CHINA BRIEF

Volume 6, Issue 25 (December 19, 2006)

NEW RIPPLES AND RESPONSES TO CHINA'S WATER WOES

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China's environmental problems are increasingly in the international limelight, as reports of the country's mounting pollutants and stories of the choking air in major Chinese cities have made their way into newspapers throughout the world. The most serious of these challenges have been linked to the country's dwindling water supply, which not only suffers from considerable pollutants, but also is insufficient for the country's rapidly growing economy and its massive population. While the Chinese government has finally recognized the seriousness of these environmental issues and has even begun to address them through various top-down efforts, its responses remain hampered by the local government's protectionism of its polluting industries as well as the crippling weakness of the State Environmental efforts have grown during the last decade and have had notable successes in combating environmental woes, they are still viewed with suspicion by the government and are even sporadically harassed. If China is to combat its environmental challenges successfully, it must provide for stronger environmental regulations and enforcements as well as empower grassroots environmental efforts.

Black Rivers and a Growing Health Crisis

China's pollution trends are sobering, threatening economic growth, human health and watershed ecosystems. Urban and rural areas are both facing equally serious water pollution problems. Urban inhabitants in China draw 70% of their drinking water from groundwater sources. Between 50% and 90% of urban groundwater, however, is contaminated by agricultural runoff, industrial and municipal wastewater and in some municipalities, even toxic mine tailings. In rural areas, 700 million citizens lack access to safe water. Besides agricultural runoff and pollutants from small and medium industries, a large (and perhaps now the largest) source of water pollution is from animal factory farms, better known as confined animal feeding operations (CAFOs). Today, China's CAFOs produce a total of 2.7 billion tons of livestock manure annually; 3.4 times the industrial solid waste generated nationwide (China Watch, December 12).

Another relatively unknown type of water pollution is occurring in karst landscape areas of southwest China. Karst landscapes—where much of the water flows underground through caves rather than at the surface—have shallow and porous bedrock, which means surface pollutants are easily able to contaminate the underground rivers, upon which millions of poor farmers depend. Water quality of rivers flowing above ground is likewise severely degraded by pollution, with nearly 50% running black at grade 5 (not suitable for agriculture or industry). Since 2002, approximately 63 billion tons of wastewater flow into China's rivers each year, of which 62% are pollutants from

industrial sources, and 38% are poorly treated or raw sewage from municipalities [1].

Rivers in China are also increasingly degraded by the growing frequency of chemical spills. In November 2005, an explosion occurred at a PetroChina chemical plant in Jilin Province that released over a hundred tons of benzene into the Songhua River. The enormous benzene slick then flowed through the Heilongjiang Provinces' capital Harbin and into Russia. A mere three months after the Songhua benzene accident, a plant in Sichuan Province spilled toxins into the upper reaches of the Yuexi River, disrupting the water supply of 20,000 people in the city of Yibin. In early 2006, SEPA released a survey, revealing that over half of China's 21,000 chemical plants are located along the Yellow and Yangtze rivers (China Watch, February 23). Few of these plants have conducted the required environmental impact assessments and almost all are weakly regulated.

Such widespread pollution to China's water supplies has resulted in troubling social and economic repercussions. Anecdotal evidence reported by Chinese and international news media, Chinese water non-governmental organizations (NGOs) and—albeit rarely—the Ministry of Health points to a disturbing trend of higher than normal rates of tumors, cancer, spontaneous abortions and diminished IQs among populations living near polluted rivers and lakes. Water pollution is also causing agricultural losses, sparking protests against industries by farmers who have lost the use of land and water and cannot sell their "toxic" crops. The Chinese government admitted that 50,000 environmental-related protests occurred in 2005, many of which were most likely related to water degradation.

Water Scarcity-Eco-refugees and Thirsty Cities

Water scarcity is also a growing crisis, exacerbating the severe water pollution problems throughout China. China's annual per capita water supply is a quarter of the global average and is even lower in China's arid north. While agriculture still consumes nearly 70% of water resources in China, water consumption in industrial and domestic sectors has been quickly rising, and none of these sectors uses water efficiently [2]. In 2002, the amount of water used for every \$10,000 worth of GDP in China was 537 m3, four times the world's average and nearly 20 times that of Japan and Europe (Economic Daily, August 8, 2005).

China's booming demand for water and lack of conservation are accelerating the depletion of its water resources, particularly in the dry north where grain production accounts for more than 45% of China's GDP [3]. In northern and western China, the overdrafting of water and land degradation has caused desertification to advance at an annual rate of 1,300 square miles, affecting 400 million people (China Daily, July 1, 2002). The economic impact of this desertification in China's breadbasket is growing, as is the human suffering from the loss of homes and livelihoods. For example, 24,000 villages in northern and western China have been abandoned or partially depopulated due to growing desertification [4]. Continued desertification will exacerbate rural migration into cities as well as increase the severity of the spring sandstorms [5]. While most severe in the north, water scarcity has become a major obstacle to sustainable development

throughout the country. Besides human suffering from water shortages, river ecosystems have also been damaged from excessive withdrawals. Most alarming has been the damage to the Yellow River, which, since the mid-1990s, often does not flow to the ocean for up to 200 days a year [6].

Yet, rather than emphasizing water conservation, increasing the country's water supply through major dam and water diversion projects continues to be a cornerstone of Beijing's response to the water shortage. Shortly after China was awarded the 2008 Olympics, the government finalized a decision to begin construction on the South-North Water Transfer project—three canals that will bring water from the Yangtze River to quench the thirst of the arid north and ensure Beijing sufficient water for the Games. Part of the rationale for damming the stunning Tiger Leaping Gorge, one of the more than 200 dams planned in southwest China, is to divert its reservoir water to Lake Dianchi in Kunming, the capital of Yunnan, to dilute its pollution problems. These enormous water transfer and dam projects are costly—in terms of money, loss of agricultural land, ecological damage and hardships on relocated people—and increasingly spark protests by unwilling relocatees.

Top-down Responses to the Water Crises

The Chinese central government has recognized and is beginning to address the serious threats that water degradation and river mismanagement are posing to the economy, human health and—of perpetual concern—social stability. The government has been adopting new laws, such as the Environmental Impact Assessment (EIA) Law, and updating old ones to strengthen water pollution enforcement (China Brief, November 22). The strengthening of such top-down water protection measures is critical for reforming the water management laws and institutions and improving the water pollution prevention infrastructure. To stem the growing threats of industrial pollution emissions and spills, in July, SEPA announced it would tighten the supervision of polluting industries and wastewater emissions affecting major drinking water sources. In addition, the central government is revising its national standards on drinking water quality, catalyzing collaboration among SEPA, the Standardization Administration and the ministries of construction and health. The new standards will increase the number of pollutants tested from the current amount of 35 to 107 (China Watch, August 3). Water shortages, primarily in northern China, have also served as the catalyst for attempts to reform the existing river basin commissions responsible for the management of the country's seven main rivers. Water protection has been increasingly prioritized with ambitious goals for river clean ups in the 10th and 11th Five-Year Plans.

Many such water protection investments and targets, however, fell short in the 10th Five-Year Plan, and expensive supply-side management projects still dominate as the primary solution to water shortages. Years of major central government investments and campaigns to protect shallow lakes suffering from serious eutrophication (e.g., Dianchi, Chaohu and Taihu) or toxic rivers (e.g., Huai River) have done little to mitigate the pollution and nutrient runoff that have turned them into nearly dead watersheds. The Huai River is the poster child of China's failing environmental governance system. Despite a decade-long central government campaign that began in 1993 to clean up the river, it is still one of the most polluted in China and citizens in the basin suffer from significantly higher rates of cancer as well as other health problems. The failures of this campaign and many of the other ambitious pollution prevention laws stem largely from the difficulties in pressuring local governments to regulate the very industries that prop up the local economy. Attempts at compelling local governments to enforce environmental laws by linking "green GDP"—economic growth and improvements in environmental quality—to individual promotions have failed. Moreover, local governments have pushed for limits on the ability of lawyers to bring class action lawsuits, which have become relatively successful in recent years in punishing polluting industries.

Grassroots Efforts-China's Water Warriors

Acknowledging their inability to enforce environmental laws at the local level, central government officials have permitted the growth of "green" NGOs beginning with the passage of a registration system in 1994. Already the largest sector of China's civil society, green NGOs spent their first decade of development focused on relatively "safe" issues, such as environmental education and animal protection issues. Yet, the growing seriousness of water degradation and the threats to river ecosystems have catalyzed a number of Chinese NGOs and even individual citizens to become "water warriors," pursuing more aggressive activities and empowering citizens through existing environmental laws. For instance, Yu Xiaogang, the director of Green Watershed in Yunnan and the winner of the prestigious Goldman Environmental Prize in 2006, brought villagers from the Nu basin to visit villages at the Manwan and Xiaowan dams, enabling them to see first-hand the detrimental effects of dam building (China Brief, November 22). In addition, Yu also assisted the villagers in understanding their rights in demanding input into environmental impact assessments and greater transparency in dam building projects. Likewise, Zhang Changjian, a local doctor in Xiping Village in Fujian Province, with assistance from the Beijing NGO Center for Legal Assistance to Pollution Victims, successfully sued the Rongping chemical plant, China's largest chlorate manufacturer, forcing it to compensate villagers for health and environmental damages.

China's green NGOs have also successfully pushed to make more environmental information accessible to the public, a remarkable achievement for a society whose access to information is often restricted. For example, the Institute of Public and Environmental Affairs, a Beijing-based environmental organization directed by a long-term water researcher and activist Ma Jun, launched China's first online public database of water pollution. This digital water pollution map enables internet users to survey water quality and monitor pollution discharges. While this database represents a significant step toward information transparency, it requires more extensive data inputs and cooperation from other environmental NGOs (China Watch, September 26). The creation of such information-sharing platforms has begun to yield tangible results in the forms of media coverage and government action. Based on the health surveys of over 100 villages in the Huai River basin conducted by the Huai River Protectors, Chinese news media, including the state-owned CCTV, have reported on the abnormally high cancer rates in the villages, most likely caused by the extensive pollution of the Huai River. Such news reports have forced local governments to invest in the drilling of deep wells to supply safe and clean

water for its villagers.

While the central leadership has tolerated the creation of green groups to help implement and monitor environmental laws, there are instances when environmental NGOs, lawyers and citizens tackling pollution issues have been subjected to major backlash or harassment from local governments or industries. Over the past two years, even the central leadership has become concerned with what it perceives as excessive social activism. This wariness stems from the growing number of protests throughout China on a wide range of issues, such as land grabs, corruption and pollution. In addition to the external constraints, green NGOs in China are also hampered by certain internal shortcomings that threaten their sustainability in the long run, including an overdependence on foreign assistance, the lack of internal transparency and a high turnover in staff due to low paying positions.

Closing Thoughts

China's severe water pollution, shortages and watershed destruction contribute to population movements, health risks, food security problems and rising income disparities. These problems raise humanitarian concerns and have the potential to affect China's economic, political and social stability. In order to strengthen the environmental governance system for water protection, the Chinese government must find ways to drastically improve law enforcement at the local level, which demands not only better regulations but also the true empowerment of NGOs and citizens to become even more effective watchdogs. Recent moves to limit the ability of the media to report on pollution accidents, discourage class action cases and intimidate NGOs are regrettable steps backwards. China's watersheds and citizens cannot wait too long for the needed political reforms.

Notes

1. U.S. Department of Commerce, International Trade Administration, 2005 Water Supply and Wastewater Treatment Market in China, Washington, DC. 2. For example, only 43% of the water consumed in agriculture is used efficiently for irrigation, compared to 70% to 80% in developed countries. See U.S. Embassy in Beijing, China's Water Supply Problems, 2003, available at http://www.usembassychina.org.cn/sandt/ptr/water-supply-prt.htm. Chinese urbanites have increased their per capita daily water consumption about 150% between 1980 and 2000-from less than 100 liters in 1980 to 244 liters in 2000. At least 20% of the water supplies to cities are lost through leaky pipes, so this official per capita consumption figure underestimates total urban water use. See Dabo Guan and Klaus Hubacek. (2004). "Lifestyle Changes and its Influences on Energy and Water Consumption in China," Proceedings of the 6th Conference for postgraduate students, young scientists and researchers on Environmental Economics, Policy and International Environmental Relations, Prague (October 7-8), p. 389. Guan Xiaofeng. (2005). "Water Crisis Needs Urgent Solutions," China Daily, November 1, available online at http://www.chinadaily.com.cn/english/doc/2005-11/01/content 489327.htm.

 Lohmar, Bryan, Jinxia Wang, Scott Rozelle, Jikun Huang, and David Dawe, China's Agricultural Water Policy Reforms: Increasing Investment, Resolving Conflicts, and Revising Incentives, 2003. Economic Research Service Agriculture Information Bulletin Number 782. (Washington, DC: United States Department of Agriculture), p. 3.
Lester Brown, Outgrowing the Earth: The Food Security Challenge in an Age of Falling Water Tables and Rising Temperatures (New York: W.W. Norton & Company, 2005).

 100 sandstorms are expected between 2000 and 2009, a marked increase over the 23 in the previous decade (Geotimes, October 18-21, 2005). The impact of these sandstorms extends well beyond China's borders to Korea, and Japan, and the U.S. west coast.
Wang Yahua, "River Governance Structure in China: A Study of Water Quantity/Quality Management Regimes," 2005. In Promoting Sustainable River Basin Governance: Crafting Japan-U.S. Water Partnerships in China, IDE Spot Survey No. 28, Jennifer L. Turner and Kenji Otsuka (Ed.), (Chiba, Japan: Institute of Developing Economies/IDE-Jetro, 2005), p. 23-36.