

# Research on Status Quo of Water Rights Trading in China

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**Abstract.** Promoting water rights trading is conducive to optimal allocation of water resources through market mechanisms, and provides an important means to improve water-use efficiency and the benefits from water use. This study explores the background against which water rights trading in China came into being, and sheds a light on the current status of water rights trading in China, which covers topics such as China Water Exchange, the progress of work related to water rights determination and trading in pilot provinces (autonomous regions), and China's efforts to build a water rights system. Furthermore, it identifies a number of problems pertaining to the subjects and objects of water rights trading, and China's efforts in building a network of trading platforms, as well as a water rights system. On that basis, it puts forward countermeasures to address the detected problems, in an effort to facilitate water rights trading.

## 1. Introduction

The combination of population and economic growth in the recent decades has led to ever-expanding demand for water resources. Nevertheless, water environment problems are increasingly prominent and water shortage has become an issue of global concern. China in particular is faced with a dire shortage of water resources, due in part to low water-use efficiency and prevalent waste of water. As the country continues to develop, the demand for water is likely to be higher, making the situation even worse. To dissolve this crisis, it will not suffice to rely solely on administrative means, and a new trail must be blazed for a return to equilibrium[1].

In China's No. 1 Central Document 2011 and at the Central Water Conservancy Work Conference convened in the same year, it was proposed that a national water rights system be put in place, as part of an effort to leverage market mechanisms for optimized allocation of water resources. In 2012, China's No. 3 Central Document specified that a well-functioning water rights system must be established, and a water market be formed, so that water resources can be reasonably allocated through market mechanisms. In March, 2014, Xi Jinping, General Secretary of CPC Central Committee, put forward "taking systematic approaches to address water issues by placing water conservation as a priority and giving full play to the roles of both the government and the market, for optimized allocation of water resources" as the guiding principle for water conservancy work in the years to come. He noted that a water rights system must be built, according to which water rights are properly determined, and that a water market be created. In 2017, China's No. 1 Central Document stipulated that intensified efforts must be made to foster a water market, in which water-use rights can



be determined and trade in water rights can be made. At the 19th CPC National Congress, resources conservation and environmental protection were identified as a fundamental state policy in China's efforts to facilitate ecological reform. As an integral part of the ecological reform, water rights reform is essential in ensuring water conservation and serves as an important means to leverage market mechanisms for optimized allocation of water resources. Therefore, substantial efforts must be made in this regard.

## **2. Status Quo of Water Rights Trading in China**

### *2.1. Origin and Development*

For decades, China has adopted a governance approach featuring the combination of macro-control and specific administrative measures to the exploitation, use, conservation, harnessing and allocation of water resources, with an aim to ensure equal rights to use water[2]. Nevertheless, this approach, without leveraging any market mechanisms, has been plagued by low water-use efficiency. According to the Coase theorem, incorporating property rights into water resources management may create a synergy between administrative means and market mechanisms, thereby conducing to raising management efficiency and optimizing the use of water resources. Such practice was first explored by some foreign localities. One of the most glaring examples is the water bank in California, which is actually a broker scheme. Here is how it works: the water bank kicks in whenever a drought hits. It will start by promptly collecting massive amounts of information concerning water demand, then buy water rights from low-demand subjects through contracts, and at last sell them to those drought-stricken areas and high-demand subjects. This approach helps to both facilitate water conservation and improve water-use efficiency. Against this backdrop, there is an urgent need for China to carry out water rights reform, which shall consist of the following initiatives, aside from total consumption control. First, China needs to determine who are entitled to occupy, use and/or profit from particular water resources. Second, China needs to promote water rights trading, so that optimal allocation of water resources may be achieved according to the forces of supply and demand. Third, China needs to put a limit on the use of water and regulate the water market to ensure adequate supply of water for agricultural and ecological uses and to protect the legal rights and interests of water users.

In promoting water rights trading, China has taken the following measures. First, China has set up pilots. Under the guidance of the Ministry of Water Resources, Zhejiang, Ningxia, Inner Mongolia, Fujian, Gansu, and Xinjiang, among other provincial-level administrative divisions, have started to explore the best practices of water rights trading since 2000. As a result, a number of water rights transactions have been completed. Second, China has set up China Water Exchange (or "CWEX"), a national water rights trading platform. Established in June 2016, the Exchange provides a venue for well-regulated water rights trading activities, where the market plays a decisive role in allocating water resources, and the government complements what the market cannot do. CWEX contributes to improved water-use efficiency and increased benefits from water use, and conduces to sustainable use of water resources and socioeconomic development. Third, China has issued a number of guidance documents to regulate water rights trading, including the *Interim Measures for Managing Water Rights Trading*. CWEX has released the *Rules for Water Rights Trading* and other seven guiding documents. Furthermore, the pilot areas have put extensive efforts to explore the best practices of piloting, water rights determination, and water rights trading.

### *2.2. Transactions at China Water Exchange*

*2.2.1. Overview of Transactions.* CWEX is an important water rights trading platform. From its inception in June 2016 to March 2018, the Exchange saw 46 completed transactions, involving a total of 1.60 billion tons of water valued at RMB 995.87 million. The highest price in a single transaction was RMB 1.2 and the lowest RMB 0.17 per cubic meter. Participants consisted primarily of government agencies, public institutions, state-owned enterprises and grassroots water-consuming organizations. In sum, despite considerable growth in the number of transactions, the overall transaction size is relatively small.

*2.2.2. Types and Forms of Transactions.* At CWEX, there are three types of transaction allowed, namely cross-region water rights and water-taking rights transactions, and those between irrigation water users. As shown in Table 1, as of November 20, 2017, the quantity of water involved in cross-region water rights and water-taking rights transactions had totaled 1.18 billion cubic meters, with a value of RMB 744.47 million; and that in transactions between irrigation water users had reached 2.91 million cubic meters, with a value of RMB 652,972.60. In other words, cross-region water rights and water-taking rights transactions take the lion's share. These transactions take two forms: one is transfer through contract, and the other is open-market transaction. As of November 20, 2017, water sold through the had totaled 684.16 million cubic meters, with a value of RMB 445.07 million; and that through the latter had reached 500.31 million cubic meters, with a total value of RMB 300.06 million. As such, both forms are playing an important part in water rights trading at CWEX.

**Table 1.** Types and forms of transaction.

	Transfer through contract		Open-market transaction		Total	
	Quantity (10,000 m <sup>3</sup> )	Amount (RMB 10,000)	Quantity (10,000 m <sup>3</sup> )	Amount (RMB 10,000)	Quantity (10,000 m <sup>3</sup> )	Amount (RMB 10,000)
Cross-region water rights and water-taking rights transactions	108,656.30	69,387.47	50,000.00	30,000.00	158,656.30	99,387.47
Water rights transactions between irrigation water users	885.31	194.15	31.09	6.22	916.40	200.37
Total	109,541.61	69,581.62	50,031.09	30,006.22	159,572.70	99,587.83

Source: CWEX official website (<http://cwex.org.cn/>)

### *2.3. Progress of Water Rights Trading in National Pilot Provinces (Autonomous Regions)*

The national pilot provinces (autonomous regions) have made great efforts to promote the related work in accordance with the goals made clear by pilot programs and has made considerable progress and gained work experience especially in areas such as determination of water rights and water rights trading.

*2.3.1. Determination of water rights in pilot provinces (autonomous regions).* These pilot provinces (autonomous regions) explored the determination of water-taking rights on two levels: regional level and water-user level[3]. On the regional level, water-taking rights and interests were specified mainly through a regional total water consumption quota system and water allocation schemes for specific rivers. For example, Ningxia Hui Autonomous Region allocated regional quotas to lower-level cities and counties, determined cross-region water rights transactions and interests with a step-by-step approach and confirmed nearly 300 water rights certificates to be issued to entities including township governments and water-consuming organizations. Henan Province released a guideline document named *Water Allocation Program for the First Phase of the Mid-route of South-to-North Water Transfer Project in Henan Province* to allocate water consumption quotas to each water areas to serve as the basis for facilitating water rights trading in related cities and counties. Guangdong Province has finished water allocation arrangement for basins of Dongjiang River, Jianjiang River, Hanjiang River and Beijing River. Guangdong also specified total water consumption quotas for the subsequent years until 2030 for all its prefecture-and-above-level cities. On the water-user level, there are two kinds of water users. First, non-agricultural water users who are granted water-taking rights. The water

administrative authorities that has the rights of review and approval determined water-taking rights by issuing water-taking certificates according to the *Regulation on the Administration of Water-taking Certificates and the Levy of Water Resource Fees*. Jiangxi Province conducted a survey about water-taking rights in Xingan County, Gao'an County and Dongxiang County and organized township governments, reservoir irrigation areas and businesses concerned to fill in survey forms and the outcomes of the survey were publicized and filed. Second, agricultural water users in irrigation areas. The local government or authorized water administrative departments firstly took into account the conditions of water resources, measurement capacity and management needs and then determined water rights by issuing water rights certificates to water user associations or farmers. For instance, in Yidu City, Hubei Province where there are ponds and reservoirs built by the rural collective economic organizations, water rights to the resources concerned were determined to these organizations or farmers through reform in small water conservancy property rights. Gansu Province allocated the irrigation water quotas into specific irrigation ditch and determined the water rights to each water user association.

In general, these pilot regions mainly took four steps to deal with the determination of water rights. First, they determined the total water consumption quota for each administrative area, and allocated the quotas to specific rivers, lakes, reservoirs and groundwater resources. Second, they formulated plans of the water resources allocation among different industries and then based on comprehensive water resources planning and need for future development, specified the share of water distributed to people's daily consumption and major water-consuming sectors including agricultural and industrial sectors. Third, based on the total water consumption quotas, allocation plans for particular industries and allocation standards for individual users, they specified the shares of water for two kinds of users. In terms of non-agricultural water users who were granted water-taking rights, the priority was to regulate the water-taking permission management and strictly verify the amount of water. In terms of agricultural water users in irrigation areas, the priority was to equally distribute water consumption quotas to water user associations or farmers. Fourth, they reviewed the total water consumption quota balance before officially issuing certificates to water users, and after that set up monitoring facilities to ensure that water rights were supervised. In some regions, the outcomes of water rights determination for agricultural water users in irrigation areas were publicized.

*2.3.2. Water rights trading in pilot provinces (autonomous regions).* At present, there are three models of water rights trading in China, namely, trading between regions, trading between users and purchasing from government authorities repurchased (or withdrawn) water rights[4]. In terms of trading between regions, after total water consumption quotas determination and the distribution of river water were completed, the saved or surplus water can be traded between these administrative regions through water transfer projects. Such intergovernmental transactions are conducted between the local governments or authorized departments. For instance, Xinmi City in Henan Province transacted a total 24 million cubic meters of water with Pingdingshan City in Henan Province through the South-to-North Water Transfer Project with the price of RMB 0.87 per cubic meter and trading period of 3 years. Trading between users consists of transactions between non-agricultural water users, and those between irrigation water users. Non-agricultural water users who gained water-taking rights can sell their saved water. For instance, Zhouta Township of Zhongning County in Ningxia transferred 2.19 million cubic meters of water saved through agricultural water-saving transformation and planting structure adjustment to the county's power plant. In terms of transaction between irrigation water users, these users can sell their saved water rights. For instance, farmers in Shiyang River Basin, Gansu Province carried out water rights transactions. One of the districts in that area, Liangzhou District in Wuwei City completed a total 241 transactions in 2015 with a total volume of 4.68 million cubic meters and a transaction value of about RMB 980,000. In 2015 and 2016, 36 companies (or large agricultural water consumer) in Ningxia were involved in water rights transactions, involving combined irrigated area of 83,000 mu, trading volume of 5.77 million cubic meters, and a total value of RMB 4.22 million. Under the third model, local governments or authorized departments repurchase or withdraw the water saved by users. The water will be first used

for ensuring people's daily consumption and restoring ecological environment, and the surplus, if any, will be put to the market. In November 2016, the Department of Water Resources of Inner Mongolia Autonomous Region withdrew the spare quota of 20 million cubic meters per year according to *Measures for Disposal of Spare Water Quotas in Inner Mongolia Autonomous Region*, and transferred it to the Inner Mongolia Autonomous Region Water Rights Transfer Center Co., Ltd. The company then listed the rights on the platform of CWEX openly selling them to companies in Ordos City, Wuhai City, and Alxa City. In the end, five companies were chosen as the ultimate transferees in a chronological order with the transaction period of 25 years and down payment of RMB 300 million. By analyzing the statistics from the official websites of departments of water resources in the pilot regions and the files of the National Water Rights Pilot Symposium, we found that the volume of water rights transaction in Inner Mongolia has reached 1117.75 million cubic meters, with a total value of RMB 667.81 million. As shown in Table 2, at present, the seven pilot provinces (autonomous regions), except for Jiangxi Province, have set up water rights trading centers at the provincial or county level. However, only Inner Mongolia has created a website to promote water rights trading – the Inner Mongolia Water Rights Storage and Transfer Center, which presents knowledge of water rights trading and discloses trading information. These specialized trading platforms have furthered the development of water rights trading.

**Table 2.** Water rights trading centers in pilot provinces (autonomous regions).

National Pilot Provinces	Water Rights Trading Centers
Ningxia	Water Rights Trading Center of Zhongning County
Jiangxi	N/A
Hubei	Water Rights Trading Platform of Jingmen City
Inner Mongolia	Inner Mongolia Water Rights Storage and Transfer Center
Henan	Henan Water Rights Storage and Transfer Center
Gansu	Shule River Basin Water Rights Trading On-line Platform of CWEX
Guangdong	Guangdong Environment Exchange

Source: Official websites of the Department of Water Resources of Ningxia, Jiangxi, Hubei, Inner Mongolia, Henan, Gansu and Guangdong and files of the National Water Rights Pilot Symposium.

### 3. Problem Analysis

#### 3.1. Insufficient understanding of Water Rights Trading Subjects

The problem of water rights determination and trading comes partly from local organizations' lack of in-depth understanding of water rights trading, as is the case with county-level departments of water resources in Ningxia water rights trading pilot market. Currently, water resources management departments and all sectors of society have not reached a consensus over the purpose of and the roles of government and market in the establishment of water rights system, with some even consider water rights determination a way to pass responsibilities down to lower levels. Such insufficient understanding hinders the development of water rights determination.

#### 3.2. Difficulty in Determining the Objects of Water Rights Trading

So far, major measures and procedures for water rights determination have taken shape, yet there remain difficulties in recording water rights determination and water resources data as certain types of water use are not easy to meter and monitor. For example, Guangdong pilot market pointed out that as Pearl River Delta adopts tidal irrigation. The measurement of its agricultural water is made mainly



through installing meters in the beginning of tidal canals. Such inaccurate agricultural water metering will directly affect water rights determination and the metering and monitoring of trading water volume. Apart from that, how to coordinate water rights determination and the approval of water access rights, and how to determine water rights at different levels of water supply reliability still require further discussion.

### *3.3. Insufficient and Ill-Structured Water Rights Trading Platform System*

The development of water rights trading requires the establishment of specialized trading platforms. Nevertheless, the roles and responsibilities of CWEX and water trading centers of each pilot province or autonomous region are not clearly defined. Nobody knows whether they are to work in parallel or hierarchy. Therefore, currently part of water rights trading in each pilot province (autonomous region) are processed unnecessarily at both CWEX and local trading platforms. Worse still, most of the pilot provinces (autonomous regions) have not established a specialized platform for water rights trading, making it inconvenient for potential traders to access trading information, which, to some extent, impedes the development of China's water rights trading.

## **4. Policy Suggestions**

### *4.1. Enhancing the Government's Leading Role in Promoting the Water Rights Trading Market*

Playing an indispensable part in the development of water rights trading market, the government should further enhance its leading role in guiding local organizations to form an in-depth understanding of water rights determination and trading. The national government should set up a clear accountability system to allow governments at all levels to split responsibilities in the process of water rights determination. Meanwhile, the government should innovate promotion methods and carry out all-round and multi-leveled promotion by making the most of all media including newspaper, television, broadcast and internet, and organize symposiums, seminars and training sessions on water rights determination and trading, educate the public on the importance and necessity of establishing water rights system, increase the engagement of the public, and gradually improve the water rights trading market.

### *4.2. Filing the Financial Gap through Administrative Incentives and Private Investments*

Water rights reform, the metering and monitoring of water resources, the establishment of information platforms, efficient water conservation, and project constructions call for a large number of investment[5]. The determination and registration of water rights and the promotion of water rights trading will be meaningless unless greater efforts are made to enhance the monitoring capacity of water resources by adopting smart monitoring system to enable every water rights owner to meter water use on a household basis. In order to ensure a smooth water rights reform, a reward and punishment system should be established to favor regions in support of the reform in aspects including project and fund arrangements. In addition, private investments should also be encouraged to fill the financial gap in water conservancy by adopting water saving management contract and other cooperation models to achieve win-win results.

### *4.3. Establishing a Well-Defined System of Water Rights Trading Platforms*

Currently, China's water rights trading is in its exploration stage with great potential to be tapped into. In the current water market, there are both intra- and cross-administrative division trades. Therefore, it is suggested that the development of water rights trading platforms be divided into two phases. In the first phase, CWEX and water trading platforms for particular pilot provinces (autonomous regions) work in parallel, with trades within each province or autonomous region made in local trading platforms which should be greatly improved to promote such trades and cross-administrative division trades made in CWEX. In the second phase, as the trade size grows, CWEX as a national water rights trading platform will integrate with all local platforms and serve as the only official platform to provide accessible trading information and complete trading database, in an effort to unleash the vitality of the water market.

## **5. References**

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This article is funded by postgraduate technology innovation project of Capital University of Economics and Business "Research on Accounting Issues of Water Rights Trading—based on the investigation and study of transaction samples in China Water Exchange".