

Water Power, Water Worries: China's Goals and Challenges as the Brahmaputra's Uppermost Riparian

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Chapter summary

- Known locally as the Yarlung Tsangpo, the Brahmaputra River is significant to China mainly for its hydropower potential.²⁸ Harnessing this potential is an integral part of China's plans to develop its western regions and to invest in clean energy resources. China has built one hydropower dam on the river and has plans for several more.
- Due to political controls in Tibet and the small affected population, domestic opposition is not likely to be a factor in limiting the speed or extent of Chinese hydropower development on the Brahmaputra.
- Possible Chinese plans to divert the Brahmaputra in order to relieve domestic water shortages have been a source of worry for some Indian observers. However, China is unlikely to pursue such plans in the near to medium term, due to cost and feasibility concerns.
- China's key concern regarding Indian activities on the Brahmaputra lies in New Delhi's prospective efforts to build hydroelectric dams in Arunachal Pradesh. Beijing worries that these facilities could further strengthen India's "actual control" over the disputed region and complicate border negotiations.

²⁸ The name of the river is also sometimes rendered as "Yarlung Zangbo" in Chinese media.

- Sino-Indian cooperation related to the Brahmaputra is likely to be limited by the border dispute and mutual distrust between the two states. These factors greatly reduce the likelihood of a major agreement, such as a water-sharing treaty.
- However, cooperation between Beijing and New Delhi on narrow, technical issues such as hydrological information sharing has commenced and further steps could be taken on disaster management, and pollution control.
- China has been reluctant to engage in basin-wide cooperation with India and Bangladesh. However, Beijing may be willing to explore multilateral avenues of cooperation if this can be done in a way that de-emphasizes political disputes and is focused on shared, practical and technical challenges.

Introduction

Like many of Asia's major rivers, the Brahmaputra rises in Tibet. Known locally as the Yarlung Tsangpo, the river curves its way through 700 miles of rugged and remote terrain before flowing into the northeast Indian state of Arunachal Pradesh.²⁹ For China, the river offers potential hydropower resources that can provide electricity for Tibet and its neighboring provinces, and play a role in Beijing's broader efforts to develop clean energy resources. China has already built one hydroelectric dam on the Brahmaputra and plans to construct several more.

While the Brahmaputra offers economic and energy opportunities for China, it also poses two key international challenges. First, Beijing has had to reassure New Delhi that its dam-building activities are non-threatening, responding to concerns by some in India that China could use these facilities to disrupt the flow of water in a future Sino-Indian conflict.³⁰ Second, China is concerned that Indian dam-building activities downstream could firm up New Delhi's "actual control" over Arunachal Pradesh, or what China regards as "southern Tibet." This could complicate border negotiations and further reduce Beijing's hopes of recovering this territory.

China has focused its diplomatic efforts related to the Brahmaputra at a bilateral level, including signing agreements to provide India with river flow data during the

²⁹ For consistency, this chapter uses the term "Brahmaputra" for the river both inside and outside Chinese-controlled territory.

³⁰ See, for example: Brahma Chellaney, "China's Hydro-Hegemony," *The New York Times*, Feb. 7, 2013; and Brahma Chellaney, *Water: Asia's New Battleground*, Washington, D.C.: Georgetown University Press, 2011.

flood season. Yet due to the border dispute, compounded by mutual distrust in Sino-Indian relations, cooperation between the two sides has been limited. Meanwhile, China has shown little willingness to address Brahmaputra issues at a multilateral level, involving both India and Bangladesh. Nevertheless, there may be opportunities for China to modestly expand cooperation at both a bilateral and multilateral level.

This chapter explores Chinese views and policies on the Brahmaputra. It draws on a range of Chinese-language and secondary sources, as well as interviews with Chinese experts conducted in 2015. It is divided into three main sections. The first section discusses China's domestic development activities along the river and their drivers. The second focuses on the bilateral dimension, assessing China's efforts to reassure India as well as the PRC's own concerns about Indian downstream activities. The third covers Chinese approaches to the river at a basin-wide level and the prospects for enhanced multilateral engagement.

China's domestic uses of the Brahmaputra: Activities and drivers

As of 2016, China's development activities on the Brahmaputra are limited to a series of planned hydroelectric dams. These are being built primarily to raise the standard of living in Tibet, and will also support the Chinese government's broader emphasis on clean energy. By contrast, China has announced no plans to attempt to divert the course of the river to satisfy domestic demands. While diversion plans have been discussed intermittently in China for decades, there are serious cost and feasibility issues that make their implementation unlikely.

Electricity generation

China has announced plans to construct four dams along the Brahmaputra in Tibet. Only one of these facilities is currently operational. Namely, the Zangmu Dam, which is situated in Gyaca County roughly 100 miles southeast of Lhasa, opened in November 2014, and became fully operational in October 2015.³¹ The dam has a total installed capacity of 510,000 kilowatt hours, raising Tibet's overall power generation capacity by roughly 25 percent.³² According to China's state energy plan for 2011-2015, there are also plans to construct hydroelectric dams along the river at the

³¹ "China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet," Xinhua, Nov. 23, 2014.

³² From roughly 1.5 million to 2 million kilowatt hours. Ibid.

nearby towns of Jiacha, Jiexu, and Dagu.³³ Figure 3 depicts the locations of these dams.

Figure 3. China's current and planned dams on the Yarlung/Brahmaputra



Source: Map drawn by Mark Markowitz, CNA, 2016. Sources consulted include Ananth Krishnan, "China Gives Go-ahead for Three New Brahmaputra Dams," *Hindu*, January 30, 2013, http://www.thehindu.com/multimedia/dynamic/01346/TH30_CHINA_1346288g.jpg.

Hydropower development in Tibet is part of a broader effort to economically develop western China. A key element of this effort is the campaign to "Open Up the West" (*xibu da kaifa*; 西部大开发), which was launched in 2000 to encourage economic progress in a historically impoverished part of the country.³⁴ The program was also

³³ *12th Five Year Plan Energy Development Plan*. PRC State Council, 2013, http://www.nea.gov.cn/2013-01/28/c_132132829.htm. In addition, Chinese engineers have explored the possibility for constructing a massive 38 gigawatt hydroelectric dam further downstream at Motuo, but this has not been officially endorsed and does not appear in the 12th five year energy plan. For details, see: Jonathan Watts. "Chinese Engineers Propose World's Biggest Hydro-electric Project in Tibet," *The Guardian*, May 24, 2013.

³⁴ For an introduction to the program, see: David S.G. Goodman, "The Campaign to 'Open Up The West': National, Provincial, and Local-Level Perspectives," *The China Quarterly* 178 (2004): 317-334.

likely meant to support the migration of ethnic majority Han citizens into minority-dominated areas such as Tibet and Xinjiang, and to develop natural resources and minerals in these areas to facilitate national economic growth.³⁵

As part of the “Open Up the West” campaign, China has devoted significant effort to improving water resources in western China. Spearheaded by China’s Ministry of Water Resources, this effort has included a total of \$4.87 billion spent on water resource infrastructure in Tibet through 2014. According to PRC data, this investment has led to improved access to safe drinking water for 2.39 million people and has brought electricity to some 360,000 Tibetan herdsmen.³⁶ Moreover, China’s five-year economic plan for 2011–2015 places the main emphasis for water resource development in China on the southwestern Mekong region and on the Tibetan Plateau, with a focus on building new water pumping and power storage facilities.³⁷

Chinese sources frequently argue that the purpose of hydroelectric dam construction in Tibet is to develop an underutilized resource to meet local energy needs. A state media report noted, for example, that Tibet’s per-capita electricity consumption in 2014 was less than one-third of the national average, and yet the region possesses a full 30 percent of the nation’s water resources, capable of producing over 200 million kilowatt hours of electricity.³⁸ According to one Chinese expert, the Brahmaputra has the lowest hydropower utilization rate of all China’s large rivers but also has the greatest potential for development. The expert argues that seizing this opportunity would help meet Tibet’s energy needs.³⁹ Likewise, at the opening ceremony of the Zangmu Dam, an official from the state electric grid boasted that the new dam would help “solve Tibet’s power shortage, especially in winter.”⁴⁰

Aside from economic advantages, China’s drive to develop hydropower resources in Tibet supports a national emphasis on clean energy development. China’s national

³⁵ Elizabeth Economy, “Asia’s Water Security Crisis: China, India, and the United States,” In *Strategic Asia 2008-09*, Mercy Kuo Ashley J. Tellis, and Andrew Marble, eds., Seattle, WA: National Bureau of Asian Research, 2008.

³⁶ “China Invests 30 Billion Yuan on Tibet Water Infrastructure,” Xinhua, Aug. 23, 2014.

³⁷ “Outline of the 12th Five-Year Program for National Economic and Social Development of the People’s Republic of China, Xinhua, March 16, 2011. Also, see *ibid*.

³⁸ “China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet,” 2014.

³⁹ Liu Peng, “Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence” (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), *South Asian Studies* (Nanya Yanjiu) 4 (2013): 33-45.

⁴⁰ “China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet,” 2014. However, the validity of this argument is questionable, since there could be considerable line losses tied to transmission of power over long distances.

energy policy states that over half of the contributions to the goal of raising non-fossil energy consumption to 15 percent by 2020 will come from hydropower. To meet this goal, the plan mandates that China accelerate construction of hydropower stations on key rivers, such as the Brahmaputra.⁴¹ Similarly, a State Council official has stated that a main reason for increased dam-building in Tibet is that these facilities will help reduce carbon emissions by providing clean energy.⁴²

Limited opposition

One of the potential obstacles to the fulfillment of these plans is opposition by local citizens and civil society groups, especially environmental non-governmental organizations (NGO). The record of China's efforts to build dams is checkered with cases of domestic opposition. For instance, plans to build 13 dams along the Nu River in Yunnan Province were halted in 2004 following an environmental campaign.⁴³ Likewise, activism by groups such as Green Watershed has led local authorities to set up resettlement funds for displaced residents along the Mekong.⁴⁴

However, it is doubtful that domestic opposition will play a significant role in halting or slowing the speed of dam construction along the Brahmaputra. One reason is that, given the social controls present in Tibet, it is unlikely that civil society groups will have the political space needed to operate as they do in other parts of the country. In addition, Chinese sources suggest that the population along the Brahmaputra is so scant that any local opposition will be negligible.⁴⁵ For instance, a researcher with China's Ministry of Water Resources has argued that relocation programs for displaced residents will be facilitated by the small size of the population. Nevertheless, he added that local officials should proactively communicate with local residents to help them see that the construction projects are "for their own benefit."⁴⁶

⁴¹ "Full Text: China's Energy Policy 2012," Xinhua, Oct. 24, 2012.

⁴² "Hydro-Power Dam Stirs Debate," *Global Times*, Nov. 18, 2010.

⁴³ "Brahmaputra: Towards Unity," The Third Pole.net, 2014. Those plans, however, were revived in 2013.

⁴⁴ Selina Ho, "River Politics: China's Policies in the Mekong and the Brahmaputra in Comparative Perspective," *Journal of Contemporary China* 23 (2014): 1-20; Pichamon Yeophantong, "China's Lancang Dam Cascade and Transnational Activism in the Mekong Region: Who's Got the Power?" *Asian Survey* 54 (2014): 700-724, doi: 10.1525/AS.2014.54.4.700.

⁴⁵ "Brahmaputra: Towards Unity," 2014.

⁴⁶ "Hydro-Power Dam Stirs Debate," 2010.

Water diversion

A more controversial use of the Brahmaputra lies in the possibility that China may seek to divert the river to meet domestic needs, especially for irrigation. By way of context, China currently faces serious water scarcity challenges at a national level. Overall, China holds 20 percent of the world's population but only 7 percent of its fresh water resources.⁴⁷ Moreover, China's limited water resources are unevenly distributed: northern China possesses only an estimated 14 percent of the country's fresh water, but 60 percent of its farmland and 45 percent of its total population.⁴⁸ In addition, 70 percent of northern Chinese villages have been described as short of water, with the per-capita water endowment of some areas less than one-tenth of the world average.⁴⁹ This situation has been exacerbated by factors such as weak pollution controls, poor conservation efforts, and inefficient irrigation methods.⁵⁰

To correct these imbalances, China has embarked on a massive water transfer project known as the South-North Water Diversion Project (*nan shui bei diao gongcheng*: 南水北调工程).⁵¹ Begun in 2002, the project consists of three planned routes: the eastern, central, and western. The eastern and central routes focus on diverting water from southern China's Yangtze and Han Rivers, respectively, to the Yellow River in the north. These two routes have already been completed and are currently supplying water to northern cities, such as Beijing and Tianjin.⁵² According to China's official plans, the western route, still in its early planning stages, will concentrate on diverting the headwaters of three tributaries of the Yangtze (the Tongtian, Yalong,

⁴⁷ Zhang Hongzhou, "Confronting China's Water Insecurity," *RSIS Commentary*, Mar. 27, 2014.

⁴⁸ Sebastian Biba, "Desertification in China's Behavior Towards Its Transboundary Rivers: the Mekong River, the Brahmaputra River, and the Irtysh and Ili Rivers," *Journal of Contemporary China* 23 (2014): 21-43.

⁴⁹ Peter MacKenzie and Marcus King, *Climate Change in China: Socioeconomic and Security Implications*, CNA, Jan. 2010, 3.

⁵⁰ Kenneth Pomeranz, "Asia's Unstable Water Tower: The Politics, Economics, and Ecology of Himalayan Water Projects," In *Himalayan Water Security: The Challenges for South and Southeast Asia*, Seattle, WA: National Bureau of Asian Research, 2013, 5.

⁵¹ For more details, see: Susan Chan Shifflett et al., *China's Water-Energy-Food Roadmap: A Global Choke Point Report*, Washington, D.C., Woodrow Wilson International Center for Scholars, 2015, 19-21, <https://www.wilsoncenter.org/sites/default/files/Water-energy-food%20Roadmap.pdf>.

⁵² Kiki Zhao, "Water From China's South-North Transfer Project Flows to Beijing," *The New York Times*, Dec. 25, 2014, http://sinosphere.blogs.nytimes.com/2014/12/25/water-from-chinas-south-north-transfer-project-flows-to-beijing/?_r=0.

and Dadu Rivers, which are all domestic rivers on the Tibetan Plateau) to the Yellow River by 2050.⁵³ These routes are depicted in Figure 4.

Figure 4. Current and planned routes of the South-North Water Diversion Project



Source: Map drawn by Mike Markowitz, CNA, 2016. Sources consulted include Wang Yizhi, "China's South-North Water Diversion Project," China Central Television, September 18, 2012, <http://english.cntv.cn/program/newshour/20120918/104994.shtml>.

Over the past three decades, various Chinese scholars have proposed diverting the Brahmaputra as a remedy above and beyond the official South-North Water Diversion Plan. The best-known plan, put forward by a senior researcher at the Yellow River Water Conservancy Commission in 1990, envisions diverting the river via a series of canals and dams through Sichuan Province and into the Yellow River.⁵⁴ Other plans

⁵³ Carla Freeman, "Quenching the Dragon's Thirst: The South-North Water Transfer Project—Old Plumbing for New China?" China Environment Forum, <https://www.wilsoncenter.org/publication/quenching-the-dragons-thirst-the-south-north-water-transfer-project-old-plumbing-for-new>.

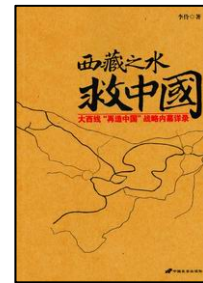
⁵⁴ Pan Wei, "China Is Planning To 'Divert Water via West Line,'" Xinhua, Jun. 7, 2011. See also: Jonathan Holslag, "Assessing the Sino-Indian Water Dispute," *Journal of International Affairs* 64 (2011): 19-35.

have been proposed and studied by scholars at the Chinese Academy of Sciences, the Yangtze River Commission, and elsewhere.⁵⁵ The box on the following page provides additional details on one plan, offered by a former People’s Liberation Army (PLA) officer, that gained significant attention within China and internationally.

Although none of these proposals have been officially endorsed, some Chinese and foreign scholars contend that China’s water shortages may become so severe that the government will have no choice but to attempt to tap into the Brahmaputra. For instance, water scarcity, combined with the effects of climate change and desertification, may become so intense that a more radical scheme to divert the Brahmaputra will be needed.⁵⁶ Similarly, a failure of the South-North Water Diversion Project to alleviate water shortages in northern China could make a plan to divert the Brahmaputra “very tempting” for PRC authorities.⁵⁷

Will Tibet’s Waters Save China?

Notions of diverting Tibetan rivers to alleviate the water needs of northern China entered the Chinese popular imagination with the publication of the book *Tibet’s Waters Will Save China* by former PLA officer Li Ling in 2005. The book argues that waters from four rivers, including the Brahmaputra, could be diverted to the Yellow River. The book has gained international attention: Indian scholar Brahma Chellaney has cited it as evidence that China harbors plans to divert the river despite official assurances that it has no such plans.⁵⁸ Other Chinese scholars, though, have panned the book as “bravado” and “folk theory.”⁵⁹



⁵⁵ Zhang Ke, “Diversion Debate,” *China Dialogue*, Jun. 13, 2011.

⁵⁶ Pan Wei, “China Is Planning To ‘Divert Water via West Line,’” 2011. See also: Liu Peng, “Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence” (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), 2013.

⁵⁷ Pomeranz, “Asia’s Unstable Water Tower,” 2013, 6. See also: Biba, “Desertification in China’s Behavior Towards Its Transboundary Rivers,” 2014.

⁵⁸ Chellaney, *Water: Asia’s New Battleground*, 2011, 154.

⁵⁹ Zhang Jincui, “An Indian Hawk’s China Outlook: The Case Study of Professor Brahma Chellaney” (*Yindu “yingpai” xuezhe de Zhongguo guan: dui Bulama Qielani jiaoshou de gean yanjiu*), *Forum of World Economics & Politics* (Shijie Jingji yu Zhengzhi Luntan) 2 (2012): 66-79. Liu Peng, “Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence” (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), 2013.

However, plans to divert rivers from western China have several shortcomings. First, from a cost perspective, inter-basin water transfers are among the most expensive ways to increase water availability. Methods such as increasing irrigation efficiency, shallow groundwater pumping, and even intra-basin water transfers tend to be more cost-effective.⁶⁰ Indeed, China is already moving ahead with various water conservation measures, such as building fewer water-intensive coal plants.⁶¹

Second, diverting water from the Tibetan Plateau also raises serious feasibility concerns. The director of the PRC State Council's office responsible for the South-North Water Diversion Project has described a "significant gap" between preliminary work done on the western route and the "actual requirements" of the project.⁶² CNA interviews conducted in 2015 also indicated that Chinese experts have concerns about the western route on technical grounds, including the view that the Tibetan Plateau is too geologically unstable to support such a massive endeavor.⁶³ Moreover, given its potentially disruptive effects, plans for the western route are likely to encounter resistance on social and ecological grounds.⁶⁴

Compared to the western route of the official South-North Water Diversion Project, Chinese experts tend to be even more dismissive of proposals to divert waters from the upper Brahmaputra. CNA interviews suggest that the Chinese government has given no serious consideration to these proposals in recent years.⁶⁵ In fact, a study commissioned by the Ministry of Water Resources in 2000 reportedly concluded that such plans would be neither necessary nor feasible.⁶⁶ Moreover, former minister of water resources Wang Shucheng stated on at least two occasions that plans to divert the Brahmaputra were not feasible.⁶⁷ Thus, while China may eventually give some consideration to such ideas, there is no evidence to suggest that this is likely in the near future.

⁶⁰ Water Resources Group, *Charting Our Water Future*, 2009, 77.

⁶¹ Renee Cho, "How China Is Dealing With Its Water Crisis," *State of the Planet*, <http://blogs.ei.columbia.edu/2011/05/05/how-china-is-dealing-with-its-water-crisis>.

⁶² Liu Peng, "Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence" (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), 2013.

⁶³ CNA interviews, Beijing, 2015.

⁶⁴ Zhang Hongzhou, "China-India Water Disputes: Two Major Misperceptions Revisited," *RSIS Commentary*, Jan. 19, 2015.

⁶⁵ CNA interviews, Beijing, 2015.

⁶⁶ Zhang Hongzhou, "China-India: Revisiting the 'Water Wars' Narrative," *The Diplomat*, Jun. 30, 2015.

⁶⁷ Zhang Ke, "Diversion Debate," 2011.

China's bilateral water diplomacy

Although the Brahmaputra offers potential economic and energy opportunities for China, it also presents two major international challenges. First, Beijing has had to respond to Indian concerns that China's upstream development activities will have adverse consequences for India. Second, many in China are concerned that Indian development activities farther downstream will firm up New Delhi's "actual control" over disputed territory in Arunachal Pradesh and thereby complicate border negotiations between the two countries. Despite these challenges, there may be opportunities for at least a limited expansion in Sino-Indian cooperation related to Brahmaputra issues.

Assuaging Indian concerns

Over the past decade, China has attempted to reduce two major Indian concerns with respect to the Brahmaputra: flooding that could be prevented with access to Chinese data; and potential Chinese development activities along the river.

Many of the concerns about flooding developed as a result of a major flood that took place in June 2000. In this incident, a natural dam that had formed due to a landslide on a tributary of the Brahmaputra in Tibet, broke. As a result, 3-4 billion cubic meters of water poured into Arunachal Pradesh and Assam, killing 30 Indian nationals and leaving 50,000 homeless. Many in India asserted that China withheld hydrological data that could have prevented the disaster; this led to friction in Sino-Indian relations.⁶⁸

In response to Indian concerns about flooding, China and India have established a series of agreements to share hydrological data. In April 2002, China agreed to provide India with hydrological data from three monitoring stations on the Brahmaputra between June 1 and October 15 of each year, corresponding to the annual flood season. During a visit by Chinese president Hu Jintao to India in November 2006, the two countries agreed to establish an expert-level group to discuss hydrological data and emergency response measures.⁶⁹ In October 2013,

⁶⁸ Wang Yan, "The River Wild," *News China*, Jan. 2012, <http://www.news.chinamag.com/magazine/the-river-wild>.

⁶⁹ Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), *China International Studies* (Guoji Wenti Yanjiu) 6 (2010): 37-43.

China extended the data-sharing period from May 15 to October 15.⁷⁰ Data supplied by China have been used by India's Central Water Commission to inform flood forecasts.⁷¹

Chinese willingness to share hydrological data has been well received by India. This is evident in a series of joint statements reached during China-India summits. For instance, in a joint statement following Chinese president Xi Jinping's visit to India in September 2014, India thanked China for providing flood season data, and the two sides agreed to continue cooperation in data sharing and in emergency response. The joint statement following Indian prime minister Narendra Modi's visit to China in May 2015 contained a nearly identical statement.⁷² Thus, China appears to have gained at least some diplomatic goodwill as a result of its overtures.

Second, China has sought to assuage Indian concerns over Chinese development activities along the river. Indian analysts have suggested that China may seek to use its dams on the Brahmaputra to disrupt the flow of water into India in the event of a conflict, or to use its control over water resources as a form of diplomatic leverage.⁷³ Some in India also speculate that China could attempt to store river water (or even divert the river), which would result in reduced river flow to India at a time when water sources are increasingly stressed due to population growth and global climate change effects.⁷⁴

Indian concerns⁷⁵ regarding Chinese upstream activities reflect a deeper problem of mutual distrust in Sino-Indian relations. This is driven by factors such as the ongoing border dispute, Chinese concerns over Indian ambitions and relations with the United States, Indian concerns over China's rapid military modernization and ties with Pakistan, and lingering resentments stemming from the 1962 China-India

⁷⁰ Government of India, Ministry of Water Resources, River Development, and Ganga Rejuvenation, <http://wrmin.nic.in/forms/list.aspx?lid=349>.

⁷¹ Ibid.

⁷² "Joint Statement between India and China during Prime Minister's Visit to China," Government of India Ministry of External Affairs, May 15, 2015. See also: "PRC-Republic of India Joint Statement on Building Closer Partnership for Development (Full Text)," Xinhua, Sep. 19, 2014.

⁷³ Vijai Nair, "The Chinese Threat: An Indian Perspective," *The China Brief* 1 (2001); Chellaney, "China's Hydro-Hegemony," 2013. See also: Mark Christopher, *Water Wars: The Brahmaputra River and Sino-Indian Relations*, U.S. Naval War College, 2013.

⁷⁴ Chellaney, *Water: Asia's New Battleground*, 2011.

⁷⁵ For India's perspectives on the Brahmaputra, see the India chapter for this project by Satu Limaye.

border conflict.⁷⁶ While Chinese interviewees contended that Sino-Indian relations have made progress under the recent efforts of President Xi Jinping and Prime Minister Narendra Modi, most concurred that distrust remains a central problem for the two countries.⁷⁷

Nevertheless, China has sought to quell Indian concerns through official rhetoric and media commentary. In particular, Chinese sources have repeatedly asserted that China plans to build only “run of the river” dams that cannot be used to reduce or stop the flow of the river into Indian-controlled territory.⁷⁸ Moreover, China’s Ministry of Foreign Affairs spokesman has stated that China’s planned dams will not pose flood risks or ecological challenges to downstream areas.⁷⁹ China has also responded to Indian speculation over potential river diversion schemes. For instance, a *PLA Daily* article denies any diversion plans and claims that China took Indian interests into account when it chose not to include the Brahmaputra in the South-North Water Diversion Project.⁸⁰

China’s public rhetoric has largely failed to assuage Indian concerns. While Indian officials have not publicly rejected Chinese pledges that Tibetan dam-building will not harm Indian interests, India’s official position has been close to that adopted by the United States in its arms control negotiations with the Soviet Union in the 1980s: “Trust but verify.”⁸¹ Specifically, New Delhi asserts that it accepts the Chinese statements but will continue to monitor China’s upstream activities and convey concerns through diplomatic channels when necessary.⁸² In addition, PRC public diplomacy has not deterred Indian analysts such as Brahma Chellaney from continuing to circulate the argument that China harbors ulterior motives in its dam-building efforts. Thus, China still faces a trust gap with India on these issues.

⁷⁶ Murray Scot Tanner, *Distracted Antagonists, Wary Partners: China and India Assess their Security Relations*, CNA, Sep. 2011, 5-9.

⁷⁷ CNA interviews, Beijing, 2015. See also: Lan Jianxue, *Sino-Indian Relations in the New Era: Current Status, Development Trend and Policy Recommendations*, 2015.

⁷⁸ Biba, “Desertification in China’s Behavior Towards Its Transboundary Rivers,” 2014.

⁷⁹ “Transcript of Regular News Conference by PRC Foreign Ministry on 24 November 2014,” *Ministry of Foreign Affairs of the People’s Republic of China*, Nov. 24, 2014.

⁸⁰ Sun Peisong, “China-India Friendship Is Basis for New Order in Future of Asia,” *PLA Daily*, Oct. 22, 2013.

⁸¹ Li Li, “An Exploration of the Maturation of Sino-Indian Relations and Its Causes” (*ZhongYin guanxi zouxiang chengshu ji qi yuanyin tanxi*), *Contemporary International Relations* (Xiandai Guoji Guanxi) 3 (2013): 49-55.

⁸² “Hydropower Station on Brahmaputra: India to Monitor Situation,” *Times of India*, Oct. 15, 2015.

Chinese concerns regarding Indian hydropower activities

A second challenge for China relates to Indian efforts to develop the Brahmaputra in Arunachal Pradesh. At present, the river is largely undeveloped as it flows through the northeastern Indian state. However, India's Ministry of Water Resources has announced plans to build dams in that section of the river in order to control flooding and to increase electricity production. The ministry also contends that dam construction is necessary for securing water usage rights under international practice.⁸³ This appears to be a step forward in firming up India's claims to Arunachal, which China regards as its own territory under the name "southern Tibet."

Arunachal Pradesh is one of two major areas of dispute along the Sino-Indian border. The other is Aksai Chin, which lies farther to the west, and has been controlled by China since 1951.⁸⁴ Arunachal was the main theater of the 1962 China-India border conflict, in which Chinese forces advanced into Indian-controlled territory and then withdrew, pending negotiations. At the core of China's contention is the view that Beijing has sovereignty over lands formerly held by the Tibetan kingdom, including Aksai Chin and Arunachal. India rejects these claims and argues that these lands belong to India as part of a 1914 treaty.⁸⁵

Indian infrastructure development along the Brahmaputra is of particular concern for China because it could grant India leverage in border negotiations and complicate Chinese efforts to gain control of this territory.⁸⁶ Li Zhifei, an expert at the Chinese Academy of Social Sciences (CASS) who has extensively studied this issue, writes that India has used several means to strengthen its "actual control" over Arunachal, including an increasing military presence, migration of citizens into the region, and development of water resources on rivers such as the Brahmaputra.⁸⁷ Li also argues

⁸³ "India Plans to Build Big Dams Over Brahmaputra, Says Uma Bharti," *The Economic Times*, Jun. 4, 2015.

⁸⁴ John Garver. *Protracted Contest: Sino-Indian Rivalry in the Twentieth Century*. Seattle: University of Washington Press, 2001.

⁸⁵ Ibid.

⁸⁶ CNA interviews, Beijing, 2015.

⁸⁷ Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes" (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), *South Asian Studies Quarterly* (Nanya Yanjiu Jikan) 4 (2013): 29-34.

that India is seeking to build dams in Arunachal to gain an “advantageous” position in border talks with China.⁸⁸

In addition to sovereignty concerns, Chinese observers also point to environmental risks posed by Indian development of the river. One Chinese claim, albeit made without a clear scientific explanation, is that Indian industrial activity in Arunachal could increase sedimentation of the river, which might raise the risks of flooding in parts of Tibet.⁸⁹ Other Chinese sources assert that rising Indian carbon emissions connected to greater industrial activity in the region could contribute to glacial melt in the Himalayas, and threaten the long-term flow of the river.⁹⁰ These arguments may reflect genuine ecological concerns, but also may be designed in part to provide an additional basis for opposing Indian development in the disputed region.

Despite these concerns, China has taken only modest steps to counter Indian plans to build hydroelectric dams in Arunachal. One tactic that China has used in recent years has been to leverage its influence in international institutions such as the Asian Development Bank to deny India funding for infrastructure projects in the disputed area.⁹¹ It is possible that China will also seek to use its leading position in the newly established Asian Infrastructure Investment Bank (AIIB) for a similar purpose.⁹² However, given Indian domestic resources and New Delhi’s impetus to develop the northeastern part of the country, it is questionable whether China will have the necessary power or influence to successfully oppose the future development of dams.

Outlook for China-India cooperation

Two factors will likely limit a major expansion of China-India cooperation related to the Brahmaputra. First is the ongoing border dispute. Contested ownership of Arunachal Pradesh means that Beijing and New Delhi will probably be unable to reach a major accord on transboundary river rights and obligations, such as a water-

⁸⁸ Ibid., 32.

⁸⁹ Lan Jianxue, “Water Security Cooperation and China-India Interactions” (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), 2010.

⁹⁰ CNA interviews, Beijing, 2015. For background on potential climate change effects on the river, see: Immerzeel et al., “Climate Change Will Affect the Asian Water Towers,” 2010, 1382-1385.

⁹¹ Sudha Ramachandran, “Chinese Antics Have India Fuming,” *Asia Times*, 2009.

⁹² Moreover, CASS’s Li Zhifei argues that China should continue to press these institutions to reject Indian requests for financial assistance. Li Zhifei, “Water Security Issues in Sino-Indian Territorial Disputes,” (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), 2013.

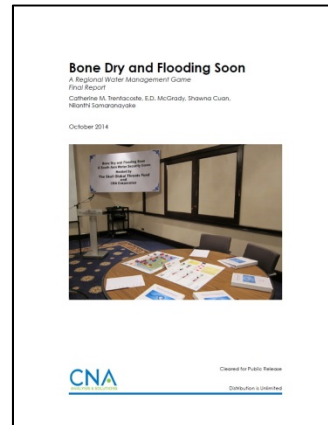
sharing treaty. As of 2015, there are no signs that this dispute is set to abate in the near to medium term.⁹³ Second is mutual distrust. While this may be a factor at the official level, it may be more pronounced within civil society in both countries. Indian analysts such as Brahma Chellaney will likely continue to question Chinese intentions regarding dam-building on the upper Brahmaputra. Meanwhile, Chinese observers will likely doubt the motives of their Indian interlocutors, whom many in China regard as biased and sensationalist.⁹⁴ These sentiments could limit the prospects for productive engagements between scholars on both sides. The following box discusses additional factors that could limit cooperation between Beijing and New Delhi.

⁹³ Vivek Raghuvanshi, "India-China Talks Fail to Make Progress on Border Dispute," *DefenseNews*, Nov. 17, 2015.

⁹⁴ Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes" (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), 2013. Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), 2010; Li Li, "Nontraditional Security and China's Relations with South Asia," in *Ecological and Nontraditional Security Challenges in South Asia*, Farooq Sobhan, Dennis Pirages, Stacy D. VanDeveer, Li Li, eds., Seattle, WA: National Bureau of Asian Research, 2011. One scholar even penned an extensive review of the writings of Indian analyst Brahma Chellaney with respect to China, critiquing Chellaney's assertions about China's intentions to use water as a weapon as biased and unsubstantiated. Zhang Jincui, "An Indian Hawk's China Outlook," 2012.

China-India Cooperation: Insights from a CNA Water Security Game

In January and June 2014, CNA conducted two tabletop exercises designed to explore water security dynamics in South Asia. Experts were assigned to play the roles of countries, including China, India, and Bangladesh, and emulate the positions of these states in water conflict scenarios. The games suggested that mutual distrust and larger political disputes, such as border tensions, could greatly reduce the chance for meaningful cooperation. The games also highlighted the role of domestic politics. As CNA's report on the games argued, "Countries must be able to govern internally in order to...effectively engage their neighbors." This suggests that China and India may have challenges in cooperating if one or both states are facing a major internal crisis.⁹⁵



Nevertheless, there may still be opportunities for a modest expansion of Sino-Indian cooperation on Brahmaputra issues. This is most likely on narrow, technical subjects that can be separated from the border dispute.⁹⁶ Specifically, China may be receptive to cooperation in areas such as disaster management, environmental protection, and river safety, or on scientific topics, such as the effects of climate change on long-term river flow.⁹⁷ Some of these issues may be discussed at an official level, such as between the water resource ministries of both states, while others may be more usefully deliberated initially at the Track 2 level, perhaps involving specialists from Chinese and Indian government-funded research institutes.⁹⁸

⁹⁵ Catherine M. Trentacoste et al., *Bone Dry and Flooding Soon: A Regional Water Management Game*, CNA, Oct. 2014.

⁹⁶ More broadly, Lan Jianxue of the China Institute of International Studies argues that Sino-Indian cooperation is most likely in "low politics" areas, such as on economic, humanitarian, and cultural endeavors, than on "high politics" areas such as the border dispute. See: Lan Jianxue, *Sino-Indian Relations in the New Era*, 2015, 30-31.

⁹⁷ CNA interviews, Beijing, 2015.

⁹⁸ Ibid.

There are several drivers that could promote enhanced cooperation on these issues. First, a positive overall direction in China-India relations, symbolized by fruitful high-level exchanges and economic agreements, could remove obstacles and set the stage for cooperation on transboundary river issues.⁹⁹ Second, China may be able to draw on its own initiatives related to the Brahmaputra to portray itself as a responsible upper riparian. For Beijing, modestly enhancing outreach on water security challenges could be a relatively low cost way to foster diplomatic goodwill with New Delhi. Third, additional progress may be facilitated if initiatives are proposed and encouraged by the Indian side. This would address the argument of some Chinese analysts that Beijing has been proactive in sharing hydrological data and that the onus is now on India to reciprocate.¹⁰⁰

Water security and China-Bangladesh relations

Compared to those with India, China's interactions with Bangladesh related to the Brahmaputra have been relatively free of controversy. This is unsurprising, since the two countries do not share a border. Beijing's cooperation with Dhaka has proceeded on several fronts. In 2008, China agreed to share hydrological data on the Brahmaputra with Bangladesh.¹⁰¹ At a summit held in 2010, China and Bangladesh agreed to improve cooperation on water resource management, hydrological data sharing, flood control, and disaster reduction. China also agreed to assist Bangladesh with riverbed dredging and personnel training.¹⁰² Another memorandum of understanding (MOU) was signed in March 2015 on the sharing of rainfall data in the river's catchment area in China, which would help inform Bangladeshi flood forecasting.¹⁰³

Sino-Bangladeshi cooperation on Brahmaputra issues is consistent with a broader expansion of the bilateral relationship in recent years. As of 2015, Beijing is Dhaka's largest trade partner, and Bangladesh plays an important role in China's vision of

⁹⁹ Li Li, "An Exploration of the Maturation of Sino-Indian Relations and Its Causes" (*ZhongYin guanxi zouxiang chengshu ji qi yuanyin tanxi*), 2013.

¹⁰⁰ CNA interviews, Beijing, 2015.

¹⁰¹ "China Assures Preferential Treatment for Bangladeshi Products," *Bangladesh Economic News*, Sep. 24, 2008.

¹⁰² *Joint Statement Between the People's Republic of China and the People's Republic of Bangladesh*, 2010, http://www.fmprc.gov.cn/mfa_eng/wjdt_665385/2649_665393/t674421.shtml.

¹⁰³ Abu Bakar Siddique, "China To Give Brahmaputra Flow Data to Bangladesh," *The Third Pole.net*, Sep. 29, 2015.

creating a “21st Century Maritime Silk Road” stretching from Asia to Europe.¹⁰⁴ China also vies for influence in Bangladesh with India, which is also reaching out to Dhaka with various agreements and incentives.¹⁰⁵ In this context, Chinese willingness to share hydrological information and provide assistance in river dredging may simply be designed to cultivate diplomatic goodwill with Bangladesh. Moreover, Beijing has sought to reassure Dhaka (as well as New Delhi) that it has no plans to divert the Brahmaputra.¹⁰⁶

In a sense, the perceived threats that Bangladesh faces from Indian development activities upstream have become a counterpoint to India’s concerns about Chinese dam-building in Tibet. Various Chinese analysts have highlighted India’s water diversion plans as a challenge that could have severe economic and ecological effects on its downstream neighbor.¹⁰⁷ For instance, in a CNA interview in Beijing, one Chinese expert argued that potential Indian diversion plans could harm Bangladeshi interests, and that Bangladesh “has a right to say something” as a threatened downstream riparian. The subtext of these comments appears to be that India may be applying a double standard in critiquing China’s upstream development initiatives.

Multilateral cooperation in the Brahmaputra basin: The view from China

China has centered its diplomatic outreach on Brahmaputra issues at a bilateral level. It has signed hydrological data sharing agreements with both India and Bangladesh, but has not engaged the two countries in a multilateral setting. This is consistent with a larger pattern of bilateralism in China’s water diplomacy. However, there are signs that Beijing could be willing to expand cooperation with both New Delhi and Dhaka at a basin-wide level.

¹⁰⁴ ASMG Kibria, “Bangladesh Juggles Chinese, Japanese Interest,” *The Diplomat*, Jan. 5, 2015.

¹⁰⁵ See, e.g. “India’s Modi Hopes to Tamp Down China’s Influence in Bangladesh,” *VOA News*, May 27, 2015.

¹⁰⁶ For Bangladesh’s perspectives on the Brahmaputra, see the Bangladesh chapter for this project by Nilanthi Samaranayake. For India’s perspectives on the Brahmaputra, see the India chapter by Satu Limaye.

¹⁰⁷ Holslag, “Assessing the Sino-Indian Water Dispute,” 2011.

Limited multilateralism

In general, China's water diplomacy has focused on achieving bilateral agreements with neighboring states. Aside from its agreements with India and Bangladesh, China has signed accords on boundary and cross-border rivers with Russia, Kazakhstan, Kyrgyzstan, Mongolia, North Korea, and others. These agreements are diverse in scope, covering issues such as water navigation, hydrological projects, environmental protection, emergency notification, and data sharing. Many are more substantial than the limited China-India pacts on the Brahmaputra, largely because China has no border disputes with these other countries.¹⁰⁸

By contrast, China has avoided multilateral diplomacy as a way to solve shared water challenges. China was one of three states (the others being Turkey and Burundi) that voted against the 1997 United Nations Watercourses Convention, which outlines principles for cooperation related to international waterways, such as transboundary rivers, and procedures for dispute resolution. The reasons China's UN representative gave for his country's opposition to the treaty include inadequate protection of state sovereignty and an "imbalance" between the rights and duties of upper and lower riparians.¹⁰⁹ China has also declined to participate in the World Commission on Dams, which provides guidelines for dam construction.¹¹⁰

In addition, China has been reluctant to participate in multilateral water agreements at a regional level. This is illustrated by China's approach to the Mekong River Commission (MRC), which was established in 1995 to govern activities among Mekong River states. Although China has been a dialogue partner of the Commission since 1996, it has not sought full membership, largely due to the concern that doing so would impose restrictions on its upstream dam-building plans.¹¹¹ Rather, as Selina Ho, an expert on Chinese transboundary river issues argues, China has opted to seek agreements with Mekong states on a bilateral basis.¹¹² Nevertheless, China has adopted limited multilateral cooperation with the MRC. This is discussed in greater detail in the following section.

¹⁰⁸ Chen Huipeng et al., "Exploring China's Transboundary Water Treaty Practice Through the Prism of the UN Watercourses Convention," *Water International* 38 (2013): 217-230.

¹⁰⁹ "General Assembly Adopts Convention on Law of Non-Navigational Uses of International Watercourses," News release, May 21, 1997, <http://www.un.org/news/Press/docs/1997/19970521.ga9248.html>.

¹¹⁰ Ho, "River Politics," 2014.

¹¹¹ *Ibid.*, 8. See also: Beth Walker, "China and India Ignore UN Watercourses Convention," *Chinadialogue*, Aug. 18, 2014.

¹¹² Ho, "River Politics," 2014."

China's preference for bilateral diplomacy on Brahmaputra issues is consistent with this larger pattern. This preference may be underscored by two factors. First is the absence of existing institutions relevant to discussions among all three riparians. The South Asian Association for Regional Cooperation (SAARC), for instance, does not include China, while the Shanghai Cooperation Organization (SCO) does not include Bangladesh. Second is the deeper problem of mutual distrust, not only in China-India relations, but also in India-Bangladesh relations, which some PRC analysts argue would undermine any plans to promote cooperation on a basin-wide scale.¹¹³ In effect, Beijing may have concluded that it is more practical and effective to work with New Delhi and Dhaka separately than to work with them together.

Possible cooperation

However, there several reasons why China may revisit its current preference for bilateralism on Brahmaputra issues. First, at a broad level, China has participated in, and even shaped, multilateral regimes and institutions since the 1990s.¹¹⁴ This is evident, for example, in China's role in organizing the Six Party Talks on North Korea and in its participation in the Association of Southeast Asian Nations (ASEAN) Regional Forum. China has also sought to play a more prominent role in SAARC, which includes both India and Bangladesh.¹¹⁵ Thus, if anything, China's bilateral approach to water diplomacy is increasingly out of step with its confidence in other policy arenas that multilateralism can support Chinese interests.

Second, there is a precedent for Chinese participation in water diplomacy at a basin-wide level. Namely, China signed an agreement with the MRC in 2002 to supply hydrological data from June 15 to October 15 of each year, a period corresponding to the monsoon season. That agreement was expanded in 2008, and again in 2013. China has also cooperated with the MRC through technical exchanges in areas such as river navigation and hydropower development.¹¹⁶ In December 2014, China's vice

¹¹³ CNA interviews, Beijing, 2015

¹¹⁴ Joel Wuthnow, Xin Li, and Lingling Qi, "China's Diverse Multilateralism: Four Strategies in China's Multilateral Diplomacy," *Journal of Chinese Political Science* 17 (2012): 269-290; Kuik Cheng-Chwee, "Multilateralism in China's ASEAN Policy: Its Evolution, Characteristics, and Aspiration," *Contemporary Southeast Asia* 27 (2005): 102-122. Hongying Wang, "Multilateralism in Chinese Foreign Policy," *Asian Survey* 40 (2000): 475-491; Joel Wuthnow, *Chinese Diplomacy and the UN Security Council*, New York: Routledge, 2013.

¹¹⁵ Nilanthi Samaranyake, *The Long Littoral Project: Bay of Bengal*, CNA, Sep. 2012, 69, https://www.cna.org/CNA_files/PDF/IRP-2012-U-002319-Final.pdf.

¹¹⁶ "Mekong River Commission and China Boost Water Data Exchange," News release, Aug. 30, 2013, <http://www.mrcmekong.org/news-and-events/news/mekong-river-commission-and-china-boost-water-data-exchange/>.

minister of water resources stated that Beijing hoped to strengthen cooperation with the MRC, such as in conducting a joint scientific study on water flow fluctuations in the river basin.¹¹⁷ The box below discusses Chinese cooperation within the Greater Mekong Subregion (GMS).

In addition to the MRC, China has also cooperated multilaterally with the GMS, which is an economic cooperation program with participation of the six Mekong riparians: China, Laos, Cambodia, Myanmar, Thailand, and Vietnam.¹¹⁸ China's agreements as part of the GMS included a 2006 agreement for an oil shipping program and a 2011 agreement on joint patrols to ensure safe navigation of the river.¹¹⁹ Moreover, in October 2015 law enforcement officials from the GMS countries agreed to expand cooperation on issues such as human smuggling and illegal immigration.¹²⁰ Although river navigation is less relevant to the upper Brahmaputra, which is non-navigable, the GMS is a model of potentially effective cooperation for the Brahmaputra riparians in that it is focused on a narrow, technical challenge and avoids becoming enmeshed in broader political tensions.

Third, the barriers to basin-wide cooperation on the Brahmaputra are likely not insurmountable. For one thing, the lack of an existing mechanism does not necessarily rule out cooperation. In other contexts, China has established new bodies to address transnational challenges when one did not currently exist. For instance, China helped establish the SCO to address terrorism and other challenges in Central Asia.¹²¹ China may also be receptive to the possibility that existing bodies, such as the Bangladesh–China–India–Myanmar (BCIM) forum, could be expanded to address water issues.¹²² In addition, mutual distrust has not prevented China from engaging in productive bilateral talks with India, and there is no reason why it would preclude similar discussions at a multilateral level. The key appears to be whether cooperation

¹¹⁷ Zhang Hongzhou, "China-India: Revisiting the 'Water Wars' Narrative," 2015.

¹¹⁸ For further details, see: "Greater Mekong Subregion," <http://www.adb.org/countries/gms/main>.

¹¹⁹ Ho, "River Politics," 2014.

¹²⁰ "Joint Declaration Issued to Enhance Mekong River Security," Xinhua, Oct. 24, 2015.

¹²¹ Wuthnow, Xin Li, and Lingling Qi, "China's Diverse Multilateralism: Four Strategies in China's Multilateral Diplomacy," 2012.

¹²² CNA interviews, Beijing, 2015.

can be insulated from higher-level political tensions and focus instead on shared technical or humanitarian issues.¹²³

Finally, China has several incentives to cooperate with other Brahmaputra riparians in a multilateral context. First, China's reputation would benefit if the Chinese took a leading role in proposing basin-wide cooperation.¹²⁴ As it has with other regional initiatives, such as the AIIB, China could argue that it is engaging proactively as a responsible regional stakeholder.¹²⁵ Second, basin-wide cooperation could help reduce a source of friction on China's western periphery at a time when it is facing increasing challenges in its eastern maritime region and in its relations with the United States and others.¹²⁶ Third, at a practical level, a basin-wide approach could yield a more holistic understanding of the river system and insights into how to address flooding and other challenges.¹²⁷ Thus, while a major multilateral accord may not be possible, China will likely be willing to explore lower-level cooperation with its downstream neighbors.

¹²³ CNA interviews, Beijing, 2015.

¹²⁴ Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), 2010.

¹²⁵ "Brahmaputra: Towards Unity," 2014, 20-21.

¹²⁶ CASS's Li Zhifei even argues that basin-wide cooperation would reduce the chances that outside powers, such as the United States, would be able to interfere in regional affairs. Li Zhifei, "Water Resource Diplomacy: A New Topic in Constructing China's Peripheral Security" (*Shui ziyuan waijiao: Zhongguo zhoubian anquan goujian xin yiti*), *Academic Exploration* (Xueshu Tansuo) 4 (2013): 28-33.

¹²⁷ Alastair Iain Johnston, *Social States: China in International Institutions, 1980-2000*, Princeton, NJ: Princeton University Press, 2008.