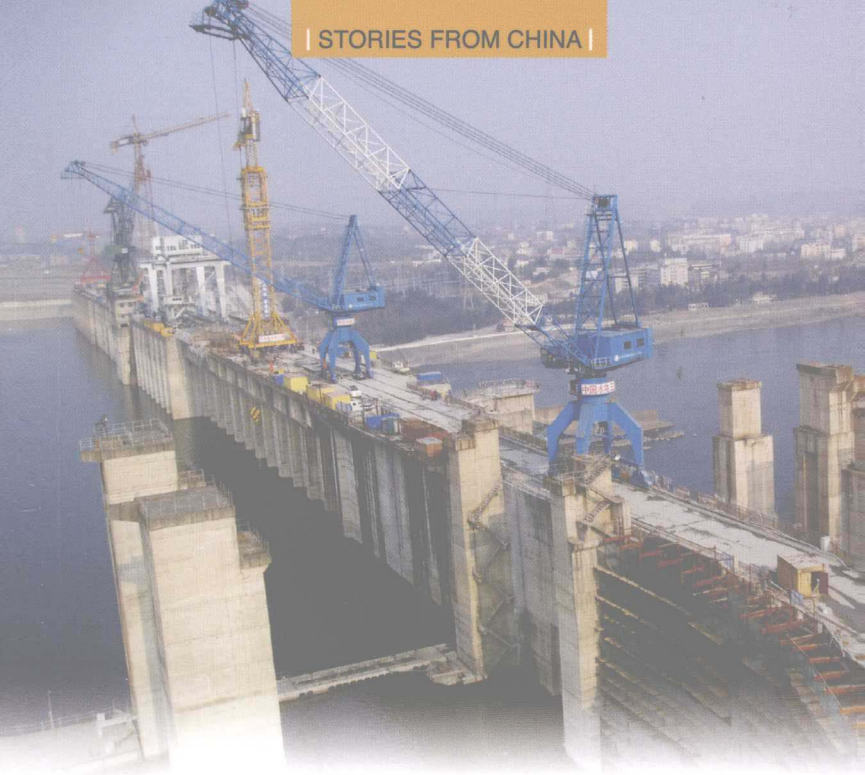


| STORIES FROM CHINA |



BY SHUI QINGSHAN

# MOVING THE FLOW

**China Reshapes Its Water Supply**

*Translated by Li Rong, Wang Li & Xiao Ying*

CHINA  
INTERCONTINENTAL  
PRESS

# MOVING THE FLOW

China Reshapes Its Water Supply

江苏工业学院图书馆

JIANGSU UNIVERSITY OF TECHNOLOGY

Translated by Li Rong, Wang Li & Xiao Ying

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# Preface

**Z**hu Xi, a thinker of the Southern Song Dynasty, once wrote: “Why is the water so clear in the dyke, for the fresh water comes from the springhead.” Literally, he meant that the water was clear thanks to a flowing headstream. The two lines aptly describe China’s South-to-North Water Diversion Project currently under construction. The aim of the project is to divert running headwaters from southern China to the north. The goal is to solve the chronic water shortage in northern China while cleaning up the rivers and lakes in the north. This sparkling goal is already underway.

Being the largest long-distance water diversion project in China’s history, the South-to-North Water Diversion Project has cost nearly RMB500 million to date, twice as much as the Three Gorges Project. The project is divided into three water diversion routes: the Eastern Route Project (ERP), the Middle Route Project (MRP) and the Western Route Project (WRP). When all three parts are completed, a total of 44.8 billion cubic meters of water will be diverted every year until 2050. That is about equal to digging a new Yellow River along the basin plains of the Yellow River, Huaihe River and Haihe River and the northwest part of China. In a word, the



project will fundamentally alleviate the serious water shortage in northern China.

First and foremost, the project benefits Beijing by easing the capital's critical water shortage. At the end of 2003, advanced construction started on the Beijing-Shijiazhuang emergency water supply works along the MRP. Starting from the Xinhua District of Shijiazhuang, Hebei province, in the south and ending at Tuancheng Lake in the Summer Palace of Beijing, the works was given priority to allow for the emergency diversion of water to Beijing and supply the entire Phase I of the MRP portion of the project. When completed, water from four reservoirs in Hebei-Gangnan Reservoir, Huangbizhuang Reservoir, Wangkuai Reservoir and Xidayang Reservoir-should divert into the MRP and in turn supply water to Beijing.

On May 20, 2008, the Beijing-Shijiazhuang emergency water supply works got temporary approval from the Office of the South-to-North Water Diversion Project Construction of the State Council. The approval qualified the Beijing-Shijiazhuang segment to temporarily divert water. It also proved the segment capable of supply water to Beijing at any time.

The Beijing-Shijiazhuang emergency water supply works is a prelude for the larger diversion of water from the south, where it is abundant, to the north, where it is scarce.



# **I More Water Resources in the South, Less in the North**





**T**he South-to-North Water Diversion Project will take advantage of the reality that China has more water in the south than in the north.

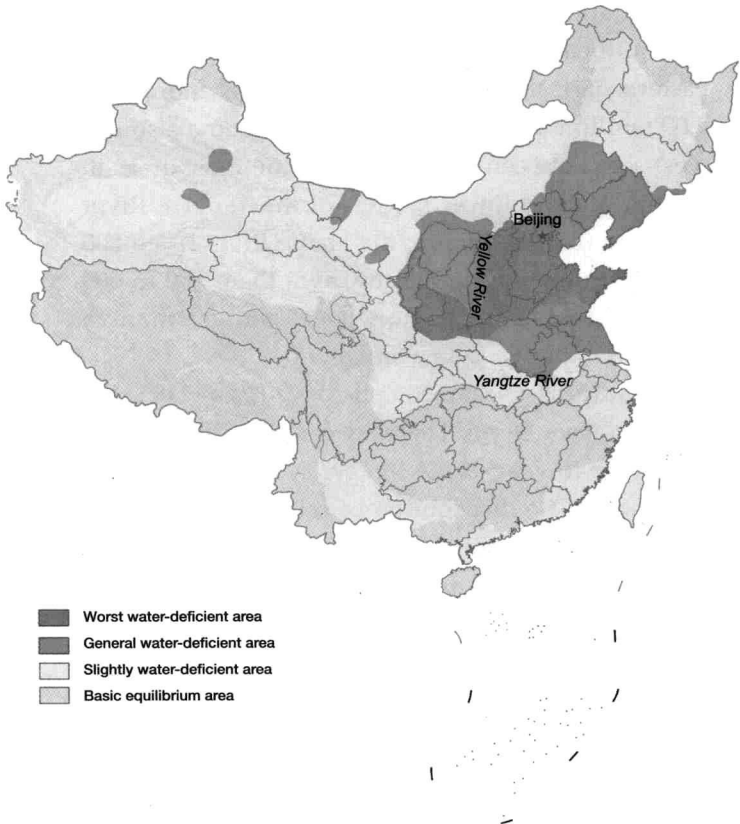
### (I) Three Basis Characteristics of Water Resource Distribution in China

China has about 5.8% of the world's water or 2,812.4 billion cubic meters. Meanwhile, China has the sixth largest stock of fresh water in the world but it is the most populous nation on the planet. Per capita, the country has 2,163 cu m, about one quarter of the world's average. This puts China on 88<sup>th</sup> place out of 153 countries in terms of access to water, according to 1998 statistics by the World Bank. At the same time, this makes water a precious natural resource for the country and forces scientist to take into account the reality of water distribution in China. Because the country has a lot of water but it also has a lot of people, the availability of water per capita is small ultimately.

Another basic characteristic of China's water is that it is not evenly distributed. There is plenty of water in the south but the north is lacking. Most of the water in stream runoffs comes from rainfall and most precipitation in China that is directly related to monsoons that come from the southeast out of



## More Water Resources in the South, Less in the North



Water shortage distribution map of China

the Western Pacific Ocean and the southwest monsoons from the Indian Ocean and the Bay of Bengal. There are enormous differences in total annual

precipitation across the country. Hilly areas along the southeast coast and mountainous areas in the eastern parts of Taiwan and Hainan get more than 2,000 millimeters of water per year; China's south-west sees between 1,600 to 1,800 mm; most areas in the middle and lower reaches of the Yangtze River get more than 1,000 mm; the Haihe River basin 800 to 1,000 mm; and the North China Plain 500 to 600 mm. Arid areas in the northwest get less than 25 mm of rain per year on average.

The third basic characteristic of China's water distribution is variation. There are considerable changes from year to year in the frequency and intensity of monsoons. The distribution of rainfall and the volume of stream runoffs are also uneven from year to year and sometimes month-to-month. There is a tendency for drawn out draughts as well as periods of intense wetness, sometimes lasting for years. Severe droughts can severely impair the development of the national economy and result in considerable ecological damage.

In the course of developing and better utilizing China's water, it is paramount to tackle these three factors. The ultimate aim is to ensure the sustainable and sound development of the national economy. The South-to-North Water Diversion Project will take advantage of advanced technology to optimize the



allocation of water across China.

## (II) The Basins of the Yellow River, Huaihe River and Haihe River are the Most Water-scarce Areas in China

The Yellow River, the second longest river in China, is 5,464 kilometers long and covers a drainage area of 750,000 square kilometers, with an average stream flow of 1,774.5 cubic meters per second. Although the Yellow River serves as one of dominant water-heads in Northwest and North China, the amount of water it carries accounts for merely 2.5% of China's total. In its drainage area, the available water available in the year 2000 was 633 cu m. There are 35 main branches that converge into the Yellow River. The larger ones are in the upper and middle reaches. There are fewer lakes on both banks as the river travels into the small area of the lower reaches.

The Haihe River is 1,000 km long. It originates in the southern part of Henan Province and flows eastwards. Its drainage area lies in the central part of China, between the basins of the Yangtze River and the Yellow River. It covers an area of 270,000 sq km. Throughout history, Huaihe River has been known as a "harmful river": It floods in heavy rain, overruns in light rain and dries up in dry weather. After the



People's Republic of China was founded in 1949, the government realigned the river's trunk stream and branches and dug drainage canals. The government also built an initial drainage system. However, flood and waterlog disasters are still rampant because the level of control needs to be enhanced. Worse still, water resources are scarce. The Huaihe River basin, including areas in the east to Jinan, the capital city of Shandong province, sees average annual precipitation of 854mm and has a total of 96.1 billion cu m of water, merely 3.4% of the country's total. In 2000, the amount of water available per capita in the drainage area was only 478 cu m; In Jiaodong area where is east to Jinan; the amount was even lower at 330 cu m. During extremely dry years, the gap between the demand and supply widens considerably.

The Haihe River, one of main rivers in North China, is a convergence of five streams. Flowing from the north and west and meeting in Tianjin, the largest industrial city in northern China, the five streams run eastward to the estuary of Dagu where they drain into the Bohai Sea. The river's drainage area is 317,800 sq km, accounting for 3.3% of China's total territory. Its basin has an average annual precipitation of 539 mm and about 37.2 billion cu m of available water every year, some 1.3% of China's total. In 2000, the amount of water available per capita in the



drainage area was a paltry 292 cu m, less than one seventh of the national average. The basin suffers from a severe water shortage and consumption there is less than the country's average by 138 cu m.

During the 1993 International Conference on Population and Development and the 1996 International Conference on Natural Resources, if a region has a water shortage, if its usage rate is 25% to 50% and per capita water availability of between 500 cu m and 100 cu m, it is deemed to suffer from a water shortage. A region with a use rate of more than 50% and per capita water resources of less than 500 cu m has a severe shortage. In 2000, the Yellow River basin had 633 cu m of water and a development rate of 67%, the Huaihe River basin had 478 cu m and a development rate as high as 59% while the Haihe River basin had 292 cu m and a development rate of 94%. All of them face severe water shortages.

In the last decade, the Yellow River has been hit by increasingly severe droughts along its riverhead, where small and medium-sized lakes and ponds have dried up and grasslands degraded and turned into deserts. In 22 of the last 28 years, from 1972 to 1999, the lower reaches were cut off from the main flow. For example, the Shandong Lijin Hydrological Station experienced cutoffs for 226 days in 1997 and the cutoffs stretched to the peripheral areas of Kaifeng, Henan Province.



Although conditions have been marginally better and there have been no cutoffs since 1999, measures for closing the breakwater gap and controlling water pump stations have greatly impacted production and living conditions on both sides of the river. Another side effect of the long dry periods along the Haihe River basin has been the impact on groundwater. Over the past two decades, this supply has also been overused to the tune of 90 billion cu m. This in turn constantly lowers the depth where water can be found. The cones of groundwater under cities along the Beijing-Guangzhou Railway and Tianjin-Pukou Railway – which travel over the Haihe River basin – have been constantly expanding and deepening to the point where they now link up into a single unit. Worse, groundwater resources in some areas have nearly dried up.

According to an analysis of demand and supply, the basins of the Yellow River, Huaihe River and Haihe River have had water shortages of between 14.5 and 21 billion cu m in 2000 and the figure will rise to 21 to 28 billion cu m by 2010 and to 32 to 39.5 billion cu m by 2030. The most serious shortages are along the Haihe River basin. Although the local government has undertaken great efforts to save water and tap new potential sources, the area will still need an extra 10 to 12 billion cu m of water by 2010 to sustain economic and social development.



In Beijing, the water shortage is plainly visible along local rivers and springs.

The Yongding River, situated along the city's alluvial fan plain, is known as the mother river of Beijing. For 3,000 years after Beijing was founded, locals have been drinking from the waters of the Yongding. The Yongding had a large stream and history tracks its rises and falls. Every decade or so, the Yongding River would burst out of its banks. It would change its course every century or so. It has traditionally been known as the "*Budinghe*" or "Walking River." For thousands of years, people have looked for ways to tame this unruly water watercourse. The history of the Yongding River and the city of Beijing is intermingled. In turns, the river moistened the city or threatened to destroy it and then the city developed around the river and tried to control it. The Qing Dynasty Emperor Qianlong (AD 1735–1796) inscribed the words "*Lu Gou Xiao Yue*" (the moon over the Lugou Bridge at dawn) on a tablet that stands at an end of the Lugou Bridge over the Yongding. The four Chinese characters describe one of eight famous sceneries of Beijing. Those times are past. These days the waters of the river no longer overrun, partly in thanks to reservoirs built in the upper reaches, but the Yongding has no headwater while its riverbed is exposed and full of withered grass. It has been a long





time since the Yongding has had enough water to mirror the moon at dawn.

The MRP of the South-to-North Water Diversion Project ends at Tuancheng Lake, which lies opposite to Kunming Lake on the other side of the dam. Since the two lakes are linked by several waterways, people usually see them as a single body of water they call Kunming Lake. In fact, the name of Tuancheng Lake is now virtually unknown. The Summer Palace, the famous royal garden built for the emperors and their retinue, was built adjacent to the Tuancheng Lake. Surrounded by plants and willow trees, Emperor Qianlong said the lake represented the “beautiful scenery in northern China.”

In many ways, Tuancheng Lake was Beijing’s first reservoir, nourishing and benefitting the city. Its waters came from springs at the foot of Yuquan Mountain and Emperor Qianlong called it “The First Spring of the World” and inscribed the epigraph of “Yu Quan Bao Tu” (the Jade Spring of Baotu) in reference to it. In turn, the rainbow that started at the spring, called “Yu Quan Chui Hong,” became another of Beijing’s eight famous sites.

That centuries-old sight now exists only in people’s imagination. In recent years, because its groundwater has been overused, the spring has seen its water level drop considerably. In the early 1950s, the Jade

