



Research Paper

Water Shortage and Pollution in China

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ABSTRACT

China's booming economy and massive population are posing several difficult environmental challenges. Water shortage and water pollution are among the most pressing issues. Sustainable water management has long taken a backseat to the Chinese drive for economic growth. In this report, we have addressed the current conditions of water shortage and pollution in China and its potential threats to public health and social problems.

Key words: Environment; water shortage; water pollution; health; China.

INTRODUCTION

China's booming economy and massive population are posing several difficult environmental challenges for a nation of more than 1.3 billion people. Water shortage and water pollution are among the most pressing issues. Water is critical for well-being and economic growth; and in contrast, human activity has potential adverse impacts on water quality. A new report released by the Ministry of Environmental Protection estimated that a total of 280 million residents in China are using unsafe drinking water (Xinhua News, 2014). Of those, almost 110 million residents are living less than 1 km away from at least one industrial site with pollution concerns such as petrochemical, coking or thermal power plants. Limited and even contaminated water resources, plus inadequately regulated human activity and economic growth, pose serious threats to public health and social problems in China.

China is not a water-rich land and the per-person water supply is actually quite low nationwide. First, although China's water resources are relatively abundant (2.8 trillion m³), the annual per-person renewable fresh water availability (2200 m³) is only a quarter of the global average (Cheng et al., 2009). Second, the water resources are not evenly distributed across the massive landscape, with northern China having only one third of the per-person quantity of southern China (Liu and Diamond, 2005). In addition, a typical continental monsoon climate in China causes annual precipitation largely inter- and intra-variable, which makes the utilization of water resources

quite challenging.

Shortage and pollution exacerbate China's water quality problems. Rivers and groundwater throughout China have been widely polluted by industrial and municipal wastewater discharges, and agricultural runoff of fertilizers and pesticides. With the China's economic transition, rural industries (township-village and private enterprises) have been playing important roles in overall economic production over time (Wang et al., 2008). Rural industries are characterized by their small scale, outmoded technology, and obsolete equipment. It was estimated that rural industries alone discharge over 10 billion tonnes of wastewater per year, which is nearly half of the industrial wastewater discharge nationwide (Wang et al., 2008). Runoff from agriculture including pesticides and fertilizers is another great contributor to water pollution. It was reported that the consumption of pesticides and fertilizers nearly doubled in the period 1990-2004 (China Statistical Publishing House, 2005). "Cancer villages" tend to cluster along major rivers and branches, and almost half of the water in China's seven major river basins was classified as being unsuitable for human consumption (Figure 1) (The Ministry of Environmental Protection of China, 2012). The parallel coexistence of both polluted drinking water and "cancer villages" has led interest in the association between the two epidemics.

Polluted water resources are not only a problem in rural areas. China's cities have limited facilities or infrastructure

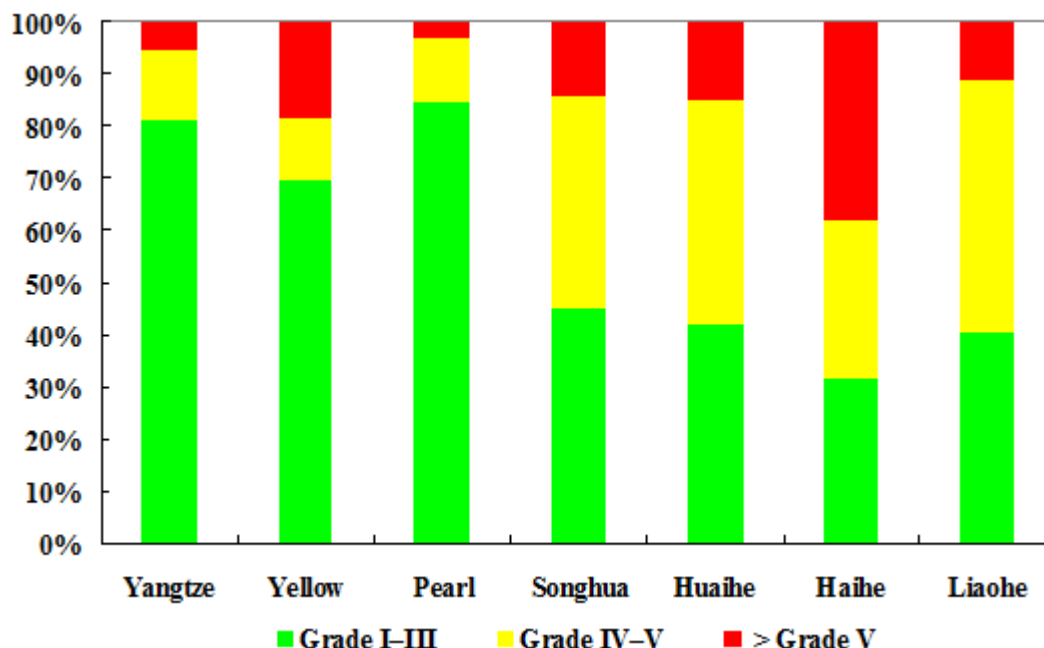


Figure 1. Water quality of china's major river basins 2011.

to treat sewage or drinking water, which mainly comes from surface water of large rivers or lakes. Most cities and communities simply discharge untreated or only marginally treated wastewater and sewage produced by households and industries into surrounding surface waters (Wu et al., 1999). It is not surprising that the poor quality of sewage treatment has resulted in widespread pollution of drinking water supplies, and in turn resulted in episodes of illness. The problems from the failure to treat sewage properly are further exacerbated by inadequate treatment of drinking water supplies. The 2013 Huangpu River dead pig incident revealed that over 10,000 carcasses floating along parts of this river which flows through Shanghai and serves tap water to Shanghai (Wikipedia, 2013). The pigs were dumped by farmers of neighboring provinces, major pig farming areas that are upstream of Shanghai. Exposure to polluted drinking water may be associated with increasing rates of cancers and infectious diseases. The World Bank (2007) estimated that the annual health cost associated with water pollution in China had reached approximately US\$8 billion.

Sustainable water management has long taken a backseat to the Chinese drive for economic growth. As a result, China has developed a set of water quality and quantity problems as severe as any on the planet. Serious water pollution has affected people's health and social stability and become the bottleneck thwarting China's rapid economic and social development. We are grateful that new tools, approaches, and technologies have been tried during the 12th Five-Year Plan (2011-2015) as China attempts to move toward long-term sustainable use of its scarce and valuable water

resources.

Conflicts of interest

We declare that we have no conflicts of interest.

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