

## 6 **Water governance in China: The failure of a top-down approach**

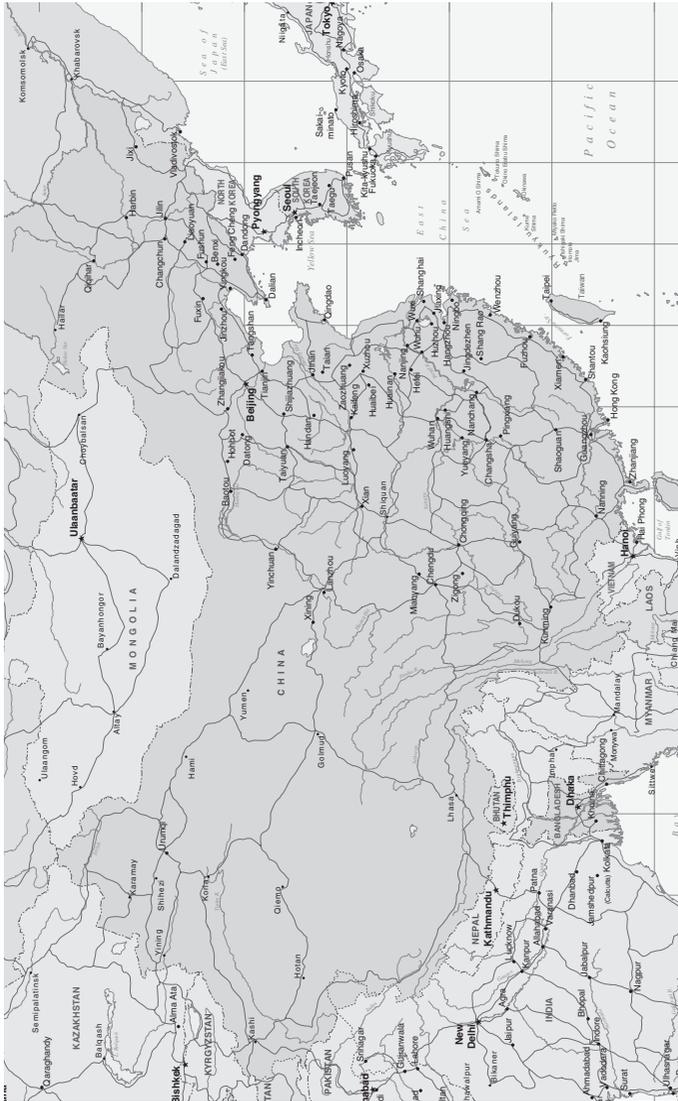
*Wang Xinbo*

As China's economy grows and expands, an ecological crisis also looms. The most serious environmental issue is that of water. In northern China there is a popular saying: "all rivers dried up, all water polluted". Water scarcity mainly affects the northern region, but water all over the country is polluted to some extent. In fact, the water scarcity in Northern China was the impetus behind the South-to-North Water Diversion Project, the largest and longest project of its kind in the world.<sup>1</sup>

What has caused these problems? What can the Chinese government do about them? This chapter outlines three aspects of China's water governance, in terms of quantity, quality and service. It analyzes the shortcomings of the current system, which allocates water resources and manages water quality through a "top-down" approach that relies on centralized political mechanisms, which is identified as the fundamental cause of the country's water problems.

The chapter also analyses difficulties encountered by the Chinese government in market reforms of the water service industry. Problems which have occurred in this area – particularly with public-private joint ventures – are also the result of the "top-down" approach.

Water is central to China's economy. Whether the country can sustain its high growth largely depends on whether it can transform



the current system of water management into one which relies upon decentralized, “bottom-up” decision-making. This means decision-making rooted in individual property rights, and other mechanisms, such as water user associations, that enable individual and community decision-making.

### Water quantity governance

#### Geographical background

China uses only one-fourth of the average per capita water of the whole world. It is considered to be one of 13 water scarce countries by the United Nations. The basin area of the water systems in northern China (north of the Yangtze River) covers 63.5 percent of the total land area, yet its aggregate water accounts for only 19 percent of the total of the country. Inland river basins cover 35.3 percent of the area in northwest China, yet the region has only 4.6 percent of the country’s aggregate water.

The problems of long-lasting drought and water scarcity are especially serious in northern China’s three-H rivers region (the Huang, Huaihe and Haihe Rivers) – an area characterized by many contradictions in terms of supply and demand. Here, water per capita amounts to only one-fifth of the average level of the whole country. Yet water resources in the three-H rivers region have been developed and utilized at rates as high as 80 percent, 65 percent and 98 percent respectively. This rate of utilization far exceeds sustainable levels of approximately 30–40 percent for those rivers.

At present, the groundwater in Northern China has been over-exploited, and the groundwater level has fallen rapidly. For example, the groundwater level of Gongzhufen area in Beijing has been descended to the bedrock and has been exhausted. At present consumption rates, the groundwater of Northern China will be exhausted in the next decade (Wang Shucheng 2003).

Paradoxically, although China’s water is extremely scarce, water use efficiency across the country in general is extremely low. For instance, the amount of water required to create additional industrial

output value of 10,000 yuan (US \$1,242)<sup>2</sup> is 5 to 10 times that of the developed countries (whose water utilization rates are only 40–45 percent).<sup>3</sup> This demonstrates a great potential and scope for enhancing water efficiency in China. Currently, however, these gains in efficiency are elusive, since there is a lack of arrangements that would enable decentralized decision-making.

### Water resources management

The existing systems to manage water resources comply with the Water Law of 1988 and the newly modified Water Law of 2002. Water management in China can be divided into two periods. Before 2002, water abstraction was managed through a license system. Since 2002, when the new Water Law was enacted, the country has been making a transition to a rights-based system.

### Before 2002 – the license system

The 1988 “Water Law of the People’s Republic of China” clearly defined the ownership of the water resources and established a license system, as well as a system of user fees, for water abstraction. The government subsequently issued various regulations relating to the procedures, supervision and management of the license system.<sup>4</sup> At the same time, regional regulations<sup>5</sup> – relating to the collection of water use fees – were formulated and executed in some areas.

The license system is based on the fundamental idea – stated in Article 3 of the 1988 Water Law – that water resources are owned by the state. Thus, the state allocates and manages water with a hierarchical administrative system.<sup>6</sup> The Water Law established a top-down allocation mechanism, through which the State Council enforces the State’s ownership. The Ministry of Water Resources (MWR), an administrative department, was established to perform this task. The MWR allocates water management to lower-level government agencies. It establishes branch organizations in the river basin or region, and develops a hierarchical administrative management system.

Each administrative region carries out a “Total Quantity Control” for its water resources, according to a plan of the river basin. Both surface and ground water resources are allocated to the provinces, cities and autonomous regions within the river basin. The provinces, counties and cities have examination and approval power over their allocated quotas. The MWR is responsible for examination and approval of any license above and beyond the allocated quota for each large river basin and large reservoir.<sup>7</sup> Finally, a water use fee is collected for both surface water and groundwater. Revenue from the fee is divided by financial departments at different government levels and then allocated to administrative water departments.<sup>8</sup>

How does the “top-down” approach work in practice? During the period in which water was managed with the license system, government at all levels did not restrict the total water consumption. It unintentionally gave a green light to a “pump race”, which caused a series of problems such as dried-rivers and ground subsidence.

The top-down approach is based on several false assumptions. First, it assumes that each level of government has accurately estimated the national and local surface water and groundwater resources, and can respond in a timely fashion to any changes of water resources or other factors. Moreover, it implies that government has a clear supervision over each user’s actual water use and, especially, any excessive water abstraction.

Second, it assumes that the state will be able to enforce restrictions on the total water consumption of the subordinate government and water users.

Third, it assumes that the administrative authorities can, and will, faithfully safeguard the public interest by turning a deaf ear to the rent-seeking attempt of water users.

In reality, there are several reasons why these assumptions do not pertain to the existing water management system. First, the data utilized by the state – such as basic data pertaining to local water resources, infrastructure, and the amount of water consumption – is outdated. Data provided by the lower-level administrative departments is generally out-of-date and inaccurate.

Secondly, government agencies and departments always satisfy their own water requirements. The government presently lacks an overall assessment of water resources, and thus cannot enforce restrictions on the total amount of water abstraction. When such an assessment exists, the government tends to overestimate the total amount of water resources, and underestimates actual water consumption. At the same time, the upper levels of government have great difficulty enforcing restrictions on their subordinates. So, the permitted amount of water always exceeds the available amount of water resources. While this does serve to increase the power wielded by public officials, these deficiencies prevent successful management of water resources.

Third, it is extremely costly to monitor water abstraction, because of the highly dispersed water resources and cross-penetration between the main stream of the river and its branches, as well as between surface water and groundwater.

Fourth, water administrative authorities are easily tempted and captured by interest groups. Local governments are hostage to local economic interests, including state-owned enterprises, the private sector and foreign investors. Local governments become tools for rent-seeking, by helping politically powerful water users to use more water while paying less in fees. Moreover, governments arbitrarily use their power to reduce the fees or even exempt them from payment. Indeed, in some areas such exemptions are used as a preferential policy to solicit investment.

The coordination costs of the license regime have also been extremely high. For instance, the system of water use fees has been very costly to implement and has many shortcomings, according to a survey by the Department of Water Resources of the MWR. Some users who owe fees instead issue "IOUs" and delay their payments as long as possible.

Meanwhile, some enterprises (in particular, those with poor returns) are allowed to default on their payments. A lack of proper metering equipment makes the situation worse. It is nearly impossible to measure actual quantities of water abstracted, which is the

basis of the relevant fee. Some local water departments intentionally neglect to collect the fee for self-owned wells, which has contributed to excessive exploitation of groundwater. Because it encourages local officials to engage in discretionary use of their power, the license system has also encouraged corruption.

Fifth, all levels of Chinese government not only oversee public policy, but also invest in many state-owned enterprises. Their primary goal is to develop the local economy, and to maximize GDP and their own revenue. Even though local government is the manager of water resources, it is also a consumer. This is a conflict of interest, and leads government to actively seek to maximize local water consumption.

Sixth, if excessive abstraction of water is very popular, no user's rights can be guaranteed.

These observations show why the license system defaults towards over-exploitation. The public at large has few opportunities to influence government's decisions over local water management. This means that a license to abstract water simply becomes meaningless words on a piece of paper.

As a result, the license system has exacerbated problems of water scarcity especially in regions such as northern China, where dried-up rivers, excessive exploitation of groundwater, and ground subsidence are commonplace. The "pump race" encouraged by the "top-down" approach has led to a large number of disputes over water affairs, even violent conflicts.<sup>9</sup>

### **Introduction of water rights**

The logic of water rights is that a decentralized, "bottom-up" approach creates superior outcomes to a top-down approach.<sup>10</sup> To function properly, water rights require the adoption of decentralized, bottom-up institutional arrangements. Water rights are a form of property, and it is the major function of government to protect property rights.

In addition to being protected as property, decentralized water

management might involve water user associations and the public more generally. Whatever other features it has, it requires the development of a legal framework that would enable transactions to occur between users. In such a system, the higher level of government would play only a coordinating role, and problems would generally be addressed through self-governance. Problems that would ultimately be handed over to higher levels government are those of an external nature.

In China, “water rights” refer to rights of things based on state ownership of water resources. Such rights are usufructs, developed under legal restrictions and with certain limitations. Currently, there is no clear legal definition of usufruct in China, but the Property (*Jus in Re*) Law currently being drafted has listed water rights as usufructs.

China’s present water management system is undergoing a slow transition to water rights. A breakthrough has occurred since 2000 in terms of development of rights, both theoretically and practically. In 2002, the Water Law was revised and enacted. The newly-revised law reiterates the state ownership of water resources, defines the water use rights of the collective agricultural economic organizations, adds some control systems such as water amount allocation system and the combination of the Total Quantity Control and quota management, and sets up water abstraction rights.

The government is now devoting effort to strengthening the Total Quantity Control Program, so as to protect water rights and boost the stability and transferability of water rights. Over recent years, China has also issued a series of laws and regulations which complement different aspects of the water rights system. Now the revision of the “Implementation Measures for the Water Abstraction License System” is being carried out to further meet the requirements of water rights management, and the market mechanism will play a more important role in allocating water resources. Some river basins suffering from water shortages have formulated their own water allocation plans according to related laws and regulation.

There have been a few voluntary or government-guided water

transactions and water rights transfers between different regions or users. Some examples of transactions include:

- (1) A water use transaction between Dongyang City and Yiwu City. Permanent use rights of 50 million m<sup>3</sup> of irrigation water were transferred by Dongyang City to Yiwu City (for urban use). This was the first practice of the transfer of a water use right in China.<sup>11</sup>
- (2) In 2001, 30 million cubic meters was transferred from Zhanghe River in Shanxi Province to Henan Province. In 2002, the two provinces transferred 30 million m<sup>3</sup> between each other.
- (3) In 2004, under the guidance of the MWR and the Water Resources Commission of the Yellow River, Ningxia and Inner Mongolia carried out a combination of investment in water conservancy and transfer of water rights. Now eight large industrial projects have signed up to water rights transfers with the irrigation areas. This has promoted better use of water resources between different industries.<sup>12</sup>

Overall, the awareness of water rights has increased, and this plays an important role in monitoring and curtailing inappropriate government actions. The introduction of water rights is a significant step forward – yet it is severely restrained by the existing power hierarchy which resulted from the license system. The Chinese government’s approach to water rights still carries a flavor of centrally-planned allocation of resources.

Thus, the state believes it must strengthen top-down planning of water resources in order to strengthen water rights. Yet the logic of decentralized water rights is incompatible with the top-down, hierarchical administration perpetuated by the license system. Until now, except for a few successful pilot programs, the top-down allocation system has not been transformed. This creates uncertainty as to whether or not the system will actually evolve into true water rights.

Wang Yahua (2005, 316–317) has outlined how China might

make the transition from the water license system to a system of water rights:

*The low-quality water rights held by communities and individuals are often legally defined as “the administrative license” (a privilege). They are political rights, which are allocated and reallocated mainly by administrative means. With various restrictions and interventions, the government has undermined the utility of such rights.*

*To improve the quality of the right, water rights must become usufructs (licensed property right). If the quality of the right can be further improved by the strong protection of the government, it can even become an absolute property right similar to ordinary assets.*

*With the decrease of government intervention and restriction, the water rights will become an economic resource, and increasingly will be allocated through the market.*

## Water quality governance

### Background

The State Environmental Protection Agency (SEPA) is responsible for administering water quality in China. The approach to controlling water pollution is quite similar to the top-down approach to water resources management.<sup>13</sup> It relies on five hierarchical levels of administration: (1) total amount of wastewater emissions; (2) wastewater emission permit; (3) wastewater emission fees; (4) wastewater emission monitoring; (5) assessment of environmental quality.

In spite of attempts by the state to control pollution, over 50 percent of the river sections of the seven large water basins areas in 2004 have been polluted to different degrees and the water quality of 28 percent of the river sections has made them unusable. Water pollution accidents have occurred frequently, causing serious economic loss. Statistics show that 3,988 accidents occurred from

2001 to 2004 across the country, with almost 1000 on average per year (NPC Information Center 2005).

A lack of access to safe drinking water is also a serious problem across the country. According to the investigation and analysis of the MWR, 250 out of 1000 surface water sources are disqualified for use as drinking water. In rural areas especially, 300 million people still lack access to safe drinking water.

Some enterprises have not abided by the law, and their problems of excess pollutant discharge are quite serious. Some enterprises have built wastewater treatment facilities, but the facilities do not operate continuously. It is well-known (but seldom acknowledged) that these facilities are often used just for inspections, and are turned off when the inspectors leave.

The following two examples provide a clearer picture of China's attempts to manage water quality.

### Example 1: Pollution control of the Huaihe River

The Huaihe River is China's third longest river, and is home to one-sixth of the country's population. The river and its many tributaries provide drinking water for many of the towns, cities and villages located in the river basin.

Many industrial enterprises are also located in the river basin, including pharmaceutical, pulp and paper, chemical, beverage, textile and food industries. Industrial waste water, combined with agricultural run-off, has contributed to high pollution levels in the river.

Moreover, the cities along the river have extremely poor sewage and wastewater treatment. The valley has experienced growth in population, which has led to more generation of sewage and wastewater. Zhang Zhenhai, the chief of the Environmental Monitor Station of Zhoukou city in the province of Henan, estimates that more than 85 percent of the sewage produced by small and medium-sized enterprises in Zhoukou does not flow into the river, but instead evaporates or infiltrates the ground instead.

A significant proportion of enterprises dispose of sewage in this

way. The sewage infiltrates the groundwater. Because surface water and ground water are connected by the same circulation system, the groundwater becomes polluted, and then the sewage circulates into the river. The damage in terms of human and environmental health can be long-lasting.

To address the pollution in the Huaihe River and its tributaries, the state promulgated the “Interim Regulations Concerning the Prevention and Control of Water Pollution in the Huaihe River Valley Water” (the only valley environmental protection code of China), and both the Ninth and Tenth Five-Year Plans for Prevention and Control of Pollution in the Huaihe River Valley. Four provinces in this valley – Henan, Anhui, Jiangsu, and Shandong – also passed relevant laws, regulations and programs to control pollution of the river.

Over the course of a decade – between 1994 and 2004 – over 60 billion yuan (US \$7.2 billion) was spent by state and local governments and the private sector in clean-up efforts. Following this decade of ‘pollution control’, the Environment and Resources Committee of the National People’s Congress organized the “Chinese Environmental Protection Survey” in August 2004. Journalists from the Xinhua News Agency were sent to conduct a thorough investigation about water pollution, especially as to whether the government’s pollution control efforts had succeeded along the river.

About one month after the journalists’ investigation, a serious pollution rebound was found in the river. The main water quality indices reached or even exceeded the historical record levels. Pollution extended from the surface underground, directly affecting the lives of 130 million inhabitants. Measurements in 2004 indicated that about 60 percent of the water in the valley is low quality (Class V or below), and cannot even be used even for low-grade industrial purposes (State Environmental Protection Administration 2004).

In July 2004, Pan Yue, the deputy director general and news spokesman of the State Environmental Protection Administration delivered a speech on the extraordinarily serious pollution of Huaihe River. He acknowledged that the Huaihe River water-

course had basically lost its ability to self-purify, and that a decade of pollution control efforts had failed to improve the river’s pollution levels. The SEPA also closed 52 factories in June 2004.

The decade-long pollution control effort in the Huaihe River has triggered an ongoing debate, and even violent arguments, among the news media (*China Economic Times* 2004).<sup>14</sup> Officials from SEPA like to emphasize their outstanding achievements, and are inclined to be optimistic about the environmental quality, but other departments are apt to criticize it.

The latest debate is about the information promulgated by the environmental department, on one hand, and the water resources organization, on the other hand, about the Huaihe River water quality and related pollution control.

In 2004, the SEPA measured 700,000 tons of COD discharge (the total chemical oxygen demand, which is the key water pollutant index). This indicated a reduction of 50 percent in COD levels since pollution control efforts began in 1994, so the SEPA concluded that pollution was “decreasing year by year.”

In contrast, the Huaihe River Water Resources Organization (which is subordinate to the Water Resources Ministry) determined that in 2003, the annual COD discharge amounted to 1,230,000 tons. It concluded that pollutant levels had not changed at all, despite a decade-long effort by the state to control pollution.

A public outcry ensued in response to this information. Further investigation by relevant specialists revealed that SEPA and the water resources organization used different methods to measure pollution. While the former only surveys water quality in main-stream water courses, the latter measures water quality in the factory drains. The former calculates based on a 225-day for a whole year while the latter calculates 300 days. These differences showed that SEPA underestimated COD levels by about 50 percent.

#### Example 2: Pollution of Songari River, November 2005

In November 2005, the explosion of a bi-benzene factory of the Jilin

branch of the China National Petroleum Corporation (CNPC) formed a pollution agglomerate as long as 80 kilometers on the Songari River. What matters for the purposes of this chapter is not why the bi-benzene factory exploded, but how the authorities treated and dealt with this significant event.

The pollution on the river stretched for more than 1000 kilometers, an area covering hundreds of cities, towns and villages which rely on the river for water. The area is both industrial and agricultural, so the incident also affected these users. Yet from the beginning, the public was not informed about the event. In fact, the leaders of the CNPC branch “brazenly hid the truth from the media and even formally prohibited its staff from leaking relevant information” (Hu 2005).

#### Timeline of Harbin incident, November 2005<sup>15</sup>

13 November – Explosion occurs at CNPC plant.

18 November – Five days after the explosion occurred, the provincial government of Heilongjiang was informed of the event. Emergency work at the earlier stage was led by Jilin provincial government (located on the contaminated upper reaches), and the State Environmental Protection Administration was in charge of evaluation, suggestions, and also coordination between Jilin and Heilongjiang.

21 November – Along the lower reaches of Songari River, Harbin (a city of 10 million residents) was the city which was most seriously affected by this contamination, since nearly all of the city’s drinking water comes from the river. In order to ensure that water was safe for human use, the municipal government decided to cut off the water supply for four days. Yet its stated reason – that the “water supply pipe network was under repair” – was farfetched and unreasonable. The masses were aroused to harbor suspicions and an atmosphere of panic resulted.<sup>16</sup>

22 November – In the evening, Harbin’s municipal government issued an announcement about the fact that the Songari water might be polluted after the explosion. People were set slightly more at ease, enabling an orderly situation to ensue.

On the same day, the neighboring country Russia was informed of the event and the pollution. The province of Heilongjiang borders Russia, and Songari River flows into Heilongjiang River along the Sino-Russia border. With good reason, Russia has been quite sensitive about the Songari water quality. Information about Songari pollution first went out from Harbin. The Russian media issued numerous comments about it, and then the relevant department in Russia issued a formal notice.

24 November – In the morning, Xie Zhenhua – the director general of the State Environmental Protection Administration – had an interview with the Russia ambassador to China, and communicated with him at length. SEPA officials emphasized on the news release of that afternoon that there were still about 14 days for the pollution agglomerate to reach Heilongjiang River: “Judging from the present situation, it is weakening, and its influence will become smaller and smaller,” therefore this notice “was not late.”

24 November – After the news release, the provincial government of Jilin started immediately to implement the emergency plan, and the State Environmental Protection Administration also went into action.

28 November – Drinking water was restored to Harbin, 15 days after the explosion occurred.

9 January 2006 – The State Council issued a “General Contingency Plan for Public Emergencies in China”. It stipulates that the news of a public emergency shall be released to the public in the first instance. This means abolishing certain related regulations – such as the “Notice on Strictly Enforcing Disciplines of Reporting the

Environmental Pollution Accidents” – which requires such events to be kept secret.

Eventually, the Director General of the State Environmental Protection Administration took the blame for handling this event unsuccessfully, and resigned. There is still much clean-up which needs to take place.

### Evaluation of water quality governance

The issues that affect China’s management of water quality are the same as those that create its inability to manage water quantity. These boil down to the reliance on top-down administration, which in turn depends on the state’s capability to collect the right information. The systems rely on a sense of responsibility of superior government officials. Both systems are fixated on micromanagement and quotas.

If the operating costs of this system were very low, it might be logical and acceptable. Overall, China’s laws and regulations related to water pollution control are nearly perfect on paper, but in practice, their enforcement costs are huge. There is a high cost to obey and enforce the law, but a low cost to breach the law. Judging from the example of Huaihe River, the overall water quality of this valley has not been improved despite expenditure of billions of Yuan; this is verified by serious pollution and dry rivers. Thus, top-down administration of water quantity and quality is both costly and inefficient.

Moreover, the laws pertaining to water quantity and quality are not enforced across-the-board. This is especially true at a local level: ‘Local protectionism’ leads state officials to use political discretion which favors local enterprises. This might entail reducing their water use and sewage fees, which in turn contributes heavily to low collection rates and cost-recovery. It could mean shielding enterprises which engage in illegal sewage discharge, or enabling them to evade supervision and monitoring. Moreover, since local governments pursue local economic benefits and political achievements, they are inclined to approve new industrial projects without proper

consideration of their overall effects on humans and the environment.

The system easily lends itself to embezzlement, bribery and corruption of public officials. When a law is easily broken, or an unlawful practice is not easily detected, or if violations are, the law means nothing – it is only a law on paper.

Mao Rubai, the director of the NPC Environmental Resources Committee gets to the truth with a single pertinent remark:

*The reason why environmental pollution in some places cannot be solved for a long period of time is ultimately traced to the government. The government does not administer by the law, nor does it enforce it strictly, nor does it manage state affairs in accordance with the law. Consequently the environmental protection law is nothing but a scrap of paper.*

### Governance of water services

#### Regulation framework

China’s governance of water services retains many features of the planned economy. No single organization maintains uniform supervision and control over water services. At present, water source projects are the responsibility of local water resources departments. Distribution is overseen by municipal construction departments. The environmental protection administration supervises sewage disposal. The agencies are disconnected from each other, such that the department in charge of water sources does not care about water supply, and the one responsible for water quantity has no control over water quality. Each individual agency has the power of enforcement, the authority to collect fees and the right of approval. There are even two different regulations, issued at two different times, which pertain to water prices.<sup>17</sup>

In Beijing, Shanghai, Shenzhen and other big cities, this industrial mode of split operation has begun to change. A new water service management system and corresponding water service group

which cover an overall process of proto-water supply, urban water supply and sewage disposal were established to oversee the entire industry. This unified approach to water supply requires the agencies of the state – which tend to centralize power – to limit their intervention. Moreover, these cities still lack a legal framework to support this type of public utility.

#### A survey of the water service industry

For a long period of time, the price of water conservancy projects for Chinese water supply has fallen short of their operating costs. Thus, infrastructure is unable to be maintained and updated, resulting in heavy losses (both financially and of water).

According to a 2002 investigation conducted by the Water Resources Ministry of over 100 major water administration units in the whole country, water conservancy projects supplied water for agricultural use at the price of only 3.61/m<sup>3</sup> (1 Yuan RMB=100 Fen).<sup>18</sup> For industrial and household use, the price was 22.84 Fen/m<sup>3</sup> (USD \$0.02) and 23.95 Fen/m<sup>3</sup> (USD \$0.03) in 2001.<sup>19</sup> Water supply projects typically sell water at a price than is much lower than the cost of supplying it. Such projects are obviously not profitable.

During the past two decades, the price of water sold in most cities in China increased substantially.<sup>20</sup> The price increases were more dramatic in some northern cities which lack water. In 36 large and medium-sized cities across the whole country, the water price for domestic users was 0.14 Yuan/ton in 1988, and rose to 1.27 Yuan/ton in 2001, then to 1.34 Yuan/ton in 2004 (more than 9 times higher than the price in 1988). The price in Beijing has increased more quickly compared to other cities, and now exceeds 5 Yuan/ton.

However, these price increases have not changed the loss-making situation of the water supply industry. Research shows that water supply enterprises have experienced an even more dramatic increase in cost. This is largely because of depreciation costs relating to maintenance of the pipe infrastructure (Wang Xinbo 2005). In addition, the deterioration of water quality has led to an increase in

both the proto-water price (mainly the water resources fee) and the actual costs of processing water.

The drainage industry faces even heavier losses, since there are generally low collection rates for the sewage disposal fee. By the end of 2003, 325 (49.2 percent) out of the 660 cities began to collect the fee.

#### Sewage disposal

In those cities where sewage disposal exists, it is characterized by low pricing standards, a low rate of payment and collection, and poor cost recovery in general. In one-fourth of the cities – including nine cities in the Jiangsu province – the sewage disposal fee levied for households is less than 0.3 Yuan/m (in those nine cities, the lowest fee is 0.10 Yuan/m). Among 12 cities of Guizhou province which do levy a sewage disposal fee, the prices for 11 cities range between 0.2 to 0.3 Yuan/m. In Shanxi, only 35 percent of the sewage disposal fees are collected, because loss-incurring enterprises and some disadvantaged inhabitants have continuously defaulted on their payments. The same situation applies in other areas (Construction Ministry 2005).

Huainan city (in the province of Anhui) collects 6,000,000 Yuan (approximately US \$745,000) in sewage disposal fees every year. However, this constitutes only 15 percent of the city's costs to treat the sewage. Shenyang enacted a new price in September 2005. However, many civilians and enterprises are deeply discontented with it, and even appealed to the State Audit Administration (Li 2004).

Thirty-five large and medium-sized cities have all started to levy a sewage disposal fee. The fees for domestic and other uses are, respectively, 0.41 Yuan/ton and 0.58 Yuan/ton. Though the sewage disposal fee has been increased considerably, the operating cost of sewage disposal factories (without considering the costs of infrastructure) has been kept at 0.8 Yuan/ton. There is still a wide gap between the actual costs of sewage disposal and total cost recovery.

In addition, most cities lack suitable infrastructure to handle urban domestic sewage. The construction of an appropriate pipe network lags far behind demand, so some sewage disposal factories cannot collect their designated amount of sewage. Only one-third of the entire country's established sewage disposal factories operate normally.

### Water prices

Public utilities set the price of water using the "cost-plus-yield rate" method. Yet the main reason behind cost inflation in water supply and discharge enterprises relates to their lack of an appropriate accounting system, which means there is no oversight of costs (Wang Xinbo 2005). At present, these enterprises have no industrial accounting system, nor any supervision over accounts. So, the overall situation in the water service industry is characterized by excessive investment, lack of maintenance and a surplus of redundant personnel. The enterprises have adopted accounting methods of government agencies, which exclude a basic tally of costs and assets.

The Chinese government formally introduced a price hearing system, in which the public can participate in price-setting. But inhabitants are generally unwilling to pay, and are quite disgusted with frequent increases in water prices.<sup>21</sup>

### Market reform

Various government departments have released restrictions on foreign and nongovernmental capital, in order to improve the efficiency of infrastructure and public utilities, and especially to reduce the financial burden on the state. The State Planning Commission, Construction Ministry, and local and municipal governments have issued rules and regulations which encourage both foreign and domestic investors to engage in the private management of public utilities.<sup>22</sup>

Furthermore, the Water Resources Ministry has hastened market reforms for basic water conservancy infrastructure. A series of

experimental property rights reforms were carried out for small-sized water conservancy projects in Zhejiang, Shandong, Shanxi, Anhui, Jiangxi and other places. Supported by the Agricultural Water Use Association, Ningxia carried out property rights reforms, such as contract and auction of the secondary and tertiary canals.

At present, there is no legal obstacle to non-state investment in basic infrastructure and public utilities. The 2004 "State Council's Decision on Investment System Reform" again reiterated the state's desire to attract private capital to provide public services, and to construct relevant infrastructure. It promises reasonable returns and a certain ability to recover investment.

While the laws and regulations may seem attractive, the policy environment for public utilities is actually rather uncertain. Because of this, the Chinese water supply and discharge industry has paid a high price for using foreign capital. Foreign investors were promised high returns, and as a result, some cities have acquired a substantial financial burden.

One of the cases I studied concerned a joint venture between Shenyang Water Company, a state-owned enterprise which is the largest water supply enterprise in Northeast China, and "Sino French Water" – a joint venture between Ondeo Services (France) and the Hong Kong New World Infrastructure Company.

The case involved a non-standardized contract between the contracting parties, beginning in 1996. The Chinese side of the contract was negotiated by inexperienced officials from the Shenyang municipal government (i.e. they were not representatives of the Shenyang Water Company), who were under pressure to attract foreign investment. The government officials did not involve any intermediary agency or law firms (a standard practice when negotiating international contracts). The foreign side drafted all of the legal documents. The contract involved no bidding procedures and no other businesses were offered the opportunity to invest.

The contract enabled Sino-French Water to acquire a 50 percent stake, and Shenyang Water Company would purchase all the water produced by the joint venture. The contract guaranteed a fixed

minimum annual return rate of 18 percent – a rate which was much higher than the average long-term interest rate for foreign capital at the time, about 5–6 percent. The company not only benefited from a contract which guaranteed fixed returns, but also obtained its stake at a reduced cost. However, no provisions were included in the contract to guarantee the benefits of the Chinese side.

In the end, the contract was terminated because retail prices could not keep up with the costs. However, this was at a cost to the Chinese side of over RMB 300 million – 2.4 times the sum originally invested by the foreign side. Due to the high price for inviting foreign investment, plus various other reasons, Shenyang Water Company suffered a loss of as much as over RMB 200 million by 2002.

In fact, the case of Sino-French Water was not unique. At the time, it was common for local governments to attract foreign investment by providing a high fixed return. This unequal agreement – in which risk and reward were not balanced – caused great losses to many places. The Chinese government ended this kind of contract, since it stirred up many disputes between contracting parties, and also with the public (Xinbo and Shaoqi 2004).

Although the Shenyang case was costly, it helped to bring about subsequent reforms to the process of developing contracts with foreign investors. In May 2002, the French Veolia Group won an open international tender to supply water in Pudong, Shanghai, with a high bidding price of 2.1 billion Yuan (more than US \$260.7 million) for a 50 percent share of Shanghai Waterworks Pudong Ltd. over an operating period of 50 years.

### Evaluation

It has been difficult for China to promote market reforms in the area of public utilities. There is a weak legal environment, so oversight of the water service industry is difficult. At the same time, public utilities rely primarily on capital acquired from public finances and state-owned banks. Keen to attract a large share of those resources, many public utilities have over-estimated local demand for water, and have thus over-invested. Public utilities also lack necessary

asset maintenance. At the same time, their costs are uncontrolled, because they lack the discipline that market processes provide to private sector firms.

The root cause of the problem lies in the fact that our water industry is not market-oriented; it still strongly reflects the monopolized operations which were adopted during the era of the planned economy. Public officials operate with the mentality of “low water price + loss + financial subsidy”. This has led to a practical problem when public sector water enterprises are trying to become commercial operations. Specifically, they are unfamiliar with how to achieve a balance between investment, risk and a satisfactory return.

The true benefit of private-sector provision of water services is that it not only guarantees that water companies have direct contact with their customers (and thus have an incentive to provide high-quality services), but also helps water companies to perceive market demands, engage in supply-oriented production and reduce waste of resources. Unlike the past, foreign suppliers will be involved the entire course of production, infrastructure, sale and supply (*Economics Reference* 2004). Thus, foreign investment in water supply for the Chinese market hopefully entails the beginning of a new era for water services.

It is urgent to reform the present system and legal environment, to promote private investment in water services. This will require government reforms that both strengthen democratic supervision and enhance the degree of public participation, and create an effective, transparent and accountable regulatory system.

### Summary and conclusion

This chapter described three aspects of China’s existing water governance, and evaluated its characteristics and effects. China’s serious water crisis is rooted in the present system of water governance. This system relies upon “state ownership” of water, which is carried out in the form of top-down planning and hierarchical political structures.

This top-down management creates high operating costs, which government authorities are unable to control. First, the state lacks the information which would in principle enable it to control water resources. Second, even if it did possess that information, the state lacks the ability to execute and enforce policies for water users. Thus, the idea of a “Total Quantity Control” is meaningless.

Water shortages and water pollution have exacerbated environmental problems and also threaten human health. Although a few local achievements have been made, generally the state’s attempts to control pollution have not improved the situation. The environmental protection agencies can often control the mainstream and the watercourse, but they neglect tributaries and groundwater.

At the same time, academic researchers in China have not developed an adequate theoretical and practical explanation of water rights. Should private water rights really derive from state ownership? In my view, the explanation of water rights should be different from the private law origin of the public rights.

The role of the government is not to allocate water resources, but to enable bottom-up mechanisms that will do so. The current system has created artificial water scarcity, which has led to conflicts. Private ownership would enable people to trade water with each other, and thus resolve the conflicts among competing uses between households and firms, as well as between communities and the environment.

There are many advantages to systems which rely upon property rights rather than arbitrary government power. Especially because China is a country of diverse regional cultures and resource environments, a system of water rights would create advantages in terms of variety and flexibility, and enable a more extensive use of local knowledge. In combination with water user associations, regional alliances, and a legal framework which enables and respects decentralized decision-making, such a system would go a great way towards solving China’s current water problems.

Although China is a large developing and transitional economy, it possesses a historical tradition of oriental despotism. A legal

system which protects private property rights has never emerged in over 1000 years of civilization. One western scholar – Karl Wittfogel – observed keenly that the oriental private property was “beggar’s” property (Wittfogel 1957).

Wittfogel and others have argued that water governance played an important role during the evolution of Chinese civilization. It is likely that centralized control over water helped to reinforce the despotism that pervaded China until recently.

Past dynasties all treated the public ownership of water resources as God’s truth – and power over water meant political power. This tradition continues today with the state’s control of water resources stipulated by the water law, from which water authorities at all levels of government derive their authority.

However, the attempt by the state to control water is at odds with the fact that households, farmers, and businesses need to use water resources. Actually, when the state claims that water is a public resource, this conceals the fact that water is shared among man and ecosystems. Even if water is a “public” resource, we should not deny private use and management of that resource. The fact that individuals and organizations compete over state-allocated water, which often leads to conflicts, shows why we need to define and protect water rights.

China is now experiencing an evolution in its management of water resources. Inevitably, it is a gradual and difficult process to move a system which relies upon centralized state power one that relies upon decentralized decision-making. Yet China’s ability to achieve sustainable development depends to a very significant degree on whether or not it successfully shifts from this top-down approach, to a bottom-up approach in which water resources are allocated and managed through markets and other local institutions.

## Notes

1. It is uncertain what environmental impacts will occur (especially in the southern area) as a result of the South-to-North Water Diversion Project. The Project has not encountered many objections by water rights organizations, since the Yangtze River has no clear definition of water rights. Phase 1 of the Project is under construction at present. The provinces and cities involved will share their water rights in accordance with their contributions to the Project. The Central Government's investment accounts for 40 percent of the total.
2. Using a conversion rate of US \$1 to Yuan 8.05, February 2005.
3. See Table 5.2, Hou (2001, 52) for further information.
4. The 1993 "Implementing Measures for Water Abstraction License System" and the MWR "Regulation on Request, Examination and Approval Procedures of Water Abstraction License" provide regulations on the rights and obligations acquired through the abstraction license.
5. "Regulations on Management of Water Resources in Shanxi Province" drafted by Shanxi Province in 1983 was the beginning of management through the abstraction license in China. At present, there is no uniform way that water resources fees are collected; most of the regions have their own individual methods.
6. Article 12, Article 45 and Article 48 outline the details of administration and allocation of water.
7. For example, it is stipulated in Hebei province that the provincial department of water resources, municipal and county authorities, have approval powers for water abstraction of (respectively) 10 million, 1 to 10 million and below 1 million cubic meters.
8. The water resources fee is disputable in theory. Some consider it to reflect the commodity price of water resources (i.e. it demonstrates the scarce nature of water resources). Some consider it to be an expense for the management of water resources conducted by related administrative departments. The reality is that the charging standards are highly variable. Some are several cents, and some several jiao (one jiao = 1/10 of one yuan). Northwest China – the area with most water scarcity – boasts the lowest water resources fee. A major problem is that collection rates are very low, and some local governments and users dodge the payments.
9. At the upper reach of Zhanghe River (a branch of Haihe River), a violent conflict broke out between the villages along both banks of the river. Since it was a trans-provincial dispute, the Central Government set up a special "Administration of the Upper Reach" to coordinate it. The Administration was granted relatively high powers, which were extremely costly. For related stories see Xiong (2005) and Liu (2002).
10. Wang Yahua (2005, 125) compared water control structures between western countries and China. His analysis suggests that the power hierarchy in China is from upper to lower levels, and that of western countries is from lower to upper levels. He did not analyze how the western systems evolved.
11. See Liu (2005), 266–267 for discussion.
12. See Liu (2005), 268.
13. The "Total Quantity Control" Program and the permit system for wastewater emissions, as well as implementation details, are set out in the "Law of the People's Republic of China on Prevention and Control of Water Pollution (1996)".
14. The earliest argument occurred between a well-known journalist of the Xinhua News Agency and some vice president of the Chinese Environment Programming Institution. The former rebuked the huge investment in pollution control on the Huaihe River has had no beneficial effects. The latter said that the journalist had the wrong data and had overlooked the obvious improvement in the river's water quality.
15. This section draws on Hu (2005). Hu is Chief Editor of an influential Chinese magazine called *Caijing*.
16. Some people guessed that an earthquake was coming, and tried to run away from the railway station and airport.
17. The Administrative Methods for Urban Water Supply Price (1998) and the Administrative Methods for Water Resources Project Water Supply Price (2003).
18. Though the price of agricultural water is very low, farmers actually pay a relatively high rate. Villages, towns and governments at the basic level levy various management costs on them. Shanxi, Sinkiang and other places execute a "terminal water price" system characterized by "one price to the household" and "one ticket for collection." They enforce the public demonstration system of "water

price, water quantity and water rate” which effectively reduces those intermediate links; contains unjustified price rises, irresponsible collection, water fee withholding and embezzlement, and; lightens water rate burden on farmers.

19. See Xinbo (2005), where I conducted relatively detailed research on investments and costs of Chinese water supply and discharge enterprises. There is a surplus of supply capacity among supply enterprises. At the same time, the quality of their assets is falling while leakage rates in the pipe network have been increasing year after year.
20. See Hou (2001), Table 2.12, p.22.
21. In 2002, the price of water paid by Chinese inhabitants was equivalent to 1.2 percent of the family income, much lower than the international level of 4 percent. However various public-opinion polls show that there is a very low percentage of people who support an increase in water prices. See also Hou (2001), Box 5.1, p.58.
22. In December 2001, the State Planning Commission (the present Reform and Development Commission) published “*Some Suggestions on Improvement and Introduction of Nongovernmental Investment*” which opened public utilities to nongovernmental capital, and encouraged domestic private investors to participate in private management of public utilities. Other agencies – including the Construction Ministry and the State Environmental Protection Administration – have subsequently issued similar reforms. Local governments, including Shenzhen and Beijing municipal governments, have also issued rules and regulations to comprehensively promote private management of public utilities.

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