

Development of a Diversified Economy to Increase Financial Revenue for Irrigation Management

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ABSTRACT

IN THE PAST, many irrigation projects were short of funds for normal operation and maintenance expenditure. This led to the deterioration of the irrigation facilities. The Chinese Government introduced a series of policies for improving water management, especially the financial situation of the professional management organizations. This paper presents the relevant policies adopted by the state, especially the policy relating to economic aspects which has been a great success in increasing revenue of management organizations. This paper also discusses the prevailing constraints for the development of a diversified economy which requires urgent attention.

INTRODUCTION

Since the founding of the New China, the government has invested substantially in developing irrigation works. Irrigation has contributed to the sustainable development of agricultural production and played an important role in countering hazards related to drought and waterlogging.

In China, the large- and medium-sized irrigation projects were constructed by the state. After the construction of the projects, professional management organizations were established with responsibility for the following:

- (a) Operating and maintaining the conveyance irrigation system.
- (b) Collecting irrigation fees.
- (c) Supervising the operation and maintenance of distribution systems, including on-farm application.

From the 1950s to the 1970s, it was a common practice to charge a low water fee rate in irrigation projects. In some cases, water was provided free of charge to farmers. The government paid the management staff salaries and all other administrative expenditures of the project management agencies. As a result, in many irrigation system, the shortage of funds for the maintenance of hydraulic structures resulted in serious deterioration of the operation and maintenance of irrigation facilities. Every year the government provided a large subsidy to the professional management organizations. However, in most cases this was very inadequate.

According to the investigation conducted by the Hubei Provincial Bureau of Water Resources before 1985, many irrigation agencies had experienced severe financial constraints (see Table 1).

In 1985, the State Council approved a proposal for the "reform of water management systems and development of a diversified economy." This program was implemented throughout the country.

In order to change the current situation, the water management system must be reformed. Water and land are the principal resources in irrigation projects. It is very important to make the most effective use of water to increase agricultural production during the drought years or seasons. At the same time, an effort must be made to promote a diversified economy to increase revenue for O&M expenditure and welfare of management staff.

The main provisions for reform were as follows:

1. Reform of water management system

Each irrigation management office should carry out the "contract responsibility system" in relation to management and all operations. For example, a professional management organization might contract with a county or Prefectural Bureau of Water Resources for the operation and maintenance of an entire irrigation system with an approved budget. The production target must be fulfilled, while any surplus or deficit is accrued by the management organization.

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Table 1. Financial deficit in the management of irrigation projects.

Items	Number of project	Financial deficit (US\$1,000)
Large-sized reservoir	42	1,228
Medium-sized reservoir	197	3,356
Pumping station	106	733
Diversion sluice	16	74
Total	361	5,391

2. Development of a diversified economy

Management and operation are the most important tasks for an irrigation management agency. At the same time, the management organizations are also encouraged to diversify their activities. This includes fishery, establishment of a small-sized hydropower station, forestry, water supply for domestic use, tourism, as well as the processing of agricultural and other sideline products for increasing the income to make up for the deficit of operation and maintenance costs.

3. For the promotion of the development of a diversified economy in the area of irrigation, the state will implement some favorable policies such as loans at low interest, reduced taxation for 2-3 years, etc.

In July 1985, the Chinese State Council issued a new national policy called "Disciplines on Re-assessing, Collecting and Managing of Water Fees for Water Projects." This stipulates the following:

- (a) The water charge should be raised on the basis of the actual cost of water being supplied for different uses.
- (b) The cost of water includes expenditures for O&M, heavy repairs and depreciation of fixed assets built from state funds.

Implementation of the above-mentioned provisions opened new prospects in the finance and economics of the irrigation districts. Many professional management organizations have achieved a balance in revenue and expenditure and have become financially self-sufficient with some surplus. The reform of the water rate system has been a remarkable success. Table 2 and Figure 1 show the annual value of collected water fees in the irrigation projects of the Hubei Province, from 1980 to 1990. Table 3 and Figure 2 show the annual value of collected water fees in the San Daohe Irrigation Project in the Hubei Province during the same period.

Table 2. Annual value of collected water fees of irrigation projects.

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Collected water fees (US\$ million)	1.6	2.5	2.6	2.7	3.0	3.8	5.7	6.2	7.8	8.1	9.1

Figure 1. Annual value of collected water fees in the irrigation projects in Hubei Province, 1980-90.

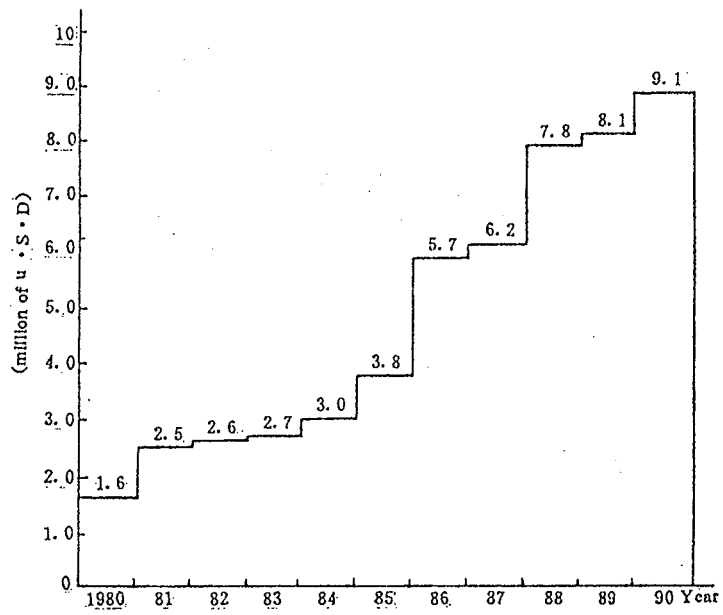


Figure 2. Annual value of collected water fees in the San Daohe Irrigation Project, Hubei Province, 1980-90.

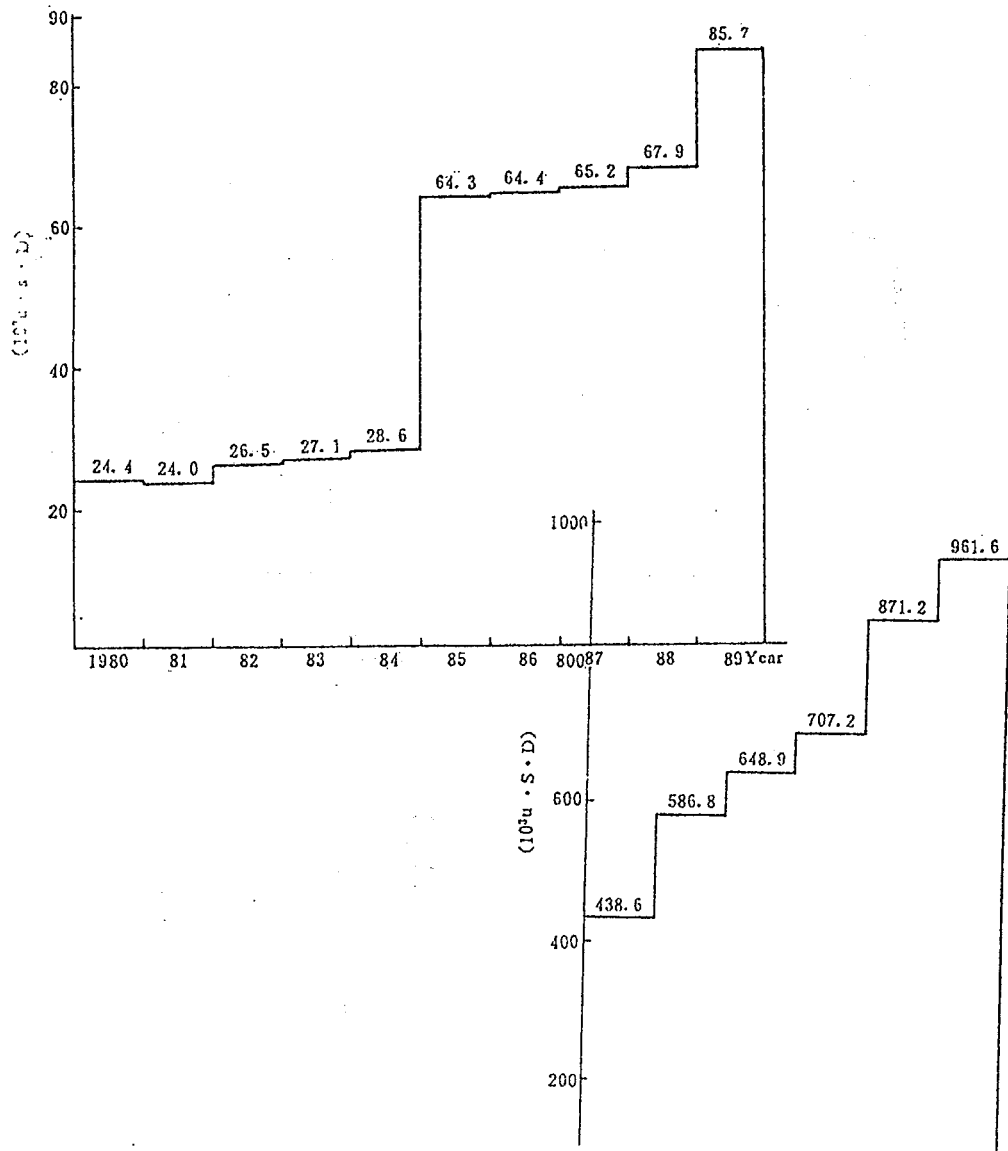


Table 3. Annual value of collected water fees of the San Daohe Irrigation Project.

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Collected water fees (US\$ thousand)	24.4	24.0	26.5	27.1	28.6	64.3	64.4	65.2	67.9	85.7

DEVELOPMENT OF A DIVERSIFIED ECONOMY

Reform of the water charges system is the key for increasing the income of professional management agencies. However, the financial self-sufficiency of most professional organizations are rather low to meet the normal requirement of O&M expenditures. This will cause the deterioration of irrigation facilities and lowering of the living and welfare standards of the professional staff. Therefore, the Chinese Government emphasized the development of a diversified economy with a view to making the institutions financially autonomous and to improving the welfare standard of the professional staff.

Development of a diversified economy in the irrigation district usually includes the following activities:

- (a) *Fishery and aquaculture:* The total water surface area of the small-, medium-, and large-sized reservoirs over the country is about 2.0 million hectares (ha). This provides favorable conditions for fishery and aquaculture, such as artificial pearls, prawn culture, raising crabs and turtles, etc. For example, in the Zhanghe Reservoirs the average annual income from fishery and aquatic products was about US\$32,000 from 1987 to 1989.
- (b) *Hydropower generation:* Along the canal or the dam site, the surplus water head may be used for small-sized hydropower generation perennially or seasonally. In the Zhanghe Reservoir, the annual income by small-sized hydropower generation is increasing yearly (Table 4).

Table 4. Annual income by hydropower generation.

Year	1987	1988	1989
Income (US\$1,000)	61.8	90.7	155.5

- (c) *Water supply for industry and domestic use:* With the rapid development of township enterprises and the increase in living standards of the population, the water demand of industry and domestic use has increased. The water charge for industry and domestic usages is much higher than that for agricultural usage. So, the irrigation management agencies should pay more attention to developing small-sized water supply projects to meet the water demand of rural industries and townships. At present, the sideline revenue from selling water for industrial or municipal use is the main income of the professional management agency of the Zhanghe Reservoir. This took up 26.3 percent of the total gross income from 1987 to 1989.
- (d) *Forestry and agriculture:* There are a lot of uncultivated land, barren hills, and slope land, which can be reclaimed for afforested areas, tea plantations or orchards in the irrigation district. For example, in the Zhanghe Reservoir, 167 ha of citrus and 2.7 ha of tea have been planted in the wasteland along the river and in some high land.
- (e) *Tourism:* The irrigation projects, especially the reservoirs, have the potential for tourism. The beautiful scenery provides favorable conditions for the development of tourism, water sports, canoeing, swimming, etc.

- (f) *Other sideline enterprises:* According to the local conditions and resources, the irrigation management agency might initiate other sideline enterprises, such as [prefabricated members plant,] quarry, hydropower processing factories, transport, communication, and commercial works.

Table 5 Annual revenue of the Zhanghe Reservoir Irrigation Agency from various channels (US\$1,000).

Revenue sources	1984	1985	1986	1987	1988	1989
Irrigation water fees	438.6	586.8	648.9	707.2	871.2	961.6
Industry water supply	114.2	183.2	251.2	238.0	249.5	143.6
Hydropower	116.3	142.7	151.7	176.0	230.7	261.8
Aquatics	97.6	123.1	61.4	61.9	90.7	155.5
Processing	24.5	34.6	29.0	29.9	27.3	38.6
Commerce	1.4	2.9	0.6	0.5	0.3	0.2
Plantation and others	5.4	7.8	19.1	21.5	27.4	11.0
Total	79.2	92.5	135.9	1709.9	245.3	350.9

Table 5 shows the annual revenue of the Zhanghe Reservoir Irrigation Agency from several channels: (a) irrigation water fees collected from agricultural use, (b) sideline revenue from industry and domestic water use (this constitutes the major portion of annual revenue), (c) revenue from selling electricity produced by hydropower plants, (d) profits from aquatic products, (e) profits of sideline enterprises and commerce run by the agency, and (f) revenue from plantation and other sideline enterprises.

DISCUSSION AND CONCLUSION

First, irrigation management offices should make major efforts to develop a diversified economy, including reform of the system of levying water fees and reduce of subsidy financed by the government budget. This will create a favorable condition towards financial autonomy or self-support from funds to be generated by the management agency itself.

The presupposition for the development of a diversified economy in the irrigation district first of all is to maintain irrigation facilities in good condition and make the most beneficial use of water to increase agricultural production. The management agency should take vigorous action to develop a diversified economy according to the local conditions and resources available.

Development of tourism and fisheries industries in the irrigation reservoir and the development of a domestic water supply should be done in such a way as to minimize any adverse effects on the environment, especially from water pollution.

Finally, in order to ensure a stable revenue from the diversified economy, it is very important to master the know-how of business operations and have access to market information. This is particularly important for hydraulic engineers and technicians.

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