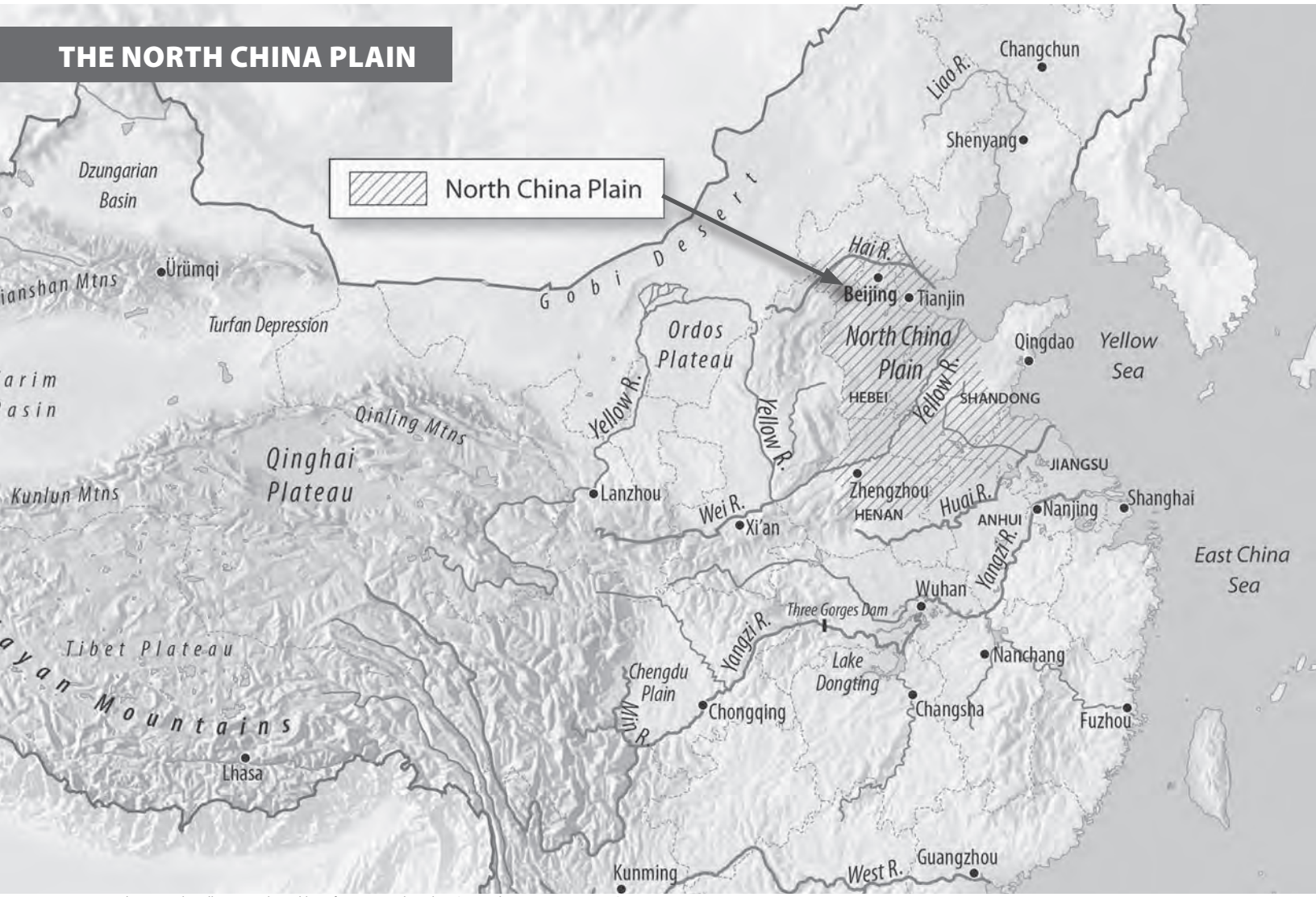
China's Water Challenges
National and Global Implications

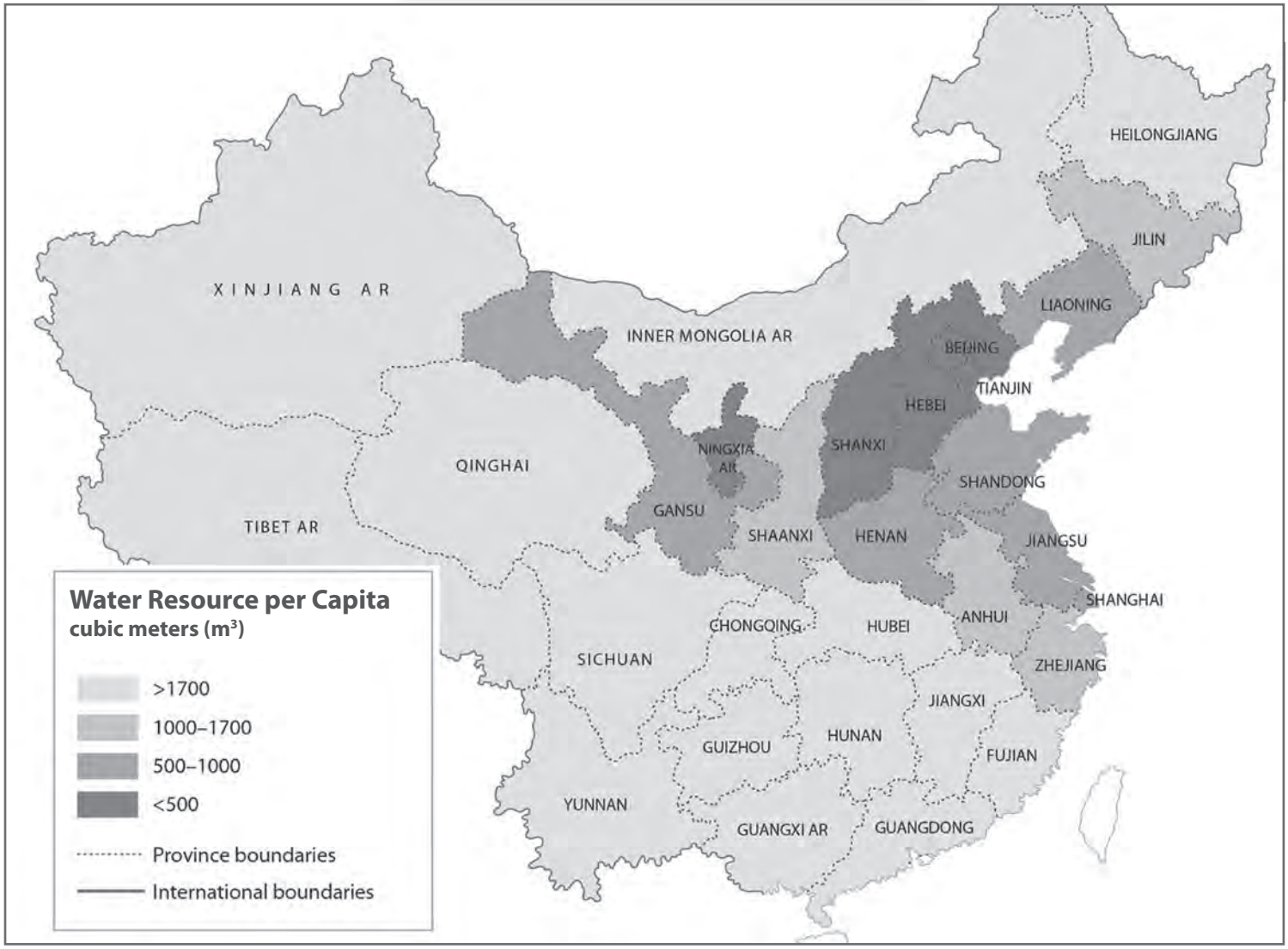
By David A. Pietz

China's environmental challenges have received wide attention in recent years. A variety of disturbing images and stories from media outlets have fueled a pervasive image of China as an environmental wasteland, while expanding scholarship has inventoried China's air, water, and land problems. Reasonable observers can disagree on the prescriptive responses necessary to address such challenges, but there seems little disagreement that a fundamental tension has existed between China's breakneck economic development and its environmental setting over the past several decades. Although there has been substantial analysis of China's role in recent international climate change negotiations, there has been little exploration of how China's environmental challenges may impact the country's internal economic, political, and social trajectories. Ultimately, the domestic and international repercussions of China's resource challenges will implicate global networks. Indeed, in a recent assessment of global challenges in the period up to 2025, the US National Intelligence Council lists resource bottlenecks as a "key uncertainty" that contains "the risk of great power confrontations."[1] Indeed, some estimates suggest that by 2030 nearly half the world's population will be living in areas of acute water shortage. Of added significance is the interconnectedness of water with a variety of contemporary challenges such as food security, energy security, and environmental security. Indeed, this nexus of issues is at play in China and will continue to shape China's internal economic, social, and political dynamics, as well as its role in international networks, for the foreseeable future.

The goal of the article is not to provide an exhaustive catalog of potential outcomes arising from China's water predicament, but instead to highlight several key examples to suggest the range of water-related issues impacting China and the critical importance these realities may have in shaping China's internal and external dynamics. But before exploring these critical policy-related questions, we begin by examining the biophysical setting of water on the North China Plain—one of the most water-challenged regions of China and the world.



Source: David A. Pietz, *The Yellow River: The Problem of Water in Modern China* (Harvard University Press, 2015).



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Water and Climate in China

Although China ranks fourth in global freshwater reserves, it possesses the second-lowest per capita water supply of any country in the world.[2] One of the most critical areas of shortage is the North China Plain, a region covering approximately 409,500 square kilometers (158,000 square miles). Despite the fact that one of China's mighty rivers flows through this region, compared to the more humid south, north China's limited water resources have been a persistent challenge to human communities inhabiting the plain for centuries. The Yellow River Valley and the North China Plain constitute one of the economic and social cores of China—generating over 20 percent of the nation's grain supply and among the most densely populated regions in the world. However, water in the region has become an endangered commodity. The North China Plain accounts for less than 10 percent of China's total water resources, despite sustaining over 30 percent of its population. Per capita water availability on the North China Plain is 225 cubic meters (59,439 gallons) per year, while China's average per capita water supply is 2,300 cubic meters (607,596 gallons). For the past several decades, per capita water resources in North China averaged one-tenth the world average. Rapid economic development since 1978 has had profound consequences for the limited water resources of the North China Plain region. Water tables have declined by an average of 1.5 meters (1.64 yards) per year since 1990. In 1997, the river ran dry 780 kilometers (485 miles) upstream from the river mouth.[3] At the same time, industrial, agricultural, and household pollutants have rendered water in downstream segments of the river unsafe for any use.

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What forces have generated these increasingly severe water problems on the North China Plain? To be sure, hyper-economic growth since 1978 has unleashed voracious demand to accommodate industrial expansion, urban growth, and agricultural intensification. At the same time, however, we must also examine water management during the Maoist period (1949–1978). After 1949, the government of the People's Republic of China sought to promote rapid agricultural and industrial development consistent with building "Communist modernity." Breakneck expansion of irrigation facilities resulted in massive exploitation of surface and groundwater supplies, with little concern for conservation or water quality. In short, the water management practices of the Maoist period cast a long shadow over water resources in the post-Mao era.

China itself is a microcosm of global water problems. On a per capita basis, there is sufficient water across the globe to meet human demand. The critical problem, of course, is distribution. The north-south hydrologic divide in China mirrors global inequities in water availability. Pollution also hits those regions harder that have limited water resources. At the same time, global demand is dominated by agricultural irrigation, while

Construction in the central business district of Beijing. Between the weight of construction and groundwater depletion, Beijing is sinking by four inches per year. Source: *Wikimedia Commons*, photo by Morio, at https://tinyurl.com/y7ncxaoj.

May 2013, Kunming, Yunnan Province, China. NIMBY (Not in My Back Yard) protesters wearing facemasks march against a PX petrochemical and plastics plant planned for a nearby town. Source: *China Story* website at https://tinyurl.com/y8c7cwdb.

urban and industrial uses increasingly compete with the rural sector for water. What requires our attention in China are the potential internal and external consequences of these water dynamics. How might resource constraints affect China's economic performance? This is a fundamental question, and the political and social stability of China rests, in part, on its outcome. And given the increasing ties that bind global economic health with China's economic health, water constraints in China have the potential to shape global exchange. Considering China's 1.4 billion people, what happens politically in China is a global issue. That these questions of national and global stability rest on a historically marginal ecological foundation is of course rather remarkable. But what compels our further attention is the compounding effects of global climate change. Climate change is the wild card that looms large in Chinese policy and scientific circles, and is one factor that generates a fixation on supply as the state aggressively pursues massive engineering projects on the Himalayan and Tibetan plateaus.

Water and the Shaping of Internal Political Discourse

Water scarcity and its impact on economic opportunity could develop into an important faultline for the nation's political stability. The introduction of market forces beginning in 1978 had a potent transformative effect on the social and economic landscape of China. The consequences of urbanization and rapid industrialization generated water quantity and quality challenges. These problems began to obstruct further economic restructuring, while at the same time creating social and political tensions.

Wastewater from the Shaanxi Aowei Qianyuan Chemical Industry Factory is discharged into the Huangpuchuan River, which flows into the Yellow River. Source: *Greenpeace Energy Desk* blog at https://tinyurl.com/yakgxusn. © Greenpeace/Lu Guang.

The Growth of Environmental Consciousness

Over the past two decades, environmental transformations have introduced new values and actors into China's water sector. The human, material, and cultural costs of all water projects—from local, small-scale water development to massive projects such as Three Gorges and the South-to-North Water Diversion Project—have generated fissures and have brought about a growing sensitivity to the environmental consequences of breakneck economic development. From prominent activists like Dai Qing and Ma Jun and civil society organizations like Friends of Nature to local groups reacting to problems in their backyards, state and party are faced with interest groups that can articulate opposition to national policies and local conditions (rural and urban) that resonate across China. While the party has occasionally tacitly encouraged moderate environmental activism and reportage to help the central government enforce environmental mandates on recalcitrant local governments and enterprises, it is keenly aware of the role played by environmental protesters as the leading edge of a broader oppositional agenda in the former Soviet Union and Eastern Bloc states.

Data released a decade ago on public protests and disturbances stunned many observers in China and abroad. A large number of these protests was sparked by grievances over water supply. Water disputes increased from 16,747 in 1986 to 94,405 in 2004. From the protests in 2000, when thousands of angry Shandong farmers responded to inadequate water supply by diverting reservoir water that had been allocated to Beijing, to the violent clashes between several thousands of villagers relocated for the South-to-North Water Diversion Projects, many of these protests emanated in rural areas. Access to sufficient quantities of clean water is one component of China's growing urban-rural divide. Furthermore, the water available to rural users is often polluted from agricultural runoff or from insufficiently regulated rural enterprises. Certainly, urban constituencies are not immune to water problems, as evinced by the headline-grabbing spill of 100 tons of the carcinogen benzene into the Songhua River in 2005.

Rural Chinese, however, lack institutional structures to cope with the economic and health consequences of water degradation. Public health systems in rural China are hard-pressed to manage water-borne diseases such as diarrhea, which is the leading cause of death among rural children under five years of age. Frustration over water quantity and quality is one component of a "perfect storm" that, combined with other factors (like environmental issues, corruption, income disparities, and a fraying social safety net), could "present a unifying focal point for dissent that crosses geographic, cultural, socioeconomic, and political lines."[4]

The Hongyanhe Nuclear Power Plant is the first nuclear power station in northeastern China and will reach forty-five billion kWh annually. Source: *Good News Planet TV* website at https://tinyurl.com/yahvfjob.

A fisherman casts his net in the Yellow River near an industrial plant dumping toxins into the river. Source: *Greenpeace Energy Desk* blog at https://tinyurl.com/yakgxusn. © Greenpeace/Lu Guang.

Water and Agriculture

Perhaps the single-greatest concern related to water in China is food. With just 7 percent of the world's arable land, China attempts to feed roughly one-quarter of the world's population. Maintaining grain self-sufficiency requires maintaining sufficient land under cultivation with access to clean surface and subsurface water supplies. Indeed, over half of China's farmland is irrigated. During the past several decades, estimates of China's agricultural acreage have diverged rather dramatically, but a central concern of state leaders has been to limit the impact of rapid urbanization and industrial development on land resources. But this has been a difficult task. With incessant pressures of economic development forces, and with the limited reach of the central government in regulating unchecked urban and industrial expansion, central mandates designed to preserve farmland have been compromised. Complicating the food security calculus has been the evolution of consumption patterns that have driven changes in agricultural production. The diets of increasingly affluent urban consumers has diversified; farmers moved up the value-added production chain from grains to fruits, vegetables, and nuts. Second, larger supplies of grain are necessary to feed livestock, as urban consumers increasingly incorporate animal proteins in their diets. With available grain production for human consumption stressed by land and water constraints, and production and consumption patterns influenced by the domestic market, the challenge for China to meet its oft-stated goal of food self-sufficiency is to maximize grain production by stabilizing agricultural acreage and maintaining access to clean irrigation water. Chinese farmers produce roughly 90 percent of the country's staple agricultural products, but the pressures of demographic expansion, as well as industrial and urban expansion, continue apace.

The critically important issue is how to use water more efficiently in the agricultural sector. There is significant capacity in China's irrigation infrastructure to increase water efficiency, but ambiguous property rights and a fractured administrative structure are significant obstacles to implementation of demand management policies. At the same time, pollution limits access to clean surface and groundwater sources. The pressures on China's agricultural economy have generated a pernicious cycle that contributes to degraded water resources. Intensification of fertilizer use, a critical input to increasing agricultural yields, has at the same time generated pollution of farmland irrigation sources and waterways. As reported by Renmin University in Beijing, China produced roughly 24 percent of world grain output, but "its use of fertilizer accounted for more than 35 percent of total global consumption," suggesting the significant intensification of agricultural cultivation. The report goes on to note that China's grain production had increased more than eightfold from the 1960s, while use of nitrogen fertilizers had surged by about fifty-five times."[5]

June 2015, harvesters reap wheat in Shandong, Cheng'an County, north China's Hebei Province of the North China Plain. Source: The Ministry of Agriculture of the People's Republic of China website, photo by Xinhua/Wang Xiao, at https://tinyurl.com/ycdwk927.

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Water and the Government Bureaucracy

Water stresses may also continue to generate tensions within the bureaucratic fabric of China. The allocation of scarce water resources falls within the administrative bailiwick of a dizzying number of government ministries and agencies. Decision-making processes within this fractured bureaucracy are notoriously characterized by competing interests and mistrust. Once decisions are made, these competing interests again shape implementation, and the interests of provincial and local governments have proved remarkably immune to central government mandates. To cite one fundamental problem of allocation between rural and urban constituents: the Ministry of Water Resources reports that 60 percent of China's cities face water shortages, while Beijing (on the North China Plain) has access to one-third of the world average per capita supply.[6] In rural sectors, it is estimated that 500 million residents are exposed to contaminated drinking water. There are myriad central, provincial, and municipal agencies involved in adjudicating these water allocation and water degradation issues. The Ministry of Water Resources, the Ministry of Agriculture, the Ministry of Industry, and the Ministry of Environmental Protection are just a few

There has been comparatively little discussion of how China's concerns over water and food security might shape interstate relations, particularly in Southeast Asia and sub-Saharan Africa.

Screen capture from *Talk Africa: China Africa Agriculture Co. Operation*, a CCTV (China Central Television—Africa) production, explores China's role in helping equip farmers in Zimbabwe with the necessary knowledge and skills to achieve its full agricultural potential. Source: *YouTube* at https://tinyurl.com/.y82kfaeq.

Screen capture from *Chinese Investment Boosts Africa's Agricultural Development*, a CCTV (China Central Television—Africa) news documentary that discusses the benefits of a joint Sino-African agricultural firm in Zambia. Source: *YouTube* at https://tinyurl.com/y8o2du6c.

of the government agencies, and at only the central level, that have critical interests in water administration. Bureaucratic constituencies fracture and coalesce around water policy. In the same spirit, provincial-level compacts regulating water withdrawals from interprovincial waterways are notoriously contentious and lack effective oversight mechanisms. Thus, water constraints hold the potential to create disequilibria within a state administrative structure already stressed by bureaucratic fault lines.

Water and China's International Networks

There has been comparatively little discussion of how China's concerns over water and food security might shape interstate relations, particularly in Southeast Asia and sub-Saharan Africa. What are the potential implications of China's water and food security concerns for the global community? China has sought to ameliorate domestic agricultural production bottlenecks, deflect reliance on international markets, and minimize future price volatility by investing in agricultural land and production abroad. These efforts have mixed consequences for global interests. Chinese purchases on international corn and soybean markets will benefit global grain-producing regions. At the same time, China's investments in agricultural regions of Africa and Southeast Asia may pose challenges to the interests of a variety of polities in those regions.

The estimated fifteen to twenty million hectares (over forty-nine million acres) of global farmland that have been subject to negotiations or transactions in the last decade have provoked charges of a "new colonialism." Much of this investment is sponsored by states that seek to bypass world markets in order to secure grain for consumption and biofuel feed stocks. Critics argue that foreign land acquisitions create conditions for continued economic impoverishment in South and Southeast Asia, and in African countries. On the other hand, many developing nations see foreign land investments as a method for providing needed technology, knowledge of advanced practices, and employment. As many have argued, global movement of agricultural commodities is really trade in water. Thus, it is no coincidence that many of the most aggressive government-sponsored investments in agricultural farmland emanate from regions that are water-poor. And China's "resource diplomacy" is generally conducted solely on economic terms, little encumbered with issues such as human rights or terrorism. This generated much discussion during the Barack Obama administration about China's role as a "responsible stakeholder" in global affairs.

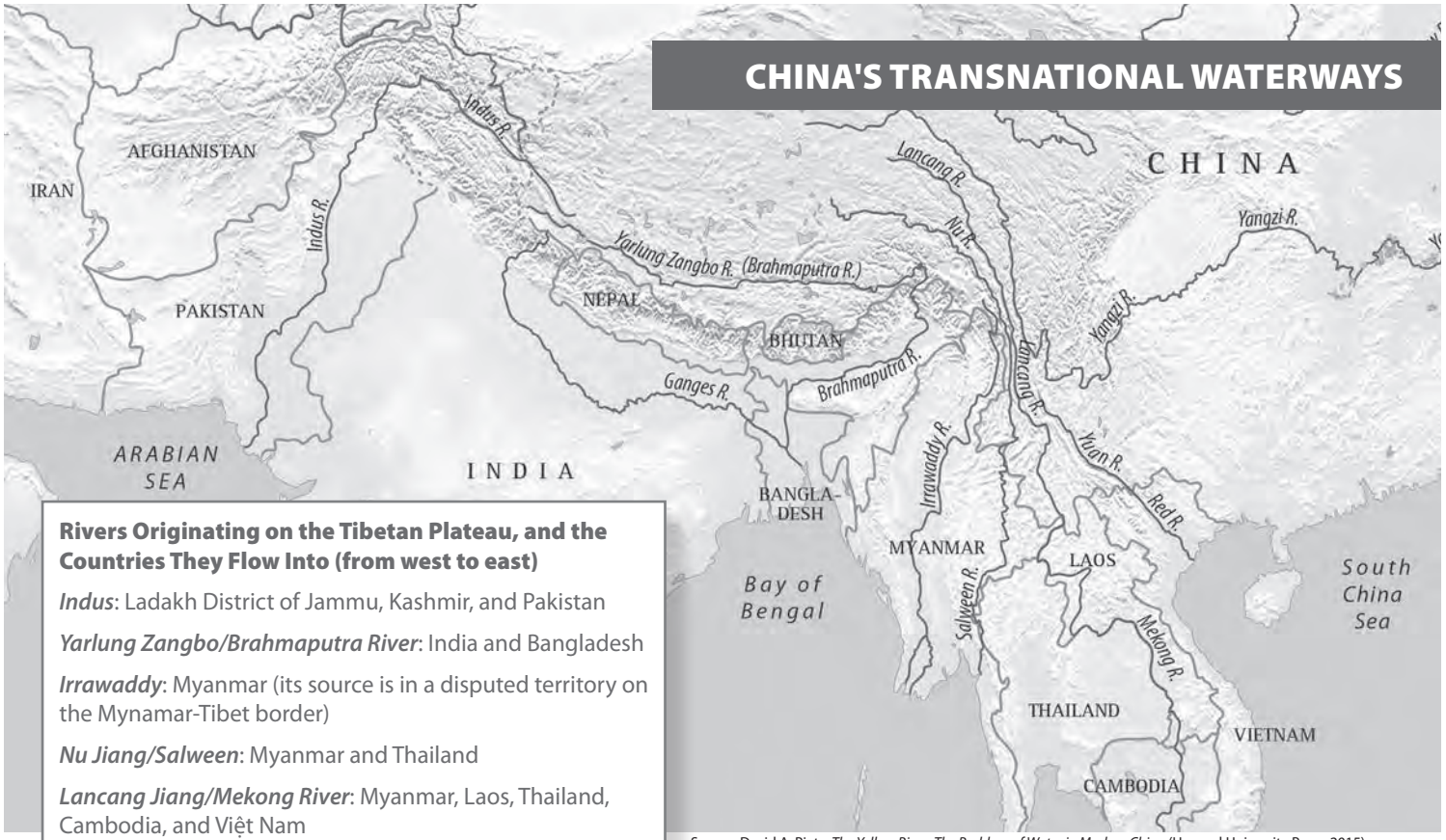
Global Food Safety and Health

China's water resource challenges are increasingly linked to food quality and health issues in and outside China. China exports significant quantities of food products. Much of the concern over China's food exports have centered on fish and fish products. The importance of farm-raised fish has become increasingly critical to global food production. Stocks of consumable ocean fish have declined substantially in the face of ravenous global demand for seafood. China has responded to this demand by producing some 70 percent of all farm-raised seafood in the world. Some of this is consumed domestically, but at the same time, China has become the number 1 exporter of fish in the world. Agricultural runoff, municipal waste, and industrial effluents have all been sources of water contamination of China's freshwater fisheries. In mid-2010, the *China Daily* reported a particularly serious incident in Fujian Province where toxic waste from a local copper mine resulted in the loss of 1,890 tons of fish. In many instances, waste from fish-producing ponds is recycled into local water systems. Further compounding the problem is the use of antibiotics in fish feed to maintain the health of fish in contaminated waters. These drugs concentrate in the muscle tissue of fish, leaving potentially carcinogenic residue.

A second global health problem related to China's water scarcity is the development and spread of zoonotic diseases (diseases transmitted between animals and people). Outbreaks of severe acute respiratory syndrome (SARS) and avian flu have shed light on the transmission of viruses from animals to humans. The emergence of pandemic diseases is likely to occur in regions with high population densities and close association between human and animals. The 2003 SARS outbreak in China reflected many of these ecological dynamics. In addition, "Scientists have become increasingly aware of the linkage between emergence of outbreaks in zoonotic diseases and the destruction of natural habitat of animal hosts, climatic changes due to global warming, and other environmental changes caused by humans."[7] Water shortages are among the outcomes of environmental change that may be critical to the development of pandemic diseases. Water shortages have intensified the human-animal interface, providing appropriate environmental conditions for the spread of zoonotic diseases. China fits this profile of ecological transformations, high population densities, and close human-animal interface that may foster the emergence of pandemic diseases that ignore national borders.

Climate Change and the "Water Tower of Asia"

Climate change is the potential game changer in the millennia-long struggle to manage the scarce resources of the North China Plain. Recession of Himalayan glaciers and of the snowpack on the Tibetan/Qinghai Plateau will have serious consequences for China's rivers that feed and water high population densities in eastern China, but that also sustain the population



Rivers Originating on the Tibetan Plateau, and the Countries They Flow Into (from west to east)

Indus: Ladakh District of Jammu, Kashmir, and Pakistan

Yarlung Zangbo/Brahmaputra River: India and Bangladesh

Irrawaddy: Myanmar (its source is in a disputed territory on the Mynamar-Tibet border)

Nu Jiang/Salween: Myanmar and Thailand

Lancang Jiang/Mekong River: Myanmar, Laos, Thailand, Cambodia, and Việt Nam

Yuan/Red River: Việt Nam

Source: David A. Pietz, *The Yellow River: The Problem of Water in Modern China* (Harvard University Press, 2015).

and economies of South and Southeast Asia. During the past decade, the state channeled substantial money to research institutions like the Academy of Sciences to forecast the potential consequences of climate change. Of particular concern in this research agenda is the fate of precipitation, glaciers, and snowpack on the Tibet/Qinghai Plateau. The melt from glaciers and annual snowfall from the region feed rivers that serve 47 percent of the world's people. There is little agreement on the precise outcomes of climate change, but a growing body of Chinese and international research suggests that the Himalayan region will be substantially affected by rising temperatures. Greater runoff will initially generate increased flows that will augment water supplies, but over the long term, runoff will decrease and other potential consequences of climate change, such as reduced precipitation in the Yellow River Valley and North China Plain, will intensify water scarcity. According to a 2007 Chinese study, Himalayan glaciers could decline by one-third by 2050 and one-half by 2090. The anticipated loss of water resources would have a negative impact on China's food production. A *China Daily* article argued that "the impact of climate change, coupled with arable land loss and water shortages, will cause a bigger grain production fluctuation and pose a threat to reaching output targets . . . China, which recorded a grain output of 530.8 million tons in 2009, plans to increase output to 550 million tons by 2020 to ensure grain security for the world's most populous country. China is likely to face an inadequate food supply by 2030, and its overall food production could fall by 23 percent by 2050."[8] In addition to responses such as accelerating use of genetically modified, drought-resistant grains, China will more aggressively increase reservoir capacity on transnational waterways in southwest China.

An important reason for China to develop these Himalayan water resources is the need to address regional economic imbalances by developing the economy of western China. State leaders see hydroelectric generation as a source of cheap energy to develop Tibet and the southwest provinces, as well as a way to send electricity to industrial centers in Guangdong Province. Both private capital markets and power generation corporations with significant state ties have capitalized on improved transportation infrastructure and technical capacities to target Himalayan rivers for the development of hydroelectric facilities. Aside from their relative distance from population and industrial centers, one could not find better prospects for power generation than these rivers. Rising high out of the Tibetan Plateau, the steep gradient of these rivers provides hydroelectric potential unmatched in China. As of 2007, there were over 200 dams that were under construction, or in planning stages, in southwest China.

Aerial view of the Eastern Himalayas. The picture covers Nepal, India, and China, and lies in the Kangchenjunga Transboundary Area. Source: *The International Centre for Integrated Mountain Development*, photo by Asha Kaji Thaku, at http://lib.icimod.org/record/29598.

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What will the consequences be for regional economic and political stability as China aggressively develops transboundary water resources? Asia's nine largest rivers originate on the Tibetan Plateau. Rivers from this region sustain the lives of 1.3 billion people in South and Southeast Asia. For example, over 50 percent of the Brahmaputra River flows through China, but the vast majority of use occurs downstream in India, Nepal, and Bangladesh. The Mekong runs through China, Burma, Laos, Thailand, Cambodia, and Việt Nam. In the lower basin, sixty million people rely on aquatic food sources for 80 percent of their protein needs.

China controls the "water tower of Asia." With such awesome hold over the resource lifeline of the region, the country is faced with critical decisions about how to wield that power. On the one hand, China's sensitivities to resource dependency lead it to be "one of only three UN member countries to reject the notion that states have the right not to be adversely affected by activities of upstream countries. Beijing asserts complete sovereignty over resources within its boundaries."[9] However, unilateral development of transboundary waterways will come at the high cost of alienating China's neighbors, one of them in possession of advanced military capabilities. Managing its transboundary rivers affords China an opportunity to engage in regional development forums. One regional association with which China has had an ambiguous relationship is the Mekong River Commission (MRC), created in 1957 by riparian countries (those who share a river) to consult on issues of common interest in river development. China is not a formal member of the commission, but has made halting steps to share upstream flow and rainfall data with MRC members. However, it has largely been resistant to consultations involving upstream reservoir management or development plans.

Conclusion

In short, China's water resource challenges, most acutely reflected on the North China Plain, implicate national, regional, and global security dimensions. Internally, water constraints will continue to affect economic growth in China. The health of the global economy depends on a vibrant Chinese economy. The potential consequences of water scarcity, combined with health concerns engendered by polluted water, can have an impact on political stability. Environmental frustration can be one component of a suite of grievances that can collectively contribute to political instability. A politically unstable China unquestionably translates into an entire host of concerns for global security. At the regional and international levels, global climate change will likely condition China's relations with South and Southeast Asian countries, as the challenges of managing these relationships are accentuated by the diminishing water resources of the Tibetan-Himalayan region. Incorporating China into governance organizations such as the Mekong River Commission can help stabilize this region. Globally, continued economic expansion, coupled with demographic growth and climate change, will intensify water resource constraints and may impel China to take a more aggressive posture in international grain markets and investment in agricultural resources like land. Finally, China's water quality and quantity issues are directly connected with global food safety and health issues. These dynamics suggest that China and the international community have mutual interests in managing China's water challenges. ■

NOTES

1. National Intelligence Council, *Global Trends 2025: A Transformed World* (Washington, DC: National Intelligence Council, 2008).
2. Nathan Nankivell, *The National Security Implications of China's Emerging Water Crisis* (Washington, DC: Jamestown Foundation, 2005). Also available at http://tinyurl.com/ydarr2a6.
3. For these and other data, see David Pietz and Mark Giordano, "Yellow River Management: Continuity and Change," in *River Basins: Trajectories, Societies, and Environments*, eds. François Molle and Philippus Wester (London: CABI, 2009).
4. Nankivell, "The National Security Implications of China's Emerging Water Crisis."
5. Report cited in "China Needs to Cut Use of Chemical Fertilizer: Research," *Reuters*, last modified January 14, 2010, http://tinyurl.com/yhovg3q.
6. For these and other data, see Fiza Malik, "Water Pollution in China," *Prezi*, last modified June 10, 2014, http://tinyurl.com/y8ua4hfb.
7. See T Truong, "The Impact of Environmental Changes on Zoonotic Diseases," *Serendip Studio,* last modified October 25, 2009, http://tinyurl.com/y79rogxc. For a general discussion, see Sonia Shah, "The Spread of New Diseases: The Climate Connection," *Yale Environment 360*, last modified October 15, 2009, http://tinyurl.com/yk8lsj7.
8. Jin Zhu, "Climate Change 'Takes Toll' on Grain Harvest," *China Daily*, May 11, 2010, http://tinyurl.com/ydd6od2o.
9. Elizabeth Economy, "Asia's Water Security Crisis: China, India, and the United States," in Ashley Tellis, Mercy Kuo, and Andrew Marble, eds., *Strategic Asia 2008–2009: Challenges and Choices* (Washington, DC: National Bureau of Asian Research, 2008), 379–380.

DAVID A. PIETZ is Professor of Chinese History, Director of Global Studies, and the UNESCO Chair in Environmental History at the University of Arizona. Pietz's research focuses on environmental history of China. His publications include *The Yellow River: The Problem of Water in Modern China* (2015), *Engineering the State: The Huai River and Reconstruction in Nationalist China* (2002), and *State and Economy in Republican China: A Handbook for Scholars* (1999). His research has been supported by grants from the National Science Foundation, the National Endowment for the Humanities, the Mellon Foundation, the American Philosophical Society, and the Institute for Advanced Studies (Princeton).

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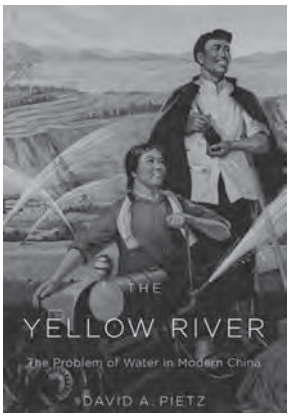

Flowing through the heart of the North China Plain—home to 200 million people—the Yellow River sustains one of China's core regions. Yet this vital water supply has become highly vulnerable in recent decades, with potentially serious repercussions for China's economic, social, and political stability. The Yellow River *is an investigative expedition to the source of China's contemporary water crisis, mapping the confluence of forces that have shaped the predicament that the world's most populous nation now faces in managing its water reserves.*

Chinese governments have long struggled to maintain ecological stability along the Yellow River, undertaking ambitious programs of canal and dike construction to mitigate the effects of recurrent droughts and floods. But particularly during the Maoist years, the North China Plain was radically re-engineered to utilize every drop of water for irrigation and hydroelectric generation. As David A. Pietz shows, Maoist water management from 1949 to 1976 cast a long shadow over the reform period, beginning in 1978. Rapid urban growth, industrial expansion, and agricultural intensification over the past three decades of China's economic boom have been realized on a water resource base that was acutely compromised, with effects that have been more difficult and costly to overcome with each passing decade. Chronicling this complex legacy, The Yellow River *provides important insight into how water challenges will affect China's course as a twenty-first-century global power.*

Source: The *Harvard University Press* website at https://tinyurl.com/ydf5a4pn.