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Managing the Rise of a Hydro-Hegemon in Asia

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Introduction

Water security has become one of the greatest challenges of Asia in the 21st century.[1] Today, water problems in Asia are severe – one out of five persons (700 million) does not have access to safe drinking water and half of the region's population (1.8 billion) lacks access to basic sanitation.[2] In the light of increasing scarcity of clean water and its rising demand, India and China sit at the headwaters of several of Asia's most important rivers. Although India has entered into water sharing treaties with Pakistan, Nepal and Bangladesh with whom it shares important trans-boundary river systems, it doesn't have one with China which is the source country of the Yangtze, Mekong, Yarlung-Tsangpo, Indus, Irrawaddy, Sutlej and the Salween River, thereby exercising a degree of hydro-hegemony.[3] In recent years,

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1 Water Security is defined as freedom from direct or indirect impacts of lacking provision of sufficient and Development Report, Gordonsville:Palgrave Macmillan.

2 Asia Society, (2009), "*Asias Next Challenge: Securing the Regions Water Future*", A report by the Leadership Group on Water Security in Asia, pp.7-59.

3 Hydro-hegemony is hegemony at the river basin level. The most stable situation in terms of riparian relations is when riparians share control of the resource, whereby the hegemon has negotiated a water-sharing agreement that is perceived positively by all riparians. This can be taken as the *positive* form of hydro-hegemony. At the other end of the spectrum is *negative/dominative* form of hydro-hegemony when the stronger competitor may seek to attain and consolidate maximum control of water resources through unilateral action. For hydro-hegemony, see Mark Zeitoun and Jeroen Warner, (2006), "*Hydro-Hegemony: A Framework for Analysis of Transboundary Water Conflicts*", Water Policy, Vol. 8, No. 5, pp.435-60.

many in India have warned that China use its upstream position to reroute the Yarlung-Tsangpo[4]. Although there are successful water-sharing arrangements in Asia, the cooperative management of international water basins are often hard to achieve due to power asymmetries. Grounded in the theoretical framework of hydro-hegemony, this paper examines the status of the Chinese projects to divert water from Yarlung-Tsangpo with the aim of suggesting policy implications for India. To further understand the role that power asymmetry plays in international water-relations and the strategies of downstream riparians to promote cooperation, the guiding questions of this analysis are: What is China´s general performance as a hydro-hegemon in Asia? What is China´s hydrobehaviour in the Yarlung-Tsangpo river?

Water in China: The Internal Dimension

Water challenges are not a new phenomenon in China. For 2,000 years the country´s rulers sought to quell the destructive power of summer floods, while historians link drought with the demise of several dynasties.[5] But as China's thirsty economy is stretching the

[4] The Yarlung-Tsangpo originates in the Jima Yangzong glacier near Mount Kailash in Tibet and flows 1,625 km before it enters into Arunachal Pradesh in India as Siang. The Siang is named the Brahmaputra (918 km) in Assam after the confluence of the Dibang and Luhit before it flows south through Bangladesh (337 km) as the Jamuna. There it merges with the Ganges and then splits into two, the Padma and the Meghna to form a vast delta. So far China and India have not yet signed any agreement on distribution of water resources. However, in 2002 the two sides agreed to set up an arrangement about sharing flood season data on the Brahmaputra with a new memorandum in 2002, 2005 and 2008-2012. Since 2006 the two sides have also set up an expert-level mechanism to cooperate on flood-season data and emergency management.

[5] Ma Jun,, (2009), "*Pollution and Scarcity: In perilous waters*", China Economic Quarterly, pp.21.

Northern China Plain (which accounts for over half of China's production of wheat) to its limits, water is today becoming a stumbling block to the red giant´s aspiration for prosperity. The statistics of China speak for itself. Two-thirds of China´s 669 cities suffer from water shortage and over 300 million lack access to clean drinking water[6], a grim picture that has been painted as "*wherever there is a river, there is no water; wherever there is water; it is heavily polluted*". Although use of water for industries has decreased and China has maintained an increase in grain output despite irrigation water decreasing over the last 30 years[7], energy sectors water thirst continues to soar unquenchably. Driven by its thirst for energy to sustain its juggernaut growth, Beijing is facing a confrontation between water scarcity and rising energy demand. Being the largest industrial water consumer with 120 billion cubic meters a year, China´s coal mining and processing, and electric generating industries account for a fifth of the national water consumption. By 2020, China´s growing dependence on coal for primary energy is projected to grow by an additional billion metric tons annually, representing a 30 per cent increase. This will create a geographical headache for the government: while the coal reserves are concentrated in the dry northern provinces of Gansu, Ningxia, Shaanxi, Shanxi, Xinjiang and Inner Mongolia, the water to develop them is in the south. Since the western line is the only one, of the three routes of the South-North Water Transfer

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6 Chen Gang,, (2009), "*Politics of China's Environmental Protection: Problems and Progress*", World Scientific Publishing CO: Singapore, pp.7.

7 In 1980, only 0.667 kg was produced per ton of water. By 2007, it had risen to 1.393 kg/ton, an average annual rate of 2.67 per cent. The main reason it was possible to produce more grain with less water was the rapid improvement in irrigation water productivity. For details see Lin, Shijun., (2010), "*Will China´s water shortage shake the worlds food security?*", Water International, Vol. 35, No. 1, pp. 6-17.

Project (SNWTP) (*nanshui beidiao gongcheng*)[8], that will deliver water directly to the dry Yellow river to feed the thirsty energy-rich northern and western provinces, it gives the unproven western transfer scheme more momentum for approval (see Map 1).[9] Although SNWTP will ease the imbalance between supply and demand of water resources in the Northern China Plain, water resources per capita will still be at the lowest level at about 300 m^3/person in China no matter how SNWTP goes.[10]

China as a Hydro-Hegemon in Asia

Positive or negative forms of hegemony?

While the impacts of the Three Gorges Dam and the SNWTP will be borne by the country itself, China's ambitions to exploit the resources of the rivers that emanate from the Himalayas will imply

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[8] The $62 billion South-North Water Transfer Project was launched in 2002 and is the largest water transfer system in the world. The Eastern Route diverts water from the lower reach of the Yangtze river to the north, while the Central Route mainly serves domestic and industrial water uses in Beijing, Tianjin and some cities in Hebei, Henan and Hubei provinces. The Western Route, which is in the planning stage, diverts water from the upper reach tributaries of the Yangtze River to the upper reach of the Yellow river. The Eastern Route was set to be finished around 2007 but will be completed only by 2013 while the Central route, originally scheduled for 2010, has been delayed to 2014. The whole project is envisioned to be completed in 2050 with a total diversion capacity of 45 billion m^3 through the three routes. Correspondence with Chinese water expert at CAS, Mar 27, 2011. Also: Yang, Hong., (2005), "*SNWTP in China*", Water International, Vol. 30, Number 3, pp.339-349.

[9] Circle of Blue., (February 15, 2011), "*Choke Point: China – Confronting Water scarcity and Energy demand in the Worlds largest country*", http://www.circleofblue.org/waternews/2011/world/choke-point-china—confronting-water-scarcity-and-energy-demand-in-the-world's-largest-country/.

[10] Correspondence with Chinese water expert at the Chinese Academics of Sciences, Mar 27, 2011.

externalities for her neighbours. China´s water policy was spelled out in the Western China Development Strategy, otherwise known as "Opening Up the West". As per this, water, minerals and energy are part of the Chinese government´s plan to develop the autonomous regions of Xinjiang, Tibet, Ningxia, Guangxi, Inner Mongolia; the provinces of Qinghai, Gansu, Shaanxi, Sichuan, Yunnan and Guizhou; and the municipality of Chongqing through an extensive economic programme.[11] Having the richest hydro-resources on the planet with a total theoretical hydropower potential of 694 GW, developing hydropower is of great importance to energy independence and to develop the landlocked western provinces. China´s southwest has 59 per cent of the hydropower resources in the country and electricity transfer schemes are trumpeted as key to relieving eastern electricial shortages in Guangdong, Shanghai and Beijing. According to China´s Hydropower Development Plan for 2005-2020, 13 bases have been identified: the Northeast, Yellow River main (north), Yellow River Up reaches, Daduhe River, Yalongjiang River, Yangtze River Up reaches, Jinshajiang River, Nujiang (Salween) River, Wujiang River, West Hunan, Fujian, Zhejiang and Jiangxi, and the Lancangjiang (Mekong) River. Up by 2020, the installed capacity of hydropower will aim to reach 300 GW, 275 GW of which will be from these hydropower bases.[12] However, its ambition has grown stronger. According to the new Twelfth Five-year plan, China has given priority to developing the following five bases: the Jinshajiang River (59 GW), the Yalongjiang River (25 GW), Daduhe

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[11] H.H. Lai, (2002), "*China's Western Development Program: Its Rationale, Implementation, and Prospects*", Modern China, Vol. 28, No. 4, pp.432-66.

[12] In 2007, the installed capacity was 145.26 GW. The technically exploitable installed capacity has been determined as 542 GW, while economically exploitable ones as 402 GW. For more detail, see: National Development and Reform Commission, the People´s Republic of China, (2008), "*The Eleventh Five-year Plan of Renewable Energy Source Development*", Beijing, China.

River (24.5 GW)[13], the Lancangjiang (Mekong) River (25.6 GW), the Nujiang (Salween)River (21.4 GW) and the Yarlung-Tsangpo River (79 GW) in order to meet its target of producing 15 per cent of the nation's energy with renewable sources by 2020.[14] In the realm of dam-building, the China Huadian Group, an important actor in hydropower development, is planning to build four 10 GW hydropower bases in upstream and midstream of Jinshajiang River, Wujiang River and Nujiang River between 2011-2015 as part of a larger cascade to reach an installed capacity of 330 GW by 2020.[15] Additionally, China´s four other electric power behemoths namely, China Guodian Corporation, China Huaneng Group, China Power Investment Corporation and China Datang Corporation, have important access to decision makers in the Energy Bureau of the National Development and Reform Commission, which has considerable influence in large-scale hydropower decisions.[16]

While hydropower has become the centerpiece of the 'Open Up the West Campaign' (*Xibu Da Kaifa*) and the 'Send Western Electricity East Campaign' (*Xi Dian Dong Song*), a third component can be added: to use Yunnan´s position in the Salween, Mekong and Jinsha rivers to get access to Southeast Asia´s electricity export market. But

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[13] "*China announces ambitious clean energy plans for the next 5 years*", Xinhua News, (March 5, 2011), http://news.xinhuanet.com/english2010/china/2011-03/05/c_13762067.htm.

[14] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers, Apr 28, 2011.Also see: China daily.,"*Nujiang hydro project back on agenda*", (Feb 1, 2011), http://www.chinadaily.com.cn/china/2011-02/01/content_11949587.htm.

[15] Xinhua News, (April 27, 2011), "*Huadian Group to build four 10-mIn-kw hydropower bases in 2011-15*", http://www.istockanalyst.com/business/news/5090705/huadian-group-to-build-four-10-mln-kw-hydropower-bases-in-2011-15.

[16] See: Darrin Magee, et al, (2008), "*Hydropower and sustainability: Resilience and vulnerability in China's powersheds*". Journal of Environmental Management, pp.1-8.

China´s overriding interest in developing eight dams on the Mekong River Basin irrespective of Cambodia´s and Vietnam´s preferences have provoked concern that once all Chinese dams are in place, they will disrupt the flow of the river and adversely affect fisheries and agriculture for downstream countries.[17] Another case in point is the giant 3,200 megawatt Myitsone Dam along the Irrawaddy river, Burma´s most important waterway, that has triggered ethnic insurgency. Burma´s decision to suspend one of seven Chinese-built dams planned on the Irrawaddy is a reputational crisis for the Chinese government and gives more ammunition to environmentalists arguing against aggressive plans for large-scale hydropower plants.[18] In addition, Beijing´s move to build 13 dams on the middle and lower reaches of the Salween river, further stimulates anxieties of China´s dominance over the hydrological contours of South Asia as downstream states, Burma and Thailand don´t possess the means to directly and physically influence the flow. Clearly, the Chinese leadership sees the Mekong and Salween rivers not simply as part of its strategy to break out of the downward fossil-fuel spiral, but rather through the broader prism of its economic and hence political stability. This is further highlighted by the fact that China's 2006 White paper on national defence explained that the People´s Armed Police Force (PAPF) had taken part in the construction of 21 key national projects, including the Qinghai-Tibet railway, the SNWTP and major hydropower projects.[19]

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[17] For details on China's performance in Mekong Basin, see Oliver Hensengerth, (2009), "*Money and Security: Chinas Strategic Interests in the Mekong River Basin*", briefing paper Asia Programme, Chatham House:London, pp.2-11.

[18] The Economist, (October 4, 2011), "*Myanmar´s surprising government: Dammed if they don't*", http://www.economist.com/node/21531278.

[19] State Council of the People´s Republic of China, "*Chinas National Defense in 2006, White paper*", Beijing, China. http://www.china.org.cn/english/features/book/194421.htm.

More importantly, downstream states like Egypt in the Nile basin, often have the potential to influence "weaker" upstream states and upend the traditional upstream-downstream power dynamic. But in contrast to Egypt in the Nile Basin, China´s geographical position as the source country of many rivers provides it with an additional advantage. Not only is it Asia's strongest economic, political and military power, but this power graph is reinforced by its hydro-hegemony. This upstream-downstream relationship (China vs South & Southeast Asia) makes interstate cooperation particularly complicated because incentives to cooperate are not uniform between riparians. In that light, China has given priority to geopolitical interests over ideology. When the resolution containing the "Convention on the Law of the Non-Navigational Use of International Watercourses" came before the General Assembly for adoption on May 21, 1997, China was one of the three countries who rejected the idea of national integrity, instead claiming indisputable sovereignty over a watercourse which flows through its territory.[20] A similar Sino-centric attitude towards international cooperation can be seen from the fact that China has rejected all entreaties to join as a full member of the Mekong River Commission (MRC) for managing water-disputes, and has stuck to its strategy to develop hydropower from the Mekong and Salween unilaterally without consulting other nations.[21] However, it needs to be borne in mind that China is willing to embrace multilateralism whenever the leadership in Beijing feels that unilateral actions and

[20] India did not do it a great favour by abstaining from voting. See, Stephen C. McCaffrey & Mpanzi Sinjela, (1998), "*The 1997 United Nations Convention on International Watercourses*", American Journal of International Law 92, no. 1, pp.97-107.

[21] For details on China's performance in Salween Basin, see Aaron Wolf, (2008), "*Case Study of Transboundary dispute resolution: Salween River*", www.transboundarywaters.orst.edu/research/case_studies/Documents/salween.pdf.

bilateral relations are not sufficient to secure its national interests. Despite its rejection to join the MRC and its denial of permission for hydroelectric dams on the Mekong and Salween rivers, China has turned to the Mekong region to build cooperation mechanisms over other issues; from fighting transnational crime to the construction of cross border infrastructure.[22] China´s expanded engagement with ASEAN and the SCO also reflects an increased importance of cooperative security and conflict management among China, ASEAN and the SCO states.[23]

Following China´s performance in the UN-led process on International Watercourses, its rejection to join the MRC and its unilateral move to harness the power of the Mekong and Salween rivers, as well as its willingness to emphasise multilateralism only when it coincides with its own national interests, it can obviously be concluded that China seeks to attain and consolidate maximum control of water resources, thereby exercising a *negative/dominating* form of hydro-hegemony.

China's strategic interests in the Yarlung-Tsangpo River

Until recently, China´s strategy in the Himalayan region was exclusively focused on power relations with India and a defensive approach to the Tibet issue. With major plans like the Western China Development strategy (*Xibu Da Kaifa*) and the West-East Electricity Transfer Project (*Xi Dian Dong Song)*, the PRC aims to position Tibet as a trading hub in the Himalayan region.[24] Under the 'Opening

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[22] Hensengerth, (2009).

[23] For details see David Shambaugh., (2005), "*China Engages Asia Reshaping the Regional Order*", International Security, Volume 29, Number 3, pp. 64-99.

[24] For a broader perspective on China´s strategy in Tibet see, Thierry Malthou,, (2005), "*Tibet and Its Neighbors: Moving Toward a New Chinese Strategy in The Himalayan Region*", Asian Survey, Vol. 45, No. 4, pp.503-521.

up the West' campaign, the extraction of Tibet´s natural resources are supposed to fuel the economic engines of eastern China, which in turn will pull "backward" Tibet forward. Hailed as *Xizang*, the place of western treasure, the Tibet Autonomous Region´s untapped water resources remains an important objective for Chinese authorities to promote economic integration and stability. It is in this context that China´s hydro-behaviour in Yarlung-Tsangpo River must be seen.

Moving westward into the Tibetan hinterland, China has increasingly stressed the need to build hydroelectric programmes in the TAR. Currently less than 0.6 per cent of Tibet´s hydropower resources have been developed[25] in a region which produces approximately 200 GW of natural hydro energy annually which is about 30 per cent of China´s total.[26] The entire Yarlung-Tsangpo River Basin was found to have hydropower potential of 114 GW, 79 GW of which was on the main river.[27] China´s main hydro-project has been the construction of the 510 MW Zangmu Hydropower Station, while four other projects, Lengda, Zhongda, Langzhen and Jiacha have begun preparations on the middle reaches of the Yarlung-Tsangpo (see annex). Even though China from its side argues that the projects are Run-of-the-River projects[28] and that they have taken full consideration of the impact on the downstream area, every intervention in a river does have downstream consequences and could lead to disruption in

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[25] China Dialogue, (January 17, 2011), "*A New Era for Tibet´s Rivers*", http://www.chinadialogue.net/article/show/single/en/4055-A-new-era-for-Tibet-s-rivers.

[26] Malthou, (2005), p.509.

[27] China Dialogue, (January 17, 2011).

[28] A project is RoR only if inflow equals outflow on a real-time basis, if there is no storage or flow modification at all.

natural flow patterns[29]. Worringly, the *People's Daily* said the Zangmu project can also be used for flood control and irrigation, which indicates it needs to store or divert water.[30] Moreover, on March 28, 2011, the *People's Daily* reported that the People's Government of Tibet Autonomous Region had released the "*Opinions on Accelerating Tibet´s Water Infrastructure Reforms and Development*" which said that Tibet will undergo a series of large water infrastructure projects along several major rivers in order to increase water supply capacity by 700 million m^3 and enable all rural towns and townships to have access to hydroelectric power. The same report claimed that the "*Opinions on Accelerating Tibet's Water Infrastructure Reforms and Development"* required Tibet to establish a relatively sound flood control system under which major towns and infrastructure can survive the worst floods in 30, 50 or 100 years – combined with supporting water conservation projects for expansion of key large and medium-sized irrigated areas by 2020.[31]

While these projects are likely to have transboundary impacts, India is more concerned that China will use its dominant upstream position to build a gigantic dam on the Great Bend of the Yarlung-Tsangpo/ Brahmaputra. Tapping the hydroelectric potential of the Great Bend as she bends and plunges from the Third Pole down towards India

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[29] Even if total quantity of flow remains the same downstream, every intervention in a river has consequences to the river flow, sediment transportation, how much pollution it can take and the cleaning capacity of the river. Interview with Professor Ramaswamy R. Iyer at Centre for Policy Research, Delhi, Mar 24, 2011.

[30] *Peoples Daily*, (November 15, 2010), "*Tibet to build first large hydropower station*", http://english.people.com.cn/90001/90778/90860/7200115.html.

[31] Peoples Daily, (March 28, 2011), "*Tibet to double investment in water infrastructure*", http://english.peopledaily.com.cn/90001/98649/7333367.html.

and Bangladesh, the Tsangpo would generate 38 GW, which is double the capacity of the Three Gorges Dam. Initial plans were developed by a Japanese firm in the late eighties, followed by an alternative construction proposal made by Richard Brook Cathcart in 1999. Cathcart proposed to build a low-rise inflatable dam in place of a high concrete or rock-fill gravity dam at a key site on the Yarlung-Tsangpo/Brahmaputra southeast of Namche Barwa within Tibet. What was proposed was that a 10 metre-high nylon-reinforced rubber bladder filled with either air or water be "securely anchored in a rock-locked steel-reinforced base-plate". This would create a shallow reservoir behind the barrier below, from which the river flow could be diverted to the head gate of the pressure tunnel at appropriate times without building up any huge weight of impoundment that could cause a seismic or rock-slide hazard.[32] Indian scholars from their side stressed that if China decides to avoid large dams altogether and take full advantage of the 2,500 metre drop, it would leave the flow intact. According to Ramaswamy R. Iyer, Professor at Centre for Policy Research in New Delhi, any hydro-electric power project at the point of the Great Bend may have horrendous ecological consequences; but if the waters are returned to the river after they pass through the turbines, it may not affect the flow to India and Bangladesh. But that is clearly not the case with a storage project because that would reduce the flow correspondingly and therefore be a matter of concern to downstream riparians.[33]

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[32] B.G.Verghese,, (2001), "*Reorienting India: The New Geo-Politics of Asia*", New Delhi: Konark Publishers Pvt Ltd, pp. 161-162.

[33] Ramaswamy R. Iyer, (2008), "*India´s Water Relations With Her Neighbours*", a tour d´horizon survey published in Knowledge World Publishers Pvt Ltd, National Security studies, pp.198.

Indeed, even if Beijing has not yet given the go-ahead for a 38 GW dam, there is plenty of evidence that the Motuo dam is under active consideration.[34] As stated by a scholar at Chinas Academics of Sciences:

> "Precious natural resources should be utilised for promoting the wellbeing of people. So if required conditions meet, China should plan to harness the hydroelectric potential of the Great Bend."[35]

Four of China´s state owned electric power companies have signed contracts with the TAR government to develop hydropower in the Lancangjiang, Nujiang and Yarlung-Tsangpo Rivers to spur economic development and to gain access to South and Southeast Asia's electricity markets, mainly in Nepal and Burma.[36] Efforts to develop hydropower in these rivers can best be understood in the context of its growing transportation capabilities in South and Southeast Asia. The "*three vertical and two horizontal links*", namely the China-Nepal, Qinghai-Tibet, Xinjiang-Tibet, Tibet-Sichuan, and the Tibet-Yunnan highways are supposed to link Tibet's economy to South Asia.[37] China´s hydro-diplomacy is a natural extension of that two-step strategy. On the one hand, developing hydropower resources helps Beijing to reduce the income gap between China´s eastern provinces and its western regions, which strengthens both, national economic integration and political stability. On the other hand, selling electricity to its

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[34] Tibetanplateau.blogspot.com has uploaded several Chinese sources who have discussed the Motuo project. For detail see: http://www.chinatibetnews.com/dili/2008-06/20/content_339502.htm, http://online.hhu.edu.cn/jpkc/sgjianzhuxue/webclass0101.htm, http://blog.sciencenet.cn/home.php?mod=space&uid=295826&do=blog&id=249662.

[35] Correspondence with Chinese water experts at the Chinese Academics of Sciences, Mar 27, 2011.

[36] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers, Apr 28, 2011

[37] Malthou, (2005), p.519.

neighbours promotes cross-border integration, which benefits the Western China Development programme. A glimpse of Tibet´s strategic relevance was spelled out in China´s state-run online magazine *ChinaTibet* in 2011 that stressed the need for state-strengthening projects like the Zangmu HPP and the Qinghai-Tibet Power Grid Interconnection project. The article highlighted three drivers of Tibet´s future economic development: state investment, development of distinctive industry and more efforts in building up the continental trade route to South Asia which would bring more opportunities for Tibet.[38] In addition to these goals, hydropower development serves also as a locomotive for mining in order to create the conditions for transforming Tibet into a "strategic resources reserve base". Apart from improved transport links, energy is a key for tapping significant reserves of uranium, chromite, borax, lithium, copper, zinc and iron in the TAR.

China has made headway in harnessing the hydroelectric potential of the Great Bend at Motuo in the lower reaches of the Yarlung-Tsangpo/Brahmaputra River. Preliminary work on building the 38 GW dam has already started with the construction of the Motuo Highway. From the Grand Yalungzangpo Gorge, the 117 km long highway crosses six rivers and various tunnels before it connects the Tibetan hinterland to mainland China.[39] With the construction of Qinghai-Tibet Railway and Motuo Highway, China has thus been able to put the infrastructure in place that is needed to tap the power of the river and to gain access to its neighbour's electricity export markets. In addition to roads and railways, China will most likely

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[38] ChinaTibetOnline, (March 07, 2011), "*Three drivers of Tibets future economic development*", http://chinatibet.people.com.cn/96057/7310155.html.

[39] ChinaTibetOnline, (December 13, 2010), "*Motuo: Dream of connecting to outside world to come true*", http://chinatibet.people.com.cn/7229128.html.

need to build nearby dams and ultra-high voltage power transmission lines to provide a basis for the construction of Motuo dam. According to a map of planned dams put up on the state-run Hydro China Corporation's website, a 38 GW dam at Motuo is planned with other large infrastructure-based hydro projects set to majorly alter the riverscape.[40] Considering the distribution of hydropower resources, China has proposed nine hydropower projects in its two major tributaries, the Yiwong-Tsangpo and the Parlung-Tsangpo. These are: Sangba (480 MW), Lhari (340 MW), Nyewo (300 MW), Drakke (632 MW), Yiwong (640 MW), Sothang (840 MW), Pome (580 MW), Sumdzom (320 MW) and the Palong (2760 MW).[41] Hydropower generated by these smaller dams is likely to be utilised to meet power needs and to run the construction of the Motuo dam. According to a geologist who has studied the Yarlung-Tsangpo River, the 38 GW dam is not primarily designed to generate electrical power for Tibet because there is no electrical load in the south-eastern part of Tibet. It is designed as a key component to fuel the eastern economic powerhouse of China as well as for sending hydroelectricity to South Asia.[42]

The Great Bend of the Yarlung-Tsangpo/Brahmaputra River has also been proposed as the starting point of launching the major water diversion project named the "Great Western Route" (see Map 2). Red nationalists like Guo Kai and Li ling – authors of the book *Saving China Through Water From Tibet (Xizang zhi shui jiu Zhongguo)* – have argued for funnelling water away from Yarlung-Tsangpo into

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[40] See: http://www.hydrochina.com.cn/zgsd/images/ziyuan_b.gif. (Accessed on May 18, 2011).

[41] Ibid, The names of the dams are in Tibetan and has been taken from Tibetanplateau.blogspot.com.

[42] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers,April 28, 2011.

a reservoir at the Laija Gorge in Maqin County, Qinghai Province. From Laija Gorge the water would be transportered to the Yellow river and be connected to the Qinghai Lake and then channelled to the freshwater Erhai Lake. From there Guo Kai has proposed the construction of three watercourses. The first one would link up with the Gaxan Nur in Inner Mongolia to the north. The second one would arc out to the northwest, supplying the cities of Urumqi and Karamay while the final one would head west to the Tarim Basin with the goal of irrigating the desert. Damming the Yarlung-Tsangpo/ Brahmaputra at the Great Bend near the Shuomatan point would benefit the entire project – named the Shuotian canal project (*Shuotian yunhe fangan*) – by channelling a total of 200 billion m^3 of water annually and linking up with the central and eastern routes of South to North Water Transfer Project. Although there has been no official confirmation that the construction of the "Great Western Route" will go ahead, it continues to be a debated option to solve China's emerging water crisis. Building difficult projects in difficult locations where it is also expensive has not discouraged Chinese technocrats from planning to build them. Ding Yifan, a researcher with the Development Research Center of the State Council, told the Global Times that the pros of building the dam outweigh the cons as hydropower is the cleanest energy and will help reduce carbon emissions. "*Any mega-projects in China are likely to arouse controversy. Most projects proceed as planned and prove beneficial in the long run.*"[43] But the "Great Western Route" has also been criticised.

In 2000, the Minister of Water Resources and supporter of the Three Gorges Dam Project – Qian Zhengying – told the State Council that in the near future, there would be no feasibility, technical or

[43] Peoples Daily., (November 18, 2010), "*Hydro-power dam in Tibet stirs debate*", http://english.people.com.cn/90001/90776/90882/7203018.html.

economical for the "Great Western Route" scheme.[44] On May 25, 2009, the former Minister of Water Resources – Wang Shucheng – told the *Xinhua News* that China´s has no intention of including the Yarlung-Tsangpo River in the western route of SNWTP and called the Great Western Route "unnecessary, infeasible and unscientific."[45] A water expert at CAS who studied the Yarlung-Tsangpo River in 2008 has also echoed this concern:

> "Firstly, China use very less water now and will use less in the future, less than 2 % of the total water resource generated in China within the catchment. Secondly, it's not possible for China to divert water from the Tsangbo River to Northwest China. Economically, it´s not feasible. It´s too difficult to divert big quantity of water in that high mountain area with evident new tectonic movements and frequent threats of earthquakes."[46]

Furthermore, the idea of launching large water division projects is dismissed by a Chinese geologist who completed a survey of the Himalayan rivers in 2010. He explained that:

> "the proposal only exists in civil discussions, and it´s not feasible either by technology or by economic senses. It is not included in government plans, so I cannot see the future for it now."[47]

However, China´s preliminary work on building the world´s biggest dam at the Great Bend raises the possibility of using the Great Bend

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[44] Southern Weekend, (August 8, 2006).

[45] Xinhua News., (May 25, 2009), "*Ex water chief: China won´t divert world´s highest river to thirsty north*", http://news.xinhuanet.com/english/2009-05/25/content_11433586.htm.

[46] Correspondence with Chinese water expert at Chinese Academics of Sciences, March 27,2011..

[47] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers,April 28, 2011.

as a source of pumping power for moving water North. But these intentions are dismissed by Tashi Tsering, a Tibetan environmentalist, who argues that the dam at Motuo would be for hydropower, not water diversion. "*The law of physics will not allow water diversion from the Great Bend.*"[48] Indeed, technical costs may be the real obstacle of any diversion scheme. According to Tsering, a dam at Mouto (850 altitude) would involve the construction of a series of tunnels, pipes and reservoirs to exploit the 2,000 m fall of the river, but a water diversion that must be transferred over corrugated mountains would have lost 2000 m of height. This was confirmed by B. G. Verghese, Professor at Centre for Policy Research in New Delhi:

> "A structure to divert the Yarlung-Tsangpo/Brahmaputra would rely on power generated by a hydro powerplant on the Great Bend to pump the water over the Namcha Barwa Mountains. But when you generate a lot of power of the drop in the Great Bend you would be using more power to pump it up again, which would be very foolish."[49]

Thus, China´s strategic interest in the Yarlung-Tsangpo/Brahmaputra River is hydropower development, not pumping water. Moreover, Tsering argued that a major issue for water diversion is the climate of the Tibetan Plateau, where it is below freezing point during winters and early spring when water demand is highest in the Northern China Plain, but Chinese scholars in their turn argued that most of the main stream of the Yarlung-Tsangpo is not frozen in the winter.[50]

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[48] The Guardian, (May 24, 2010), "*Chinese engineers propose world´s biggest hydro-electric project in Tibet*", http://www.guardian.co.uk/environment/2010/may/24/chinese-hydroengineers-propose-tibet-dam.

[49] Interview with B.G. Verghese at Centre for Policy Research, New Delhi, Dec 20, 2010.

[50] Correspondence with Chinese water expert at Chinese Academics of Sciences,March 27, 2011.

Although the "Great Western Route" near the Great Bend has been found scientifically unfeasible, it hasn't deterred red nationalists like Li Ling who has moved his grandiose project further upstream of Yarlung-Tsangpo. Faced with severe drought in the middle and lower reaches of the Yangtze river in 2011, engineers have newly proposed that China go beyond diverting three tributaries of the Yangtze – Tongtianhe (Qinghai), Yalongjiang (Sichuan) and Daduhe (Sichuan) rivers by also diverting water from the upper reaches of the Yarlung-Tsangpo/Brahmaputra to send water northward.[51] In his book *Saving China Through Water From Tibet (Xizang zhi shui jiu Zhongguo)* from 2005, Li ling proposed that the waters of the Yarlung-Tsangpo/Brahmaputra be captured by a dam at Suma Tan, the gorge below Tsethang town to transfer water 1,239 kilometers across mountains as well as gorges of the Gyalmo Ngulchu (Salween), Zachu (Mekong) and Drichu (Yangtze). A recent report by *Xinhua News Agency* says Chinese experts have raised a new proposal to divert water from the upper reaches of the river, from where China can reroute the water to Xinjiang along the Qinghai-Tibet Railway and the Hexi Corridors – part of the Northern Silk Road located in Gansu Province.[52] An advantage in damming this location further upstream of Yarlung-Tsangpo/Brahmaputra is that it has an altitude of 3, 600 metres above sea level, thereby reducing the need for pumping uphill. Even if the newly proposed route is stirred up by the drought in the Yangtze River, the economic costs and benefits may hamper its planned function due to engineering and technical difficulties in the high elevation of the Qinghai-Tibet plateau. For instance, if the price of the transferred water is extremely high while the ability to pay for it

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[51] Science & Technology, (June 8, 2011), "*China to Consider Diverting the Brahmaputra River*", http://www.2point6billion.com/news/2011/06/08/china-to-consider-diverting-the-brahmaputra-river-9430.html.

[52] Ibid.,

by the water users is relatively low, intended recipients of the water transfers will look for substitutes. A leading water scholar at the CAS declared that:

> "...the far west routes will not be feasible, mainly because the high cost of water diversion compared with what can produced by the diverted water. It would be more cost-effective to invest in alternatives."[53]

However, if operating costs are low and Beijing has decided that the national interest demands diversion of Yarlung-Tsangpo/ Brahmaputra, then the authorities are unlikely to rank international law or lower-riparian concerns high up on their agenda. What may deter them, however, would be political considerations; if they feel that good relations with India and Bangladesh are desirable for political reasons, then they may indeed take their concerns into account and try not to upset them.[54] Qin Hui, a professor in the School of Humanities and Social Sciences of Tsinghua University, raised this concern in the Economic Observer:

> "Without international co-operation it is impossible to launch any major water project for an international river like this."[55]

At the same time, the SNWTP lays the foundation on which the rationality of diverting Yarlung-Tsangpo/Brahmaputra can be judged. The rationality of quenching the dragon´s thirst with a giant water transport scheme has also raised a fundamental question: What if the SNWTP does not operate as planned?

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[53] Correspondence with Chinese water expert at Chinese Academics of Sciences, 2011/03/27.

[54] Iyer, Ramaswamy.R., (2008).

[55] China Daily, (November 22, 2006), "*Dam proposal rubbished by critics*", http://www.chinadaily.com.cn/china/2006-11/22/content_739379.htm.

All three legs of the South-to-North water project have problems. The eastern route, with the existing Grand Canal, was supposed to start withdrawing about 14.8 billion m^3 of water from the lower reaches of the Yangtze River, and pump the water 65 m high and deliver it 1150 km northward by artifical channels to the eastern North China Plain in 2007. But the eastern leg of the SNWTP has not been as easy as planned and the completion time is delayed to 2013. Delivering polluted water northward through water treatment plans is so expensive that Tianjin and other cities prefer to build desalination plants. Additionally, pumping water 65 m high makes the delivery cost high compared to other water resource options. As stated by Zou Ji, a professor at the Renmin University in Beijing:

> "The unit water cost of desalination is actually cheaper than that of the South-to-North Water Diversion Project."[56]

The longer middle route was originally planned for completion by 2010, but has been delayed by four years because of environmental and cost concerns. Even if both routes will be completed as planned, the big outstanding problem of the diversion schemes will be cost recovery. If the water price is set too low, not only will the government have to cough up the cash for the diversion, but also the transferred water will go a waste and little water would be left for the ecosystems. On the other hand, pricing it too high would oppress water demands, forcing urban users and industrial enterprises to use cheaper alternatives such as water conservation and seawater desalination plants.[57] Under such circumstances the government will be unable to

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[56] Circle of Blue, (March 1, 2011), "*Choke Point: China – A Dry and Anxious North Awaits China's Giant, Unproven Water Transport Scheme*", http://www.circleofblue.org/waternews/2011/world/a-dry-and-anxious-north-awaits-chinas-giant-unproven-water-transport-scheme/.

[57] Hong Yang,, (2005), p.346-347.

recover the mammoth engineering investments; the largest water transfer proejct in the world could become a "sunshine" project. It must be noted that cost recovery may be the real problem if China goes ahead with major water diversion projects in the Yarlung-Tsangpo. Coming at an estimated cost of 125 billion US dollars[58], the operating costs of the "Great Western Route" might be so high that the project will be unable to provide water at costs lower than other alternatives, including water conservation and seawater desalination facilities. Experience of the central and eastern routes of the SNWTP shows it can be tough to persuade the intended sectors to purchase diversion water, especially when the "Great Western Route" costs twice as much as the entire SNWTP. Now we come to the crux of the problem: what happens if a wet season comes?

According to one of the leading water experts at CAS, the dry period of the North China plain which has been more than 28 years since 1980 will end and the wet season will be back soon. Since the receiving areas are under the semi-humid monsoon climate zone, there would be little need for water transfer in the wet years, thereby pushing the price of transferred water up while users would look for demand management alternatives.[59] The delays that the SNWTP in China has already seen in the eastern and central routes mean that any timeline for western diversions will also be pushed back. In the new 12th Five-Year Plan, China will accelerate the construction of the east line and the middle line of the SNWTP as well as the supporting facilities.It will ensure project quality and develop preliminary research on the western line.[60] This is also confirmed by another Chinese scholar:

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[58] Southern Weekend., (August 8 , 2006).

[59] Correspondence with Chinese water expert at Chinese Academics of Sciences,March 27, 2011.

[60] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers,April 28, 2011.

> "China is now focusing on finishing the East and Middle Routes of SNWTP. The East Route will be finished in 2013, while the Middle Route in 2014. And then, the West Route will be put on the schedule. Although the cost is high, it may be necessary for feeding the thirsty Northwest and North China."[61]

Although China has gradually developed several major demand management policies, including setting a proper water pricing system and establishing water rights and marketing systems, the current water deficit in the North China plain will still be 43 billion m^3 annually. Chansheng et al. (2010) report that even if China achieves water saving goals by 2050, the water deficit in the North China Plain still ranges between 48-49 m^3/year in the dry years and the SNWTP is only a partial solution to relieve the water deficit in the region.[62] Given the magnitude of deficit in the future, the western leg is the "maker or breaker" of China´s development. Moreover, even if the western route would divert more water than the other two combined, it needs to overcome many engineering difficulties and obstacles. These are:

1. **Environmental:** Around 50 per cent of Yangtze discharge to the sea comes from the upper basin, where the hydrological processess have shown changes due to glacial melting. As the glaciers are retreating it is also possible than the SNWTP will have an impact on the hydropower generation of Yangtze Basin dams due to the losses of water. Furthermore, diverting 17 billion m^3 of water annually accounts for nearly 80 per cent of the mean annual flows in the three tributaries, which would leave 20 per

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[61] Correspondence with Chinese water expert at Chinese Academics of Sciences,March 27, 2011. Also see: Peoples Daily, (May 28, 2010), "*China accelerates south-north water project*", http://english.peopledaily.com.cn/90001/90776/90882/7004377.html.

[62] Chansheng He et al., (2010), "*China´s South-to-North Water Transfer Project: Is it Needed?*", Geography Compass, pp.1312-1323.

cent of the flow in the lower reaches. Transferring that quantity of water during dry years could deplete the flows in the lower reaches of the river and provoke protests or violence.[63]

2. **Social:** Since 1995, the number of demonstrations has risen by more than 25 per cent a year to reach 128,000 – about twelve times the number from a decade ago.[64] With the anti-dam movements against the Three Gorges Dam and the Nujiang project, it is becoming increasingly difficult to push through elephantine projects like the SNWTP. Teh-Chang Lin (2007) argues that the movements against these projects, and the issues of resettlement and environmental protection associated with dam constructions, have incited society to challenge the state. In this regard, the SNWTP is a litmus test for China. The political impact of relocating large numbers of Tibetans and Mongolians in order to tap the three tributaries of the Yangtze and channellise them into the Yellow River is a dilemma for Beijing because it could prove counterproductive by creating social instability in the Qinghai-Tibet plateau.

Therefore, using the SNWTP as a locomotive to drive the resource-intensive economy without drastic efficiency gains is likely to intensify debate in China between the powerful political-business elite and an increasingly vocal group of farmers, individuals, scholars and environmentalists calling for a change in high-risk industrial projects. Bringing a strong India to the table by diverting the Yarlung-Tsangpo/Brahmaputra would be strategically unwise for Beijing given the fact that water can be diverted from Lancangjiang, Nujiang and Jinsha Rivers more easily.

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[63] Chansheng He et al., (2010), p.1320.

[64] Lei Xie, (2009), "*China´s Environmental Activism in the Age of Globalization*", City University of London, Working papers on Transnational politics, pp.1-21.

India´s Water Strategy:

Maximise cooperation, Minimise mistrust

In order to influence China´s position as the upper riparian, a thoughtful strategy would be to cite the principles laid down in the International Water Law. As a source of bargaining power, the principles of 'no significant harm' and 'prior notification of works' may increase the legitimacy of downstream riparians and enhance India´s bargaining position in the negotiation process *vis-à-vis* China. India is entitled to ask the People´s Republic of China for information for determining the implications for them, and insist on prior consultation before dam-activities are set in motion. But this can only be done by constantly raising concerns over any major Chinese intervention in the river, as there is no point in crying wolf over reductions in flow after a dam has been built. At the same time, India cannot ignore the needs of the upper riparian and needs to give due consideration to the principle of 'restricted territorial sovereignty' prescribed in the International Water law. This means that China has the right to use rivers that flow through their territory but not without keeping the interests of the lower riparians in mind and refraining from causing significant harm. Since China as an hydro-hegemon is not likely to cooperate voluntarily, a framework for action required to coax China to acquiesce, has to provide incentives for it to play a responsible role as a upper riparian, while hedging against the possibility of aggressive dam-behavior as China´s power grows. A twofold strategy seems to be appropriate, namely, 'desecuritisation of water resource management' and 'river basin approach'.

Desecuritisation of Water Resource Management

In order to enter into an understanding over the Yarlung-Tsangpo, it is important that the water issue is not held hostage to different political issues. It was in fact through the deliberate isolation of this matter from political and military concerns that the Indus Waters

Treaty has managed to survive three wars between India and Pakistan since its signing in 1960.[65] Given the complex Sino-Indian relations, efforts at linking water with other issues can increase the risk of making negotiations more complicated by bringing too many issues onto the table and by further politicising water relations. Instead of reactivating other disputes in the context of disagreements over water management, India should try to remove water from the security discourse by promoting the idea of better resource management with China. Since water ignores boundaries, benefit-sharing can be a strategy to move the riparians away from the sharing of water quantities to the sharing of the benefits the users receive from its use.[66] The advantage of such cooperation within the water sector is that it involves lower transaction costs than issue linkages.[67] As China, India and Bangladesh are all energy-deficient, a joint hydroelectric dam on the Great bend of the Yarlung-Tsangpo (38 GW) can be among the areas of mutually benefial cooperation if the distribution of benefits is perceived as acceptable by all riparians. In this case, side-payments from the benefiting party (India, Bangladesh) to the providing party

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[65] Even the Indus-treaty is affected by politics today. For details on the Indus-treaty see Ramaswamy Iyer,, (2003), "*Water: perspectives, issues, concerns*", New Delhi: Sage publications India.

[66] The main idea of benefit-sharing is that by focusing on benefits instead of quantities, difficult negotiations on water allocations may be avoided. In terms of China-India relations, I can identify three forms of benefit-sharing: 1) Side Payments; payment for benefits or compensation for costs 2) Issue linkages, 3) Benefits from the river, to the river and beyond the river. For more information, see: Ines Dombrowsky,, (2010), "*The role of intra-water sector issue linkage in the resolution of transboundary water conflicts*", Water International, Volume 35, Issue 2, pp.132-149.

[67] In the case of an issue linkage (linking water with other issues), representatives from different sectors will have to negotiatiate with one another, and it may be difficult for them to appreciate the reciprocity with the arrangement unless a higher level of authority fosters such linkages. See: Ines Dombrowsky, (2010).

(China) would be rational if joint provision can be interpreted as a positive-sum game. Utilising water resources in collaboration with other neighbours may indeed promote win-win solutions. But it must be added that political conflicts over river water often happen in the context of large projects. China's hydropower projects in the Mekong River basin have the potential to create conflicts over water with its neighbours. In the case of the Indus-treaty, the Baglihar project has created some misunderstandings between India-Pakistan over the Indus waters.

An additional problem for building a gigantic 38 GW dam in the Himalayas is that it faces a high risk of catastrophic failure due to earthquakes. According to the United Nations International Strategy for Disaster Reduction (UNISDR), in 2007, seven of the top ten natural disasters by number of deaths occured in China, India, Bangladesh and Pakistan, accounting for 82 per cent of total natural disaster related deaths worldwide.[68] In the face of such uncertainties, the idea of harnessing hydroelectricity jointly in a fragile and seismically active ecosystem seems to carry implications of a large-scale technology-driven planning which is neither flexible nor adaptive to climate change. Instead of putting all eggs in one basket, India should take the lead and embark on a "soft path for water"[69] with China and Bangladesh by moving away from large-scale, supply-side planning towards a strategy that tries to improve water efficiency, decentralise infrastructure and broadly rethink water usage and supply. Thus it can be seen that the "soft path" – improving management of water – is the most important level at which India

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[68] Mats Eriksson, et al.,(2009), "*The Changing Himalayas – Impact of climate change on water resources and livelihoods in the Greater Himalayas*", ICIMOD, p.11, http://books.icimod.org/index.php/search/type/1/45.

[69] The Pacific Institute's definition and discussion of the soft path for water is available at http://www.pacinst.org/publications/worlds_water/worlds_water_2002_chapter1.pdf.

can engage both China and Bangladesh to strengthen water efficiency and maximise opportunities to utilise technologies. "Soft path" requires a holistic approach to water that fosters cross-sector, cross-agency and transnational cooperation rather than merely a state-to-state interaction.

Given that water is a multi-functional resource with multiple uses at various levels, cooperation can be driven by benefits from the river and to the river, through joint multipurpose projects: improving the management of water resources (rivers, lakes, mountains, aquifers); monitoring changes in glaciers, and adapting to impacts of glacier melt; conservation of wetlands, floodplains and groundwater recharge to maintain their capacity to buffer river flow and water quality variations; dealing with common problems such as preserving soil fertility and reducing contaminant and sediment soil transport; coping with floods and strengthening natural disaster management; sharing knowledge in local water-harvesting and building extensive, decentralised local water storages. These are all areas of collaboration that can foster a change in perception away from the possibility of threat (securitisation) to the possibility of shared benefits (desecuritisation). Emphasising options for cooperation at various levels (governments, NGOs, academic institutions) within each of the above spheres may then start broadening the basket of potential benefits to both upstream and downstream countries. This approach harmonises well with what Lan Jianxue suggests implicitly in his paper "*Cooperation on Water Resource Security and Interaction in Sino-Indian Relations*" when he argues for strengthening and improving the management of water resources in basin areas to transcend the zero-sum mentality.[70] Lan Jianxue states:

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[70] Lan Jianxue,, (2009), "*Cooperation on Water Resource Security and Interaction in Sino-Indian Relations*" (*Shiziyuan anquan he Zhong-Yin guanxi*), Chinese International Studies, No.18, pp.108-124.

> "with the purpose of seeking benefits, the two countries should pay attention to cooperation for "avoiding damage", such as joint effort on control of trans-boundary water pollution, protection of biodiversity, early warning, forecast and prevention of major emergencies, reduction of regional poverty and maintenance of regional security."[71]

However, joint projects for shared benefits and trust building remains institutionally demanding and can be diffult to design between India-China as it can erode state sovereignty. A first step for any joint water resource management effort would therefore be to set up a hydrological data-sharing mechanism as it would support trust building. Having a trust-building component already in place with the expert-level mechanism to exchange hydrological data from 2006, it is clearly possible to take the next step and speak of benefit sharing.[72]

In fact, Chinese experts have taken an interest in developing different institutional arrangements for collective management of transboundary water resources. This is echoed by Jianxue who argues for a multilateral water-cooperation mechanism between China, India, Pakistan, Nepal, Bhutan and Bangladesh on international rivers to promote environmental protection and achieving the "integrated benefits of regional coordination."[73] Another Chinese scholar states:

> "to reduce the looming larger and larger water resource disputes we can establish water resources forum, a mechanism to focus

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[71] Ibid, p.122.

[72] The idea of sharing benefits is not a new phenomenon for China. They are indeed increasing their focus on water rights and eco-compensation mechanisms (side-payments) by means of "liking water to benefits" to address environmental and ecological imbalances in the country. See: Jesper Svensson,, (2010), "*Transboundary Water-Cooperation in China: A Case-Study of Hebei-Beijing district*".

[73] Lan Jianxue,, p.123.

> on hydro-cooperation in the immediate regions and clear up some misunderstandings and even disputes related with hydro-power utilisation. And also, this forum could be charged with duties in mapping the water resources and formulating comprehensive arrangement by taking all the concerns and requirements. Without efforts, the water shortage will make matters worse between China and India, since these two countries share the common main watersheds."[74]

The same scholar has also argued for hydro-cooperation between China and India as well as with other countries. He states:

> "The first step is to tap the hydro-electricity jointly in countries between China-India, mainly Nepal, Bhutan, Afghanistan and other countries by setting up joint ventures, which is to build regional hydro-electricity transmission and distribution system, both in physical infrastructure like hydro-power grid and institutional setup like power trading institution, to improve the efficiency in utilizing the electricity generated. The electricity generated in one region could via this trading institution and grid net be economically consumed by local and more to surrounding consumers."[75]

A South Asian scholar at Sichuan University went further:

> "We can join hands to enter into mutual understandings on certain specific water issues because both of us are clear that good and close bilateral relations are necessary for further development."[76]

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[74] Correspondence with a South Asian expert at China's Institute of Contemporary International Relations, April 02, 2011 .

[75] Ibid.

[76] Correspondence with a South Asian expert at Sichuan University,May 03, 2011.

In this regard, a Chinese geologist suggested that China should address water issues in a cross-sectoral fashion with India:

> "China should enhance cooperation with India, especially on water monitoring and river basin development in an effective and long-term manner. Since the Yarlung-Tsangpo is a seismologically sensitive area we could develop a comprehensive disaster-management program to reduce the harm and take precautions together."[77]

Additionally, a common institution – like a Himalayan Council for the Himalayan rivers – between Asian populations can help stabilise relationships and provide platforms to address transboundary water issues. Similar initiatives have been emphasised by water scholars at IDSA, who have argued for raising water resources in Tibet as a "global commons" in order to build a 'coalition for the commons'.

> IDSA`s Task Force Report, *Water Security for India: The External Dynamics* states: "International awareness of such concerns hopefully will create the grounds for sharing the benefits of the water resources of Tibet."[78]

Whether a common institution can be adopted for Asia depends on whether these countries are willing to abandon absolute legal doctrines and adopt a doctrine of limited territorial sovereignty. Hence, it will be rather difficult to find a mutually beneficial solution to the problem unless China eases its position to the principle of 'absolute territorial sovereignty'.

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[77] Correspondence with an independent Chinese geologist who has studied the Himalayan Rivers,April 28, 2011.

[78] Uttam Kumar Sinha et al, (2010), "*Water Security for India: The External Dynamics*", IDSA Task Force Report, IDSA: New Delhi, p.50.

Besides, benefits can be generated not just from the river, to the river but also beyond the river by adopting cross-sectoral approaches to water management *within* China and India. A common thread that ties India and China together is that the agriculture sector is the largest water user in both countries, which requires a common solution. Co-benefits of that kind could be: intensive rice production methods, planting drought-resistant crops, improving water infrastructure and coordinating adoption of technologies in order to improve the efficiency of water use for agriculture. As stated by a Chinese scholar at China Institutes of Contemporary International Relations (CICIR):

> "We can cooperate on water management in a more general way, on how to use water efficiently, how to provide tap-water to rural areas, how to build home-based water tanks, how to produce water from the sea, how to build small hydro-plants in mountainous areas, how to reduce the transmission loss of electricity. This collaboration would be not so politically sensitive. When such cooperation becomes rewarding and builds up mutual trust, then gradually expand cooperation and even finally cover the frontier regions between China and India."[79]

Thus, India´s strategy should be-- expanded cooperation with China on less contentious water issues that creates "spill-over" effects into a larger basket of benefits so that settlement of the water-sharing issue might be possible. The idea of benefit-sharing between India-China is also intimately linked to a basin-wide approach with the inclusion of a downstream state, namely Bangladesh.

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[79] Correspondence with a South Asian expert at China's Institute of Contemporary International Relations,April 02, 2011.

River Basin Approach

While combating less contentious water problems through collaboration with the aim of mutual gain with China, it is necessary for India to bring Bangladesh into negotiations over the Yarlung-Tsangpo/Brahmaputra with China. Moreover, getting Bangladesh on board remains critical from India's point of view even if an added riparian is less favourable for reaching a consensus between riparians in general. Excluding Bangladesh from negotiations which affect them would not just cause fear but also be perceived as a threat to Bangladesh's national sovereignty with serious implications for conflict prevention in the long-term. As Green Cross International points out:

> "Fragmented attempts at resolving water disputes, which exclude other basin states or important sectors of water users, have seriously compromised chances of achieving long-term solutions. Example of such attempts are all too common, including the 1994 peace agreement between Israel and Jordan, which left out the Palestinians, Lebanon and Syria, and the 1959 agreement between Egypt and Sudan over the Aswan High Dam which ignored all other Nile riparian states, most importantly Ethiopia."[80]

Even if China rejects multilateralising an issue that it perceives as a bilateral affair, it will be tough for it to totally disregard the legitimate interest of Bangladesh in any water-dialogue with India given that China has signed a provision of flood-season hydrological data to Bangladesh, thereby "accepting" its contribution to the flow in

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[80] Green Cross International (GCI), (2000), "*National Sovereignty and International Watercourses*". GCI: Renens; Switzerland, p.59, http://www.gci.ch/en/communication/publications.

Dhaka.[81] However, India´s preference for a multilateral approach including Bangladesh will only work if water issues are insulated from other political issues, because injecting the border-dispute into the water situation will only bilateralise the whole issue and rule out Bangladesh´s participation while making it more difficult for India to press the case against China and thus gaining the upper hand in the negotiation process. The threat to Bangladesh´s survival that climate change poses offers an additional incentive for India to protect the interest of Bangladesh. A population exceeding that of the geographically massive Russia, coupled with a possible multifoot rise in sea level will trigger the largest mass migration in human history to India.[82] As a country surrounded by the Indian landmass on three sides, India must try to be a positive influence in Bangladesh with a long-term approach. Brahma Chellaney, an Indian security expert, outlines it thus:

> "A Bangladesh that sinks deeper in extremism and fundamentalism will be a serious geopolitical headache for India. But a Bangladesh from where the refugee flows become a torrent will be a geopolitical nightmare for India."[83]

Although both states have an incentive to cooperate because of the porous nature of their border, it is questionable whether Bangladesh

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[81] In addition to its sharing of hydrological data, India, China and Bangladesh signed the Memorandum of Understanding on Provision of Hydrological Information of the Yarlung Tsangpo/ Brahmaputra River by China to Bangladesh in 2008. See: Lan Jianxue,, (2009).

[82] National Geographic, (May 2011), "*The Coming Storm*", http://ngm.nationalgeographic.com/2011/05/bangladesh/belt-text/1.

[83] Brahma Chellaney, (2007), "*Climate Change and Security in Southern Asia: Understanding the National Security Implications*", RUSI April, Vol.152 No 2, p.67.

want to engage China on the Yarlung-Tsangpo by banding together with India given the highly volatile Indo-Bangladesh water-ties.

Unlike China, India's treaty with Bangladesh on the Ganges imposes engineering-restrictions as to what India can do and not do. While this treaty has settled the issue of the Ganges water, a similar framework has not yet been applied to the other rivers – Teesta, Muhuri, Manu, Gumti, Khowai, Brahmaputra, Dharla and Dudh Kumar – that the two states share. Being the lowest riparian in the Ganga-Brahmaputra-Meghna systems, Bangladesh could well feel a sense of water insecurity, particularly considering its giant and geographically enveloping neighbour India. The strong state/weak state perception is further complicated by the fact that there are 54 rivers crossing the Indo-Bangladesh border and that 94 per cent of Bangladesh waters originate beyond its boundary.[84] Meanwhile, India's inter-linking of rivers has caused another thorn in the side between the two countries simply because of the Himalayan component – diversion of waters from the Brahmaputra & Ganga systems westwards to southern Uttar Pradesh, Haryana, Punjab, Rajasthan and southwards to the peninsular component – will have implications for Bangladesh.[85] Another issue that is pent up is the damming of Barak river, from which Bangladesh gets 7-8 per cent of its water. Bangladesh feels that the Tipaimukh dam is limiting free flowing Surma and Kushyara rivers and will disrupt agriculture, irrigation, water supply, navigation and reduce ground water recharge during the lean season, affecting all dug wells and shallow tube wells in Bangladesh.[86] Consequently, India's Achilles heel as a middle

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[84] Ramaswamy Iyer,, (2003), p.214.

[85] Ibid, p.314-315.

[86] Jiten Yumnam,, (2009), "*Transboundary Water Conflicts and Tipaimukh Dam*", http://icrindia.org/?p=412.

riparian in the Yarlung-Tsangpo/Brahmaputra river is that Bangladesh will turn round and say that China is only doing to India what India has been doing to Bangladesh. As stated by a Bangladeshi water expert:

> "We have not been able to resolve disputes with a friendly state and an immediate neighbour (India) for years, how could we even think of any benefit of raising concerns about China? There are some people in Bangladesh who might even be happy that China´s projects would be a natural justice as it would deprive India in the same way India is depriving us. But of course, I agree that, in an ideal world India and Bangladesh should join hands against Chinese projects. Regarding smaller projects, Bangladesh would be interested in any type of genuine and mutually beneficial cooperation. No doubt about that."[87]

Moreover, India hardly has the legitimacy in raising serious concerns about the ongoing dam plans on the Yarlung-Tsangpo by China given the fact that India is planning at least 168 large hydroelectric projects in the Northeastern region, acclaimed as India´s potential 'future power house' including a 11,000 MW project over the same Yarlung-Tsangpo River, called Siang in Arunachal Pradesh.[88] The middle and lower Siang project with 750 MW and 2,700 MW power generating capacitities respectively are other large hydropower schemes in the region. The 2,000 MW Lower Subansiri project and 1,750 MW Demwe Lower (Lohit) project are two more dams to be built over tributaries of the Yarlung-Tsangpo/Brahmaputra River running

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[87] Correspondence with a Water law expert at Dhaka University,April 07, 2011.

[88] Assessed hydroelectric power potential of the Northeast is 63, 257 MW. See: Vagholikar, Neeraj et al., (2010), "*Damming Northeast India: juggernaut of hydropower projects threatens social and environmental security of region*". Briefing paper co-published by Kalpavriksh, Aaranyak aand ActionAidIndia, pp. 1-20.

through disputed regions named *Xibaxia Qu*, controlled by India. China is worried that these hydroprojects could result in some Tibetan regions in China drowning.[89] It is evident that Beijing will use its history card, coupled with India's projects to justify its own dam-behaviour in Yarlung-Tsangpo. While China's building of dams on Yarlung-Tsangpo carries strategic implications for India, it is even more worrying that the subcontinent is stuck in the same supply-side hydrology paradigm as China.[90] India can try to remove that sickness attached to its middle riparian position by changing the "language of the game" when dealing with China and Bangladesh. Instead of the paradigm of the dams, diversion and groundwater mining approach, India has to break free from and embrace "soft paths" that seek to improve the overall productivity of water use rather than to find new sources of supply. By changing the "language of the game", Indian policy-makers should involve China and Bangladesh in a new innovative dialogue that strives to improve Asia's agricultural water productivity by employing technological and management methods. On this path, India and Bangladesh can confront water challenges through collaboration, including: improving water quality (combating arsenic in groundwater), sharing rain-water harvesting experiences, along with improving flood-forecasting, flood-coping and flood-preparedness. In the light of improved bilateral relations[91], a better political climate can serve to open the window for a treaty on the Teesta River which has been discussed in recent

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[89] Correspondence with a South Asian expert at China's Institute of Contemporary International Relations,April 02, 2011.

[90] This paradigm has come under enormous criticism in recent years. For more detail see: Rohan D'Souza, (2010), '*From Damming Rivers to Linking Waters: Is this the Beginning of the End of Supply-Side Hydrology in India?*' in T. Terje, G. Chapman, and R. Hagen, (ed.), *A History of Water: Water, Geopolitics and the New World Order,* Series II Volume 3, I.B. Tauris: London, New York, pp. 356-73.

[91] For more detail see: Sreeradha Datta,, (2010), "*Indo-Bangladesh Relations: An Enduring Partnership?*", IDSA: New Delhi.

years. Improved political relations and expanded coopertion in different water-areas might then create a more positive context in which a common understanding of the Yarlung-Tsangpo/ Brahmaputra issue might be possible. Indeed, it is important that a joint India-Bangladesh approach can reassure China that they will also receive a fair share of those gains in such a cooperative arrangement rather than through unilateral action alone[92](see Table 1).

Table 1: Types of cooperation and benefits in the Yarlung-Tsangpo/Brahmaputra

Type	The challenge	The opportunities
Increasing benefits *to the river*	Degraded water quality wetlands, and ecosystem	Improved water quality, river flow, sediment soil transport
Increasing benefits *from the river*	Increasing water-demand, sub-optimal water management	Improved water management for agriculture, flood management
Increasing benefits *beyond the river*	Asian fragmentation: food crisis, climate crisis	Food security, climate adaptation, integration of markets & trade

Source: Sadoff & Grey., (2005).

[92] It is important for the reader to note that sharing of benefits between China, India and Bangladesh is not totally unfamiliar to the countries. China and Bangladesh are already cooperating with India on water issues such as sharing some metrological data bilaterally and sharing knowledge and information on flood management through ICIMOD's research programmes. Two examples can be cited: 1) ICIMOD-WMO HKH-HYCOS project: Opportunity for regional collaboration in flood information management 2) Sharing of benefits from the rivers of the Great Himalayas under a programme called Abu Dhabi Knowledge Forum Small Grant Research programme (ADKFSGP) funded by the World Bank and managed by ICIMOD. The second project is not at an official Governmental level but at the scientists and researchers' level. For more information see: www.icimod.org.

In the face of the water challenges ahead, an optimal policy for India would be to operate on multiple levels: initiating NGO, academic and industrial cooperation while trying to expand government dialogue and widen the field of cooperation into less contentious water issues while trying to bring Bangladesh into negotiations with China. Blooming collaboration on water issues across sectors (agriculture, climate sphere) will serve as a building block in the fostering of cooperation on more difficult political issues.

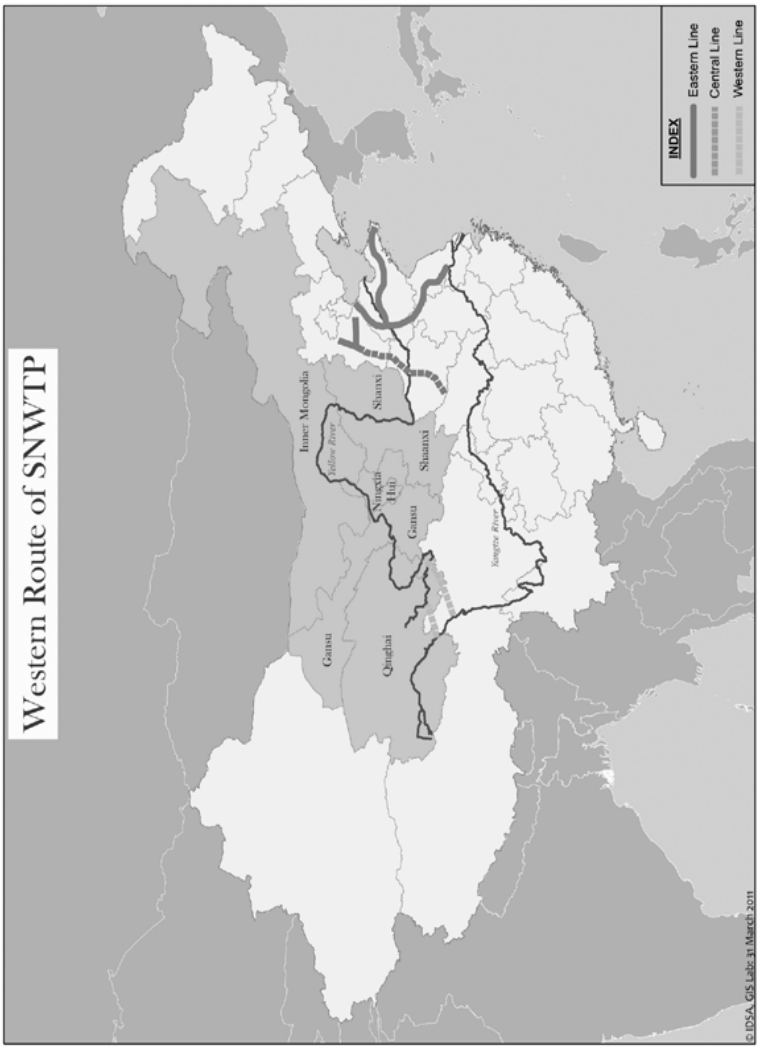
Conclusion

China is on the precarious path of squandering its water resources and exporting the damages to its neighbours unless it eases its position. Throughout this paper it has been shown that a strong demand management policy will be unable to solve the water shortage crisis of the North China Plain and water resources per capita will still be the lowest in the world at (about 300 m^3 per person) in China no matter how the SNWTP goes. While China is the strongest economic, political and military power in Asia, its hydrological position reinforces this asymmetry. Being the source of major international rivers, China is exercising a degree of hydro-hegemony. Against this background, Beijing´s performance in the UN-led process on International Watercourses, its rejection to join the MRC and its aggressive dam-behaviour in the Mekong and Salween Rivers clearly shows that China employs a *negative/dominating* form of hydro-hegemony. However, it is found that the Chinese leadership sees the Yarlung-Tsangpo/Brahmaputra River as an important river for developing hydro powerplants, but not for launching major water diversion schemes. The Great plan to to divert water from the Yarlung-Tsangpo/Brahmaputra to the Yellow River and then further to Northwest China is dismissed or ignored by all legitimate academic institutions and governmental agencies because it is environmentally risky, technically and economically unfeasible. Yet, if national interest

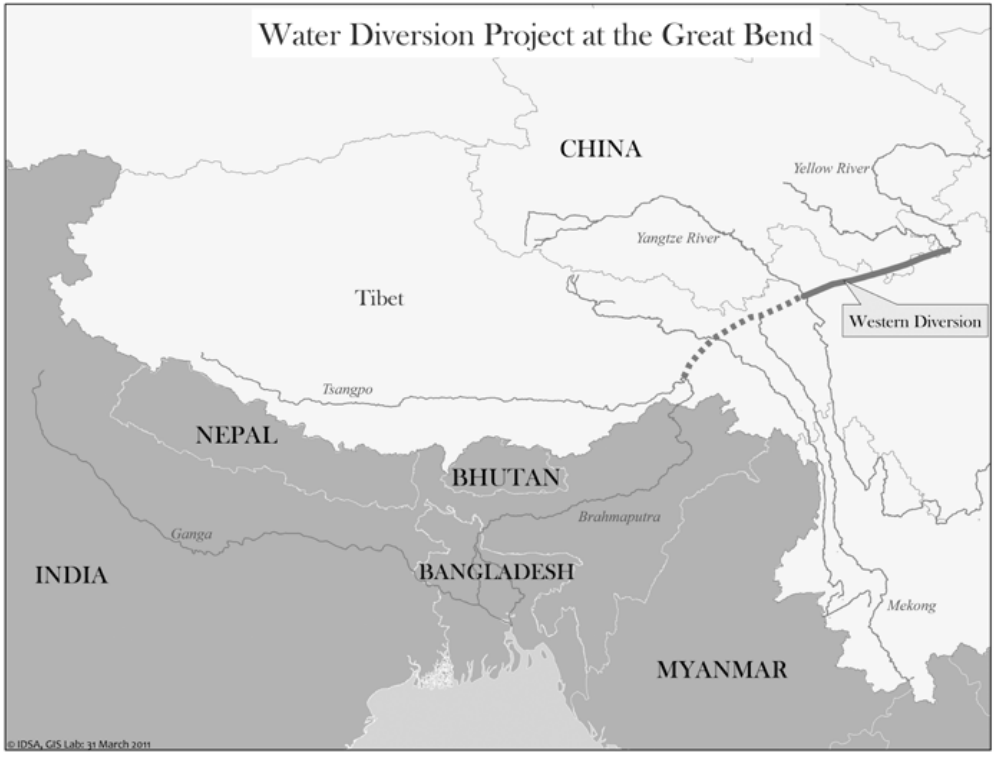
demands diverting water from the Yarlung-Tsangpo/Brahmaputra, international law or lower-riparian concerns will not deter Beijing from undertaking major diversion schemes if the price of transferred water is cheaper than conservation or getting water from the sea. Moreover, it has also been showed that Chinese scholars have taken an interest in developing cooperation with India on smaller, less contentious and more easily manageable projects to reduce the looming larger and larger water resources disputes. Even if that is indeed encouraging, China has not been transparent to either India nor Bangladesh regarding its plans to build a 38 GW dam on the Great Bend of the Yarlung-Tsangpo/Brahmaputra. For China, building large dams on the Yarlung-Tsangpo/Brahmaputra River has become a multipurpose strategic option: from enhancing national political-economic integration to seek cross-border integration with South Asia while spurring mining in the Tibetan hinterland.

In order to influence China´s hydro-behaviour in the Yarlung-Tsangpo/Brahmaputra River, a thoughtful twofold strategy would be 'desecuritization of water resource management' and a 'river basin approach'. This cooperation-strategy aims to widen the field of cooperation into less contentious water issues that creates "spill-over" effects into a larger basket of benefits with China while trying to bring Bangladesh into negotiations over Yarlung-Tsangpo/Brahmaputra. Along this path, India should revisit the supply-side hydrology 'desecuritisation of water resource management' and a 'river basin approach'. This cooperation-strategy aims to widen the field of cooperation into less contentious water issues that creates "spill-over" effects into a larger basket of benefits with China while trying to bring Bangladesh into negotiations over the approach in Asia. It will help embark on a "soft path for water" with China and Bangladesh that seeks to strengthen and improve the management of water rather than to find new sources of supply.

Map 1: Western Route of the SNWTP



Map 2: The "Great Western Route"



Picture 1: Preparations at Lengda.

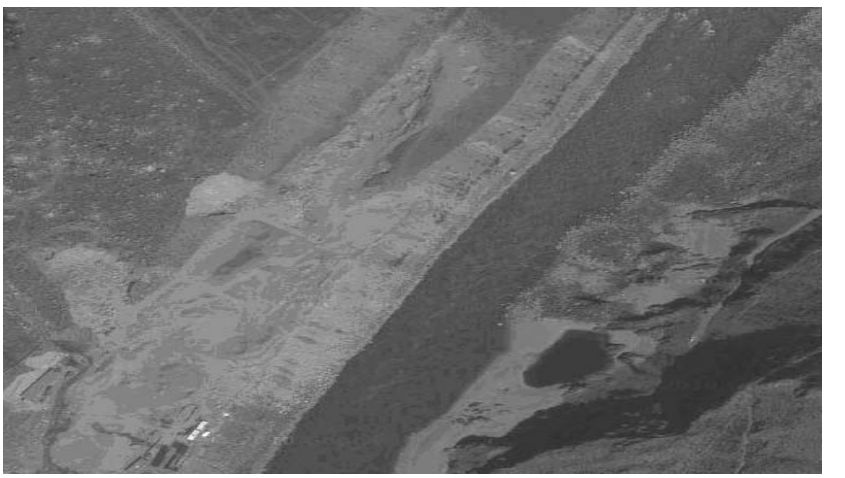
Source: Google Earth

Picture 2: Preparations at Zhongda.

Source: Google Earth

Picture 3: Preparations at Langzhen.

Source: Google Earth



Picture 4: Preparations at Jiacha.

Source: Google Earth

This Paper examines the Sino-Indian water-relations in Yarlung-Tsangpo/Brahmaputra river in order to suggest policy implications for India. Though the Great Plan to divert water from the Yarlung-Tsangpo to the Yellow River has been dismissed or ignored by all legitimate academic institutions in China, it has been reinforced throughout this Paper that a strong water demand management policy, combined with the South-to-North Water Diversion Project will be unable to solve the water shortage crisis of the North China Plain. However, it argues that if national interest of China demands major water diversion projects in Tibet, it will undertake such projects if the price of transferred water is cheaper than conservation or getting water from the sea. Although Chinese scholars have taken an initiative to cooperate with India on smaller and less contentious water issues, Beijing has not been transparent to its lower riparians given the fact that China has started preliminary work on building a 38 gigawatt dam at the Great Bend of Yarlung-Tsangpo/Brahmaputra. To address China´s position as a negative hydro-hegemon, a two-step strategy seems appropriate: widen the field of cooperation with less contentious water issues so that it creates ”spillover” effect into greater benefits for China, while trying to bring Bangladesh into the negotiations over the Yarlung-Tsangpo/Brahmaputra.

The Paper examines China´s general performance as a hydro-hegemon in Asia, presents the case study on China´s hydro-behaviour in the Yarlung-Tsangpo river basin, and outlines a framework for promoting trans-boundary water-cooperation.

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