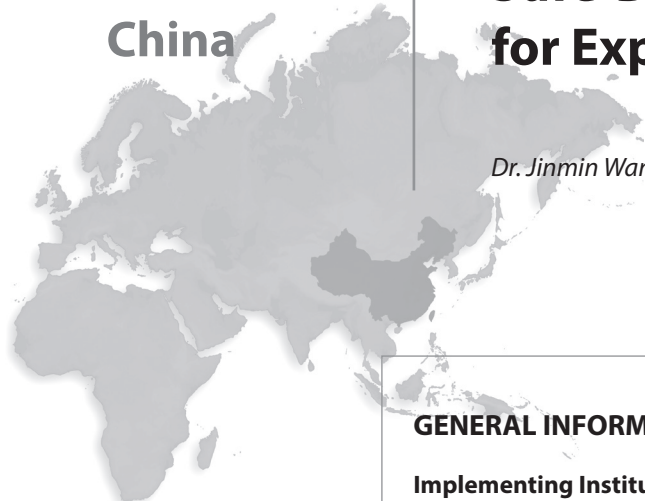


# 12

China



## Safe Drinking Water for Expanding Cities

*Dr. Jinmin Wang*

### GENERAL INFORMATION

**Implementing Institution:**  
Yiwu Municipal Government

**Head:**  
Qishui Zhou, Weirong Wu

**Details of Institution:**  
*Address:* 21 Xianqian Street  
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**Implementation Period:**  
2000-2005

**Costs:**  
In November 2000, the Yiwu Municipal Government spent RMB200 million purchasing the permanent water-use rights of 50,000 million cubic metres per year from the Hengjin Reservoir of neighbouring Dongyang City. In addition, the Yiwu Municipal Government needed to pay a comprehensive management fee of RMB0.1 per cubic metre on the basis of the actual use of water per year.

## SUMMARY

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The rapid urbanization and industrialization since 1978 have posed some serious environmental challenges for sustainable development in China, with pollution and water shortages ranking among the most pressing issues. Although China is rich in water resources, water availability was only 2,343 cubic metres per capita per annum, which is just a quarter of the global mean. Water resources are unevenly distributed across the country. Floods take place very frequently (Lee, 2006).

Before 2000, there was an administrative monopoly on water allocation, with many cities facing severe water shortages. However, with the increasing water shortages, the allocation of water rights solely through administrative means failed to meet the needs of rapid urbanization and economic development in some regions of the country. Yiwu City and Dongyang City became the first Chinese cities to experiment with the partial transfer of water rights in the country in 2000. The partial water-rights transfer agreement between the two cities initiated the reform of the water-resources management system in China.

## BACKGROUND AND JUSTIFICATION

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The Water Law, which defines the nature of water-resources management in China, was approved in 1988 and amended in 2002. It aims to undertake the rational development, utilization, saving and protection of water resources; to prevent and control water disasters; and to make the use of water resources sustainable (Shen, 2004). The Water Law stipulates that the water resources belong to the whole country and the State exercises ownership over water resources on behalf of the country. It has other regulations on long-term water supply and demand, the system of macro-allocation of water resources, the licensing of water use, the use of water with compensation and the coordination of water disputes. Since

the management of water resources is undertaken mainly by the provincial, city or county-level government, it is inevitable that there are some inconsistencies between the central and local governments in optimizing the allocation and utilization of water resources for social and regional development. The role of the administrative power of governments is overemphasized in water-resources management (Liu, 2005).

## DESCRIPTION

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Yiwu City adjoins Dongyang City in the middle of Zhejiang Province. Both cities are located in the eastern part of the Jinhua-Quzhou Basin. Dongyang City is located higher up on the Jinhua River.

Yiwu City has developed from a small, agricultural county with an urban popula-

tion of only 28,000 in 1980 into a modern commercial city with an urban population of 1.23 million in 2012 (Yiwu County was upgraded to Yiwu City in 1988). The population with local household registration was around 640,000 while the population with migrant household registration numbered approximately 590,000 (Yiwu Municipal Bureau of Statistics, 2013). The world's largest commodity trading market is in the city. In the course of rapid urbanization, commercialization and internationalization of Yiwu City, water shortage has been a serious issue constraining urban development since the 1990s (fig. 1). The total amount of water resources in Yiwu City is 820 million cubic metres, with average water resources per capita of 376 cubic metres (Yiwu Water Bureau, 2012).



**Figure 1.** Yiwu City.

Source: [http://en.yiwugou.com/purchaserservice/list/101101\\_1.html](http://en.yiwugou.com/purchaserservice/list/101101_1.html). Accessed 31 July 2013.

Dongyang City has more water resources than Yiwu City, with 1,608 million cubic metres. The average water resources per capita are also greater than they are for Yiwu City. There are two large reservoirs, the Hengjin Reservoir (fig. 2) and the Weishan Reservoir, with abundant high-quality fresh water (Speed et al., 2006). In theory, the water rights of Jinhua River can be shared by the cities along its upper and lower

reaches. However, the use rights and earning rights of the water resources in the Hengjin Reservoir are owned by Dongyang City. Under the administrative water-resources management system, Yiwu City can ask for agricultural water use from Dongyang City with the permission of the higher authorities in times of drought.



**Figure 2.** Hengjin Reservoir, Dongyang City, Zhejiang Province.

Source: <http://www.panoramio.com/photo/27632996>. Accessed 31 July 2013.

Initially, the Yiwu Municipal Government planned to construct new reservoirs itself but after an overall assessment by a team of water-resource planning experts, that was deemed unfeasible due to the rapid growth of the urban population. The experts suggested that the use of high-quality water from the Hengjin Reservoir should be the best option to address the water shortages in the city. Afterwards, the Yiwu Municipal Government started to ask for approval from the higher authorities including the Ministry of Water Resources and the Department of Water Resources of Zhejiang Province to explore the feasibility of partial water-rights transfer from Dongyang City to Yiwu City.

In November 2000, the Yiwu Municipal Government and the Dongyang Municipal Government signed an agreement on partial water-rights transfer from the Hengjin Reservoir in Dongyang City to Yiwu City. The permanent rights to 50,000 million cubic metres of drinking water per year were transferred at a price of RMB200 million. Meanwhile, the Yiwu Municipal Government must pay a comprehensive management fee of RMB0.1 per cubic metre to Dongyang City on the basis of the actual use of water per year. The water transfer from Dongyang City to Yiwu City was officially completed on 6 January 2005.

## **PARTNERSHIPS**

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The Yiwu Municipal Government worked closely with the Ministry of Water Resources, the Department of Water Resources of Zhejiang Province, and the Dongyang Municipal Government in the planning and implementation of this large water-diversion project. The pipelines to convey the water from Dongyang City to Yiwu City were planned and designed by Yiwu City. All of the construction was undertaken by Dongyang City and Yiwu City bore all the costs.

## **REPLICABILITY**

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The successful implementation of the Yiwu-Dongyang water-rights transfer agreement has aroused great attention in China since 2000. It was replicated in Zhejiang Province and other prov-

inces afterwards, including the paid water-distribution scheme to solve the water-use conflict in the Zhanghe River Basin involving Shanxi Province, Hebei Province and Henan Province in 2002; the water-rights transfer between the Inner Mongolia Autonomous Region and Ningxia Hui Autonomous Region in 2003; and the water-diversion project in the eastern part of Zhejiang Province taking water from the mouth of the Qiantang River to aid the drought-ridden Shaoning plain and the Zhoushan region.

## **POLICY IMPLICATIONS**

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The partial water-rights transfer between Yiwu City and Dongyang City indicates that rapid urbanization and regional development in China impose a high demand for the establishment of a water-rights institutional framework. There is still ample room to introduce a market mechanism to optimize the allocation of water resources and reduce the gap between water demand and supply in different regions of the country. The establishment of a water-rights system needs the transformation of the government's role in the management of water resources. The top-down approach to water-resource management partly fails to meet the needs of rapid social and economic development in China.

Although the Ministry of Water Resources continues to be influential in making and revising the rules and regulations on the management of water resources, the innovative practices of

water-resource management at the local level will influence the institutional design of the water-rights transfer and trading system.

A market-oriented ecological compensation approach has been introduced with the water-rights transfer between Yiwu City and Dongyang City. The ecological compensation in China has been carried out mainly with administrative orders issued by the Ministry of Water Resources. However, the partial transfer of water-use rights does not change the ownership of the Hengjin Reservoir. Dongyang City continues to take responsibility for the management and maintenance of the water resources in the reservoir. An RMB200 million hydraulic construction fund can be used for the long-term development and conservation of water resources in Dongyang City.

## LESSONS LEARNED

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Water rights are usufruct rights and exclusive rights for water use relating to one country's ownership of water resources, which can be interpreted as property rights (Liu et al., 2001). In China, water rights are the rights of water use, excluding water ownership. The separability of statutory water ownership and water-use rights makes it possible to transfer water rights. The establishment of a water-rights system needs to be backed by the corresponding legal framework and regulations (Huang and Qiao, 2012). As for the partial water-rights transfer between Yiwu City

and Dongyang City, there was no legal or regulatory guidance on water-rights transfer and trading arrangements. The central government needs to develop a complete institutional framework on water-rights transfer and water-rights trading.

In addition, the water-rights transfer agreement between Dongyang City and Yiwu City has shown that clarifying the property rights helps to nurture a water-transfer or water-trading market. The clarification of property rights includes the identification of the use rights, the earnings rights, the transfer rights and the respective holders of these rights. The deepening market-oriented reform will continue to reduce the costs of property-rights transactions.

## IMPACT

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The partial water-rights transfer between Yiwu City and Dongyang City was completed on an equal and voluntary basis. It broke through the barriers among administrative regions and achieved the coordination and sharing of regional water resources. Furthermore, the water resources have been utilized more efficiently since the surplus water in Dongyang City was transferred to Yiwu City. The partial water-rights transfer agreement between Yiwu City and Dongyang City has initiated the reform of the water-management system in China and has accelerated the pace for the establishment of a water-rights system in the country since 2000. It is a mutually beneficial case for both cities.

The water-rights transfer in some cities and provinces of China has led to the policy reform of the central government. On 1 February 2008, the Ministry of Water Resources promulgated Interim Measures for Water Quantity Allocation, which provides a framework for the allocation of water quantity across provinces, autonomous regions and municipalities.

## **FUTURE PLANS**

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China is moving towards the establishment of a water-rights system although it is a long and gradual process. An appropriate water-rights system will contribute to the optimal allocation of water resources. The Ministry of Water Resources needs to develop a feasible framework for establishing a nationwide water-rights system in the coming decades, ensuring the allocation and transfer of water rights in a legal, fair and transparent way to benefit the entire society.

In 2012, Yiwu City became the first State-level water-saving city in Zhejiang Province. The Yiwu Municipal Government will continue to adopt a series of measures to ensure the supply of safe drinking water to meet the needs of the expanding city and develop the city into a water-saving society. First, the water-resource management system will be further improved. A networked water-saving management system will be launched involving the townships, villages and enterprises. There will be unified planning, deployment of water resources, water licensing, collection of

water charges, water quality control, and surface and underground water management. Second, a water-saving industrial structure will be developed. The high water-consumption and high-polluting industrial projects such as paper making and textile dyeing will be prohibited in the city. The enterprises that emit water pollutants and wastewater will be asked and subsidized to set up water-recycling systems. Meanwhile, green and environmentally friendly industries and enterprises will be encouraged and rewarded. Third, a water-saving engineering system will be established. The rivers and streams will be cleaned regularly to maintain good ecosystems. Reservoirs will be consolidated to avoid water leakage. More urban and rural sewage treatment facilities will be set up to reduce the pollution (Yiwu Water Bureau, 2012).

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