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To cite this article: Hongzhi Wu *et al* 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **146** 012008

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The Practice of Water Rights Transaction in China

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Abstract. The allocation and transaction of water rights have been widely concerned in China. It is essential to carry out the theory innovation and practice of water rights transaction. Based on the corresponding practices of water rights trading system at home and abroad, the paper put forward some discussions on the ownership of water, the water allocation system, the water transaction system and Legal norms and institutional system.

1. Introduction

Water is one of the important resources in industry and agriculture production process. But along with continuing population growth and rapid economy development, China faces prominent challenges: water shortage, water pollution, over-exploitation of underground water and low efficiency of water usage and the imbalance between water supply and demand in China has been continuously sharpened and the conflict of water rights has been a serious social problem undoubtedly. In recent years, with scarcity of water resources increasingly serious, the allocation and the transaction of water rights and water management have been widely concerned in China. However, the theory and practice of water right is few, especial in legislation on water rights system. The article mainly summarized the advanced water rights management systems and current water rights management systems actuality at home and abroad and gave some discussions and suggestions on water rights transaction system.

2. The Practice of Foreign Water Rights

Currently, world water right trading market mainly concentrated in places such as America, Australia and Asia, among which the United States, Australia, Chile, Mexico and south Asian countries is the most representative. They execute the separation of water resource management, that is to say, power shift down and attach great importance to environmental protection and the protection of the third party for the deal.

In USA, the water right system is the earliest established and its theory is relatively complete. Water right system in the United States is generally defined by the state laws and regulations. Based on perfect legal system, water rights systems differ in the states. In the regions of the east, the southeast and west, most of them adopt the riparian rights. Riparian rights system refers to the rational use of land connected with the shore of water bodies but do not affect other riparian landowners who use the right to the reasonable use of water. However, the preemption system is established and developed in the arid and semi-arid western states of the United States to solve the water problems in these water-scarce areas. Within the specified boundary, water resources belong to the public or the



state government. Under the ownership of water resources, the allocation of water rights refers to the allocation of water resources. Although water rights trading started earlier in America, there are only several western states which established the water rights trading system. The water right system in the western states is perfect, but water market has not been set up yet. The reason is that in the water rights trading, administrative transaction costs for the buyer and the transaction cost for seller are too high to bear so as to affect the benefits and the activities of water right[1-4].

Similar to the United States, Australia's water management focus on the state as the unified management of water resource. Water rights trading can be divided into four forms in the inner state, interstate temporary water right trading and the inner state, interstate permanent water right transaction. The Murray darling basin of the south Australia (Murray-DathingBasin) is the representative water right trading [2-4].

Developing countries such as Mexico and Chile step in advance in this respect. After nearly a century of development, water resources in Mexico gradually formed a relatively complete legal system. In 1975, the first national water resources plan was implemented in Mexico. In 1992, the national water law put forward the outline of a set of integrated water resources management which included the goal of sustainable management of water resources and strengthened that water commission is the only the water management authority. It also encouraged that more private enterprise participated in water resources management and development. In addition, it introduced the market mechanism, promoted the effective management of water resource, maintained the national water commission as the management of the water right transfer and awarded the national water resources commission to licensing adjustment, water restrictions, updating licensing, and the parameters determination for the water quality protection and so on[3-4].

2.1. The Ownership and Use of Water Rights

Countries adopt different water rights regulations on the basis of their respective characteristics of water resources. Even within the same country, the ownership of water is different. For example, the owner of water belongs to property right in USA. In the eastern United States, such as Arkansas, Delaware, Florida, Georgia, and so on, the ownership and use of water adopt the Riparian rights (Riparian Doctrine) due to relatively abundant water, whereas they adopt the prior appropriation doctrine because of drought and water shortage in the western United States [5-8]. In Japan, the 1995 law regulated the river belongs to the national industry and implemented the appropriate protection, utilization and management of the rivers and strive to achieve the objectives. Rivers may not belong to private ownership. So to speak, the licensed owners of water rights can't again transfer water rights to others and the only government can award the water rights to new users[4]. Compared with the early water law, the 1981 national water law regulated that the water rights completely was separated from the ownership of land. This is the first time in the history of Chile. And the law regulation can free to trade and guaranty the water right just like any other property [9].

2.2. The Categories of Water Rights

The categories of water rights are different in many countries. For example in Australia, water rights are commonly divided into three kinds; the first kind is bulk entitlements as is granted with the administrative institutions of irrigation and water supply, electric power company; the second kind is license, namely to award individuals to the water right of rivers, underground water and the management engineering institution within a certain time limit; The third kind is water rights, which is related to the land, namely to use for life, irrigation and livestock. In USA, water rights are divided into riparian right, exclusive priority right, mixed water right and public water right. Riparian right indicates that it applies to rich water resources in the east and awards the owners of the land associated with adjacent to the river to a limited share of water right. The exclusive priority used for water shortage in the western region include three principles: one is that who occupies first , who has the priority; two is that the use of water can not damage the interests of others; Three is that it is valid for the utilized water right; it is invalid for the no having utilized water right. Mixed water right is namely

used with riparian rights and priority comprehensively. In general, riparian rights prior to priority. Public water right, used for shipping, fishing, commercial purposes, such as swimming, water entertainment, leisure, scientific research, and to meet the requirements of ecological and environmental protection of water resources, has become an important factor of water resource utilization in this respect of the interests of the public. In Chile they are divided into consumptive and not consumptive water right, permanent and temporary water right [6-9].

2.3. The Distribution of Water Rights

Since 1980s, the state government began to implement the water rights auction in Australia. Water rights may transfer temporarily or permanently; or transfer within the state or across the state; or transfer all or part. At present, they no longer approval to issue new water rights. Water rights are obtained only through the water rights trading.

Also Chile adopts permanent and temporary water rights registration system in the national water right management department [9]. In America, the distribution of water rights refers to the application of priority exclusive right which is a priority to man-made waterway such as reservoirs, canals and pumping stations. Namely it is 'time preference, right priority'. In general, there are the following procedures to access to the exclusive right: (1) a written application; (2) administrative institutions or judicial authority acceptance; (3) the acceptance of application, permits issued by administrative organizations. If the objections have been received, a hearing will be convened. Within the stipulated time, the priority right proved as uselessness will be confiscated[4,10].

3. The Practice of Water Rights Transaction in China

Due to the vast territory and big differences in natural conditions, historical development, economic, social and cultural factors, China is not feasible to establish a unified national water rights market. Limited to a certain basin or region, water right market is of watershed or regional characteristics. That is to say, different river basins or regions have own water right trading characteristics respectively.

For example, Ning(Ningxia Hui Nationality Autonomous Region)Meng(Inner Mongolia Autonomous Region) water rights succeeded to be transferred through high strength water saving investment and without increasing water indexes in the Yellow River watershed[8]. Zhangye city(Gansu province) is a pilot site of water saving society construction in China. After the reform of water rights system, water tickets have become the carrier of water exchange and water use[10]. Zhangye provincial river basin water rights trading practice achieved remarkable social and economic benefit [10]. Through the optimal allocation of water resource, it effectively alleviated the contradiction between the upstream and downstream water. Also it optimized the allocation of water resource and fostered the Zhangye water rights market. It was to break through the traditional concept and explore a new way of solving water disputes using economic means and market mechanism.

The practice of water right market in Jiangxi Province shall be helpful to carry out theoretical studies in water rich areas in southern part of China. There are two categories in water right market. one is a delegate with reservoir or irrigation region. It is the market transaction behaviour as agricultural water is used for industry or urban public water supply; another is inter-basin water rights trading as a representative of Pingxiang mountain rock reservoir. It is the only real deal in Jiangxi province[11].

Changji state, as one of the shortage of water in Sinkiang, actively carried out the pilot project of agricultural water right transaction in early 2014. There are mainly two types of transactions: one is internal between agricultural water trading, that is, between farmers; another is cross-industry water rights trading, namely water right trading transfers from agriculture to industry and public water supply[12].

In Shaanxi province, the basic work of water right transaction has already been carried out to promote environmental protection and water saving as the usage of market mechanisms. Although in three regions split into as Shanbei (northern Shaanxi), Guanzhong (central Shaanxi) and Shannan (southern Shaanxi) from north to south, Shaanxi have the same demand of water right transaction, the

way of the trade and the design of the mechanism are different. Also the purpose of the transaction is different. So in Shanbei, the inter-basin water rights conversion is used to solve the problem of water resources shortage; in Guanzhong, cross-industry water trading system is applied to improve the water efficiency of irrigation areas; in Shannan, cross-regional water rights trading system helps to establish the ecological compensation mechanism[13].

4. Discussion

With the various kinds of exploration at home and abroad, it has become necessary to apply market means to manage the utilization efficiency of water rights, water rights trading and water market development. The discussion mainly involves the following points:

4.1. The use of Water right

Clear water rights are the fundamental requirement of optimizing the water resource allocation under the market system. The innovation of water right system in China should focus on the separation of ownership and use of water resources. Now in China and many countries in the world, the water resource belongs to the public, but for the right to use it does not be regulated. In order to establish water rights trading market to accumulate more experience, we should seriously carry out the theory innovations in water resources property right system and actively encourage various kinds of water rights trading.

In the process of water rights system construction, we should clearly not only develop water rights for approval to register, but also focus on developing agricultural water approval. Also we should set up different types of water right transaction trading premise condition and rule, thus play a role of market mechanism.

4.2. Water Resource Allocation System

The practices of water allocation above showed that water resource allocation can be divided into three types: administrative (government) configuration, user participation and negotiation allocation respectively. Administrative (government) configuration indicates that water resources are allocated through the control of water volume or water price between the industries and the regions as is a top-down approach. On the contrary, in the process of user participation or negotiation allocation, the users or related interest groups control the water distribution. The management of the farmer's participation in the irrigation system is one of the most typical examples of this approach.

The water market uses the market mechanism to allocate water resource under the market condition. According to relevant experience and China's current market level, the construction of water right allocation system in China should innovate and adjust measures to local conditions step by step.

The domestic pilot regions showed the allocation form or model of water rights has presented a diversified development trend. To establish the perfect water market, new forms of water rights allocation are actively explored and adjust measures to local conditions.

4.3. Water Right Transaction System

The practices of water rights transaction above show that water resource transaction present the characteristic of diversification and flexibility. There are permanent and temporary transactions; intra regional and cross regional transactions; intra industry and cross industry transactions. From the current practice of water rights trading, the water rights trading system has the following important advantages: (a) to be a more mature and feasible water right system in which market and government play important roles; (b) to save water resources, improve the efficiency of water resource and optimize the allocation of water resources; (c) to increase the participation in the management and distribution of water resources; (d) to be a better way of water resources distribution using market mechanism; (e) to effectively control the over-exploitation of groundwater.

In China, water rights trading system has not yet regulated in the concrete execution links. We should draw lessons from foreign advanced experience, such as Chile and Australia, and so on, and

adjust measures to local conditions to satisfy national and local water conditions. In the construction process of water rights transaction system, government management and two-way market regulation should be strengthened so as to sustainable utilization of water resource.

4.4. Legal Norms and Institutional System

Along with the improvement of the market, some countries such as the United States, Australia, Chile, Mexico and so on, have formulated the corresponding water law according to their water situation one by one. In China, with respect to management model, transfer implementation rules, and intermediary services of water rights, and so on, they must be considered now. To solve the distribution of water resource, corresponding legal procedures of water rights allocation, reasonable water price setting mechanism, water rights trading market supervision and management system, water right transaction registration system and should be established and developed.

Acknowledgments

The authors gratefully acknowledge the financial supports from the National Natural Science Foundation of China (No.41701627) and the *Taishan Scholar Program of Shandong Province, China*.

References

- [1] Wenhua Yu.: Water right system legislation revelation abroad. *J. The rule of law and society*, (3):510-511(2007)
- [2] R. Quentin G., James H.: Water markets in the Murray-Darling Basin. *J. Agricultural water management*.145,61-71(2013)
- [3] Jacinta Palerm-Viqueira, Colegio de Postgraduados.: Water rights and water institutions in Mexico. Worldbank, http://siteresources.worldbank.org/EXTWAT/Resources/4602122-1213366294492/5106220-1213804320899/10.2_Water_Use_Rights_Mexico.pdf
- [4] Jiaoyan Song.: The study on water rights trade system: In: Master thesis in northwest agriculture and forestry university of science and technology (2010).
- [5] Go Palkarishna C.: The doctrine of prior appropriation and its impact on water development: a critical survey, *J. American Journal of economics & society*, 32(1973)
- [6] Huffaker, R., et al.: The role of prior appropriation in allocating water resources into the 21st century. *J. Water Resource Development*, 16 (2000)
- [7] Colby, B.: Transactions costs and efficiency in western water allocation. *J. American Journal of Agriculture Economics*, 72 (1990)
- [8] Stephen B., Annara H.: Water trade and externalities of water use in Australia. In: *Common wealth of Australia*(2002)
- [9] Jie C., Changxin X.: The influence of Chile's water law to China's water rights trading system. *J. Yellow river*, 27,:47-48,54(2005)
- [10] Jie C.: Theory, method and application of transaction of water rights option, In: *Doctoral Dissertations in Hehai University*(2006)
- [11] Zhou Ying, Li Hongren.: Studies of institutional system for water right trading in Jiangxi Province, In: *China Water Resources*,30-32(2017).
- [12] Qinhui Jiang.: Xinjiang agricultural water rights trading legal thinking: the case of Changji state, In: *Journal of Kashgar University*,29-31(2017).
- [13] Qian Zhang.: Water rights trading mode analysis in Shaanxi, In: *Environmental protection and circular economy*, 17-19(2016).