

Water Issues in China

Introduction

As China's population and economy have grown, so has its thirst for water. Today China is the world's biggest water user, accounting for 13 percent of the world's freshwater consumption.²⁶ Not only do humans use water for drinking; we use it to wash our clothes, bathe, cook, and clean. On a larger scale, water is heavily used for countless other purposes such as industrial manufacturing, household plumbing, raising agriculture and livestock, and even producing energy. All of these processes require good, clean water. Luckily, China is home to many sources of fresh water. People have relied on these sources—rivers, lakes, rain, and aquifers—for thousands of years. In a country that is experiencing such rapid urbanization and economic development, however, clean water is becoming more and more scarce. Aquifer levels are dropping, lakes are disappearing, rivers are drying up or becoming polluted, and air contaminants are producing acid rain. Water shortages plague over half of China's cities.²⁷ Today, water is one of China's most crucial issues.

China's current water crisis is driven by two primary factors. The first of these is China's uneven distribution of water. Because of its large and diverse geography, China has a wide spectrum of terrains and climate zones. While southern and eastern China enjoy abundant rainfall, the northern and western regions of the country receive very little. (See next page for map.) This weather pattern can lead to unfortunate and seemingly contradictory effects, with some provinces battling floods while others are suffering from months-long droughts. Between mid-April and the end of May 2006, southern and northeastern China endured three brutal rainstorms, bringing rainfall of 400 millimeters (15.7 inches) or more per day. This resulted in regional flooding, destruction of vast crop fields and thousands of homes, 60 to 70 human deaths, and economic losses of nearly \$1.6 billion. At the same time, however, northern China was experiencing a severe drought that affected or threatened 182 million hectares (450 million acres) of farmland, 8.7 million livestock, and 95 million people.²⁸ Beijing, the nation's capital in northern China, was suffering its worst drought in 50 years. It received only 17 millimeters (0.7 inches) of rain in four months—a fraction of a day's rainfall in southern China.²⁹

Extremes in this climate pattern have led to problems for China. Although the floods in April and May 2006 were damaging to the

cities and communities of southern China, they were not nearly as disastrous as others in China's recent history. For example, one flood in 1998 caused the Yangtze River—China's largest—to overflow, killing more than 3,500 people, damaging or destroying more than 21 million houses, and causing economic losses of \$32 billion.³⁰ Another flood in 1954 was even worse, taking 30,000 lives.³¹ To address the common flooding of the south, China has recently built the Three Gorges Dam, an ambitious and controversial project meant to monitor and control the Yangtze's water levels to prevent future floods.

Northern China faces the opposite problem: it often receives far too little rainwater. In the north, the demand for water surpasses the available supply, largely because it has two-thirds of China's total cropland and 43 percent of its population, but only 14 percent of its water supply.^{32,33} Beijing and other northern cities and communities have had to rely on other sources of water to irrigate their crops, run their cities, and feed their people. Although northern China sits atop two large underground aquifers, so much water is being drained from them that their levels are dropping at an incredible rate. In Hebei Province next to Beijing, the water level of the deep aquifer falls three meters every year.³⁴ Rivers are also used for their water, but overuse has diminished even the Yellow River to a trickle. The Yellow River—northern China's main river—has dried up every year since 1985.³⁵ With aquifers and rivers suffering from overuse, lakes are also being affected. Hebei has already lost 969 of its 1,052 lakes.³⁶ Yet with all of northern China's water resources being tapped, water shortages still cost the Chinese economy a lot of money. According to one report, water shortages are responsible for direct economic losses of \$35 billion annually, about 2.5 times the average annual losses due to floods.³⁷

Besides the disparity in water supply between the north and south, China's water crisis has a second factor: pollution. Even in water-rich areas of China, pollution is decreasing the supply of clean, usable water. According to estimates, a full 70 percent of China's rivers and lakes are currently contaminated, half of China's cities have groundwater that is significantly polluted, and one-third of China's landmass is affected by acid rain.^{38,39,40} Today, most of the Yellow River is unfit even for swimming, and experts have called the Yangtze "cancerous."⁴¹ Because hundreds of cities—including large ones like Shanghai and Chongqing—rely on these rivers for their drinking water, people all over the country are suffering from China's water pollution crisis. The central government has begun to fight the pollution problem by issuing stricter regulations on pollutants and spending billions of dollars on water projects, but water quality is generally still poor. In 2006, Chongqing's tap water contained 80 of 101 banned pollutants.⁴²

Causes and Effects

China's water crisis is both natural and man-made. For example, China's northern regions are arid because of its natural geography and climate patterns, but humans have made these effects even worse. Rapid climate change, which most scientists consider largely human-influenced, is shortening China's rainy seasons and melting important glaciers that feed the Yellow River.⁴³ Northern China's rivers are drying up as they are strained by a growing population, more factories, and water-hungry crop fields. Overgrazing by livestock—which have become incredibly numerous—has turned grasslands into sandy deserts, which in turn has caused ecosystems to lose their natural water-trapping capabilities and become even dryer.⁴⁴ In this way, many of China's water problems stem from both natural and human causes.

Although the water crisis affects the whole country, farmers experience a large part of its effects, simply because of economic reasons. Growing food is water intensive, but not highly profitable. A farmer needs 1,000 tons of water to produce a ton of wheat worth \$150, whereas a factory needs only 14 tons of water to produce a ton of steel worth \$550. In China, where the government is desperate to create jobs and grow the economy, it makes economic sense to prioritize a steel factory's water needs over a farmer's. Thus, farmers' needs are often sacrificed. In Beijing, for example, water was diverted from the Juma River to supply a petrochemical company, while 120,000 villagers downstream watched the river dry up, no longer able to use the Juma for irrigation.⁴⁵ Episodes like this are not uncommon.

Farmers sometimes contribute to China's water scarcity and pollution problems as well. The high water-cost of irrigation—which accounts for 70 percent of water use worldwide⁴⁶—is often raised even higher in China by inefficient irrigation methods. In addition, the agricultural chemicals (like pesticides and fertilizers) that are used on crops sometimes turn into toxic runoff that can pollute groundwater.⁴⁷

Factories are even worse polluters, releasing untreated waste and chemicals into China's rivers. Many times, the pollution happens by accident. According to authorities, one pollution accident occurs every two to three days in China.⁴⁸ In one case, in 2005, a chemical explosion at a petrochemical plant spilled 100 tons of pollutants into the Songhua River, forcing the downstream city of Harbin to shut down its entire water system, leaving 3.8 million residents without water for four days.⁴⁹ But most times, pollution is intentional; the same petrochemical plant has released more than 150 tons of mercury into the Songhua since it was built.⁵⁰ About 80 percent of China's 7,500 dirtiest factories are located on rivers, lakes, or in heavily populated areas, so the potential for future pollution—accidental or not—is enormous.⁵¹

In terms of health, China's water crisis has had serious consequences. About 300 million people in China—a quarter of its population (or a

number equivalent to the entire U.S. population)—drink contaminated water every day. Almost two-thirds of these people—190 million—fall ill. Children are suffering, too, with more than 30,000 dying each year from diarrhea caused by contaminated water. In addition, China's water has been blamed for the recent high rates of various health abnormalities like cancer, stunted growth, low IQs, miscarriages, and birth defects.⁵²

Efforts to solve these water problems have sometimes created additional problems. To control flooding, numerous dams have been built on China's waterways. These dams are meant to allow humans to control the water level of river "reservoirs" so that, in the event of heavy rains, the region will not flood. However, China's past dams have been unreliable. Between 1954 and 2005, 3,486 reservoirs collapsed in China, 68 in 2005 alone.⁵³ In 1975, two Huai River dams collapsed, killing an estimated 30,000 to 100,000 people.⁵⁴

China is now completing its largest, most ambitious dam ever, the Three Gorges Dam. It will create a reservoir extending 600km (375 miles) behind the dam, raising the water level of the Yangtze, and submerging farmland, houses, temples, factories, towns, and entire cities—not to mention some of China's most famous scenery.^{55,56} In exchange, the Three Gorges Dam is intended to prevent flood disasters downstream, potentially saving tens of thousands of lives. In addition, generators in the dam will transform the power of the river's water into electricity, providing much-needed energy to keep China's economy thriving. China claims the dam will generate the electricity of 15 power plants—enough to pay for half of the project's cost—and will reduce the country's annual coal usage by 50 million metric tons, therefore diminishing a major source of air pollution and greenhouse gas emissions.^{57,58,59}

To complete the project, the government has reported spending upwards of \$25 billion (though the project's real cost is widely believed to be much higher) and has forced more than 1.3 million people to relocate, sometimes with little or no compensation.^{60,61} In areas like Wanxian Prefecture, the new reservoir will submerge rich farmland, and relocated farmers will be forced to farm on higher, less fertile ground.⁶² Furthermore, critics say the slowed river water will allow pollution to gather and contribute to the spread of disease. The government denies these claims and says that water quality will actually improve.⁶³

China is also undertaking another massive water project called the South-North water diversion, where China intends to engineer three new waterways to carry water from China's wet south to its dry north. This project began in 2002 and is projected to cost \$60 billion (though it is already over budget). More than 200,000 people will be relocated.⁶⁴ The relocations are likely to encourage people to destroy forests for new land, therefore accelerating soil erosion.⁶⁵ Still, perhaps the water diversion is necessary. As one Chinese scientist said, "Without water in northern China, people can't survive. And the economic

development that has been going on cannot continue.”⁶⁶ Projects like the South-North water diversion and the Three Gorges Dam have both costs and benefits. The important question is how to weigh their potential economic, social, and environmental effects against each other.

Suggested Resources:

Worldwatch Institute: <<http://www.worldwatch.org>>

Wikipedia: <<http://en.wikipedia.org/>>

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Notes:

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