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# Empirical Study on the Reform of Water Resources Management in Xinjiang Rural Communities

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**Abstract** With the case study of two rural communities of Hetian County and Shawan County in Xinjiang, the foundation, operation and development of the water management organizations in the two communities and their reform achievements were studied and compared. It was concluded that the reform of water resources management should be in accordance with the practical conditions of rural communities. Only with the same objectives of community people and by benefiting the farmers could the reform of water resources management be effectively implemented and achieve good results.

**Key words** Xinjiang, Rural community, Water resources management, Reform

In Xinjiang, a typical arid and semiarid region as well as an irrigated agricultural area, water resources are the key element of agricultural production, and their management has been paid more attention to by governments at all levels. According to the *Implementation Views on Water Supply to the Household in Irrigated Agricultural Area of Xinjiang* and *Implementation Views on the Reform of Grass Roots Management System in Xinjiang Uygur Autonomous Region* issued by Xinjiang People's Government in 2001 and 2005 respectively, the reform of grass roots management system in the irrigated agricultural area would be finished in about three years, and the management system composed of water management units and farmer water cooperation organization should be constructed<sup>[1]</sup>; relevant policies should come into being to promote the establishment of farmer water user association in rural communities. At present, 1/3 of rural communities have farmer water user associations in Xinjiang. However, the expected targets of water resources management reform and farmer water user association operation have not been realized according to a sample survey and site visit. In this paper, we deeply investigated Yexianbazha Village, Tawakule Township, Hetian County and Xikengwan Village, Laoshawan Town, Shawan County from the foundation, operation and development of the water management organizations in the two communities and their reform achievements, aiming to provide basis for decision making of water resources reform in Xinjiang rural communities.

## 1 Introduction of water resources management reform cases in the communities

### 1.1 Reform of water resources management in Yexianbazha Village

Yexianbazha Village is located in the lower reaches of Hetian River, and each household has 0.40 hm<sup>2</sup> of farmland on

average. During 2007 – 2009, the village was chosen as the test point of water management reform. To conduct the water management reform test, the government reformed and repaired water management facilities in the village. With the aid of researchers and water management workers, a farmer water user association composed of seven members (including chairman, vice chairman, water accountant and other members) was established through an election made by various interest groups (women, members of single-parent families, village cadres and religious people) in the community. Besides, they established association rules as well as relevant management and methods, including agricultural irrigation order, penalty approaches and so forth. Meanwhile, a small water management group composed of a leader and two managers was established in each villager group through elections. The water user association is in charge of water resources management and allocation among the small villager groups in the communities. The small water management groups are responsible for water resources management and allocation among farmers. In addition, the association is in charge of collecting water fee. According to the association rules, the members of the association and water management groups were elected every two years. Additionally, the members not belonging to the village committee could obtain certain amounts of economic allowance from collective income of the village.

### 1.2 Reform of water resources management in Xikengwan Village

Each household in Xikengwan Village has 2.33 hm<sup>2</sup> of farmland on average, and the village committee is in charge of water resources management and allocation, water fee collection and so forth. In 2009, the local government obtained the funds for the construction of national high-quality cotton base, and started to implement the construction project of water-saving cotton field at a high level. Each irrigation system has an area of 33.33 – 66.67 hm<sup>2</sup>, and it is demanded that cotton irrigation should be managed uniformly in drip irrigation system. Each farmer has a small area

Received: October 15, 2012 Accepted: February 1, 2013

Supported by the International Cooperation Department of the Ministry of Science & Technology of the People's Republic of China (2010DFB90240).

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of scattered farmland, but the project demands that farmland should be centralized. To implement the project, the village committee supported by the local government convened a villager meeting to discuss and establishes specific measures of land replacement on the premise that there is no change in farmland area and contracting year. Land replacement was carried out to concentrate scattered farmland as well as the farmland that would be reformed by high-standard water-saving technology. Every 15 – 20 households constitute a mutual-aid group with one group leader and vice group leader who are responsible for water management and water fee collection. Water fee collected by mutual-aid groups are given to the village committee and then water management department. Additionally, each household in mutual-aid groups should contribute 30 – 45 yuan/ $hm^2$  of management fee that is given to group leaders and vice group leaders as service fee. Group leaders and vice group leaders reelected every year, and they can stand for reelection. At present, most household in the village took part in mutual-aid groups, forming a new water resources management mode.

## 2 Case study

### 2.1 Reasons for the reform of water resources management in rural communities of Xinjiang

Since 2005, the Ministry of Water Resources and Xijiang Government have committed themselves to the reform of water resources management in rural communities of Xinjiang and actively promote the development of farmer water user associations in rural communities to realize farmers' self-management and improve the level of water resources management. In addition, whether farmer water user associations are established in rural communities has become one of indicators examining rural water management departments, which is an external reason for the establishment of the farmer water user association in Yexianbazha Village. After the village was chosen as a test point to conduct the reform of water resources management, the local government arranged small water farmland water conservancy construction projects to solve the problem of poor water management facilities conditions. This measure is in accordance with the actual demand of water management in the community, so villagers expressed great enthusiasm to the reform experiment of water resources management. On the other hand, there exists unfair water use and unreasonable water fee in the community, and the contradiction about water diversion irrigation have occurred occasionally among villagers during the peak period of water use. Therefore, villagers desired to improve water resources management, which is another reason for the establishment of farmer water user association in Yexianbazha Village. The reform of water resources management in Xikengwan Village arose from the implementation of construction project of water-saving cotton field at a high level. Traditional cotton field has been reformed by using advanced drip irrigation technology, and the reformed cotton field is irrigated and managed uniformly, which has promoted the establishment of a new water management organization (mutual-aid group) in the

community. To implement the construction project of water-saving cotton field at a high level, the village committee organized villagers to visit the water-saving cotton field in surrounding state farms. Through the visit, villagers have come to accept the need for the construction of water-saving cotton field and uniform management of cotton irrigation that can save irrigation water and reduce cotton production cost. Meanwhile, it can standardize cotton field irrigation, fertilization and other farming activities, greatly improve the application effect of water fertilizer and pesticide and cotton yield, so villagers have great enthusiasm to the construction of water-saving cotton field and establishment of mutual-aid groups, which resulted in the establishment of new water management organizations in the village.

### 2.2 Effect of water management organization reform in the communities

Whether farmers have benefited during the operation of water management organizations in the communities is an important indicator to test their operation effect, as well as the key to the sustainable development of water management organizations.

**2.2.1** Increasing villagers' ability to take part in water management. Through farmer water management organizations, farmers participated in discussion and decision making relative to water management more frequently, such as election, establishment, implementation and supervision of irrigation order and system, etc. Through taking part in these activities, villagers could know the ways, methods and skill of water resources management, how to exercise their rights effectively and express their appeal well, so villagers' ability to take part in water management has enhanced obviously.

**2.2.2** Establishing and improving water management supervision mechanism. During the establishment and operation of water management organizations in the communities, villagers taking part in water management understand the objective and significance of establishing water management organizations, management systems relative to water management, as well as the responsibility, right and benefit of managers and common villagers, making water management, especially water fee account open, which is convenient for villagers to supervise managers and for managers' self-discipline. The atmosphere and mechanism of community management and supervision in which most villagers take part is favorable to the implementation of water management systems and fair water use in the communities.

**2.2.3** Improving water management facility conditions of the communities. During the establishment and operation of water management organizations in the two communities, the two governments invested certain amounts of funds in the water management project of Yexianbazha Village and the construction of national high-quality cotton base in Xikengwan Village respectively. Meanwhile, the water management and irrigation infrastructure have been improved, which is beneficial for villagers.

**2.2.4** Increasing villagers' income. In the two villages, due to the improvement of irrigation and management infrastructure and management level, and the reduction of leakage and water loss

during water transportation process, the amount of water used to irrigate farmland has been decreased, and thereby production cost has been reduced, while production efficiency has been increased. However, the water-saving and yield-increasing effect of Xikengwan Village are more obvious than those of Yexianbazha Village.

**2.3 Operation and development of water resources management organizations in the communities** Operation and development of water resources management organizations in the communities must depend on intrinsic motivation of communities. First, villagers of Yexianbazha Village established a water user association to implement water resources management. One objective is to obtain government's investment in small water conservancy construction projects, which is the most attractive target. The second target is to improve management level to realize fair water sue and reasonable collection of water fee. Different interest groups have various views on this objective, and some villagers think water use is unfair, so it is difficult to promote the reform of water resources management in the communities. The third aim is to enhance utilization rate of water resources and reduce production cost. At present, water price is low in the villages, and the proportion of water fee saved by improving water management level to total production cost is very small, even lower than the cost of taking part in water user associations. Therefore, all association members are village cadres whose living allowance is provided by the township government, and thereby village committee and water user association combine.

In Xikengwan Village, villagers established mutual-aid groups to obtain government's investment in water-saving cotton field construction project at first. After the construction of the project, the quantity of water in farmland irrigation has reduced by about 40%, and production cost has decreased by 375 yuan/hm<sup>2</sup> due to the application of drip irrigation and standardization administration. At the same time, cotton yield has increased by 955 kg, and cotton income has increased by 4 500 yuan/hm<sup>2</sup>. In addition, only two villagers are in charge of field management, while other villagers could work in cities to earn additional labor income. The establishment of mutual-aid groups can not only bring about significant economic benefit to villagers, but also strengthen the partnership among villagers. In 2008, villagers who did not take part

in mutual-aid groups joined to establish mutual-aid groups, so that above 90% of villagers are members of mutual-aid groups.

### 3 Conclusions

At present, high-standard water-saving cotton field construction project and agricultural modernization have been implemented widely in Xinjiang, and it would change traditional smallholder production and implement large-scale, standardized and scientific production management mode, which can promote the reform of water resources management and improve the level of water resources management in rural communities of Xinjiang. In regions with mature conditions, villagers should be organized to take part in training to promote the reform of water resources management. Meanwhile, it is necessary to strengthen the construction of water management infrastructure that is an important condition for effective management of water resources. Thus, the local government ought to set up special fund and strengthen the construction of water management infrastructure to speed up the reform of water resources management. Additionally, it is necessary to reform the price of water used in agriculture. In Xinjiang, the price of water used in agriculture is low, even lower than cost in some regions of Tarim Basin. The low price makes water-saving cost close to (even higher than) water fee saved, which has greatly affected villagers' enthusiasm to water management and popularization of water-saving technology, and it is not propitious for water resources management and development of water management organizations in communities. Hence, the government should speed up the price reform of water used in agriculture to make water price adjust to social and economic development and farmers' affordability.

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