

In Deep Water: Ecological Destruction of China's Water Resources

Jennifer L. Turner

Moving from energy to water issues in Pacific Asia, Jennifer Turner discusses the many implications—environmental, social, and political—of China's poor management of resources. Not only is China's water crisis inciting civil unrest, but regional impacts are causing concern among China's neighbors. Turner argues, however, that the many problems arising from pollution and water scarcity may ultimately serve as an impetus for China to improve its environmental governance institutions.

When the issue of water problems in China is raised, many people may first think about the infamous Three Gorges Dam—an infrastructure project hotly debated even within China because of the need to relocate 1.3 million citizens, concerns about the dam exacerbating water quality problems in the Yangtze River, and the loss of cultural relics and endangered species. Since the beginning of construction of the dam, local residents have lodged numerous complaints about local government officials pocketing funds meant to go to relocated communities.

Although it is true that many dams, dikes, and water transfer projects in China create ecological problems and place hardships on citizens who are in the path of the construction, equally severe are water pollution and scarcity that are threatening the health of China's watersheds, its people, and potentially its political stability. While many other Asian nations struggle with water quality and quantity problems, China's water woes are perhaps among the most severe in the region, not simply owing to the country's large population and rapid growth but also to its extremely poor implementation of environmental protection laws and a water management system that lacks many mechanisms to encourage water conservation.

Although serious problems of air pollution, solid waste, and rapid biodiversity loss are quite severe in China, the country's water problems are perhaps its greatest environmental threat. During the past few years the dire water quality and quantity problems are finally becoming higher priorities for the Chinese government and international community. China's water woes may ultimately become catalysts for the Chinese government to strengthen its environmental governance system, which

could become a useful model for other nations in the region. Below is a brief overview of the water pollution and scarcity challenges as well as highlights of how these problems are making an impact outside of China.

Black Water

Water pollution within China has become so bad that it even makes headlines internationally. In November 2005, for example, an explosion at a PetroChina chemical plant in Jilin Province released a 100-ton slick of the carcinogenic benzene into the Songhua River. Officials in Jilin initially covered up the spill, informing officials in Harbin—the capital of the downstream province Heilongjiang—only days before the slick reached the city of almost 10 million. Another 600 kilometers downstream the Songhua River turns into the Amur River and becomes the main water supply for the Russian city of Khabarovsk, whose officials were also in the dark about the pollution floating toward them.

Once informed of the spill, Harbin officials also tried to cover up the crisis, but their announcement about shutting down the city's water supply for routine maintenance led to a large public outcry. Municipal officials quickly revised their announcement, stating that the water system would be shut down to prevent citizen exposure to benzene. The sequence of events remains murky, but it appears the central authorities were not informed until the Harbin officials revised their story, at which time the Chinese news media were quick to investigate the explosion and the cover-ups. Reporting became so intense that the central authorities ordered the news media to shift focus to the efforts of the People's Liberation Army to help get water to the needy in Harbin during the shutoff. The spill was China's largest pollution accident ever reported, and it became an embarrassment because it was reported widely internationally. Pollution flowing into Russia aggravated tensions with cross-border areas that had long complained of China's pollution and excessive withdrawals of water from the Amur River.

The head of China's State Environmental Protection Administration (SEPA)—Minister Xie Zhenhua—stepped down. His agency had not been informed of the spill when it happened, but he took responsibility for its lack of a swift response. Soon after the slick moved past Harbin, the central government passed new rules that limit the ability of the Chinese news media to report on environmental emergencies.¹ In the months following the spill, SEPA did pass some regulations criminalizing businesses that neglected to report spills within 24 hours. SEPA also undertook a highly publicized survey of chemical plants in China, which revealed that nearly half of the 21,000 chemical plants are close to drinking water supplies along the Yangtze and Yellow rivers.

This anecdote captures many of the drivers of water and other environmental problems throughout China: powerful local officials who are often more concerned

1. Iain Marlow, "Black Rivers, Red Future: Political Overhaul Not Necessary to Save China's Environment," GlobalFLUX, Carleton University School of Journalism and Communication, 2007, <http://www.carleton.ca/sjc/globalflux/marlow.html>.

about protecting their own economic interests than the environment; the weakness of SEPA in terms of staff (just under 300), funding, and clout; and a news media that at times is an effective watchdog but is often limited by the state. The Songhua River case also illustrated some promising signs: a central government that is prioritizing water problems but often in an ad hoc fashion, an environmental watchdog agency ready to take advantage of crises to increase its authority, and a Chinese public that is increasingly willing to take to the streets or protest through the courts on environmental issues. Although China's nongovernmental organizations (NGOs) were not active in the Songhua spill, a growing number of grassroots groups are active in the field of water protection.

The litany of water pollution problems stems not simply from chemical accidents but also from extremely low rates of municipal wastewater treatment. At the end of 2002, the official municipal wastewater treatment rate was 39.9 percent, and in rural areas these rates are much lower. The highest rate of wastewater treatment is in Beijing, which in the run-up to the Olympics will increase wastewater treatment to 90 percent in the city center and surrounding suburbs—a striking increase from a treatment level of 40 percent in 2001 when the city was awarded the 2008 games.² Many of the municipal wastewater problems stem from local protectionism. A 2004 survey by SEPA of sewage treatment plants built since 2001 found that only half of them were actually working and the other half were closed down because local authorities considered them too expensive to operate.³

Another major, yet rarely acknowledged, source of water pollution stems from China's 14,000 factory farms (also known as concentrated animal feeding operations [CAFOs]). In 2003, it was estimated that 90 percent of animal farms in China lacked any kind of pollution controls and fewer than 10 percent had conducted any form of environmental impact assessment (EIA).⁴ China's CAFOs produce 40 times more nitrogen pollution and 3.4 times the solid waste of industrial factories.⁵ When effluents from industries are combined with the growing levels of organic pollution from CAFOs and agricultural runoff, the result is toxic algae blooms in lakes and a growing severity of red tides that have affected much of the east coast of China since the 1990s.

The lack of pollution control in industrial, municipal, and agricultural sectors has left China's waterways seriously degraded:

- More than three-quarters of the surface water flowing through China's urban areas is considered unsuitable for drinking or fishing, and 90 percent of urban groundwater is contaminated;⁶

2. Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG), "New Beijing," 2001, <http://61.135.180.163/eolympic/xbj/lsbj/lsbj.htm>.

3. "China Politics: Green-Tinted Glasses," Economist Intelligence Unit, July 6, 2004.

4. Linden Ellis, "Environmental Health and China's Concentrated Animal Feeding Operations (CAFOs)," China Environmental Health Research Brief (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2007), http://www.wilsoncenter.org/index.cfm?topic_id=1421&fuse-action=topics.item&news_id=225795.

5. Ibid.

- Nearly 40 percent of river water is worse than grade 5 (not suitable for agriculture or industry);⁷
- More than 300 million rural Chinese, about a quarter of the country's total population, lack access to clean drinking water;⁸
- Water pollution is causing growing agricultural losses as well as increasing protests against industries by farmers who have lost use of land and water and cannot sell their "toxic" harvests;
- Dramatic increases in aquaculture production in the 1990s have created growing eutrophication and chemical deposits (especially antibiotics) in coastal waters, destruction of mangroves, and increasing incidents of red tides;⁹ and
- Along major rivers and large lakes in China, communities suffer from higher than normal rates of cancer, tumors, spontaneous abortion, and diminished IQs caused by the high level of contaminants in the soil and water.¹⁰

Thirsty Country

Water scarcity is another major threat to China's economic growth and human health. China's annual per capita water supply is 25 percent below the global average. By 2030 the per capita supply is expected to fall from 2,200 cubic meters (m³) to below 1,700 m³, a level that meets the World Bank's definition of a water-scarce country.¹¹ Water scarcity is most acute in northern China where per capita water resources are only 750 m³ per year.¹² Although agriculture still consumes nearly 80 percent of water resources in China, water consumption in industrial and domestic sectors has been rising quickly. A lack of conservation measures in all sectors is accelerating the depletion of water resources, particularly in the dry northern part of China where, despite having only 24 percent of China's water resources, grain production accounts for more than 45 percent of China's GDP.¹³

6. Chao Shengyu, "Underground Water in 90 Percent of Chinese Cities Polluted," Jinhua News Network, December 28, 2005, http://www.jhnews.com.cn/gb/content/2005-12/28/content_552266.htm.

7. OECD *Environmental Performance Review of China* (Paris: OECD, 2007).

8. Yinglin Liu, "China's Drinking Water Situation Grim; Heavy Pollution to Blame," Worldwatch Institute, August 3, 2006, <http://www.worldwatch.org/node/4423>.

9. Aaron Cosbey, "Reconciling Trade and Sustainable Development," in *State of the World 2006: Special Focus: China and India* (Washington, D.C.: Worldwatch Institute, 2006), pp. 134–151.

10. Elizabeth C. Economy, *The River Runs Black: The Environmental Challenge to China's Future* (Ithaca: Cornell University Press, 2004).

11. Elizabeth C. Economy, "China's Environmental Challenge: Political, Social, and Economic Implications" (testimony before the Congressional Executive Commission on China, Washington, D.C., January 27 2003), http://www.cfr.org/publication/5573/chinas_environmental_challenge.html.

12. "China's Water Supply Problems," U.S. Embassy in Beijing, October 2003, <http://www.usembassy-china.org.cn/sandt/water-supply.htm>.

While China's naturally dry climate in the North and its large population are clearly key drivers of water shortages, it is ultimately shortcomings in governance institutions that exacerbate the problem. For example, in China there is a lack of clear water rights. Water is owned by the state, which has made water an ostensibly open-access resource. The water withdrawal permit system and higher water fees mandated under the 1988 National Water Law have not yet succeeded in limiting water use, in great part because there is no legal means for water users to sell water that they conserve.¹⁴ In recent years a number of major cities have begun to increase water fees and install more water meters, which are key changes needed to slow the dangerous overdraw of surface and groundwater resources. Nevertheless, when cities lack water they usually opt to tap new supplies rather than strictly enforce fee, permit, or other conservation policies.

The South-North Water Transfer Project is the most recent example of this continuing reliance on creating water supply. This ambitious water transfer project has been debated for decades but was passed within weeks of Beijing being awarded the Olympics in 2001, in part to guarantee the capital's thirst will be adequately quenched in time for the 2008 games.¹⁵ In 2002, construction began on the first of three huge canals—each at least 1,200 kilometers long—to divert water from the Yangtze River and its tributaries to thirsty northern China. The middle route will demand relocation of at least 300,000 rural residents in Henan and Hubei provinces—two densely populated provinces with little extra land for the relocated farmers.¹⁶ Because of the importance given to this project by central officials, there was little public discussion on its social and environmental impacts.

Low prices also drive waste in water in China. For example, only 43 percent of the water consumed in agriculture is used efficiently for irrigation, compared with 70 to 80 percent in developed countries.¹⁷ China's industrial water consumption is even more wasteful, using 10 to 20 times the average of industries in developed countries.¹⁸ Chinese urban dwellers increased their per capita daily water con-

13. Bryan Lohmar et al., "China's Agricultural Water Policy Reforms: Increasing Investment, Resolving Conflicts, and Revising Incentives," Agricultural Information Bulletin no. 782 (Washington, D.C.: U.S. Department of Agriculture, 2003), <http://www.ers.usda.gov/publications/aib782/>.

14. Wang Yahua, "River Governance Structure in China: A Study of Water Quantity/Quality Management Regimes," in *Promoting Sustainable River Basin Governance: Crafting Japan-U.S. Water Partnerships in China*, ed. Jennifer L. Turner and Kenji Otsuka, IDE Spot Survey no. 28 (Chiba: Institute of Developing Economies, 2005), pp. 23–36.

15. Christoph Peisert and Eva Sternfeld, "Quenching Beijing's Thirst: The Need for Integrated Management for the Endangered Miyun Reservoir," in *China Environment Series 7* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2005), pp. 33–45, <http://www.wilson-center.org/topics/pubs/feature32.pdf>.

16. Michael Eng and Ma Jun, "Building Sustainable Solutions to Water Conflicts in the United States and China," in *China Environment Series 8* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2006), pp. 155–184, http://www.wilsoncenter.org/topics/pubs/CEF_SpecialReport.11.pdf.

17. Jennifer L. Turner and Kenji Otsuka, *Reaching across the Water: International Cooperation Promoting Sustainable River Basin Governance in China* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2006).

18. Lohmar et al., "China's Agricultural Water Policy Reforms."

sumption from less than 100 liters in 1980 to 244 liters in 2000. At least 20 percent of water supplies to cities is lost through leaky pipes.¹⁹

Water as a Catalyst for Stronger Environmental Governance

Water problems have been a major catalyst for stricter top-down policies and bottom-up pressure and protests—both trends could potentially help push China to create significantly stronger environmental governance institutions and better implement existing pollution and conservation laws. Some promising top-down measures include greater prioritization and investment into water quality and quantity initiatives in the 10th and 11th Five Year Plans. For example, investment into desalinization of waste and seawater has increased significantly to provide coastal cities with greater access to clean water.

For rural water needs, during the past five years the Chinese government has spent \$3 billion to help 71 million rural citizens obtain safe drinking water. The government will allocate another \$1 billion in 2007, targeting safe water for another 20 million rural people, one-third of whom are in the particularly poor Southwest, where the majority of water is in underwater rivers that are susceptible to pollution and difficult to access.²⁰ In an attempt to stem the rampant violation of water pollution control laws, in July 2007 SEPA announced it would suspend the approval of all new industrial projects in 13 cities and industrial parks along the Hai, Huai, Yangtze, and Yellow rivers, all of which suffer from severe water pollution.²¹

Beyond project investments, the Chinese leadership's openness to using the free market in water allocation is growing. To promote water conservation in dry areas, for example, some water trades—officially these trades have been illegal—have taken place between counties and between industry and agricultural users.²² Opening up such trading could spark considerable efforts for conservation in agriculture in order for farmers to be able to sell water to thirsty cities and industry.

19. Dabo Guan and Klaus Hubacek, "Lifestyle Changes and Its Influences on Energy and Water Consumption in China" (paper prepared for the sixth conference for postgraduate students, young scientists, and researchers on environmental economics, policy, and international environmental relations, Prague, October 7–8, 2004), <http://homepages.see.leeds.ac.uk/~leckh/leeds04/6.5final-gdb-march%20conference.pdf>.

20. Jennifer L. Turner, "Environmental Health Crises in Southwest China" (summary of China Environment Forum meeting, Woodrow Wilson International Center for Scholars, Washington, D.C., November 8, 2006), http://www.wilsoncenter.org/index.cfm?topic_id=1421&fuseaction=topics.event_summary&event_id=20691.

21. Ling Li, "China Takes Steps to Restore Polluted River Basins," *China Watch*, August 23, 2007, <http://www.worldwatch.org/node/5325>.

22. In 2000 in Inner Mongolia, for example, a new coal power plant lacked sufficient water because the province had no extra water allocation available from the Yellow River runoff. The plant invested 89.5 million yuan to develop water-saving projects in irrigation districts in the area. In return for the investment, the local government permitted the plant to obtain a water withdrawal right of 50 million m³. For more details of this and other such trades, see Wang, "A River Governance Structure in China."

During the past few years perhaps the most significant top-down measures have been the surge of new rules and regulations empowering the public and NGOs to participate more in EIAs and other forms of environmental decisionmaking.²³ New regulations pushing industries to disclose pollution emission information could greatly empower the public and NGOs in pressuring polluters. This greater space for citizen participation in the environmental sphere has created more opportunities for China's NGO sector to strengthen existing water protection laws and act as watchdogs against local governments.

ADVOCATING TRANSPARENCY IN DAM BUILDING. One striking example of NGOs beginning to push the boundaries and work to improve enforcement of laws took place in September 2004, when Chinese environmentalists and journalists launched a huge national campaign to protest the Yunnan provincial government's plans to build 13 dams on the Nujiang River (Salween River)—one of China's last remaining wild rivers in an area that is recognized as a World Heritage natural site. Highlighted in the campaign was the lack of an EIA on the dams, which is required by law. The extensive public debate caught the attention of China's leaders, and in February 2005 Premier Wen Jiabao suspended planning of the dams pending an EIA. In August 2005, a broad coalition of Chinese groups—which included 61 NGOs and 99 researchers and government officials—sent an open letter to the top leaders urging public disclosure of the EIA, which had been declared a state secret. The EIA was subsequently released and revealed plans for 4 instead of 13 dams. The debate over the Nujiang River gave SEPA the power to finally draft and issue regulations in March 2006, formalizing the procedures for how the public could participate in EIA hearings. These regulations have led to some highly publicized hearings in Beijing,²⁴ but currently the question of holding a public hearing around the Nujiang dam is at a standoff because of its high sensitivity.

ADVOCATING FOR RIGHTS OF POLLUTION VICTIMS. One unique Chinese NGO empowering the public is the Center for Legal Assistance for Pollution Victims (CLAPV), which helps pollution victims successfully navigate the court system and increasingly win cases. CLAPV has been most successful in assisting cases linked to damages from water pollution, and even cases it loses have an impact in that this NGO is adept at using the news media to promote legal education surrounding the case. Most cases end up highlighting local government protection of industry and unresponsiveness to citizen needs.

PROMOTING WATER POLLUTION INFORMATION DISCLOSURE. Ma Jun, a major water activist who founded the NGO Institute for Public and Environmental Affairs, created China's first online public database on water pollution emissions in 2006. The water pollution map enables users to monitor water quality and pollution discharges using digital mapping. Data were drawn from official statistics, but this NGO is also providing grassroots groups throughout the country with equip-

23. Allison Moore and Adria Warren, "Legal Advocacy in Environmental Public Participation in China: Raising the Stakes and Strengthening Stakeholders," in *China Environment Series 8* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2006), pp. 3–23, http://www.wilsoncenter.org/topics/pubs/CEF_Feature.1.pdf.

24. Moore and Warren, "Legal Advocacy in Environmental Public Participation in China."

ment to monitor water quality. Data on water quality will be entered into a geographic information system (GIS) linked to the map, making it more of a real-time data source.²⁵

While NGO activism is growing in this area, citizen protests around water and other environmental issues are significantly larger. Disputes over water have raised tensions within communities and between provincial governments. Xinhua News reported that more than 50,000 environmentally related protests occurred in China in 2005, slightly more than half of which were about water pollution issues.²⁶ Many of these incidents do get reported in China, but some of the larger protests are censored, such as the April 2005 protest in which 60,000 farmers battled police as part of a blockade of an industrial park with 13 chemical plants that had been contaminating water and soil for years.²⁷ This explosion in protests about water supplies indicates a critical absence of effective water resources management and conflict resolution mechanisms. Water scarcity is also a source of conflicts²⁸ and potential destabilization, particularly in the dry North, where the United Nations predicts the number of eco-refugees fleeing the growing ocean of sand could reach 50 million by 2010, adding to the existing infrastructure and social pressures in coastal urban areas.²⁹

Regional Impacts

Another important source of pressure on China to deal more comprehensively with its water problems stems from the growing regional impacts of poor protection and mismanagement of rivers.

Since the well-publicized benzene spill, governors and mayors downstream in Russia have become more outspoken about the long-standing Chinese pollution contaminating the Amur River. The tensions have helped to catalyze some bilateral monitoring initiatives, which represents an important first step in addressing the cross-boundary water problem. In addition to the Russians' displeasure about pol-

25. Ke Zhang, "Group Monitors China's Water Polluters Using Online Mapping," *China Watch*, September 26, 2006, <http://www.worldwatch.org/node/4622>.

26. "China to Address Urgent Environmental Issues," Xinhua News Agency, May 4, 2006, http://english.peopledaily.com.cn/200605/04/eng20060504_263042.html.

27. "Sixty Thousand People Protest against Pollution," *AsiaNews.it*, April 14, 2005, <http://www.asianews.it/index.php?art=3036&l=en>.

28. Throughout the 1980s and 1990s, for example, villages along the Zhang River (a tributary of the Hai in northern China) have undertaken near-guerrilla warfare, destroying each other's water diversion canals after a growing number of government-sponsored water diversions further upstream created a severe water shortage in the basin. For nearly two decades local governments in the basin have struggled to resolve these conflicts, and it was only when the Ministry of Water Resources set up a special river basin management office to mediate the situation in 2004 that tensions began to cool. See Timothy Hildebrandt and Jennifer Turner, "Water Conflict Resolution in China," in *China Environment Series 7* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2005), pp. 99–103, <http://www.wilsoncenter.org/topics/pubs/chinaenv7.pdf>.

29. "China Says Desertification Being Controlled Yet Still Grim," *Agence France-Presse*, June 15, 2005, http://news.inquirer.net/world/index.php?index=1&story_id=40369.

lution, leaders in the Russian Far East are critical of China's growing agricultural withdrawals and dam building on the tributaries that feed the Amur (Heilong) River. These projects alter the volume and timing of the flow of water, disrupting agriculture and fisheries throughout Russia and Mongolia.³⁰

While China's coastal pollution is beginning to worry its closest neighbors, Korea and Japan, a more pressing marine environmental issue is China's growing consumption of fishery products, which is strongly linked to the country's growing freshwater pollution. Many species in China's seas and rivers have declined so precipitously from pollution and overfishing they now face total extinction.³¹ Thus, to meet the growing domestic and international demand for fish, Chinese fishers and fishery companies have had to expand their fishing in the coastal zones of other countries or the high seas. Chinese fishers have sparked many high seas and diplomatic clashes as they have encroached on the coastal waters of other countries; relations with Vietnam have been particularly tense over this issue. China has negotiated a network of bilateral fishery management agreements with Japan, South Korea, and Vietnam, but clashes still occur.³² Such incidents represent yet another irritant in China's relationship with other countries.

China is facing serious shortages of both water and energy as its rapid economic expansion further strains its limited natural resources. Under the current round of dam building, which includes plans for more than 200 dams in southwest China, the government plans to triple hydropower capacity by 2020. China's damming, pollution, and channelization of the upper reaches of the Mekong River have created perhaps the most sensitive transboundary water situation. Of particular concern to the downstream Southeast Asian nations is the current boom of dam building for hydropower.³³ Local governments in southwest China are currently planning or building more than 200 dams, and few of these projects have completed the required EIAs. On the Mekong River, the Chinese side has conducted transboundary impact assessments (TIAs) for channelization and some of the dams, but these TIAs generally are superficial and overlook the true environmental and social impacts of the planned project on downstream communities.³⁴

30. Juli S. Kim and Michael Murphy, "Transboundary River Tensions: Opportunities for Collaboration," in *China Environment Series 8* (Washington, D.C.: Woodrow Wilson International Center for Scholars, 2006), pp. 209–211.

31. David Rosenberg, "Managing the Resources of the China Seas: China's Bilateral Fisheries Agreements with Japan, South Korea, and Vietnam," July 1, 2005, <http://community.middlebury.edu/~scs/intro.html>.

32. Li Yong Yan, "China Goes Fishing," *Asia Times*, March 17, 2005, <http://www.atimes.com/atimes/China/GC17Ad01.html>.

33. "China's Upper Mekong Dams Endanger Millions Downstream," Briefing paper no. 3 (San Francisco: International Rivers Network, October 2002).

34. Linden J. Ellis and Jennifer L. Turner, "Environmental Security and Regional Politics in the Mekong Basin" (summary of China Environment Forum meeting, Woodrow Wilson International Center for Scholars, Washington, D.C., February 26, 2007), http://www.wilsoncenter.org/index.cfm?topic_id=1421&fuseaction=topics.event_summary&event_id=224757.

A Way Out

While China's water woes are severe, they have catalyzed progressive policies and created more political space for grassroots activism. International assistance in this sector is also growing, but much more could be done to help improve China's water management infrastructure.³⁵ For example, the European Union's various pilot projects and research initiatives in the Liao River basin since 2002 produced basin-wide recommendations on reforming water sector institutions and tariffs that Liaoning Province integrated into its 10th Five Year Plan. All of China's seven main river basins are under severe ecological stress—mainly from pollution—so there exist many opportunities for bilateral and multilateral aid agencies to pursue basin-wide initiatives such as the EU is doing.

The World Bank's environmental information disclosure initiative addressing industrial emissions in Jiangsu has led to a national program and new regulations that aim to push industries to become more transparent in pollution emission information. International organizations and businesses could play an important role in increasing the capacity for this program, which could pressure industries to lessen water pollution emissions.

Currently not many international organizations are working on sustainable urban planning, which is an issue that could promote more sustainable water use. For example, much of the construction of upscale apartment buildings in China's water-short regions does not take available water resources into account.³⁶

International corporations also are beginning to play a potentially important role in pushing for better water management and protection in China. For example, Coca-Cola has begun implementing its new worldwide policy of net zero water loss in China, which will bring considerably more efficient wastewater recovery processes into its plants and partner companies in China. GE is greatly expanding its market presence in China in water-saving and water treatment equipment, most strikingly illustrated in its construction of China's first rainwater recycling project for the National Stadium being built for the 2008 Olympics in Beijing. The nanofiltration membranes in this system recycle rainwater using underground pools, which will then be reused for landscaping, firefighting, and cleaning the Olympic village.

35. Turner and Otsuka, *Reaching across the Water*.

36. Jim Yardley, "Beneath Booming Cities, China's Future Is Drying Up," *New York Times*, September 28, 2007, http://www.nytimes.com/2007/09/28/world/asia/28water.html?_r=1&th=&oref=slogin&emc=th&pagewanted=print.