The Management of Village Irrigation Systems in the Shandong Province

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INTRODUCTION

THE TERM VILLAGE irrigation systems refer to irrigation systems paid, constructed and managed by either village collectives or individuals. The characteristics of these systems are as follows.

Most of them are small-scale systems which mainly consist of small lift stations with motor-pumped wells (installed capacity less than 100 kw), small reservoirs and dams (with a storage capacity of less than 100,000 m^3), and irrigation canals.

A great number of these irrigation systems are scattered over an extensive area. According to an estimation of the Shandong Province, the area under village irrigation systems accounts for 55 percent of the total irrigated area of the province. The fixed assets of the village irrigation systems account for almost 12 percent of the total fixed assets of hydraulic systems all over the province.

The village irrigation systems with motor-pumped wells have the following advantages: The water conveyance distances are short, the irrigation water use efficiencies are high, the irrigation rotation periods are short and system maintenance is easy.

System ownership is determined by construction history and the sources of investment. There are three categories of ownership: systems owned by village collective, systems owned by a group of farmers, and systems owned by individuals. In the Shandong Province, the first category of ownership system accounts for roughly 95 percent.

Before 1970, ownership of systems was integrated with the management authority of the system. The village administration had overall responsibility for the construction and management of all the irrigation systems. With the reform of the rural economic system that took place after 1980 the management of system maintenance and system operation has also changed. In some regions, the ownership of systems is separated from the management authority. Other new types of management system are practiced. The main forms of irrigation management in the Shandong Province are given below.

MANAGEMENT BY PROFESSIONAL HYDRAULIC VILLAGE TEAMS

The main characteristic of this type of management is that the professional hydraulic team of a village is an economic entity that possesses management authority of all the irrigation systems in the village. It has the following responsibilities:

a) To define the boundary of the infrastructures and land-use rights.

b) To check and register the fixed assets, current capital, credit, and debt together with the Village Committee.

c) To keep accounts and to carry out independent accounting.

d) To collect water fees on the basis of the actual cost of water supply, as well as O&M expenditures and annual depreciation charge of fixed assets.

These professional hydraulic teams collect irrigation fees from farmers. The collected depreciation charges are deposited into a village fund to be used for rehabilitation of irrigation facilities. This solves the problem of repairing and replacing damaged irrigation structures.

Experience shows that this management system has been effective. For example, in Li Ji town, Peng Lai city, the Shandong Province, 36 administrative villages have collected US$34,000 of depreciation and overhaul charges in three years. Studies show that 95 percent of the hydraulic structures is in good condition, compared to 50 percent in the past. Water use efficiencies did also increase. The rotation period of irrigation has been shortened from 12 days to

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9 days. The electricity and oil consumption of the irrigation systems have been decreased by 30 percent and, consequently, much energy is saved. In the entire area, crop yields have gone up.

MANAGEMENT BY CONTRACTED PROFESSIONAL SYSTEM MANAGERS

In this management system, the Village Committee contracts the irrigation system to professional system managers. The contract period is 15 to 20 years. The contract is granted after the fixed assets of the irrigation system have been checked. During the contract period, the Village Committee (which is the first party) has the authority to supervise the system managers. The system managers (the second party) have the right to manage the irrigation systems on a commercial basis and to collect the water charges from the users. Part of these water charges is used to cover depreciation cost of the irrigation facilities. This part should be turned over to the Village Committee funds. The remaining part is the gross income for the system managers. In Yang Lan Gou Village of Tai An City of the Shandong Province, more than 50 dams, motor-pumped wells and water diverting projects have been contracted to 7 professional system managers. All of them have got good results. Some villages have only contracted the irrigation structures to the professional system mangers, whereas machines and electric equipments have to be provided by the system managers themselves. In some other villages, professional households constructed motor-pumped wells with their own funds. An example can be found in Shou Guang County of the Shandong Province where there are 200 wells built by the professional system managers themselves. They could freely sell water to the users.

DIRECT MANAGEMENT BY VILLAGE COMMITTEES

In this management, Village Committees take direct responsibility for the construction, operation and maintenance of irrigation systems and other works. This also includes the collection of water charges and financial management. All the irrigation systems have adopted the Contract Responsibility System in the operation and maintenance of irrigation canals, structures and equipment. The contract for operation and maintenance of irrigation systems is signed between the Village Committee and the invited managers. The contract also lays down the method of performance evaluation and makes provisions for reward and punishment. In some villages, the overall operation costs for motor-pumped wells are contracted to mechanics. If the irrigation targets are achieved and operation costs can be saved, the remaining would be the income of the mechanic. In case of a deficit, the mechanic himself has to make up the balance. For example, Liu Jia Tuan Village of Tai An City of the Shandong Province owns a total of 39 motor-pumped wells. In 1992, the collected water charges were US$3,800 of which 15 percent was contracted to the mechanics for maintenance. After paying energy costs and other expenditures US$1,753 were saved. It can thus be concluded that the Contract Responsibility System has proved to be effective in terms of maintaining village irrigation systems. However, in the case of some small reservoirs, Village Committees had to hire temporary laborers to look after the reservoirs and the allocation of irrigation water without any management rules or contract-responsibility systems.

IRRIGATION FACILITIES OWNED BY COLLECTIVES BUT MANAGED BY INDIVIDUAL FARMERS

This management can mainly be found in areas with shallow wells. These wells belong to the collective, but the pumps and pipes are provided by the water users. During the irrigation season, there could be five or six farmers pumping water from one well at the same time. Farmers who cannot afford to buy motor pumps can hire pumps from others. The rent of a pump ranges from US$0.3 to US$1.1 per pumping hour. As a result, water resources cannot be fully utilized. A large number of motor pumps have been purchased, but the efficiency of water use is very low and, therefore, it leads to an enormous waste.

ANALYSIS AND EVALUATION

The above four management types have their own specific historical and economic backgrounds, management levels and guidelines from higher-level authorities within the Water Resources Department. These management types follow different management transfer processes and have their own strengths and shortcomings.

The advantage of the first type is that the ownership is separated from the management authority. The hydraulic village team is an economic entity with full rights to make independent decisions. Therefore, the management results are good. It is an advanced management system with great vitality. However, it needs an economic basis, higher skilled managers and the support from higher authorities. This type of management system accounts for about 5 percent of the systems in Shandong Province.

The second management type, in which irrigation systems are contracted to professional water managers, is basically the same as the first one. But it gives less rights to independent decisionmaking. This causes some

limitations. On the other hand, it has the advantage of having greater flexibility and being easier to practice. It could be a transition form of management types.

The third management type did not support the separation of ownership from management authority, which is the key of current reforms. It basically continues to be a centralized management form. Although this type is practiced with the idea of contract responsibility, management arrangements cannot really be transferred in accordance with the economic rules. Consequently, the results are poor. Owing to historical reasons, this type of management system is still practiced in some districts. Anyway, the partial contract responsibility system is better than the centralized system that was practiced before.

The fourth management type, in which irrigation wells are owned by collectives but pumping facilities are used by individuals separately, is an outdated management system which should be abandoned.

DISCUSSION

The ownership of the most small irrigation systems is with villages. With the deepening of rural economic reform, the function of the Village Committees has changed accordingly. Direct engagement in economic activities by administrative organizations is not permitted. The administrative authority and the operation and management of enterprises should be separated. Managing an irrigation system is like managing an enterprise. Therefore, the separation of management authority from system ownership is imperative.

After 1979, the Chinese Government moved to restructure the agriculture system in order to boost food production. The major characteristic of the reforms is that of "the production responsibility system." The basic concept of this system is to allow farmers greater individual flexibility in how they can manage their operations. So the basic production unit is now the "household" in rural areas. However, water resources and the irrigation systems should follow communal management and operation. The contract responsibility operations in no way mean that water is used without a plan or that land and irrigation systems are divided. Neither does it mean that communal management and operations are like doing every thing under centralized planning. Communal management and contract responsibility operations are dependent upon each other. At the same time they complement and support each other. So the contract responsibility management and operations of small irrigation systems will be adopted gradually into all small irrigation systems and eventually also to medium and large systems.

In Lai Wu, De Zhou district of the Shandong Province, a share system for handling the village irrigation systems was developed during recent years. During the construction of motor-pumps wells, small lift stations and other structures, capital is raised by floating shares. Farmers contribute with construction materials and labor, rather than with money. After the construction of the system has been completed, shareholders have the right to supervise the management and enjoy priority in using the system. In case a profit is made, a bonus is shared by the shareholders according to the quantity of shares they owned. The share system not only raised funds for the construction of irrigation systems, but also integrated construction with management and operations. It is an effective way for transforming management mechanisms and solving the problem of separate ownership from management authority. This practice is welcomed by farmers. On the basis of information provided by Lai Wu City, the status is as follows. At present 2,500 wells, 4,600 motor pumps and 860 small reservoirs have been constructed and are managed through the share system. The number of farmer shareholders is 38,000. They raised funds that amount to more than US$3.4 million. We can expect that in the future this share system will be further developed for the construction of irrigation systems.

At present, water charges that are collected from the village irrigation systems are much lower than the actual cost of the water that is supplied. According to statistics, the collected water charges were less than one fourth of the actual cost. Therefore, the water charge system should be reformed and the rate of water charge should be determined on the basis of the actual cost of supplying water. Only if this problem is dealt with seriously, can the reform of irrigation management systems and management transfer be successful.