

Hong Kong and the Greater Pearl River Delta

Delta or Desert?: Fathoming the Pearl River Delta's Water Insecurity

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Many cities in the Pearl River Delta (PRD) have undergone water shortages in recent years because there has been increasing demand for water resources at the same time that there have been frequent and severe disruptions of water supply.

Increasing Demand, Faltering Supply

The higher demand of water resources in the PRD is mainly caused by growing population, urbanization, and industrialization. The annual population growth rate of PRD cities—Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Zhaoqing (part), Zhongshan, Huizhou (part), Dongguan—between 1980 and 2000, was as high as 4.7 percent, fueled by huge migration flocks.¹ For now, due to the population increase, the average per-capita water resources of the PRD cities is 1,185 cubic meters, about a half of the national average. As many residents have moved from traditional courtyard houses to apartment buildings equipped with washing machines, flush toilets, and kitchen taps, water demand has increased. The region's economic growth reflected in its exceptional rates of increase of per capita GDP has made it possible that many of the residents can actually afford this equipment and consume more water.² Of course, the economic growth is also based on rapid industrialization, which has required vast quantities of water for industrial use.

On the supply side, according to some Chinese scholars like Yuan Ruhua, an associate professor of the Hehai University in Nanjing, climate changes have caused more frequent droughts all across China,

north and south, year-round.³ For the last 40 years, there has been a gradual increase in the number of droughts across China. The PRD region is not an exception: for the three years leading up to spring of 2006, there were serious and almost consecutive droughts in the region. Another major reason for water

supply shortage is pollution; worsening water pollution has rendered much raw water unsafe and useless. In the PRD region, the total volume of domestic, agricultural and industrial sewage has increased from 2.6 billion tons in 1997 to 3.3 billion tons in 2002.

Illustration – Guangzhou and Shenzhen

As early as 1993, Guangzhou, the capital city of Guangdong Province, experienced a major water deficit. By 1995, the shortfall reached 400,000 tons. In 1999, with a continued deterioration of water resources, the shortage became the worst on record for the past fifty years. At that time, Guangzhou residents began to pay attention to the so-called “two nine percents”: the first nine percent means the annual increase rate of the city's need for water and the second indicates the annual growth rate of its wastewater.⁴

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Concerning Shenzhen, 227 (about 73 percent) of 310 rivers and streams crossing through the city are polluted.⁵ In addition to water pollution, rising population and severe and continued droughts are also causing water scarcity for the city. In Shenzhen, the number of residents per square kilometers has increased from 825 to 3,597 between 1992 and 2002, with a 15.3-percent annual growth rate, which is the highest growth rate among all cities in China.⁶ Meanwhile, from October through December 2004, Shenzhen was affected by the severest drought since 1952. Consequently, in 2004, its per-capita water resources were just one-eighteenth compared to that of twenty years ago.⁷

For now, Shenzhen relies on Dongjiang, the eastern tributary of the Pearl River beyond the city, for about 60 to 70 percent of its water supply. To address water shortage, it is considering designating a couple of coastal communities where seawater can be utilized for toilets in order to save fresh water. To catch more rainfall, it will build two large reservoirs as well.⁸

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Socio-Economic Disruptions

Water scarcity in the PRD has caused social and economic disturbances and costs for the region. In particular, as the water level of the Pearl River has diminished during the current drought spells, saltwater from the sea has flowed back into the inland rivers. This saltwater tide now poses a threat to available supplies of potable water for PRD cities. For example, as a result of the severe drought in winter 2003 to spring 2004, Guangzhou, Zhuhai, and Zhongshan have experienced the severest saltwater tide in two decades and some residents have had to drink saltwater.⁹ In spring 2006, because of saltwater tides, tap water for Macao residents became undrinkable. Water had to be diluted with expensive distilled water. In addition, the price of bottled water in Macao tripled.¹⁰

Drought or water shortage in general has affected industry in the PRD as well. For example, Shenzhen, the first Special Economic Zone of China, had to close or partially shut down most of its textile, dyeing, food, and beverage factories, losing more than \$2.4 million per day, because of pollution-triggered water shortage, beginning as early as 1991.¹¹ During the drought of late 2004, factories in Longgang and Bao'an, where most of Shenzhen's manufacturing companies are located, had to cut water consumption by 15 percent from normal usage. Under these circumstances, Mai Qigzhao, secretary-general of the Shenzhen Toy Association was quoted by *China Business Weekly* as saying that water scarcity was growing as a major problem for the city's toy-makers,

who account for almost 42 percent of China's entire toy export.¹²

Finally, it should be noted that some cross boundary, regional tensions or even conflicts can be expected as provinces and cities allocate increasingly scarce fresh water resources. For instance, when some PRD cities diverted water from Guizhou Province for a two week period in early 2005 to secure sufficient drinking water, fishing boats in Guizhou had to stop operating so as not to disturb the water diversion process, causing about 100-yuan loss a day for an average fisherman in the province.¹³ Problems of still greater magnitude emerge as one considers the relationship between PRD cities in Guangdong Province and the Hong Kong Special Administration Region with regard to water allocation, an ominous commentary from Hong Kong is worth noting: "Before long Guangdong will find itself short of clean water supply. We (in Hong Kong) cannot expect to be looked after forever. Sometime in the future, there'll come a point when Guangdong will have to decide if it will look after itself first and then supply HK with only what is left."¹⁴

Endnotes

¹ For reference, the rate of China's natural population increase was roughly 0.88 percent as of 1999.

² Here is an old but relevant statistic demonstrating the contribution of urbanization to water demand (consumption) increase: nationally, between the year 1980 and 1993, the urban population increased from 159 to 282 million with 4.5 percent annual increase rate while the household water consumption increased from 6.8 to 23.7 billion cubic meters with 10.1 percent annual increase rate, 2.2 times higher than the annual increase rate of urban population. Yue Zhang, ed., *China's Water Resources (Zhongguo shuiziyuan)*, pp. 99 - 100. Regarding the higher GDP of the PRD region, the GDP growth rates in most PRD cities have been always 10% or higher every year for last 20 years. For example, Dongguan's GDP growth rate was 18.4% in 2002. Per capita GDP of the PRD was about \$2,700 in 2002 when the national average was around \$963. Si-ming Li and Koon-Kwai Wong, "Urbanization and Pearl River

Delta's Changing Aquatic Environment" (2005) (manuscript).

³ Yuan Ruhua, Huang Taozhen, and Hu Wei, "Impacts of Extraordinary Climate on Water Resources in China (*Qihou yichang dui woguo shuiziyuan de yingxiang ji duiche*)," *Acta Geographica Sinica (Dili xuebao)*, Vol. 55 (supplement) (November 2000), pp. 130-132.

⁴ Jun Ma (translated by Nancy Yang Liu and Lawrence Sullivan), *China's Water Crisis* (EastBridge, 2004), pp. 170-1. As of 1999, according to Junhe Chen and Guoquan Zheng at Department of City and Resources Planning of Sun Yatsen University, the annual increase of water consumption in Guangzhou was 10 percent. And, the annual wastewater discharge of the city was more than 1 billion tons: near 3 million tons a day; two-thirds is domestic sewage; and 90 % is not treated. They also pointed out that the city's inefficiency of industrial water consumption was another reason of its water shortage. In 1994, Guangzhou consumed 642-cubic-meter water to produce 10,000-yuan value whereas Beijing consumed 133.4 cubic meters. Junhe Chen and Guoquan Zheng, "Utilization of Water Resources and Sustainable Development of Guangzhou City (*Guangzhoushi shuiziyuan liyong yu kecixu fazhan*)," *Journal of Sun Yatsen University*, Vol. 20, No. 1 (February 2000), pp. 11-12.

⁵ "Polluted Rivers Foul City's Image," *China Daily*, May 31, 2005.

⁶ "Shenzhen to Tackle Population Explosion," *Shenzhen Daily*, November 15, 2004. As of 2004, the number of people per square kilometers was about 5,000.

⁷ "Water Scarce while Waste Continues in Shenzhen," *Shenzhen Daily*, November 17, 2004.

⁸ "Seawater to Flush Seaside Houses in Shenzhen," *Shenzhen Daily*, March 27, 2006.

⁹ "Salty Tide Threatens Potable Water Supply," *China Daily*, March 5, 2004.

¹⁰ See "Fresh Water from Xijiang to Soon Reach Macao," *China Daily*, January 17, 2006 and "Fresh Water Crisis," *China Daily*, March 6, 2006.

¹¹ Jun Ma, *The Crisis of China's Water Resources (Zhongguo shui weiji)*, (Beijing: China Environmental Science Publishing House, 1999), p. 376.

¹² Hong Chen, "Drought Squeezes Exporters," *China Business Weekly*, December 22, 2004

¹³ Overall, the project affected more than 50,000 residents in Guizhou. "Project Starts to Send Water to Dry Areas," *China Daily*, January 18, 2005.

¹⁴ "Find Other Ways to Quench HK Thirst," *China Daily* (HK edition), January 31, 2005.