Strategy on Irrigation Management Transfer in Vietnam

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INTRODUCTION

VIETNAM IS SITUATED in Southeast Asia. It covers an area of 33 million ha, of which agricultural land is 7 million ha, representing 21% of total area. It is estimated that the area of agricultural land will increase to 25% by the year 2000.

The climate of the country is tropical and is influenced by the monsoon with temperatures ranging from 1°C to 42°C, and rainfall from 1,300 mm to 2,900 mm per year. A big problem for agricultural development is that 80% of the rainfall is concentrated in six months of the rainy season; in the dry season the rainfall is very small. There are some months without any rain. The country has a dense network of rivers and streams with abundant water resources. Agricultural land is suitable for tropical and moderate agricultural development because of its topography and climate such as more sunshine, hot temperature around the year in the south; hot summer, and cold winter in the north and moderate climate in the highland.

Vietnam's economy relies chiefly on agriculture which employs 7 out of every 10 labourers and accounts for about 40% of the national total output. In some recent years, due to [renovation] of the economy, the Vietnamese economy increased at a high rate. The annual average growth rate of GDP is 7.2% in the period 1991 - 1993. The inflation reduced from 67% in 1991 to 17.5% in 1992 and to 5.3% in 1993. In agriculture, reforms in new policies have given the farmers great incentives in their cultivation and the support of agricultural technical measures: water, fertilizer, pesticides, etc., and the production has increased rapidly from 18.2 million tonnes of paddy in 1985 to 21.5 million tonnes in 1990 and nearly 25 million tonnes in 1993.

Rice is the main agricultural product in Vietnam. It gives two or three crops per year. There are Winter - Spring paddy, Summer paddy and Monsoon paddy. Among the other crops are maize, sweet potato, cassava, potato, vegetables and fruits. They are most necessary for food processing and raising livestock. There are a lot of trees of industrial value in Vietnam. Rubber is the most important of them, followed by tea, coffee, sugarcane, peanut and coconut.

The population of Vietnam has increased rapidly between the 1979 and 1993 censuses; the population grew from 52.7 million to nearly 72.0 million or by about 2.2% per year. The pressure of population is an important problem in development. Although the Vietnam Government has had a family planning program since 1960, the result is less than expected.

In the past years, Vietnamese agriculture has developed intensively and extensively. However, irrigation is the most important factor, because of the use of machines, fertilizer, pesticides and new cultivation technology. In order to expand the irrigation land, and because of so many difficulties in finance, sustainably managing the operation and maintenance and improvement of irrigation systems are made the responsibility of the water users; the Vietnam Government has implemented a strategy on irrigation management transfer. It is called "Government and water users (farmers) develop water resources together." There were two main policies in the strategy: Investment and water fee policies.

Investment Policy

The main idea of this policy is that the government invests to build all the construction works of irrigation systems and the canals which irrigate areas over 150 ha. The farmers have to pay the expenses for construction of canals which irrigate areas less than 150 ha. The government does not collect the initial investment directly.

Water Fee Policy

In accordance with the national policy, the water users (farmers) have to pay water fees to cover the cost of operation and maintenance of irrigation systems.

The water fees are based on: Irrigation area, types of cropping season and crop yield, and types of irrigation. The water fee policy has been applied since 1984 as follow:

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Table 1. Water fee for paddy.

Cropping season	Gravity Irrigation	Gravity/Pump Irrigation	Pump only Irrigation
	C percentage of contract yield		
Winter-Spring Paddy	4 - 6.5%	4.5 - 7%	5 - 7.5%
Summer-Autumn Paddy	4.5 - 7%	5 - 7.5%	5.5 - 8%
Monsoon Paddy	3 - 5.5%	3.5 - 6%	4 - 6.5%

The water fee for the other crops is equal to 50% of the water fee for the paddy, at the same season and in the same type of irrigation.

WATER DEVELOPMENT AND MANAGEMENT

Because of the strategy on irrigation management transfer "Government and water users develop water resources together," for more than the past 30 years, Vietnamese people, with the support of the government, have constructed a lot of irrigation systems in the country. The investment for water resources projects has been considered as the investment for infrastructure. The government makes the master plan of water resources of the river basins in the whole country, then spends money for design and planning, and for research and training. The water resources projects have to be agreed to by the local leaders and the farmers in the region. In the construction period, the government has invested to build the headworks: dams, reservoirs, pumping stations, sluices..., all the construction units on the canals and the canals which irrigate more than 150 ha in area. The farmers only have to pay for digging the canals which cover less than 150 ha.

The most important problem to the farmers is land. In many countries, there are two kinds of land owners: Private sector and public sector. Sometimes, difficulties occur when using private land for construction of the water resources projects. In Vietnam, all the land belongs to the country. There are no private land owners. Since 1988, the government has provided long-term land tenure to cultivators. The farmers can make their decision in planning production, and can grow their crops. The right of land could be transferred from one to another. Because of the land policy, irrigation systems have been quickly developed. There are no expenses for the land owners.

Up to 1988, in Vietnam there were 16,744 cooperatives and collectives involving 90% farmers, and 80% cultivated land. During the 28 years from 1960 to 1988, Vietnam introduced a centralized economic model, collective property of production means. The cooperatives made decisions on input and output. The structure of these cooperative had advantages: irrigation systems were quickly developed; advanced technology could be widely applied through extension work; improvement of literary life, standard of education and public works; and it is easy to mobilize labour force in social work. But, there were some disadvantages: The farmer is not truly the owner of the land; The responsibility of farmers in production is limited as there are no material incentives. Since 1988, the current policy includes the conversion of farmer cooperatives into new ways of conducting their business with the following function: the cooperatives have been in charge of all major inputs and supply to the farmers, e.g., fertilizer, seed, machinery, pesticides and water. The cooperatives have functioned as a service organization for their farmer members. They will be responsible to the various state agencies to assist with both the pre-production and post-production techniques, such as assurance by them that supplies of input are available when required and the assurance of adequate processing and marketing capability for farmer products.

For carrying out the water resources development, there is an institution system from central to village unit. The ministry of water resources is responsible for research and training, design and planning, construction, operation, maintenance, and general oversight within the water resources sector. It is headed by a minister, assisted by several deputy ministers. Functionally, the deputy ministers fall into planning and budget, technical construction and administrative sectors; each of them holds a number of main departments such as development of irrigation, department of flood control and dykes, and department of construction. There are also numerous institutes as such the Institute of Planning and Water Management, the National Institute of Hydraulic Investigation and Design, and the Hydraulic Science Research Institute. At provincial level, there is a provincial water resources service in each province and numerous irrigation companies running irrigation systems. There are 53 provincial offices and 150 irrigation companies looking after 4,976 irrigation systems in the whole country. Beside that, many small schemes

and canals irrigating in the area less than 150 ha are developed and managed by farmers themselves. The water user farmers of the same canal set up an organization called an irrigation team. The irrigation team's responsibilities are: operation and maintenance of the network in the field, delivery of water to the fields suitable for the crops, collection of water fee from farmers to pay its expenses and to the irrigation company. The principle of irrigation team's action is with its own force. The expenses for irrigation team's actions are supported by the water users. The irrigation team is helped by the irrigation company with experiences and technology. Each labourer in it has to look after an area of about 15 - 20 ha.

Up to 1990, 4,976 irrigation/drainage systems were built in the whole of Vietnam, of which 496 ones are major systems and 2,420 are medium systems. Design capacity of all irrigation systems is 2,986,000 ha ([in which available water resources for lifting 650,000 ha]). Design drainage capacity is 900,000 ha with a mean criterion efficiency of 3 l/s/ha. In 1993, about 5,400,000 ha of paddy were irrigated estimating 85% of cultivated area. Of this, 2,318,000 ha were cultivated to Winter - Spring paddy; 1,342,000 ha to Summer - Autumn paddy; 1,756,000 ha to Monsoon paddy; also about 500,000 ha of catch crops were irrigated.

Water resources projects are usually multipurpose projects combining irrigation, drainage, flood control, fisheries, navigation, hydraulic power, tourism development to feed the people as well as to protect property and life of the people from flood; so water development and management have been recognized as the key factor in matters of life and development. It is specially important for the agricultural development of a developing country as Vietnam.

To raise finances for operation and maintenance of the irrigation systems, the water users have to pay water fees to the irrigation company. In accordance with the national policy on the water fee, the collected water fee is used for normal operation and maintenance costs of existing irrigation systems including: repairing the headwork, the network of canals and the construction units on the canals; paying for electricity and petrol, salaries for the members of the irrigation company; expenses for actions of the irrigation team and expenses for administrative works. It does not include amortisation of the capital costs for construction, and replacement of equipments, and costs for major repairs and for disasters.

At the beginning, in 1984, almost all farmers were not willing to pay the water fee, but in recent years the collection of water fee has increased year by year. The farmers understood the aims of the collection of a water fee. One simple truth is what place has good quality water service where the farmers will pay the water fee with pleasure? However, up to now the result of water fee collection in whole irrigation companies is short of the plan. In 1991, the actual collection of water fee accounted for 43% of the planned target. It increased to 57% in 1992 and 60% of the planned target in 1993. Although the actual collection of water fees was still low, it covered a substantial proportion of normal operation and maintenance costs in existing irrigation systems, and reduced the subsidy from the national finance. Due to the payment of water fees, the responsibility of both water users, irrigation teams and the staffs of irrigation companies improved step by step. The irrigation systems are looked after more and more carefully, and therefore the quality of water service becomes better and better. The strategy on irrigation management transfer has made a significant contribution to the water resources development in Vietnam for more than 30 years.

IRRIGATION MANAGEMENT TRANSFER IN DAUTIENG IRRIGATION PROJECT

Dautieng project is one of the biggest irrigation - agriculture projects in the whole country. It is situated between Tayninh and Songbe provinces in the south of Vietnam. The headwork of the project is a big reservoir with 27,000 ha of design surface area and 1.5 billion cubic meters of water storage. It was built after 1981 and the first stage was completed in 1985 with a financial loan from the World Bank. The objectives of the project includes:

- Irrigating 172,000 ha, including gravity irrigation of 67,000 ha for 8 districts: Trangbang, Godau, Duongminhchau, Hoathanh, Chauthanh, Tam Bien, Tayninh and Cuchi; and pumping irrigation of 105,000 ha for the main crops: rice, peanut sugar cane, vegetable.

- Supplying 100 million cubic meters of water for domestic purposes and industries of Tayninh, Songbe, Longan provinces and Hochiminh city.

- Using up the reservoir to raise and catch aqua-products.

- Building 3 hydro-electric plants to provide the power for household and production within the area.

- Setting up a tourist centre for tourism and entertainment.

After finishing the first stage in 1985, the irrigation system has been exploited. From 1985 to 1990, the whole system from the headwork to the network at the field level was managed by the Dautieng Irrigation Company which belongs to the Ministry of Water Resources. In 1990, the irrigation management of Dautieng system was transferred from the Ministry of Water Resources to provincial irrigation services and the farmers. Now, the Dautieng Irrigation Company runs only the headworks, two main canals and the construction works along the two main canals. The provincial irrigation services manage the branch canals and construction works on the branch canals irrigating an area over 150 ha. The irrigation team elected by the farmers operates the irrigation network irrigating areas less than 150 ha.

Every year, the farmers have to register in advance with the irrigation team's leader indicating their irrigation areas, crops and water fee. Then, the irrigation team leader makes the water use contract with the provincial irrigation service office. Under contract every thing is shown clearly as the irrigation area, the kind of crops, the time of growing and harvesting, the quantity of [using] water and the water fee. Depending on the water use contract, the provincial irrigation service makes the water use plan for each crop in the year. Basing on the water use plan and the weather, the irrigation company supplies water which suits the demand of the cultivation. The responsibility of operation and maintenance from the first branch canals to the other branch canals irrigating areas over 150 ha rests with the provincial irrigation service office. The repair of network and delivery of water to the fields are done by the irrigation team.

At the end of each crop, the irrigation teams leader collects the water fees from the farmers. The collected water fees are shared as follows:

- 20% for the irrigation company at headwork
- 30% for the provincial water service office
- 40% for the irrigation team
- 10% for the village authority.

The implementation of irrigation management transfer in the Dautieng Irrigation Project has continued since 1990. Although positive results could be achieved there were a lot of difficulties:

1. The irrigated area in the region expanded year by year. The results are shown in the Table 2.

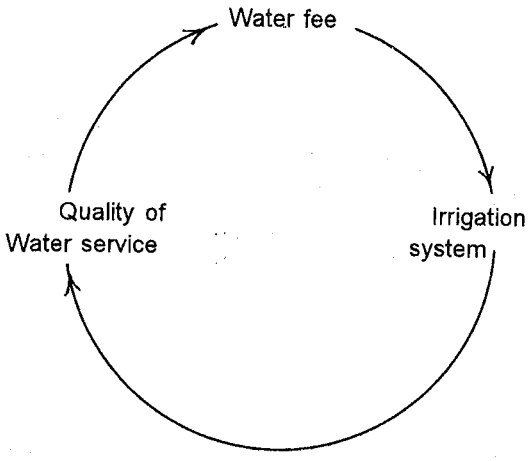
Table 2. Area irrigated (ha), 1985 - 1993.

Year	Spring crop	Summer crop	Monsoon crop	Total
1985	25,000	15,000	-	40,000
1990	33,000	29,000	18,000	80,000
1993	42,000	40,000	20,000	102,000

2. The quality of water service improved, contributing to the increase of the yield and productivity of the crops in the area. For example, in Tayninh province the area under peanuts was 80,000 ha and the product of raw groundnut was 10,000 tonnes before the Dautieng project; it has increased by about 35,000 ha with 70,000 tonnes in 1993. The average peanut yield has increased from 1,100 kg/ha to over 2,000 kg/ha. Especially in Winter - Spring crop, many well - experienced farmers have attained a productivity of 3,000 kg/ha. The interest for one dong of capital invested in peanut is 0.35 dong, the highest rate in economic efficiency among plants now. So, the farmer's living standard is getting better and better.

3. The irrigation system, especially the network in the field, has been looked after more carefully by the irrigation team. Every day, the irrigation team's members work in the field, repairing the damaged works immediately and delivering the water to the farmers. Because of repairing in time, the maintenance cost has been reduced every year and the income of irrigation team's members has increased. This encourages the activity of the irrigation team's members and the relationship between the irrigation team and the farmers has been kept up.

4. The water fee collected has gradually increased since 1990 until now, and it has become a very important source of finance for covering the operation and maintenance costs of the whole irrigation system. The relation between irrigation system, quality of water service and water fee can be shown in a circle below:



If we have a good irrigation system, we will have a good quality water service, and the farmers are willing to pay the water fee then. When we have enough for operation and maintenance, we will have a good irrigation system. The relation circle will go a positive way. If we could not do that the relation circle will go the opposite way.

5. The water users (farmers) have been assuming more responsibility as the network is seen by them as their property. The farmers elected some active members to the irrigation team. The income of irrigation team's members depends on the situation of the system and the quality of water service. The farmers have to pay water fees, so they have the right to request for a good quality water service.

CONSTRAINTS

As in the case of many developing countries, the results attained through the implementation of the strategy on irrigation management transfer in Vietnam in general and in the Dautieng Irrigation Project in particular are noteworthy. But there were a lot of difficulties which limited the process of water resources development. These constraints are as follow:

1. Irrigation system capacity is yet inadequate to meet the demand of agricultural development. During drought periods, the quality of water service in the region at the end canals is still unsatisfactory. At that time, conflicts often occur between the farmers in the far and near regions of the canal. On the other hand, the irrigation system is often not complete. When transferring responsibility, this makes difficulties for the farmers because they have to pay a big sum for the completion of the irrigation system. In such regions, the farmers do not want to get the responsibility for management of the irrigation system.

2. The lack of system's operational equipments, especially facilities for water measuring and control in the irrigation systems in Vietnam has limited the effect of the irrigation management transfer. It is very difficult to control the consumption of water and this may make soil degradation hazards as erosion, waterlogging, salinity and alkalinity. Because of this reason the irrigated agriculture may become unsustainable.

3. The awareness of local authority leadership on the responsibility for system management as well as on the obligation of paying water fee has progressed slowly. In the Dautieng project, there are 8 districts in the irrigation area. But until now only 2 districts (Cuchi, Hoathanh) have performed on the irrigation management transfer with good results accounting for 25%; 3 districts (Duongminhchau, Chauthanh, Tambien) have got medium results accounting for 37,5%; the 3 remaining districts (Trangbang, Godau, Thixa) have not had good results.

4. Shortages of knowledge and experience on system's operation, maintenance and irrigation management transfer seems to be a big problem. In some regions, the process of devolution of responsibility to farmers has moved forward deliberately and methodically over a period of years. The lessons learned during the transferring time, provide good measures to solve problems. But in some regions, transfer policies were pushed ahead

rapidly, sometimes with little care on the difficulties. So, the result of irrigation management transfer is not uniform in every region.

5. The difficult regions, with poor land, usually suffer severely because of natural disasters, and low standard of living; therefore, the implementation of irrigation management transfer must be considerated carefully. In some of these places, the result is contrary to expectations because the farmer incomes were very slow. They did not have enough money for their living, so they could not pay water fee for operation and maintenance costs. The transfer in these regions must proceed gradually over a period of years parallel with improvement in the standard of living.

CONCLUSIONS

From many aspects, the strategy on irrigation management transfer can be considered a great success in the water resources development in Vietnam. Implementing two main policies: investment and water fee of the strategy, the Vietnamese people have built a lot of irrigation systems in the whole country.

Irrigation systems are truly the key factor for the agricultural development in Vietnam. The success of the food programme in recent years with enough food for domestic demand and 1.5 million tonnes of rice for export per year are largely due to the contribution of the water resources development. The Ministry of Water Resources has transferred the responsibility of management of almost all large irrigations systems, subsequent to the construction period, to the provincial irrigation service office. For the use of water, the farmers have to pay the water fee to cover the operation and maintenance costs of the irrigation system. This strategy has improved the responsibility of the local authority and the water users and has cut down a big sum which was subsidized by the government.

However, there are a lot of difficulties on the irrigation management transfer in Vietnam. We hope to have cooperation and support from the international community both in experiences and finance to continue this strategy.

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Figure 1. Dautieng irrigation system map.