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# Support Water Rights Trading in Agriculture Sector in China

Water Rights and Water Rights Transfer/Exchange are regarded as an economic instrument helping the government leverage the market to allocate water resources to its maximum value and efficient use. Supply-side water management has been dominating in China for decades even today, represented by investing in water diversion engineering projects, constructing irrigation canals or other water facilities. Since 2002 central government started to explore demand-side management, attaching high attention to build up water rights mechanism and foster water rights trading market so as to encourage water rights trading among farmers, water user associations (WUA), large-scale irrigating areas, and between industrial and agricultural water users.

### Status-quo of water market development in China

Agricultural irrigation is the largest water user, accounting for about 62 ~70% of total water use in China in 2021. Many measures have been tested to encourage the development of water rights trading market. For instance, the conversion of agricultural water abstraction rights to industrial water users has been conducted in the upper and middle reach of the Yellow River in two ethnic minority autonomous region of Ningxia and Innomongolia. The pilot in the Heihe river basin in northwest China has encouraged the water rights trading among irrigating water users.

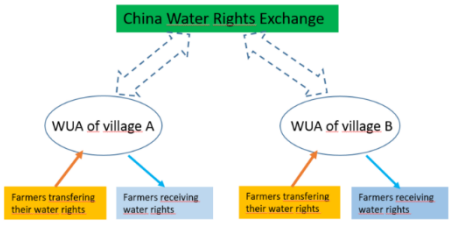


Figure 1: Water Rights Transfer among farmers in the same village

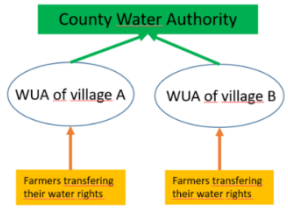


Figure 2: Water Rights bought-back by local water authorities

Above are the two major types of agricultural water rights transfer piloted in China. Figure 1 is the mostly occurred model in north China that water rights are transferred among farmers in the same village. Following this "Free-Trade" model, 107 transactions were made in a county in Hebei province during three years from 2019 to 2021, with 23'372.8m$^3$ groundwater traded in total, at a price of 0.06CNY/m$^3$ in 2019 and 0.07CNY/m$^3$ in 2020. In another county in Hebei province "Government Buyback" was piloted at a price of 0.2CNY/m$^3$. In 2017, 310'865m$^3$ was bought back by local water authority. In 2019, this figure dropped to 131'232m$^3$. No transaction occurred in other years due to lack of governmental earmarked funds. It has to be recognized that "Free-Trade" model wouldn't reduce water use for a region as a whole because the saved water by some farmers would be re-allocated to other farmers. Whereas Figure 2 model of "government buyback", water bought back by the government is not further allocated or consumed, thus saved truly.

### KEY MILESTONES OF AGRICULTURAL WATER RIGHTS TRADING MARKET

- *In 2005, Chinese Ministry of Water Resources issued the "Opinions on the Transfer of Water Rights", which was followed by the "Framework for Water Rights System" that clarified the water resources user rights and principles of water rights transfer.*
- *In 2006, the State Council issued the "Regulation on Water Abstraction Permits and Water Resources Levy", further specifying the scope of tradable water rights.*
- *In 2014, four ministries of Develoment&Reform, Finance, Water Resources and Agriculture co-issued government document on "Deepening Comprehensive Reform of Agricultural Water Prices", which initiated the allocation of initial agricultural water rights and started piloting water rights transfer in 7 provinces.*
- *In 2016, National Water Rights Trading Platform was established, aiming to encourage water rights transfer among water users, across regions, across sectors and between up and down-streams of river basins.*

Let's further take a look at the water trading market in year 2021 *(Data source: China Water Rights Exchange)*:

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|---|
| *Total water trading volume: 307.68 million* $m^3$*, 5.2‰ of total water use in China* |
| *Total Trading volume of agricultural water use: 8.58 million* $m^3$*, 0.24‰ of total agricultural water use* |
| *Number of water rights traded by irrigation water users of total number of water rights traded: 94%* |

The trading activities from 2017 to 2021 shows that the number of transactions of agricultural water rights has increased fast, but the volume of individual transaction remains very small. From 2017 till now, total irrigation water traded is only 0.14‰ of total water consumed, much lower than international average of 5-10% (Easter et Huang, 2014). Most trading occurred in north China where water is scarce, but the traded volume is less than 4% of total trading volume. This reflects that most trading in north China occurred among small water users whose allocated water is extreme low due to ca. 200 $m^3$ water resources per capita. Trading between WUAs is nearly half of total trading volume. Government procured from WUA is the second largest in terms of trading volume, reaching 36.6%. Trading price in most cases is lower than the average price of irrigation water.

**What has prevented the growth of agricultural water rights market?**

Pof. Wang Jinxia of Peking university and Prof. Sun Tianhe of Hebei University of Economics and Business have analysed the factors that may have hindered the development of agricultural water rights trading market in China:

- Water rights are not clearly allocated to the level of farmers or WUAs at villages in reality, who are the actual water users and potential trading bodies;
- It is misunderstood that water trading is mostly needed in water scare north China. In reality, even though the number of transactions is higher in north China, individual size of transaction is too small to influence water use. Whereas, in south China where water resources are rich, size of transaction is much larger, showing solid growth potential.
- Inadequate and non-reliable metering facilities might have hindered the development of water trading market at the operational level.
- Different regions shall design different water trading rules applicable to the region, taking into account local water resources availability, cropping structure, benefits for farmers for their active other than passive participation, as well as governmental role in the water trading system.

**KEY MILESTONES OF AGRICULTURAL WATER RIGHTS TRADING MARKET**

- *In 2018, the State Council issued National Strategy for Rural Revitalisation, further promoting agricultural water pricing reform, allocating initial water rights, and improving the water rights exchange system.*
- *In 2021, four ministries of Development&Reform, Finance, Water Resources and Agriculture co-issued governmental document, furthering the agricultural water pricing reform, incentivizing agricultural water rights transfer across-sectors and regions, and testing buy-back of saved water by governments. Central government announced total water use cap, which are broken down to each level of local government.*

**Policy Recommendations**

Given the facts of extreme low transaction volume of China's agricultural water rights, passive participation of farmers or WUAs at villages and government led piloting through earmarked funds or administrative orders, we make below suggestions for the sustainable growth of agricultural water rights exchange:

- **Legal framework for water rights allocation and water rights trading system** needs to be established, which shall regulate:
  - Water rights are allocated legally to farmers or WUAs at villages through Water Rights Certificate (WRC) in the form of allocated water use volume, irrigation time or irrigation land area. Build awareness among farmers to understand the value, meaning and benefits of water rights for common understanding of No WRC, No water.
  - Water rights exchange system and models that local government can follow. Free-trade and government buy-back can be combined in practice.
  - Role of central and local government, farmers&WUAs at villages, large irrigation water users and private sectors.
- As technological precondition to develop water trading market, reliable **metering facilities** shall be in place that the water use data is mutually recognized between up and down-stream, among large irrigation water regions and across sectors.

- **Feasible water rights exchange system** still needs to be developed. Local government needs to re-evaluate the potential of developing agricultural water trading market, not only considering local water resources availability, but also taking into account the economic development need for water, protection of eco-system, livelihood of farmers, and the financing capability of local government. After analysing the water needs and agricultural water saving potential, local government may design feasible water exchange system that shall encourage transaction among large irrigation water users, across sectors and across regions. For a long period of time, China will still remain a country of smallholder farmers. When the collective operation of small and mid-sized farmers reaches certain scale, with the increasing application of digital technology in agricultural irrigation, smallholder farmers may find their contribution to the water rights exchange.

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