chen, "[The Securitization of Non-Traditional Threats: Water Security in China](#)", *E-International Relations*, June 23, 2012 (Accessed May 25, 2018).

⁸ Shannon Tiezzi, "[China's Looming Water Shortage](#)", *The Diplomat*, November 30, 2014 (Accessed May 25, 2018).

⁹ See [Section on China](#), Aquastat Survey, *UN Food and Agriculture Organisation*, 2011 (Accessed July 11, 2018).

¹⁰ Scott Moore, "[Issue Brief: Water Resource Issues, Policy and Politics in China](#)", *The Brookings Institution*, February 12, 2013 (Accessed July 11, 2018).

¹¹ Shannon Tiezzi, no. 8.

¹² David Stanway, "[Pollution makes quarter of China water unusable: Ministry](#)", *Reuters*, July 26, 2010 (Accessed July 12, 2018).

already accounts for six per cent of its power supply.¹³ China intends to triple its hydropower capacity to 300 GW. China's 12th FYP also calls for an increase in the use of hydroelectric power, as under the 11th FYP only two-third of the hydroelectric projects could be completed. China, therefore, is increasingly damming trans-boundary rivers to achieve its hydropower targets.¹⁴

China's 12th FYP recognises that China's water crisis could be a choking point for its economic development.¹⁵ The Chinese Government has taken two major policy initiatives. Internally, there has been a move to improve the efficiency of water use and limit the rising demand through actions such as the "Three Red Lines" policy promulgated by the Chinese Communist Party Central Committee and the State Council. In addition, China has undertaken gigantic water diversion projects such as the South-North Water Transfer Project (SNWTP) to address its regional water distribution imbalance. The SNWTP aims to transfer some 45 billion cubic meters of water per year from central and southwest China to augment the flow of Huang He (the Yellow River) and meet the water demand in the Beijing-Tianjin region. The final cost of this project is estimated to exceed \$62 billion. It would also require resettlement of thousands of people.¹⁶ The western line of this project is most controversial of the three lines as it includes building a dam on the Great Bend of Yarlung, where the river curves into the Assamese plains of India, which would entail diverting 200 billion m³ of water from Yarlung to Yellow River. However, China's exact plans for the western line are difficult to ascertain due to conflicting information from different sources.¹⁷

Chinese Moves to Harness Brahmaputra

China's unique position as the only country in the region which is completely upper riparian, lends it an unparalleled advantage and power to influence the flow of water to nations downstream. As an upstream state, China shares 42 major transboundary watercourses (including lakes) with its neighbouring countries. As a result, China's international water policy is at the core of Asia's water security.¹⁸ India functions as a middle riparian state. It is a lower riparian state in relation to China, but an upper riparian state vis-a-vis Pakistan and Bangladesh.

The upper and lower riparian nations often make incompatible claims about their rights over river waters. The upper riparian nations base their claim on the principle

¹³ Jim Yardley, "[Chinese Dam Projects Criticised for Their Human Costs](#)", *The New York Times*, November 14, 2007 (Accessed May 07, 2018).

¹⁴ Jessica Williams, "[The International Implications of China's Water Policies](#)", *E-International Relations*, February 15, 2013 (Accessed July 11, 2018).

¹⁵ Ibid.

¹⁶ Scott Moore, no. 10.

¹⁷ Jessica Williams, no. 14.

¹⁸ Jesper Svensson, "[China's water policy and the sharing of international rivers in Asia](#)", *Global Water Forum*, March 21, 2018 (Accessed July 11, 2018).

of ‘absolute territorial sovereignty’, meaning the right to use the river waters unilaterally regardless of lower riparian concerns. This is often called the Harmon Doctrine.¹⁹ According to this doctrine, an upstream nation can freely utilise a river’s flow within its boundaries without considering the effect on a downstream state.²⁰ The lower riparian states, on the other hand, base their claims on ‘absolute territorial integrity’ which argues that upper riparian actions should not affect the water flowing downstream.²¹

China has been seen to act in a manner typical of an upper riparian nation. Its distinctive position as a completely upper riparian nation allows it to act as a hydro-hegemon in the region. China’s hydro-hegemony is made possible by its control over Tibet. The Qinghai-Tibetan Plateau extends over a vast area spanning 2.5 million square kilometres. This Plateau, often referred to as the ‘third pole’ and ‘roof of the world’, is home to the largest fresh water reserves outside north and south poles. It is the source of some of the Asia’s most important river systems including the Indus, Ganga, Brahmaputra, Irrawaddy, Slaween, Mekong, Yangtze and Huang He. All these rivers are trans-boundary in nature, with the exception of Yangtze and Huang He.

As per the estimates of the Chinese ministry of water resources, the Tibet Autonomous Region (TAR) has 448.2 billion cubic metres of water, which is strategically important since it gives China an enormous edge over India in terms of control over water resources. Chinese scientists have discovered that Tibet has 40,000 times more water resources than China.²² The Chinese occupation of Tibet, wherein the most important rivers originate, *de facto* assures China’s hydro hegemony. The *de jure* control over water resources is aided by the fact that China has made huge investments in dams and has not entered into any water sharing agreement with India.²³

China is no stranger to massive dam projects. The Three Gorges Dam on Yangtze River is by far the biggest in the world. However, unlike the Three Gorges Dam, where impact is restricted to areas within China, the several dam projects on Yarlung Tsangpo assumes significance since India (as well as Bangladesh further down) will be directly affected and will have to bear externalities emanating from it.²⁴

The Yarlung Tsangpo enters India after passing the Great Bend, through Arunachal Pradesh where it is known as Siang/Dihang, then onto Assam where it is called

¹⁹ Named after American Attorney General Judson Harmon who in 1895 applied the idea of ‘absolute territorial sovereignty’ to a dispute between the United States and Mexico over polluting of Rio Grande River.

²⁰ David J. Lazerwitz, [“The Flow of International Water Law: The International Law Commission’s Law of the Non-Navigational Uses of International Watercourses”](#), *Indiana Journal of Global Legal Studies*, 1 (1), Fall 1993, p. 250 (Accessed May 07, 2018).

²¹ Uttam Kumar Sinha, no. 1, p. 114.

²² [“Water Security for India: The External Dynamics”](#), *IDSA Task Force Report*, New Delhi, 2010, p. 44.

²³ Arnab Chakrabarty, no. 4, p. 115.

²⁴ Jesper Svensson, [“Managing the Rise of a Hydro-Hegemon in Asia: China’s Strategic Interests in the Yarlung-Tsangpo River”](#), *IDSA Occasional Paper*, 23, New Delhi, April 2012, pp. 8-9.

Brahmaputra, and thereafter to Bangladesh where it is named Jamuna. China completed the Zangmu Dam (510 MW capacity) built on the upper reaches of Brahmaputra in 2010. Three more dams at Dagu (640 MW), Jiacha (320 MW) and Jeixu are at present under construction. The work on Zam hydropower station, which will be the largest dam on Brahmaputra, too commenced in 2015.²⁵ Although the Indian allegations about Chinese dam building activities on Brahmaputra date back to more than a decade, Beijing admitted to the construction of Zangmu Dam only in 2010 and that too after a series of denials. China has not yet officially communicated anything about the construction of the other three dams – Dagu, Liacha and Jiexu – on Brahmaputra. Lack of communication by China has created an atmosphere of suspicion and mistrust in India, especially in its north-eastern region.

Chinese Unilateralism

China seems to have chosen a policy of absolute sovereignty rather than one of national integrity over shared water resources (where states have the right not to be negatively affected by activities of upper-riparian countries).²⁶ China has built more dams on its rivers than the rest of the world combined,²⁷ and yet has no water sharing agreement or treaty with any of its neighbours including India. For instance, China has built eight of the proposed 15 dams along the Lancang section of the Mekong River, with very little consultation with downstream countries. China's Yunnan Provincial Government is proposing one of the world's highest dams on the Salween River, which flows into Myanmar and Thailand. This dam would be situated in an environmentally sensitive area according to the World Wide Fund for Nature (WWF), but neither Myanmar nor Thailand have been consulted.²⁸

China has been repeatedly invited to participate in multilateral consultations by downstream states comprising the Mekong River Commission (MRC), which it has refused to join. Chinese reluctance to participate in MRC could be attributed to growing water scarcity within the country and the possibility of similar demands by other downstream states. However, back in 2010, a severe drought in the country had pushed China to participate in MRC discussions and data sharing.²⁹

China has also been reluctant to ratify the 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses which provides a framework for multilateral cooperation on water. Article 11 of this UN Convention mentions the

²⁵ Rashme Sehgal, "[India's water security concerns over China's dam building spree are legitimate, require action](#)", *Firstpost*, May 18, 2017 (Accessed June 27, 2018).

²⁶ Jessica Williams, no. 14.

²⁷ Brahma Chellaney and Ashley J. Tellis, "[A Crisis to Come? China, India and Water Rivalry](#)", *Carnegie Endowment for International Peace*, September 13, 2011 (Accessed July 11, 2018)

²⁸ Jessica Williams, no. 14.

²⁹ Ibid.

need for states to share information regarding use of international water courses; Articles 21 and 23 elaborate on pollution, prevention and protection of the marine environment.³⁰ China believes that the Convention does not adequately considers the interests of upstream states. India too has not ratified it probably because the Convention has no force over non-party countries such as China. According to Srinivas Chokkakula, Centre for Policy Research, New Delhi, the “Geopolitical and strategic imperatives do not justify a state becoming a party to the Convention unless other states with transboundary water associations also become parties.”³¹

China had refused to sign and ratify the Helsinki Rules too. In 1966, a codification of the principles of international law relating to transboundary water resources was completed through the International Law Association's (ILA) Helsinki Rules on the Uses of the Waters of International Rivers. The gist of the Helsinki Rules is that each state within an international drainage basin has the right to a reasonable and equitable part of the beneficial use of the basin waters. The two basic principles can be briefly summed up as reasonable usage and an obligation to do no harm. However, the enforceability of the Helsinki Rules is undermined by the ILA's status as an unofficial organisation. Thus, these resolutions cannot be legally binding in international law unless they are adopted in the form of a multilateral convention or followed by states as state practice.³²

Implications for India

The Chinese decision to build more and more dams on Yarlung/Brahmaputra and continued evasiveness on its long-term plans, the number and kind of dams it intends to build, has been an issue of major concern for India. China, on its part, insists that the dams are and will continue to be run-of-river projects, wherein water will be returned to the river after use. As such there ought to be no fears of diversion, hoarding, and release of water later. This claim was taken with a pinch of salt by the Indian Government. In fact, in February 2014, the then External Affairs Minister Salman Khurshid admitted that the ministry of water resources has been asked to verify whether the dams built on Yarlung are run-of-river or storage dams.³³

In December 2015, the External Affairs Minister Sushma Swaraj, responding to a question on steps taken by the government with regard to Chinese dam building activities on Brahmaputra, had stated that, “Government, in close cooperation with various State Governments including Government of Assam, which are users of the

³⁰ [“Convention on the Law of the Non-navigational Uses of International Watercourses, 1997”](#), United Nations, 2014.

³¹ Beth Walker, [“India and China ignore UN watercourses convention”](#), *China Dialogue*, August 18, 2014 (Accessed July 12, 2018)

³² David J. Lazerwitz, no. 20, p. 253.

³³ Amitava Mukherjee, [“China and India: River Wars in the Himalayas”](#), *Geopolitical Monitor*, April 2014, p. 1 (Accessed June 16, 2018).

waters of river Brahmaputra, continues to carefully monitor the water flow in river Brahmaputra for early detection of abnormality so that corrective and preventive measures are taken to safeguard livelihood of peoples of these States of Union of India.”³⁴

What further adds to India’s concerns is that these dams are large enough to be converted and used as storage dams, especially if the purpose is flood control and irrigation (as is the case with Zangmu Dam). In the absence of a water treaty, China depriving India of water during lean seasons becomes a possibility. According to Chandan Mahanta, who heads the Centre for Environment at the Indian Institute of Technology (IIT), Guwahati, the Chinese hydropower projects could convert Brahmaputra into a seasonal river implying water scarcity in India.³⁵ Another risk is the release of flood waters during the monsoon season, which could inundate the already flooded Brahmaputra river basin in Assam. There is much apprehension that the Brahmaputra may lose the silt, which makes the plains in its basin fertile, because of sediment trapping in the dams.

Additionally, all hydropower projects, particularly around the Great Bend, are located in a highly volatile tectonic zone. Their proximity to known geological fault lines, where Indian Plate collides with the Eurasian Plate, makes them extremely earthquake-prone. In 2008, the Three Gorges Dam on the Yangtze River gave way under the stress of an earthquake (7.9 on the Richter scale) in the eastern rim of Tibet, resulting in loss of many lives.³⁶ This raises serious concerns about risks posed by big dams built in such seismically sensitive areas.³⁷

In building its dams, China has also polluted its rivers. The quality of water that flows downstream into India needs to be taken into account. The disruption of natural flood cycles of the river could also adversely affect the rich geo-environmental and bio-physical settings in India’s Northeast. These multifarious factors could also severely impinge on the economy of the region.

It is important to mention here the principle of prior appropriation, which favours neither the upstream nor the downstream State but the one that puts the water to first use, thereby protecting the right to first use of water as in the past.³⁸ China has priority rights since it was the first to build dams on Yarlung Tsangpo. By building dams especially near the Great Bend, after which the river flows into India through Arunachal Pradesh, China could be seeking to leverage its position over the Indian state of Arunachal Pradesh.

³⁴ See [Q. No.52: Dam on Brahmaputra by China](#), *Rajya Sabha*, December 03, 2015 (Accessed July 11, 2018).

³⁵ Rashme Sehgal, no. 25.

³⁶ Amitava Mukherjee, no. 33, p. 3.

³⁷ Ibid.

³⁸ David J. Lazerwitz, no. 20, p. 250.

Around the time China started working on this dam project, India too decided to commence construction of 14 hydropower projects in Arunachal Pradesh, most of which were located lower down on Brahmaputra. This might be viewed as India's effort to establish its 'lower riparian right' to counter China's first use priority rights. The idea might be to ensure a strong bargaining position to detract China from building hydel projects on the river's upper reaches. However, except for one project, all other projects are currently stuck due to lack of necessary environmental clearance.³⁹ The only project cleared so far is the 2000 MW Lower Subansiri hydroelectric power project, which too is languishing due to scarcity of funds.⁴⁰

Some experts have pointed out that the volume of precipitation varies across the Brahmaputra sub-basin substantially. It receives primarily two types of precipitation, rainfall and snowfall. In this respect, the Tibetan part of the basin along the stretch of Yarlung, being located on the northern aspect of the Himalayas, receives much less rainfall as compared to the southern part of the basin, that is, the stretches in India and Bangladesh.⁴¹

According to a study by Chinese scholars, the total annual outflow of Yarlung from China is about 31 billion cubic metres (BCM), while the annual flow of Brahmaputra at Bahadurabad, the gauging station near the end of the sub-basin in Bangladesh, is 606 BCM. Around 80 per cent of the flows of Brahmaputra emerges within the Indian boundary.⁴²

According to some Indian experts, the Brahmaputra gets mightier as it flows downstream because of the flow contribution of tributaries such as Dibang, Lohit and Subansiri. In terms of sediment flow, the flow volume and discharge is not sufficient to generate and transport the large sediment load that is characteristic of Brahmaputra downstream.⁴³ Despite China having 50 per cent spatial share of this 3,000 km-long water system, low precipitation and desert conditions mean that Tibet generates only 25 per cent of its total basin discharge, while India, with 34 per cent of the basin, contributes to 39 per cent of the total discharge.⁴⁴ This refutes the thinking that the flow of a river is proportional to its expanse within the country. Even then, the fact that intentional flooding and degradation of water upstream remain serious issues of concern for India, cannot be summarily dismissed.⁴⁵

³⁹ Anil Sasi, "As clearances turn into hurdles, Brahmaputra edge lost to China", *The Indian Express*, October 21, 2015, at <https://indianexpress.com/article/india/india-news-india/as-clearances-turn-into-hurdles-brahmaputra-edge-lost-to-china/> (Accessed June 20, 2018)

⁴⁰ Keith Schneider, "[Arunachal's unfinished Lower Subansiri dam could be tomb for India's giant hydropower projects](#)", *Scroll.in*, June 12, 2015 (Accessed July 04, 2018).

⁴¹ Nilanjan Ghosh, "[The Brahmaputra: floated myths and flouted realities](#)", *The Third Pole*, December 18, 2017 (Accessed May 09, 2018).

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Swaran Singh, "[Is China muddying Brahmaputra waters?](#)", *Livemint*, December 07, 2017 (Accessed July 01, 2018).

⁴⁵ Ibid.

As of now, there is no institutionalised mechanism on water cooperation between India and China. China has signed no such treaty with India or any of its neighbours and continues to act in a unilateral manner in the region. However, in 2002, India and China had entered into a Memorandum of Understanding (MoU) wherein China agreed to share hydrological information about Yarlung Tsangpo (Brahmaputra) including its discharge at Nugesha, Yangcun and Nuxia stations from June 01 to October 15 every year. This was helpful in the formulation of flood forecasts by the Central Water Commission. When this provision ended in 2007, it was renewed for another five years. In 2006, a Joint Expert Level Mechanism was set up between the two countries in order to exchange hydrological information and ensure a smooth transmission of flood season hydrological data. In 2013, this provision was renewed with the change that 2014 onward sharing of data would take place twice a day from May 15 to October 15. However, China had refused to share hydrological data during the Doklam standoff last year.⁴⁶ Although hydrological data sharing resumed in 2018,⁴⁷ the Doklam face-off showed how China could use water for political leverage. By refusing to share data which is crucial for flood control and planning during the monsoon period in India, China demonstrated that it is not averse to using water as a political weapon to control and force compliance on its downstream neighbours.

Any forward movement on ensuring hydro security in the Brahmaputra basin would require a long-term understanding between the two countries. India's hydro-diplomacy thus faces the daunting challenge of engaging China in a sustained dialogue and securing a water sharing treaty that serves the interests of both the countries.

⁴⁶ Brahma Chellaney, "[China is waging a water war on India](#)", *Hindustan Times*, August 21, 2017 (Accessed June 26, 2018).

⁴⁷ "[Memorandum of Understanding between the Ministry of Water Resources, the Republic of India and the Ministry of Water Resources, the People's Republic of China on Strengthening Cooperation on Trans-border Rivers](#)", *Indian Ministry of External Affairs*, October 23, 2013.

About the Authors

Shreya Bhattacharya is Research Interns with the Non-Traditional Security Centre of the Institute for Defence Studies and Analyses (IDSA), New Delhi.

The Institute for Defence Studies and Analyses (IDSA) is a non-partisan, autonomous body dedicated to objective research and policy relevant studies on all aspects of defence and security. Its mission is to promote national and international security through the generation and dissemination of knowledge on defence and security-related issues.

Disclaimer: Views expressed in IDSA's publications and on its website are those of the authors and do not necessarily reflect the views of the IDSA or the Government of India.

© Institute for Defence Studies and Analyses (IDSA), 2017