

Impact of Chinese Activities on Brahmaputra River

Brigadier Bimal Monga®

“He who holds Tibet, dominates the Himalayan piedmont; he who dominates the Himalayan piedmont threatens the Indian sub-continent; and he who threatens the Indian sub-continent may well have all of South East Asia within his reach, and all of Asia”.

— — “Communist China and Tibet:
The First Dozen Years”

by George Ginsberg and Michael Mathos 2013

Abstract

The long-term plans of China for securing natural resources, including water, hold ominous portents for the world at large, and for its neighbouring countries in particular. As far as the trans-border water resources between India and China go, China has an advantage being the upper riparian state. Its plan to dam the Brahmaputra River has particularly rung alarm bells in India. The potential impact of dams, not only on the livelihood and sustenance of the population dependent on the waters of the Brahmaputra River but also on their very existence due to catastrophic earthquakes and floods, is worrisome. Moreover, China’s capability and, arguably, the intent to use water as a weapon, when required, is another aspect India has to be mindful of. It is, therefore, imperative for India to evolve a well ‘thought-out’ and ‘thought-through’ strategy in concert with other lower riparian and like-minded states and international organisations to ensure that its security interests are safeguarded.

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Background^{1,2,3}

India and China have 18 and 19 per cent of the world's population but only 4 and 7 per cent of the freshwater resources, respectively. The extremely skewed distribution of water resources, inefficient water management, high population numbers, water contamination, and climate change have further exacerbated the already precarious situation. For instance, China, with total water reserves of 2.8 trillion cubic metres (tcm), the sixth highest in the world, has a per capita reserve of 2300 cubic metres which is just one third of the world average. To make the situation worse, nearly 60 percent of China's groundwater is polluted, and 19 per cent of the water of major rivers and 35 per cent of reservoirs is not fit for use due to contamination. The situation in India is even more critical; it has 1.9 tcm of water reserves, the ninth highest in the world, however, the per capita availability is 1123 cubic metres which is just one sixth of the global average. The situation concerning polluted ground water and contaminated rivers is even more alarming. Not surprisingly, 54 per cent of India faces extreme water stress.

In this backdrop, China's rise as a hydro-hegemon has been unparalleled. To overcome the water woes, China has quietly, but with focus, worked towards assuming riparian pre-eminence over its neighbours. As part of its long thought-out strategy, China has assiduously worked towards securing scarce natural resources like fuel and minerals both within and globally. Water too has become an increasingly important part of this ever-growing list; all this to gain long term advantage over its neighbours and competitors. Towards this end, China's unilateral activities of developing extensive upstream hydro-engineering infrastructure on various trans-border rivers, have caused deep concern and resentment amongst co-riparian states. China's policy of rejecting the very concept of water sharing and its continuing opaque activities on these rivers has only heightened the feeling of distrust and resentment amongst its neighbours.

Tibet: The Third Pole

Tibet has accorded China unfettered access to perennial water sources; being the world's largest repository of fresh water after the Arctic and Antarctica, it is often referred to as the 'Third Pole.' Asia's ten great river systems emanate from the Tibetan Plateau

and traverse eleven countries, supporting over 2 billion people.⁴ Overall, seven major Asian river basins are dependent on the rivers flowing from the Tibetan Plateau. The ones of importance to China's southern and south-eastern neighbours are the Indus (China, India, Pakistan), Brahmaputra (China, India, Bangladesh, Bhutan), Salween (China, Burma, Thailand), Mekong (China, Laos, Thailand, Cambodia, Vietnam) and Sutlej (China, India, Pakistan). Over 45,000 glaciers seasonally drain into these rivers. No wonder, Tibet is regarded as the 'Water Tower of Asia' and is of such great importance to China. Tibet's importance to India is well documented; amongst other issues, it holds the tap to three major rivers flowing into India, viz. the Indus, Sutlej, and Brahmaputra. China's increasing activities on all of these rivers in recent past has been a matter of immense concern to India.

Importance of Indus, Sutlej, and Brahmaputra Rivers

Indus River. The Indus River originates in Tibet near Lake Mansarovar and flows 3180 km through Tibet, India, and Pakistan before emptying into the Arabian Sea. The river is the backbone of agriculture in North and North-western India and in the states of Punjab and Sindh in Pakistan. There have been proposals from Chinese scientists and researchers to divert the waters of Indus in western Tibet, to the parched Tarim Basin in Xinjiang.⁵ It is estimated that if China diverts water from Indus, it will deprive India of 36 per cent of the river's entire flow; the impact on Pakistan will be even more severe, as it has a claim over 63 per cent of this flow. China's recent activities on the Indus River, especially in the Gilgit-Baltistan Region — an area belonging to India — where they have embarked on the construction of the Basha and Bunji Dams to produce 4500 MW and 7100 MW of electricity for Pakistan, have been strongly objected to by India.

Sutlej River. The Sutlej River is the easternmost tributary of the Indus and originates from the Rakshas Tal in Tibet; it flows approximately 1450 km through Tibet, India, and Pakistan. The rapid course and volume of water make it a 'powerhouse of the Himalayas' on which a number of hydro-electric dams have been constructed. Therefore, if the waters of the Sutlej were to be diverted, the entire North India would be plunged into darkness as more than 3600 MW of energy generated by the Sutlej Water, which flows into Bhakra Dam, Karcham Wangtoo project and Naptha Jhakri dams, will be disrupted.⁶

Brahmaputra River

The Brahmaputra River, called Yarlung Tsangpo in Tibet, originates from the Angsi Glacier in Burang County of Tibet and covers a drainage area of almost 5.8 lakh square km over its 2880 km long journey. It enters India in the state of Arunachal Pradesh, where it is called Siang, then meanders through Assam before entering Bangladesh, where it joins up with the Ganga River and finally empties into the Bay of Bengal (refer Figure 1). As a percentage of the total area of the Brahmaputra Basin, China occupies 2.71 lakh sq km, India 1.95 sq km, Bangladesh 39,100 sq km, and Bhutan 38,400 sq km.⁷

Importance to China. Brahmaputra River is of great importance to China for four major reasons:⁸

- **River Basin.** While China is the upper riparian state for four major South and Southeast Asian trans-boundary rivers, it occupies the most significant part (over 50 per cent) of the Brahmaputra River Basin. China, thus, considers it a right to claim a majority stake in the waters of the Brahmaputra River. It goes without saying that the potential impact of Chinese activities on the Brahmaputra River will also be much bigger in scale and severity.
- **Tibet.** At the national level, the role of the Brahmaputra River in China's total freshwater supply is very limited. The river is, however, of great importance to Tibet as it emanates from the birthplace of the Tibetan civilisation, an area characterised by scarce precipitation and dearth of water. The river, therefore, continues to play a critical role in the agricultural and energy sectors; a number of hydropower projects to electrify Tibet have been planned on the Yarlung Tsangpo (refer Figure 2).
- **Perennial Source.** From the 1950's, China believed that the Brahmaputra River was a rich source of perennial water with immense potential to be diverted to its arid northern region.
- **Border Dispute.** Finally, Brahmaputra River extending from the Triple Junction between India, China and Bhutan in the West to Arunachal Pradesh in the East, largely along the crest of the Himalayas is intrinsically linked to the Sino-Indian

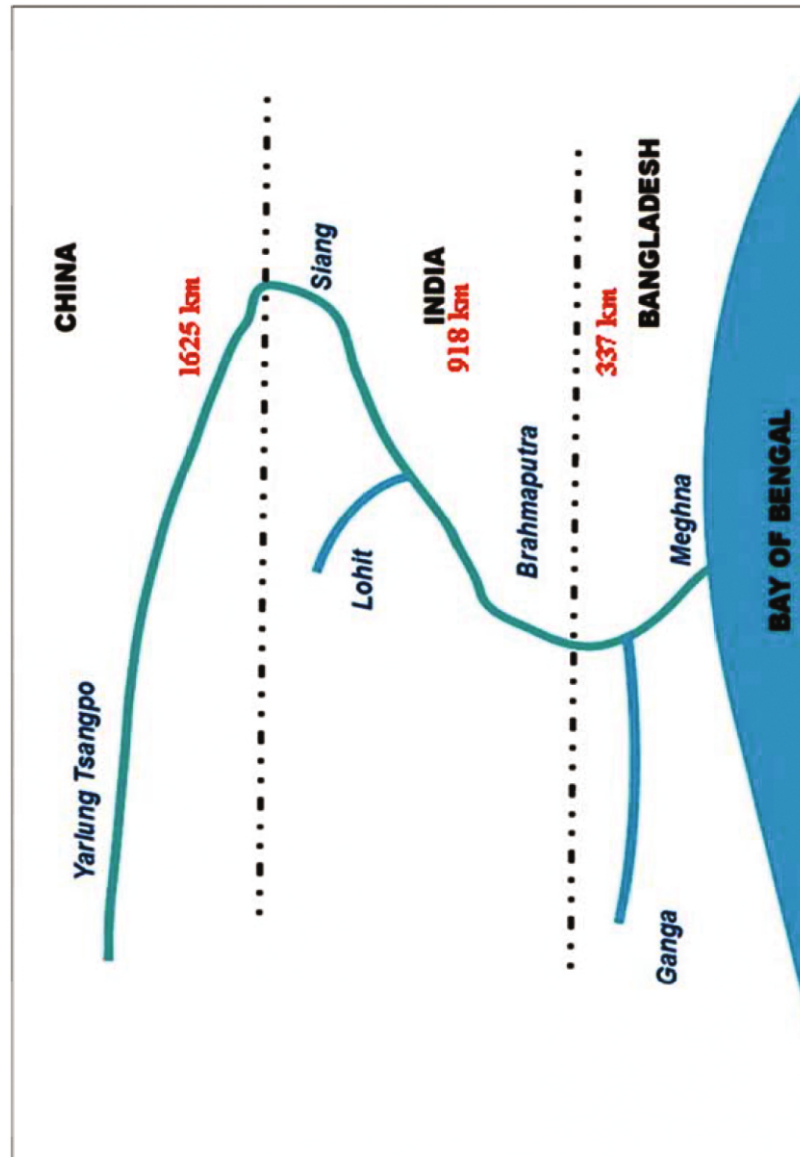


Fig. 1 : Brahmaputra's Many Identities : Tibet to the Bay of Bengal

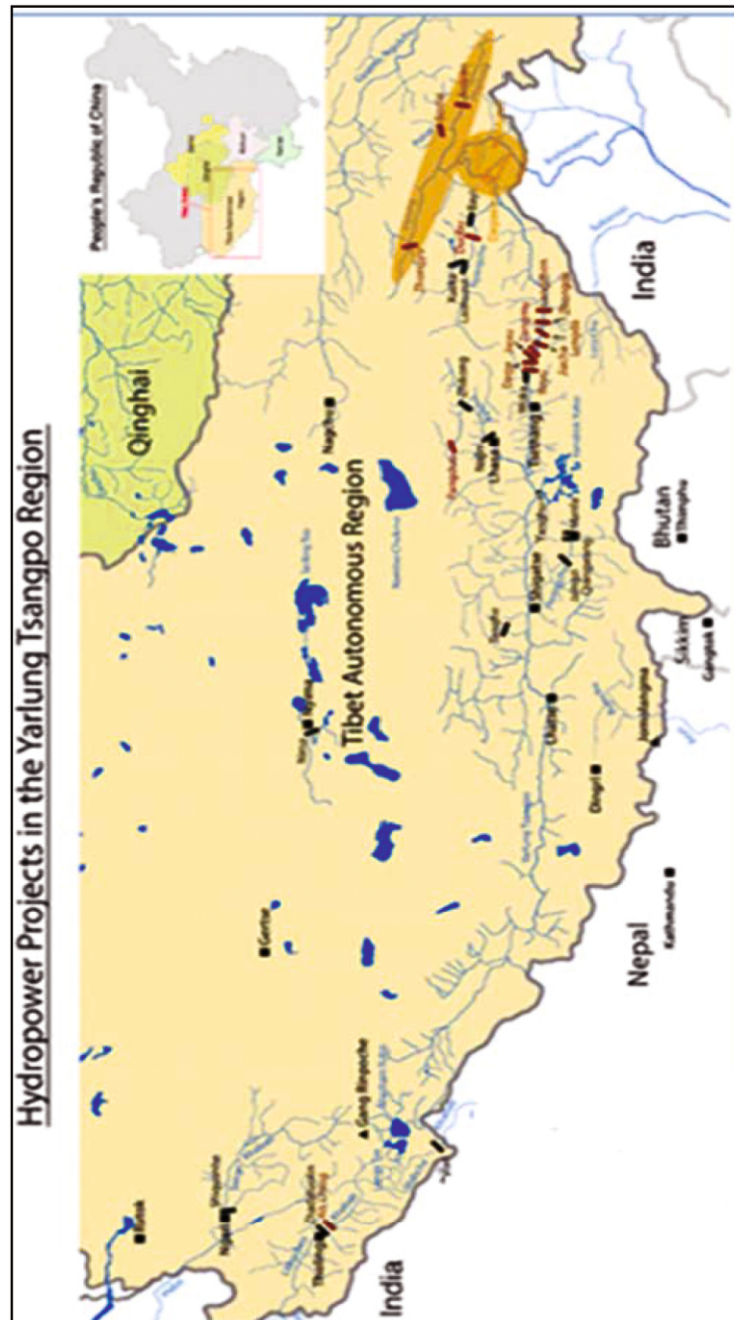


Figure 2 : Hydropower Projects in Yarlung Tsangpo Region

(Source : Indiadefenceview.com) http://www.meltdowntibet.com/f_river_tsangpo.htm

border dispute, hence the increased Chinese sensitivity to the river and the claimed rights over its water.

Importance for India. For India, the Brahmaputra River is of even greater importance:

- **Livelihood.** Brahmaputra River's delta is home to over 130 million people, both in India and Bangladesh; over six lakh people live on river islets, and rely on the annual 'normal' flooding to bring moisture and fresh sediments to the flood plain soils. The Brahmaputra Basin importantly accounts for 573 bcm of surface water in the North East.⁹
- **Hydropower.** According to the Central Electricity authority, the Brahmaputra River basin possesses about 44 per cent of India's total hydropower potential. It is assessed that the 'exploitable hydropower potential' of the Brahmaputra basin is 58,356 MW out of the overall hydro-electric potential of India estimated to be around 150,000 MW. As of now only less than two per cent of the capacity of Brahmaputra has been developed, and another 6 per cent capacity addition is under development.
- **Waterway.** The Brahmaputra River, accounts for 29% of the total run-off of India's rivers and is key to the country's river linking project. It has immense potential of providing easy and cheap communication networks and accessibility within the North-eastern states and also up to Chittagong in Bangladesh. Though the Brahmaputra River was declared National Waterway 2 in 1988¹⁰, a lot of infrastructure is yet to be developed to exploit the river to its full potential (refer Figure 3).

Water Treaty. With Brahmaputra River being of such importance, there should have ideally been a treaty on water sharing between the two major neighbours. However, in stark contrast to India's policy, China has not signed a single water sharing treaty with any of its lower riparian states. Reluctance to sign a water treaty stems from its erroneous belief in the Doctrine of Absolute Sovereignty i.e., unfettered rights over water flowing from its territory. The only document of some relevance is the Memorandum of Understanding (MoU) signed with India in 2002, wherein China pledged to provide hydrological information on the Brahmaputra

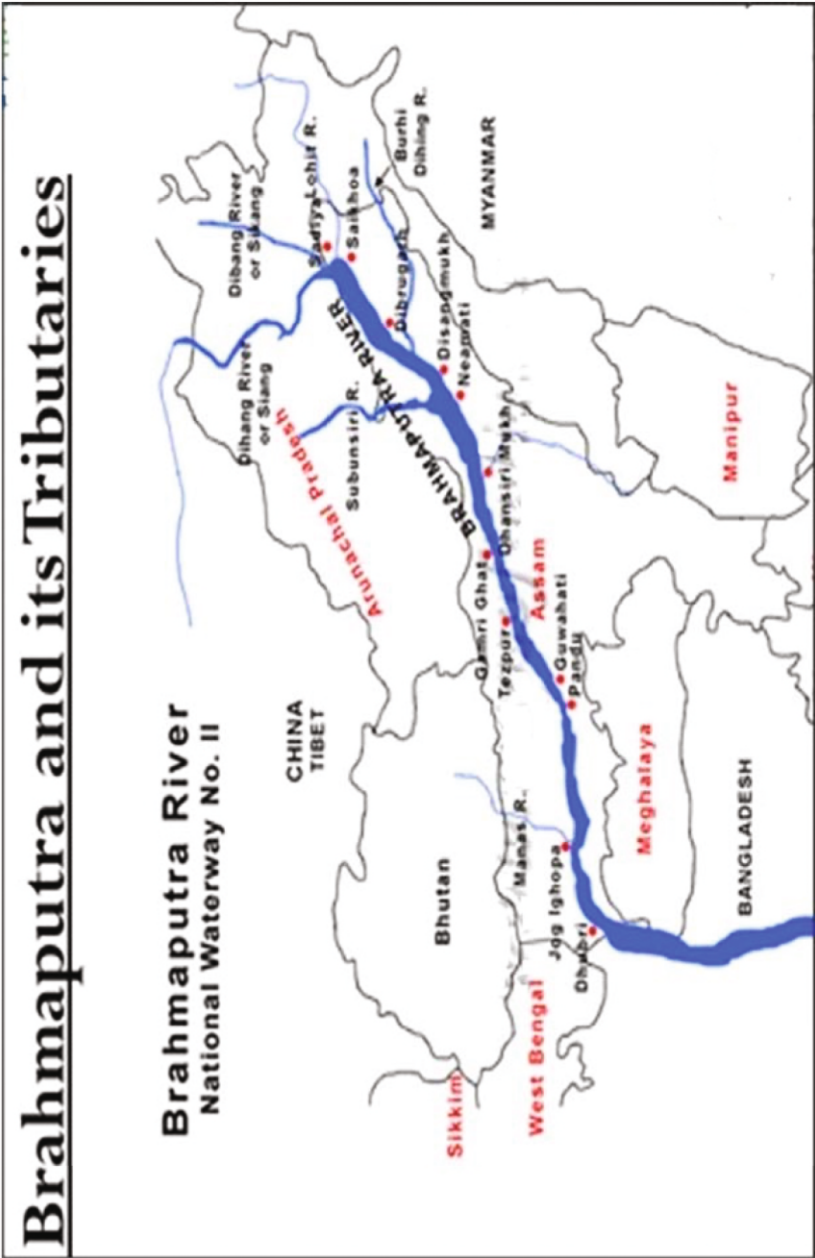


Figure 3: National Waterway No 2

and Sotlej rivers in the monsoon season; this MoU has been renewed every five years. In absence of any treaty or agreement, China unabashedly continues with its unilateral water diversion and damming activities on the Brahmaputra River.

Water Diversion

Shou-tian Grand Concept. With an aim to provide water for its parched Northern Region, China has always believed in the Shou-tian Concept, i.e., reversing the flow of Tibetan water from the South to the North. This plan, propagated by the noted Chinese hydrologist Guo Kai, originally derives its name from a canal which originates near 'Shoumatan' in the South and ends at 'Tian jin' in the North. China has embarked on the diversion of both its internal and trans-border rivers to the arid North-Eastern regions.

➤ **The South-North Water Diversion Project (SNWDP).**

The idea of South-North Water Diversion was initially propagated by Mao Zedong in 1952. It deals with internal rivers. As the water scarcity increased in the Northern regions the Chinese formally commenced the project in 2002 with an aim to divert 44.8 million cubic metres of water from Yangtze River in the South to the Beijing and Tianjin regions in the North. It planned to construct three arteries, viz. Eastern, Central, and Western routes to the Northern Region across the high-altitude Qinghai Tibet Plateau. The Eastern and Central routes have already successfully diverted water from the Yangtze and Han Rivers, respectively, to the Yellow River in 2014, resulting in increased water supply to Beijing and Tianjin and the provinces of Henan and Hebei (refer Figure 4). The Western Route, being the most challenging, is yet to fructify.

➤ **Great Western Water Diversion Plan (GWWDP).** The GWWDP is a much more ambitious water diversion project involving trans-boundary rivers. It aims to divert water from the upstream sections of six rivers in South-West China, including the Mekong, Brahmaputra, and Salween Rivers, to the dry regions of Northern China through a complex web of reservoirs, tunnels and natural rivers.¹¹ What is of particular concern to India is that the proposed "Grand Western Canal" aims to divert 50 billion cubic metres of water from the Brahmaputra to the Yellow River¹² (refer Figure 5). It has

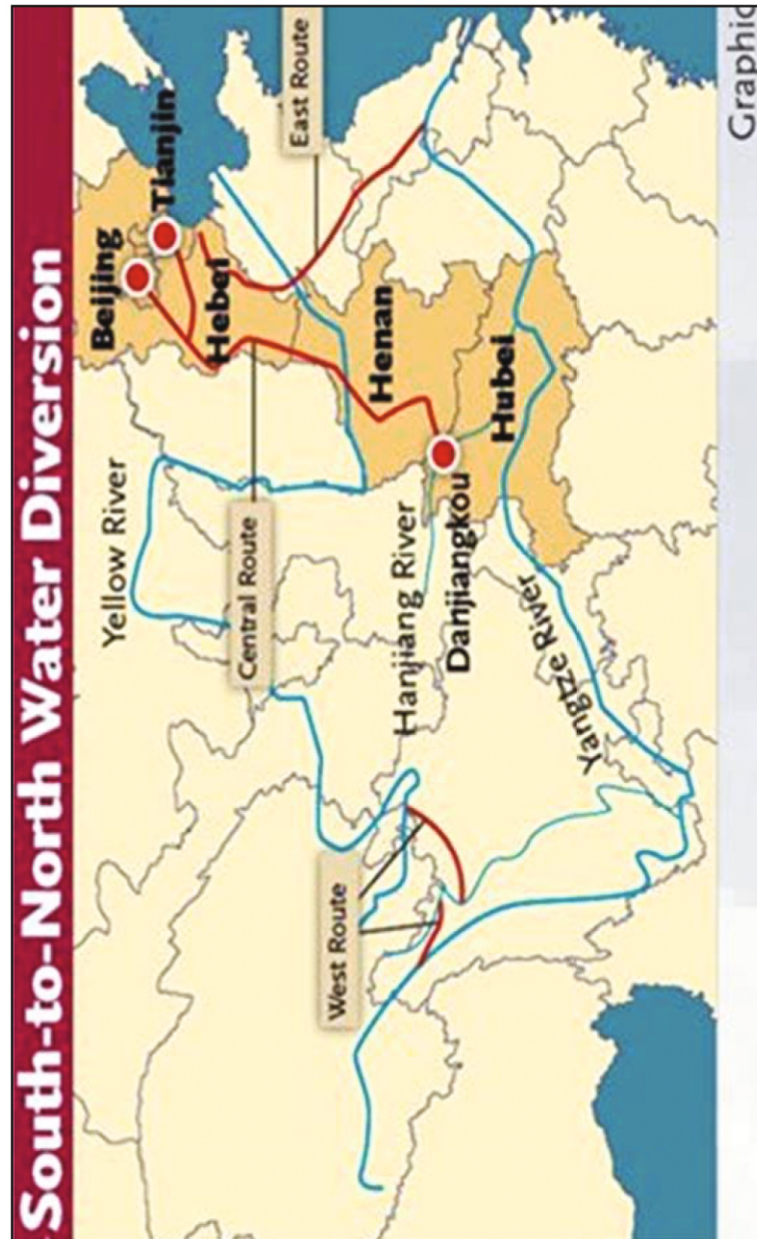


Figure 4 : SNWD : Alignment of the Three Arteries
(Source : globaltime.com and the geotradeblog.com)

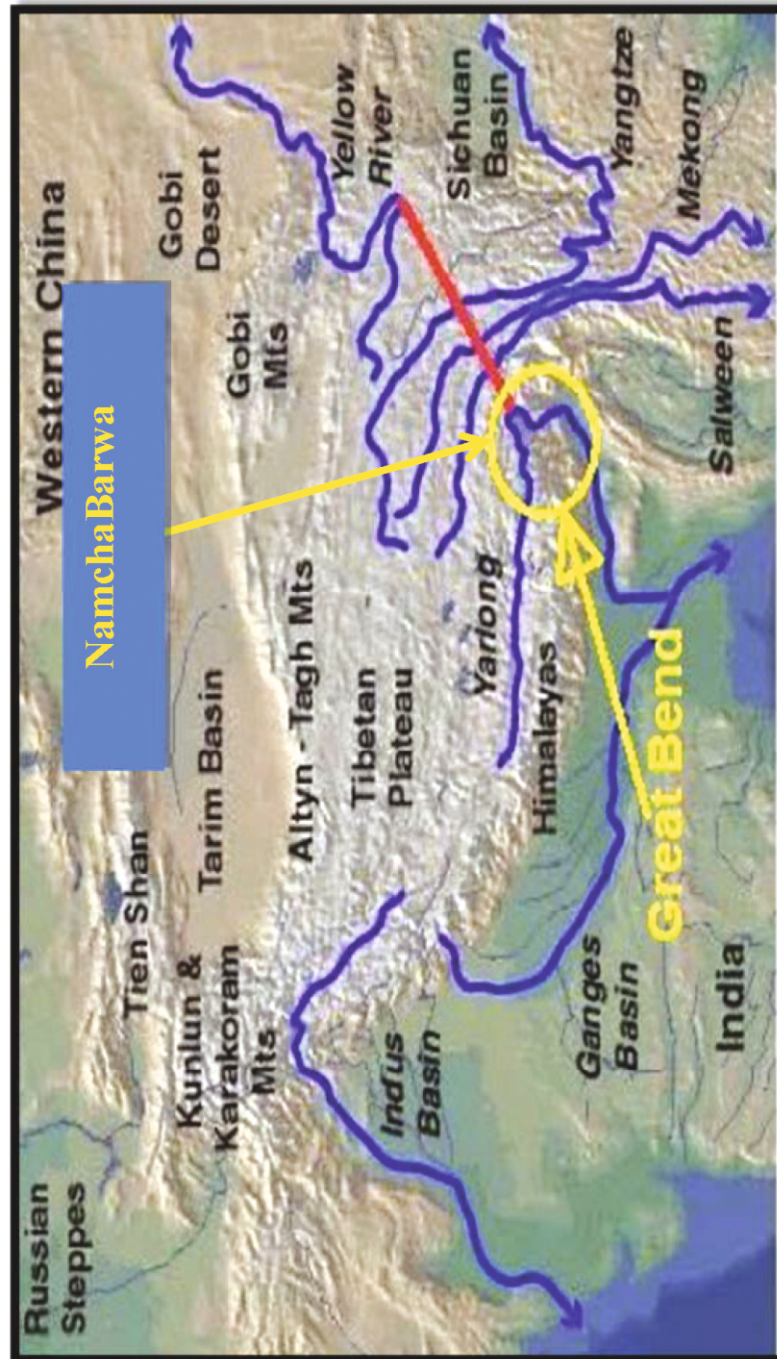


Fig. 5 : Proposed Diversion of Brahmaputra GWWDP

been reported that China is testing techniques to build a 1000 km long tunnel, the world's longest, for this purpose at a cost of \$150 billion¹³ to channelise water to China's largest administrative division and the Taklimakan desert in Xinjiang. It is feared that such a tunnel, when created, will not only affect the water flow in the Brahmaputra, but also cause draughts, floods, and irreparable damage to the ecological and environmental systems of both India and Bangladesh.

Construction of Dams

The dam building programme of China was given a fillip in 1987 by its then Premier, Li Peng, a hydro engineer by profession. China is now the most prolific dam building nation and has built approximately 26,000 mega dams, which account for more than the rest of the world combined.¹⁴ Overall 85,108 dam reservoirs in China have the capacity to store approximately 562 bcm, i.e., more than 20% of China's total renewable water resources in a year.¹⁵ Its plans of building dams on trans-border rivers and to divert the river waters have been in focus for some time.¹⁶ Some of the major dams that China has built or plans to build on major rivers emanating from Tibet are depicted in Figure 6. Other river-wise details are in the succeeding paragraphs.

- **Mekong River.** On the Mekong River, China has already built the 4200 MW Xiaowan Dam and the 5,850 MW Nuozhadu Dam (refer Figure 7). At the commissioning of the Nuozhadu Dam in 2012, an alarmed Vietnamese President, Truong Tan Sanghad, stated that *"tensions over water resources are threatening economic growth in many countries and representing a source of conflict"*. Similarly, China's damming of the Illy River threatens to shrink Kazakhstan's Lake Balkash further.
- **Indus and Sutlej River.** China has constructed dams/barrages both on the Indus and Sutlej Rivers. These include the Senge Tsangpo and Nagri Shiquanhe hydropower stations on the Indus River and a barrage across the Zada Gorge on the Sutlej River.¹⁷ It is also constructing the Basha and Bunji dams on the Indus River in the Gilgit-Baltistan region.
- **Brahmaputra River.** The Brahmaputra River and its tributaries are considered a lucrative source of business by

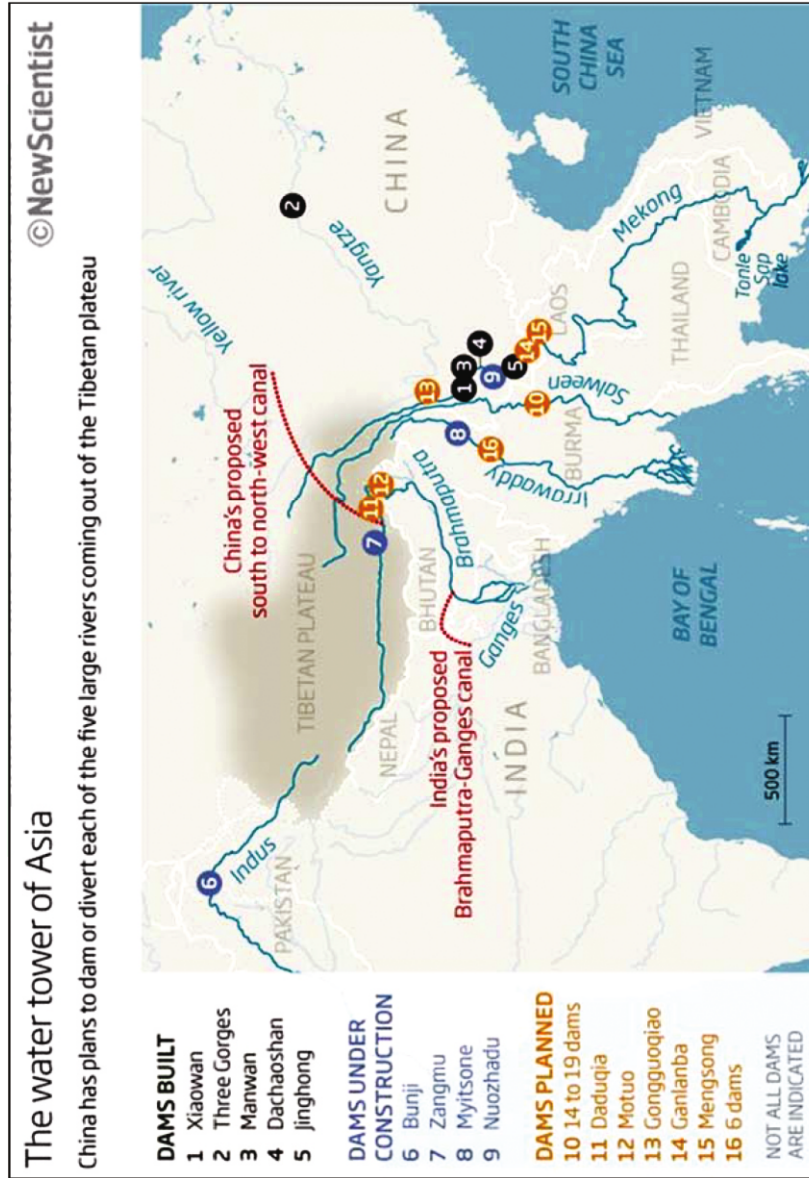


Fig. 6 : China's Dam Rush : Tibetan Rivers



Fig. 7 : Dams on Mekong River (Source: Terra)

the Chinese dam builders. According to the UN data, the Brahmaputra River system's combined cross-border annual discharge into India amounts to 165.4 bcm, which is more than the collective trans-boundary flow of three key rivers running from the Tibetan plateau to the Southeast Asia, viz. the Mekong, Salween, and Irrawaddy Rivers.¹⁸ A total of 28 dams are proposed to be built on the hither-to-fore undammed Brahmaputra River to generate 65000 MW¹⁹ of electricity. These dams also have the incidental potential to facilitate the re-routing of the Brahmaputra River subsequently. The four major dams listed in the Chinese Twelfth Five Year Plan

2011-15²⁰ include the Zangmu, Dagu, Jiexu, and Jiacha Dams. The \$ 1.2 billion Zangmu Dam which commenced construction in 2009, (in Gayla County of TAR barely 200 km from the Indian Border) has already been completed and produces 500 MW of electricity. Dagu, a 640 MW dam 18 km upstream of Zangmu; Jiexu Dam, 11 km upstream of Zangmu; and Jiacha, a 320 MW Dam, downstream of Zangmu, are nearing completion. (Refer to Figure 8). However, China's most ambitious plan, which is of utmost concern to India, is the "Mother of all Dams", at Metog and/or Daduqia, at the "Great Bend" on the River Brahmaputra. The proposed dams planned power generation capacity is a humungous 60 GW, three times that of the three Gorges Dam (refer Figures 9 and 10).

India's Concerns Over Chinese Activities

Impact. The Chinese plans to build dams and divert waters from Yarlung Tsongpo are to be seen in the overall perspective of strained relations between India and China, its poor track-record on sharing hydrological data, the impact of dams built by it on other shared rivers (e.g., Mekong), affecting the lower riparian states, and most importantly, China's propensity to take unilateral measures while shrouding its motives in secrecy. The adverse impact of diversion and damming of the Brahmaputra River is assessed to be far-reaching. Some of the major concerns are flagged below:

Livelihood and Ecology. Permanent disabling of annual flooding cycle due to heavy upstream damming and diversion will affect the agriculture and marine farming of millions of people due to changes and loss of adjacent flood plains. It has the potential to severely disrupt the economies and destroy the ecosystems of the downstream countries.

➤ **Floods.** The dams located in seismically sensitive areas may induce earthquakes and floods, causing mayhem, deaths, and mass migrations in the lower riparian areas. There have been a number of incidents in the past. In June 2000, floods in the Sutlej River caused havoc in Himachal Pradesh, leading to the deaths of 200 people and damage to the Naptha Jhakri Hydro-electric plant. Earlier, in May 2000, a breach in one of the dams on the River Yarlung in Tibet resulted in severe floods in Arunachal Pradesh, causing immense

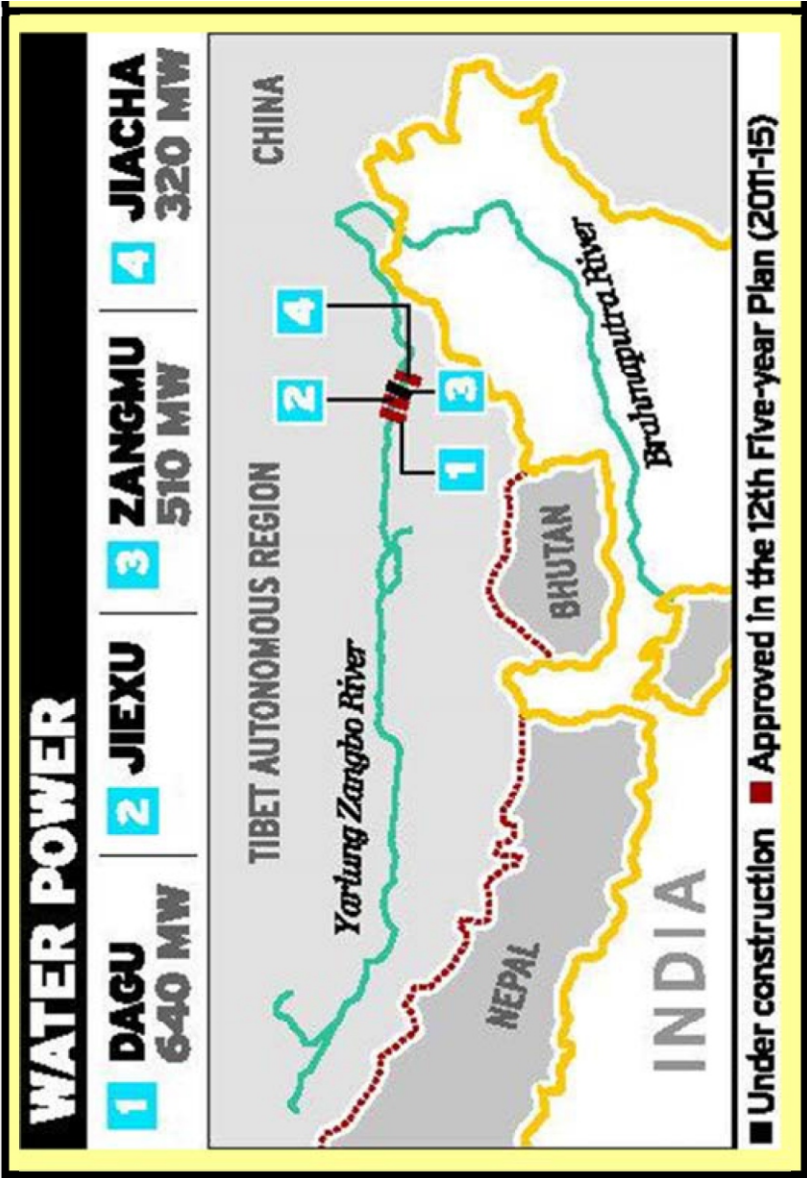


Fig. 8 : Other Dams Planned on Yarlung Tsangpo (Source : Chauratta.wordpress.com)

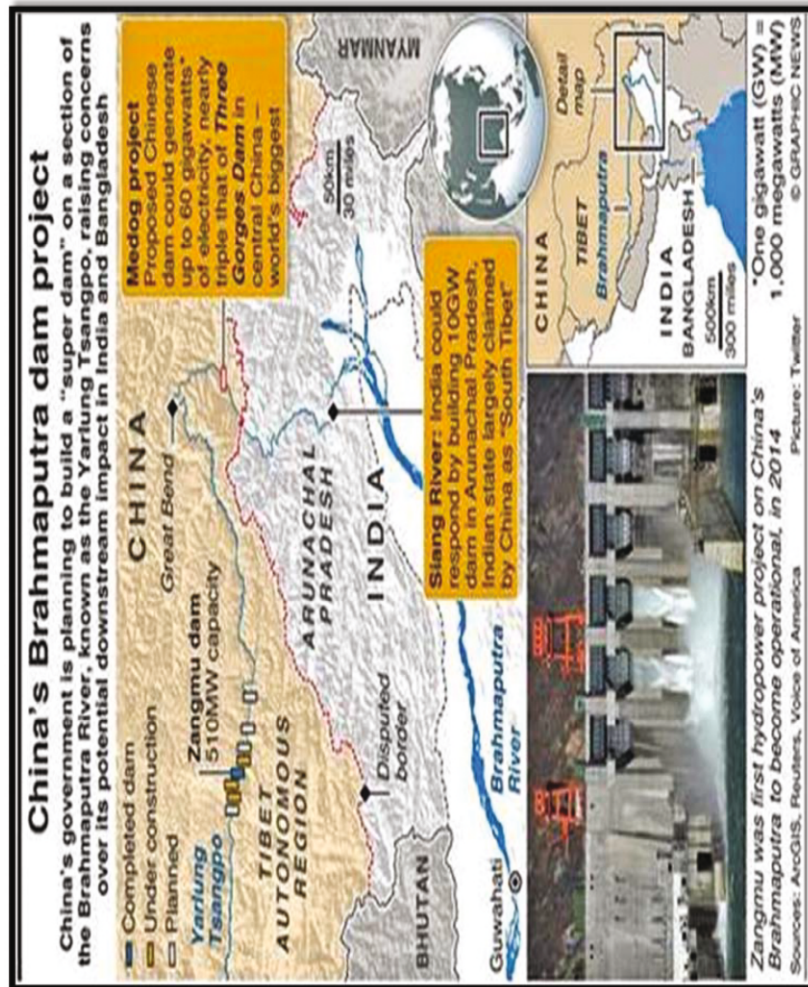


Fig. 9 : China's Brahmaputra Dam Proj (Source : AroGIS, Reuters, Voice of America)

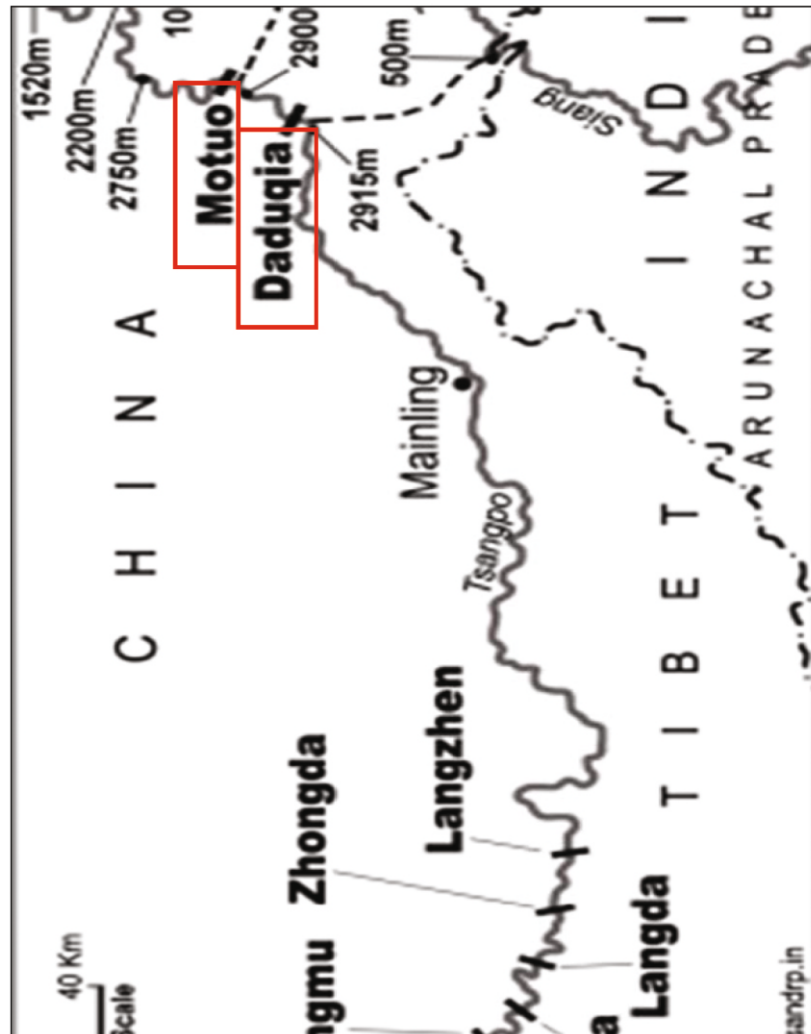


Figure 10 : Metog and Daduqia Project (Source : sandrp.in)

damage and loss to life and property. The sudden nature of floods and the ambiguous response from China had raised suspicions; the Indian government therefore tasked its remote sensing agency to take a closer look at the breach site. The report submitted in 2000 stated that “after monitoring the complete technical details and pictures of the site, it is confirmed that the recent flash floods in Arunachal Pradesh were a result of a breach in the Tibetan Dam”.²¹ Can similar incidents re-occur in Arunachal Pradesh, Assam, and West Bengal due to a number of dams being planned on the Brahmaputra River in Tibet? Consider this in the backdrop of the fact that the average discharge of the Brahmaputra River is about 19,300 cubic metres per second (cusecs) but can increase fivefold to above 1,00,000 cusecs during floods. Dams such as Zangmu, Jiexu, Dagou, Jiexu and not to mention the planned super mega dam at Metog/Dadugia are very near to the border and therefore far more vulnerable to earthquakes (or manipulation) and the related catastrophic effects on the downstream regions.²² (refer Figure 11)

➤ **Seismic Activity.** More than 8700 people were killed in an earthquake on the Tibetan plateau in 2008; Chinese experts homed in on the Zipingpu Dam – located near the geological fault line that possibly caused dam induced tectonic stresses,²³ leading to an earthquake. This has given rise to fears of more earthquakes and floods due to a number of dams coming up in seismically sensitive zones much nearer to the Indian border (refer Figure 12).

➤ **Hydrological Data.** As per the provisions of the MoU signed between India and China in October 2013, China is to provide hydrological data on trans-border rivers for the monsoon period from 15 May to 15 October every year. However, in the backdrop of the Doklam standoff, no data was provided in 2017, ostensibly due to “upgradation and renovation of the Data Collection Centre in Tibet”. However, Bangladesh at the same time confirmed that the hydrological data for the same river had been shared with them as scheduled, confirming India’s apprehensions of China using water as a diplomatic (and possibly military) leverage in times of tensions. Further, in the beginning November 2017, the water of the Brahmaputra was observed to be dull and black,

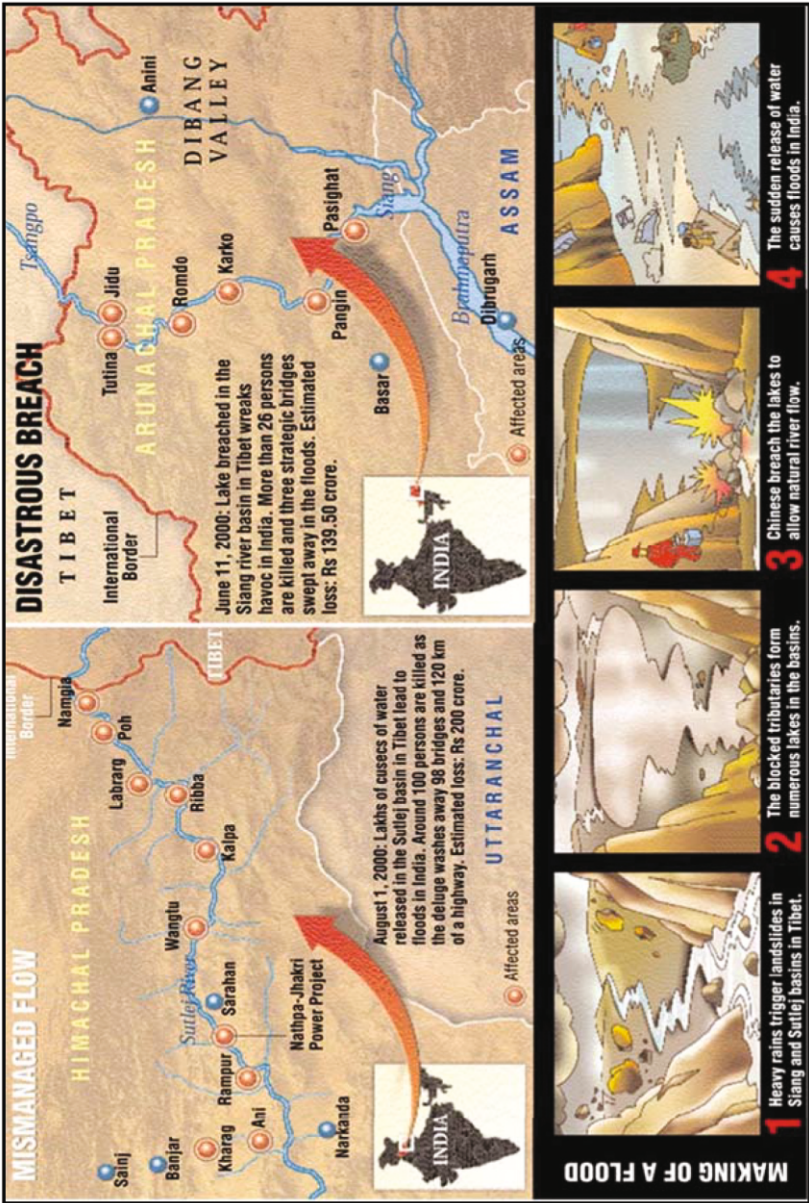


Fig. 11 : Floods in Himachal and Arunachal, 2000



Fig. 12 : Earthquake 2008 : Tibetan Plateau
(Source : ESRI, USGS, NGA)

with a high content of iron and cement, rendering it unfit for consumption. India alleged that this was possibly due to the Chinese infrastructure building activities on the Brahmaputra River before it enters India (refer to Figure 13). China, however, denied that it was in any way responsible for the turbidity of the Brahmaputra River and attributed it to an earthquake in South East Tibet. However, on analysing the data provided by the US Geological Survey, the Chinese claims were proved to be hollow; it was established that an earthquake of magnitude 6.3 struck Tibet's Nyangtri (Nyingchi) on November 18, much before the river turned turbid.²⁴ These incidents confirm the opaqueness of Chinese activities on the Brahmaputra River and its unwillingness to share hydrological data and other details that directly affect the lower riparian states.

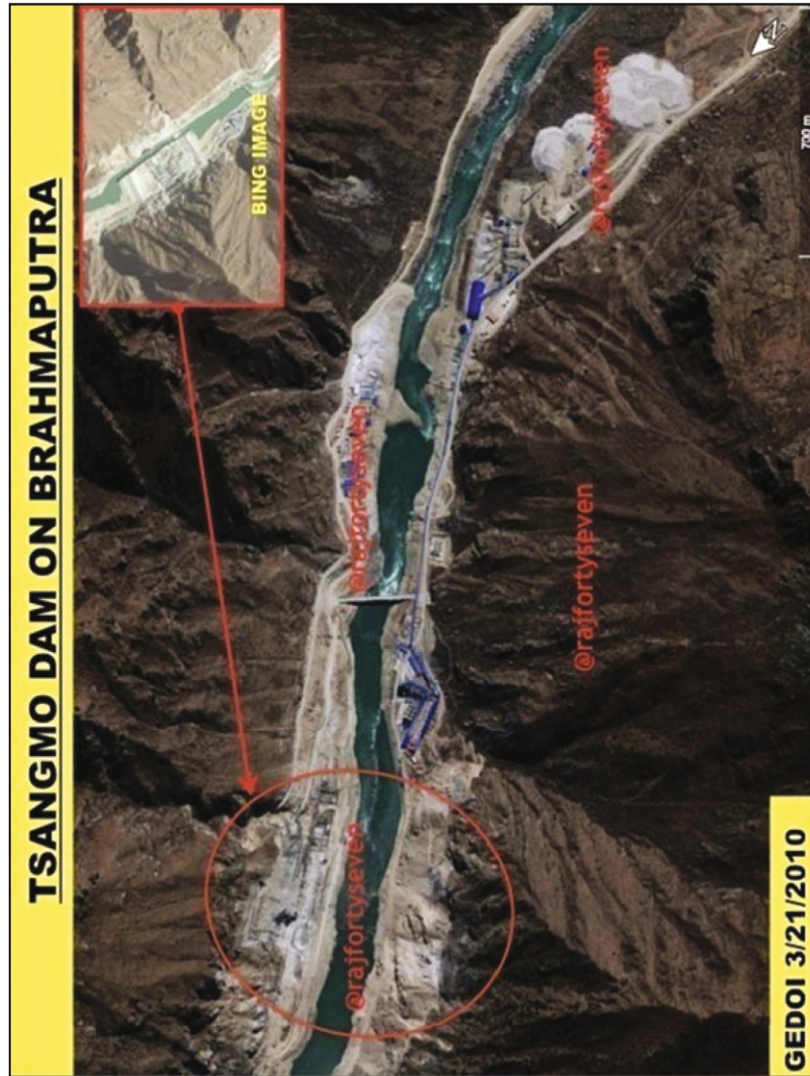


Fig. 13 : Tsangmo Dam on Brahmaputra (Source: VinayakBhat, The Print)

China's Stand

The Chinese have been largely dismissive of Indian apprehensions regarding the impact of their activities on the Brahmaputra River.

- **GWWD.** With respect to GWWD, China has claimed that the project is neither technically feasible nor practical or necessary for them. This reference is based on a report by China's Engineering Academy, authored by, amongst others, the noted academic, water expert, and former minister of Water Resources, Qian Zhengying, and Zhang Guangodou, another noted water expert. Subsequent to this, a relatively less radical proposal to link upstream Yangtze and Yellow rivers was formalised as part of the Western Route of SNWD, which also, due to various challenges, could not be executed. Prohibitive economic considerations and social and environmental costs are other factors quoted by Chinese scholars to dismiss the claims of India and Bangladesh.
- **Dams.** To counter criticism for constructing a number of dams on the Brahmaputra River, China has always claimed that these are "run of the river (RoR)" dams being constructed to meet its energy requirements. These would have no negative impact on the downstream states. In fact, they point an accusatory finger at India, which they claim is planning to dam the Brahmaputra extensively by building 160 dams, including the 3000 MW Dibang hydro-project in Arunachal Pradesh.

Analysis

Impact of Diversion. An assessment based on statistical data reveals the following:

- 50% of the Brahmaputra River basin is in China; but it accounts for only 22-30% of the total basin discharge.²⁵ The cold Tibetan weather and scanty rainfall and snowfall amounting to 4 to 12 inches per annum are mainly responsible for this. Bhutan, in spite of its small size, contributes an equally significant 21% while covering only 6.7% of the river basin. The Indian basin which covers 34.2% of the area, contributes the maximum i.e 39% of the total discharge in Brahmaputra River. Only 14% of the entire Brahmaputra flow is therefore in the river before it enters India. The balance 86% is contributed by the rains and monsoons in India.²⁶

➤ It is thus evident that China's contribution to the river flow of the Brahmaputra is minor, though not insignificant. It is, however, not in a position to divert the entire water emanating from Tibet. It is assessed that even if the diversion is effected in the middle of Yarlung Tsangpo, a maximum of 50% of the water originating from China can be theoretically diverted, which at the most would amount to 1-15% of the total flow.²⁷ The utilisable water of Brahmaputra system in India is estimated to be about 4% of total discharge due to the flow rate and sheer volume;²⁸ therefore the volume of water, if diverted, though not a small amount, is however unlikely to cause a severe water shortage in India or Bangladesh.

Dam Construction

➤ China's plans to build a number of dams, including mega dams at Metog/ Daduqia on the Brahmaputra River, have rung alarm bells in India. This anxiety has been further reinforced after observing the damming of the Mekong River and its adverse impact. China, meanwhile, has been aggressively asserting its right to construct "run of the river" dams on the Brahmaputra River, which it insists will have no impact on the flow of water on the lower riparian states.

➤ **Chinese Contention: A Myth?** China has always insisted that all its dams are RoR projects with "no storage or diversion capacity", and would thus not impact any of the lower riparian states. However, this stand is not entirely correct, primarily for two reasons: firstly, all RoR projects have a break in the river between a "point of diversion" to the turbines and a "point of return" of water to the river. This break can be very long, varying anywhere between 10 km and 100 km. A RoR would therefore normally have series of such breaks. Secondly, as the turbines operate intermittently, depending upon the electricity demand, water is required to be held back and released, leading to huge diurnal variations (0-400%). Thus, a river could be dry for twenty hours in a day and in the balance of four hours, water could be released in bulk. A RoR project may therefore spell the death knell for aquatic life and doom for the river in general. However, Nayan Sharma, a professor at the Water Resources Development

and Management Department, IIT Roorkee, has a contrarian viewpoint and is of the opinion that “the theories of China utilising the water of Brahmaputra through dam construction, which will eventually dry up the river, do not hold true as long as the proposed projects are limited only to non-consumptive use such as hydro-power.”

The following questions regarding the Chinese activities, thus arise:-

- Water diversion of Brahmaputra is a challenging project; does China have the technical capability, resources and more importantly the will to pull it off?
- Will China ride roughshod over internal resistance from South Tibet over water diversion from their area and also antagonise both its southern neighbours viz., India and Bangladesh?
- Does a cost-benefit assessment (including ecological impact) by China justify these projects?
- In view of the maximum 10-15% of the total water flow of the Brahmaputra River which can be diverted, will there be a catastrophic impact on India and Bangladesh, warranting the lower riparian states to press the panic button?
- Most importantly, is China putting the lower riparian states at risk of floods and earthquakes by building dams at seismically sensitive locations on trans-border rivers?

Prognosis

Analysis of scientific and technical data leads us to believe that the diversion will impact the lower riparian states adversely but not very severely. This is mainly due to the overwhelming contribution to the Brahmaputra River by the middle and lower riparian states. Are lower riparian states at risk of being flooded and exposed to earthquakes? The answer is an unequivocal “YES.” Construction of a slew of dams on the Brahmaputra is a more serious problem. These dams will not only affect the lower riparian states much more acutely due to their adverse effect on the flow of water and ecology, but also due to the inherent dangers of triggering floods and earthquakes, as has been repeatedly experienced in the past on different rivers.

Conclusion

The global rise of an expansionist China and its long-term plans for securing natural resources, including water, hold ominous portents for the world at large, and for its neighbouring countries in particular. As far as the trans-border water resources between India and China go, all the cards are firmly stacked in favour of China, it being the upper riparian state. Its plans to dam the Brahmaputra River have particularly rung alarm bells in India. The potential impact of dams, not only on the livelihood and sustenance of the population dependent on the waters of the Brahmaputra River but also on their very existence due to catastrophic earthquakes and floods, is worrisome. Moreover, China's capability and, arguably, the intent to use water as a weapon when required is another aspect India has to be mindful of. It is therefore imperative for India to evolve a well 'thought-out' and 'thought-through' strategy in concert with other lower riparian and like-minded states and international organisations to ensure that China adheres to the laid down principles, norms, and rules on the sharing of trans-border rivers. It has to be ensured that China respects the interests and concerns of lower riparian nations before embarking on trans-border river projects, that have far-reaching and potentially catastrophic effects.

Endnotes

¹ Krishna, Anatha, China and Water Security, *The Hindus*, 2009, Oct 20.

² Chellaney, Brahma, *Confronting the Global Water Crisis*.

³ www.indiawatertool.in and Central Water Commission

⁴ Sinha, Uttam Kumar, "Examining China's Hydro – Behaviour, Peaceful or Assertive". <https://idsa.in/strategicanalysis>

⁵ Claudearpi.blogspot.com/2015/01/diverting-indus-to-xinjiang.html

⁶ Nayar KP, *The Telegraph* 24 Sep 2016.

⁷ Jrcb.gov.bd/new/index.php

⁸ Pak Jin H, China, 'India and War over Water'.

⁹ Annual Report 2016 Brahmaputra Board

¹⁰ Water Resources Information System of India, National Water Way 2.

¹¹ Gua K, Brief Review of Shuotian Canal Project 1993.

¹² www.ipcs.org , www.pbr.co.in

¹³ <https://timesofindia.indiatimes.com>china>, 30 Oct 2017

¹⁴ Chellaney, Brahma, Water Peace and War.

¹⁵ Chellaney, Brahma, Water Peace and War.

¹⁶ Food and Agriculture Organisation, Aqua Stat Survey 2011, Water Report 37.

¹⁷ Sisodia, NS etac, Op Lit, P 42.

¹⁸ Brahma Chellaney, Beijing New Geostrategic Offensive, Tol, 10 Jan 2018.

¹⁹ www.researchgate.net, Competition for Water Resources in the Brahmaputra River Basin – Issues of concern.

²⁰ Krishna, Anatha, “Chinese Towers Plan Quells Brahmaputra Dam Fears” The Hindu, 30 Jan 2013.

²¹ <https://www.rediff.com/news/2000/aug/22assam.htm>

²² Gupta Shishir, “Made in China Floods Ravage Himachal Pradesh and Arunachal Pradesh, Satellite Pictures Suggest China’s Hand” India Today 2001.

²³ <https://www.denverpost.com>2008/05/12>

²⁴ Chellaney Brahma, Beijing New Geostrategic Offensive, Tol 10 Jan 2018.

²⁵ Ray PK, Rivers of Conflict or Rivers of Peace : Water Sharing Between India and China

²⁶ Hilton Isabel, Editor China Dialogue.

²⁷ J Pak.Jin, H Questioning the Shuotian Canal GWWDP 2001

²⁸ Ray, Pranab Kumar, Director of Centre for Hydro Meteriology Resources in Kolkota.