

Case study

China: The ways to address disputes in Zhang River (No. 476)

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March 2016

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1. Problem addressed

Zhang River runs through Shanxi Province, Hebei Province and Henan Province as the border of Hebei and Henan Provinces. Within the basin, there is a large population but inadequate water and land resources. The residents of the villages along the river only have a small amount of valley terraces and flood land barely meeting their survival demand. The area of arable land per capita in Shanxi, Hebei and Henan was respectively 0.13 ha, 0.07 ha and 0.06 ha and the effective irrigation area per capita only 0.02 ha, 0.03 ha and 0.04 ha. The water disputes of Zhang River were triggered in the 1950s owing to the limited natural resources, mainly on the Zhuozhang River, the Qingzhang River and the main stream of the Zhang River in the border area of Shanxi, Hebei and Henan. The number of destructive incidents of water projects in Hongqi Canal of Henan Province, Dayuefeng Canal of Hebei Province and Baishan Canal of Hebei was over 30. The residents of villages on both sides of Zhuozhang River from Hebei Province and Henan Province shelled each other and fought with weapons. The conflicts caused casualties and significant economic loss and directly affected the local social stability and economic development. The Zhang River region was one of the worst regions that had been suffered by the greatest water conflicts.



The problems could be summarized into several points. First, the upper reaches of Zhang River were short of land and water resources that led to obvious contradiction between supply and demand. Second, there was a blank of the integrated management and planning of related authorities, resulting in unregulated exploitations and contradictions difficult to coordinate. Third, the residents on both sides competed to build field-and-village-protecting dams and hydroelectric power projects for occupying river banks.

2. Decisions and Actions Taken

Due to the particularity of the basin and its influence in China, the Central Government has attached importance to water disputes of Zhang River, issuing documents and guidance to the provincial governments of Henan and Hebei Provinces for settling disputes and achieving social stability. On June 3, 1989, the State Council approved "the Water Allocation Plan of Zhang River" proposed by the Ministry of Water Resources, providing that the water distribution ratio of Zhang River to Henan and Hebei were 48% and 52%, respectively.

In 1992, Ministry of Water Resources coordinated the two provinces to sign "the Agreement on the Settlement of the Water Disputes of Zhang River". While the main channel of the Red Flag Canal was blown up in August, 1992, the State Council held a meeting to mediate the water disputes of the Zhang River, and meanwhile, "the State Council's Coordination Meeting Minutes of the Water Disputes of Zhang River" (State Council [1992] No. 132) was proposed. It was decided to establish the Zhang River Administration affiliated to Haihe River Water Conservancy Commission, the Ministry of Water Resources (hereinafter referred as the Administration), in charge of the reaches up to 108.44 km, covering the lower reaches of Houbi Hydrometric Station of Zhuozhang River, the lower reaches of Kuangmenkou Hydrometric Station of the Qingzhang River and the upper reaches of Guangtai Hydrometric Station of the main channel of the Zhang River, where there were the most severe water disputes. In 1993, the Administration was formally founded, actively developing management mechanisms to solve water disputes between the provinces that resulted in effective outcomes in transboundary river management.

2.1 Measures to foster the planning process

The main task for the Administration was to implement sound regulations and integrated planning. This allowed to take engineering measures at the lower reaches of Houbi Hydrometric Station of Zhuozhang River, the lower reaches of Kuangmenkou Hydrometric Station of the Qingzhang River and the upper reaches of Guangtai Hydrometric Station of the main channel of the Zhang River.

It has also carried out the water distribution plan aiming at water disputes of Zhang River, helping to maintain a stable order of the local water resources management.

According to "the Regulation Plan of the Reaches of Zhang River from Houbi and Kuangmenkou to Guangtai" approved by the Ministry of Water Resources in 1997, the Government has invested 86.64 million yuan. They carried out the regulation projects to prevent water disputes of the upper Zhang River by four stages:

- regulation line of the river channel
 - demolishing the illegal construction,
 - reinforcing the field-and-village-protecting dams, and
 - constructing separation work
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- improving management facilities.

These measures gradually eliminated the risk of water disputes by the engineering means and basically solved the riverside villages' land problem.

In 2001, with the coordination and support of the Administration, the two provinces jointly set up an inter-provincial inverted siphon project, which solved the problem of water utilization and irrigation in Nanyangcheng Village by transferring water from Xiaoyuefeng Canal of Hebei Province to Nanyangcheng Village of Henan Province.



After the reform of water resources management in 2005, the repair and maintenance of water projects have been enhanced and the engineering facilities have also been upgraded.

2.2 The use of water rights and water market tools

The Administration has assessed water rights and introduced the water market. These were new ideas of using the market mechanism to settle water disputes, namely "the paid inter-provincial water diversion, the optimization of the water distribution, prevention of water disputes and stable development." During the spring and summer in 2001 when it needed irrigation and sowing, there was a continued drought in North China. The riverside villages and the four irrigation areas of Henan and Hebei were badly in need of water to fight the drought, where there was a grim situation of competing for water. However, at the same time, in the upper reaches, there was much water storage beyond the flood limit in the reservoir of Shanxi Province, which should be discharged ahead of the summer flood season. The Administration investigated the water storage in the reservoir of Shanxi Province and the water demand of the two provinces in the lower reaches. A consultation among the related governments and water authorities of Shanxi, Hebei and Henan reached an agreement on the paid water diversion programme. In April and May, the divided water of 15 million m³ flowed from Zhangze Reservoir of Shanxi to the irrigation area of the Yuejin Canal in Henan Province, which was the initial trial of inter-provincial water diversion. In June, aimed at the severe contradiction and frequent water disputes during the sowing time, another agreement made water of 30 million m³ divided from 5 reservoirs of Shanxi Province to the lower reaches including the irrigation areas of Hongqi Canal and Yuejin Canal in Henan Province and the riverside village in Henan and Hebei Provinces. It effectively prevented water disputes regularly caused in the summer sowing time. In the spring irrigation period of 2002, based on past experience, the water diversion reached 30 million m³ to irrigate the areas of Hongqi Canal and Yuejin Canal in Henan Province.

Water Diversion Volumn of Zhang River					
Irrigation Area Year	Hongqi Canal(Henan Province)	Yuejin Canal(Henan Province)	Senior Yuefeng Canal(Hebei Province)	Junior Yuefeng Canal(Hebei Province)	Sum
2001	1.1245	0.2355	2.247	1.0353	4.64
2002	0.947	0.1046	2.4225	1.6718	5.15
2003	1.7802	0.2577	3.6018	0.4779	6.12
2004	2.896	0.6029	3.9848	0.411	7.89
2005	1.7331	0.4699	3.589	0.7817	6.57
2006	1.9336	1.0708	4.5454	1.1412	8.69
2007	2.2513	1.0553	3.7351	1.9605	9.00
2008	1.6246	0.8659	2.7768	1.2924	6.56
2009	0.5473	0.0568	2.1523	0.6185	3.37
2010	1.0446	0.1237	2.7958	1.0924	5.06
2011	1.397	0.1441	3.347	1.358	6.25
2012	1.536	0.3160	3.383	1.041	6.28
2013	1.719	0.5443	3.522	1.606	7.39
2014	1.332	0.6066	3.556	1.967	7.46
2015 Jan-July	0.9497	0.1996	1.506	0.8597	3.52
Sum	25.22	8.27	47.68	15.36	96.53
Unit: 100m cubic metre					

Resource: Zhang River Administration

The turn-out gate of the headworks was well equipped in the irrigation area in the reaches directly under management. This provided the conditions of water allocation. Efforts were made to train and enhance professional skills of the staff in the hydrological station. The standardized management was gradually advancing and the information capability was growing. Every year, the reaches directly under management provided the four main irrigation areas with 4.6 billion cubic meters, ensuring the water demand of local economic and social development.

After more than 30 coordination meetings in over 10 months, in 2012, the two water resources authorities of Hebei and Henan ultimately formed the "Advice on Water allocation of Zhuozhang River (Trial)" which decided the rotation irrigation as the main solution, and the proposed act should be carried out in May 2012. This is the initial realization of water allocation of Zhang River between Hebei and Henan, which is the first step of water allocation of Zhang River.

2.3 Water dispute resolution mechanisms

The Administration was founded and treated as the management committee of Zhang River. It serves as the platform of the Upper Reaches Administration and the three provinces and four municipalities. One of the major functions of the Administration is handling water pollution emergency for river

security. Jointly with the environmental protection departments, water resources departments and hydrology departments of related cities as well as a reservoir management bureau in the river basin, the Administration completed the ***River Pollution Emergency Response & Communications Plan of Upper Stream of Zhang River Basin***, regulating regular meeting schedule, information sharing, emergency response and capacity building. It has helped the Administration and stakeholders coordinate closely and handle with emergencies/disputes effectively achieving social stability and water security.

The Administration, relying on the hydrologic work platform, has well settled several disputes in recent years, like the Huanglongkou Tunnel project in She County of Hebei, the construction of Shiti Hydropower Station, the construction of Xi'an Hydropower Station (phase ii) in Zecheng of Shanxi, the construction of Pengtou Hydropower Station in Pingshun of Shanxi. It also resolved the issue of throwing waste to Zhuozhang River during the construction of rebuilding S288 provincial highway in Henan, and rectification of land within the scope of flood discharge in Sanliwan, Anyang County of Henan. Meanwhile, the Administration arranged regular inspections and river dispute screening to resolve conflicts, prevent and reduce water disputes in time.

2.4 Monitoring and data sharing

To ensure that the relevant organizations along the river can timely get the information on the water volume of the upper Zhang River, the Administration established a hydrological monitoring network for the reaches under the integrated management. The monitoring network consists of data on water quantity, withdrawals, and water quality in the basic chemical, physical and biological parameters. There are 14 hydrological stations that collect hydrological information and data of Zhang River for achieving reasonable water resources management. One is "Houbi" that monitors and reports water inflow quantity and flood control of the river; and three are Xihuangzha, Guyi and Matian that monitor water outflow of the river basin. And ten stations are built up on the bank of the Zhang River to monitor the water inflow of each canal. The water quality monitoring center covers the water boundaries between provinces, water function zones, river discharge outlets and water ecosystem. The real time system is applied for checking all reservoirs and rainfall stations of the on the upper stream of Zhang River. The monitoring is conducted by a qualified group of hydrologists who proposed the "Hydrological Report of the Upper Reaches of Zhang River" and "Water Dynamics of the Upper Reaches of Zhang River" and sent to the relevant organizations and departments of the three provinces along the Zhang River. The official website of the Administration was installed to publish the runoff conditions and water diversion of the irrigation areas along the river, making the information transparent and laying the foundation for the water distribution.

The government departments of Hebei and Henan at all levels and the related water resources authorities actively visit each other. Thus, it is possible to strengthen communication and enhance understanding. For example, the municipal governments of Handan and Anyang established a friendly networking system and issued a "Proposal on Jointly Water Management".

2.5 Demand management measures to promote ecological health of the river

The Administration has attached the importance to the health and ecosystem of the river through integrated management of river basin. Especially in the dry seasons, it keeps communications and collaboration with irrigation management departments and balances different water demands, ensuring river ecosystem demand of water resources.

Besides, it is capable of providing ecological water use of related water projects in the river basin area. In 2005 and 2006, for instance, the Haihe River Water Conservancy Commission of the Ministry of Water Resources was challenged by water shortage as implementing 'the Water Diversion from Yue to Dian' and 'the Water Diversion from Yue to Heng' in the headwater area. Meeting the ecosystem demand of water resources of the projects, the Administration coordinated with its key irrigation management departments by reducing their water consumption. The saving water resources could flow to the headwater area for the ecosystem demand of the projects.

3. Outcomes

Through 20 years' efforts, with the implementation of a series of measures, the raising legal awareness among the stakeholders along the river and improvement of the comprehensive coordination mechanism, at present, the conflicts between two sides of the upper reaches of Zhang River has mitigated and the direct water disputes and violent conflicts between residents along the river from Hebei Province and Henan Province have been reduced, which meant that a stable order of water affair has been established in the villages of the neighboring provinces along the river. The following outcomes can be summarized as follows.

- The allocation of water resources has been optimized
There was a strong contradiction between water supply and demand among various water users. Upper Reaches Administration has taken advantage of the integrated water resources management and control, and taken measures including the paid inter-provincial water transfer and rotation irrigation, basically solving the problem of competition for land and water. It not only protected the fundamental interests of the population of the villages along the river, but also optimized the allocation of water resources within the basin and mitigated the contradiction between water supply and demand, which achieved significant social benefits.
- Agriculture outputs and economic benefits have been yielded
The Upper Reaches Administration transferred water to irrigate cropland of 33,300 hm² three times a year, solving the water scarcity of hundreds of thousands of people and livestock and increasing the agricultural income of 50 million yuan (USD 7.68 million). The annual revenue of the Shanxi Water Resources Management Authority was increased to 1.4 million yuan (USD 215,040). The revenue of the riverside power stations represents 1.2 million yuan (USD 184,320).
- A new approach to solve the water disputes by the economic means and market mechanism has been developed.
The Upper Reaches Administration has broken the traditional concepts and practiced the theory of water rights and water market, which explored a new way to solve the water disputes by the economic means and market mechanisms.
- Shared vision was promoted to build the trust among the provinces
The stakeholders from three provinces have chosen an acceptable mediator – the Administration - to "guide" them in designing a process and reaching



an agreement on mutually acceptable solutions. Currently, a link between the villages has been established on the two sides of the Zhang River, which asked for a regular contact between the village cadres and the people's frequent travel between the two sides. The increasingly frequent contact between the two sides not only enhanced the friendship of the cadres and the population from both sides, but also created a good atmosphere of water control in solidarity.

4. Lessons learnt and replicability

The following lessons are driven from this case:

- Water disputes were mitigated by the introduction of the appropriate administrative structure
- Complex instruments were applied in an integrated way – ranging from the use of administrative, economic, legal, technical and engineering means. Especially the use of market mechanism and the rational allocation of water resources is an important approach to solve the water disputes.
- Mitigation of water disputes allowed to develop a water-saving and pollution-preventing society. The carrying capacity of the water resources and ecosystem protection was an important part of the interventions in the Zhang River basin. At a mean time, development of the economy and society was enhanced.
- Taking precautions beforehand and putting prevention first is an important principle to solve the water disputes.
- Communicating effectively with other provinces and developing a friendship with the related provinces is an important humanistic factor to solve the water disputes.

The experience drawn from the case is available for reference to solve the inter-provincial water disputes.

5. Contact information, references, people

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Organizations and Personnel

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