IRRIGATION WATER.MANAGEMENT.AND PRIVATIZATION OF IRRIGATION DELIVERY SYSTEMS — SRI LANKA

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ABSTRACT

Sri Lanka has a long history of hydraulic civilization for the last 2600 years of recorded history. Present day farmers use surface water and effective rainfall for their cultivation in the wet zone of Sri Lanka. But in the dry zone areas available surface water is not sufficient and hence water is collected into reservoirs. Traditions and conventions govern water use. A few reservoirs generate hydro-power in addition to irrigation and water supply. Construction of reservoirs is a state duty and land was allocated to farmers under the Land Development Ordinance. The Irrigation Department and the Mahaweli Engineering and Construction Agency maintained the irrigation systems from the commencement and hence operation and maintenance cost was paid by the state. The farmers were not taxed but cultivation was for rice under accepted principles. During the last 40 years, measures were taken to improve the crop yield by substitution of hybrid varieties and improved irrigation water management to optimize net income to the farmer. However many projects are not yielding sufficient income to the farmer and state liability is continuing. Formation of farmer organizations and raise the standard to stable farmer companies were tried but handing over of over all responsibility is not decided yet. The paper discusses the benefits and losses of the proposed system.

INTRODUCTION

Sri Lanka had 65519 sq km land area with 18 million population in 1998. (The National Atlas of Sri Lanka) The country is primarily agricultural with 70% of the population engaged in agriculture. The staple food is rice and people consume live proteins and vegetables along with rice and bread. The country is divided into a wet zone and a dry zone by a 2000 mm isohyet. The dry zone in the north-east part of the country has 2/3 of the land area with 1/3 of the population. This area was developed for the last 2600 years and supported the nation as a hydraulic civilization. The 12th century had the peak of development in water resources, which produced rice and exported to Burma. The rainfall was collected in

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reservoirs and used for irrigation. Diversion schemes brought water to reservoirs from rivers. Hence the land was prepared and seasonally cultivated by proper methods. Embankment, spillways and sluices were of high quality to match modem day levels. In recent years the dry zone was under heavy jungle which covered the traces of old irrigation structures. Gradually these jungle areas are converted into colonies and irrigation was continued in all streams from 1830 to date.

WATER UTILITY

Traditional methods were adopted to cultivate local rice varieties in various parts of the country. Due to low population and abundant resources, those projects provided sufficient food for the nation. Many projects were renovated and the same command area was developed for modem days. Indika rice variety was sown in lowlands while chena lands were used for grains and vegetables. The new introduction of japonica rice derived high yields and the Department of Irrigation, Department of Agriculture, Department of Agrarian Services and Mahaweli Development Board were responsible for accelerated development of water resources. The jungle is now reduced to 23% of the land area. Flood control measures were done in the wet zone to divert water and eliminate flooding in the basins. Hence lands were protected from flooding, but the wet zone drained soils were of poor quality to get high yields. Dry zone undrained soils retained high quality and yield is high.

WATER MANAGEMENT

The land and water resources are limited in irrigation projects. Due to this limitation it is planned to optimize the income of the farmer with in projects. The optimization procedure took a long period to modify the project. Hydrology of the project area is analyzed. Hence water requirement for rice crop is gauged and computed by records. The irrigation duty was noted to indicate the necessary head of water for rice in one season. This is in addition to the effective rainfall on the farmland. Conveyance loss and evaporation loss is nearly 50% of the available surface water in the reservoir.

METHODS OF WATER MANAGEMENT

All the villages in the dry zone are depending on storage water. When a reservoir breaches, people migrate to another village. Water is the life supporting material which is scarce and by tradition, all villagers possess knowledge to use water carefully. The tank storage is carefully utilized after receiving maximum capacity

at the spill level elevated by temporary gunny bagging for last stage of spilling. Then this water is retained until drought is reached. Water issues are carefully done to economize water and all the leaks are controlled by keen actions. The drainage water flows into the next tank in the cascade and hence it is not wasted The dead storage is used by all people and animals. Water quality is kept clean under natural conditions. Traditional water management in village tanks were not seen in major tanks. Farmers are selected by distinct areas and live separately. Farmers are grouped and fight for more water without any consideration for managing. Upstream farmers are accustomed to getting more water from the beginning of water releases. The tail end lands were developed from a later date and naturally caused reaction from upstream farmers.

WATER SHORTAGE

This is very often recorded in many projects due to wastage. Measures were taken to identify the lands, which need more water due to the gravel content of soil. These lands are abandoned after identifying. Again low yielding lands due to iron toxicity and rocky nature are also eliminated and converted into vegetables or chena lands. Deep percolation can be reduced by such measures. Lining reduces percolation water loss of canals. Excessive water use is allowed if available but otherwise effective rainfall is allowed to reach the target by cutting down canal supply well before the rain is dropped. Land preparation with early rains accelerated the crop growth passage and hence high yield with low water use is reached by careful management practices.

WATER MANAGENMNT TECHNIQUES

Farmers are encouraged to use water saving practices by rotational issues of water. Branch canals are opened in rotation and measures are taken to make decisions under unanimous agreement of farmers. The drainage water, which is usually drained out of the farmland, is suitably used for the next farm tract in the new designs. More resident time and longer travel reduced the soil loss from the farm. Water metering devices are fixed to gauge the flow in canals. Depths of water gauges are calibrated on the walls of structures, which will assist operators in the control of gates. The yield per unit of water was improved by training the farmers in many projects.

WATER MANAGEMENT SECRETARIAT

The Mahaweli system is operated by a preplanned system with expected targets and coupled with hydropower generation. Water management staff was trained to

take corrective measures in continuous operation. The serious drought situation occurred in 1992, was handled by the staff with low damage, who distributed water carefully. Another drought situation occurred in 1996 and rainfed cultivation failed. Reduction in cropping intensity according to the availability of water was decided to save part of the crop. (Seneviratne, 1996)

POLICY CHANGES IN IRRIGATION

Water management was further strengthened for optimization of net income to the farmer. Hence it is planned to implement all possible measures for any locality with the help of all state institutions and farmers. Due to low quality of soils in many projects, it is difficult to improve further without a sizeable investment on fertilizer and weed control. The economic policy decisions and regular import of food materials also decline the income levels of farmers. Many projects were assisted by foreign monetary sources at the inception. Joint planning has taken place in last decade for sustainability of the irrigation projects.

Agriculturists have taken climatic factors also into account in deciding cropping intensity and cropping calendar. Serious drought situations and El Nino effects predicted difficult planning for rice vegetation. Rain-fed irrigation in both the dry zone and the wet zone was partly abandoned due to low income against rising labor cost.

PRIVATIZATION OF IRRIGATION PROJECTS

Aim

The maintenance cost presently undertaken by government is eliminated if the systems are handed over to private organizations. If the system needs some state assistance, that money can be directly . given to the private parties without any control from the state. The loan facility is exercised through banks on recoverable basis. Hence the government is no longer bearing a liability to finance the operation and maintenance component of irrigation schemes.

Introduction

The idea of privatization of irrigation projects was developed after 1950 and it was originated in the Philippines. The present system of operation and maintenance in Sri Lanka has a long history. In 1900, the Irrigation Department was established to prevent roads getting under water. The railway line in Vavunia was shifted over and over but flooding was not stopped. Hence separate sets of engineers were needed to handle water problems. Hence the Public Works Department was

separated and the Irrigation Department was formed. New engineers were recruited from the United Kingdom. The prime aim was not only to do flood control, but for development of water resources for supplying food to the growing population in the island. Indian laborers brought for tea cultivation in upland areas needed more food supply.

Hence the population in 1830 was doubled in 1930. Abandoned water resources were restored to feed the new nation. The railway was extended and the country became an export-oriented colony in the British Empire. The closed nationality of Ceylon Kandyan Kingdom known as "Sinhale" was opened up by the tea industry. Chena lands were converted into tea estates. Villagers were forced to work in tea lands but failing that Indians were brought and housed in line rooms from 1842 onwards.

Sinhalese created chaos over the development. Excess population was moved for farming in new colonies. Jungle was cut and tanks were restored, one by one which created a professional support for selected farmers. The land was originally remained as abandoned and water was freely drained to the sea. New roads were developed to keep relations between displaced citizens from home to colony. Coastliners traveled to remote villages in search of jobs. Unemployment was growing in the thickly populated coastal sector. Any investor from the United Kingdom could obtain 100 ha and develop his own estate. He was assisted by state and trade companies' loans. Roads, bridges culverts were erected for the transport. Machinery was imported for tea making and rubber rolling. But agriculture needed only the reservoir and the sluice. Farmers did their own development traditionally and hence the restored tanks were entirely given to farmers.

The inter war period was seen as an era of migration. Many Ceylonese went to Singapore and Europe. Malaria killed many people while cholera, leprosy, small pox and infant mortality prevailed all the time. The Agrarian Services Department (ASD) strengthened traditional village tank. The Irrigation Department (ID) controlled major tanks. Minor tanks with less than 400 ha command area were handed over to ASD after construction, but ID did any rehabilitation work. Major tanks were constructed at the same location of the ancient tank. Diversion schemes were developed using old structures and canals. Necessary structures were designed and constructed using engineering skills copied from India.

In the post world war period, independence was granted and universities were producing local engineers to serve in the Empire related Commonwealth. Major dams were constructed to generate hydropower and irrigation. Gal Oya, Walawe and Rajangane were built using skills of local engineers under local funds. Laxapane hydropower project was commissioned in 1950. Foreign aid was utilized in completing Mahaweli Development Project. Hydro-power capacity was

improved to 1100 MW. Nearly 750 000 ha of land were under irrigation for rice crop.

Duty of the Control Agency

The Mahaweli Engineering and Construction Agency, Irrigation Department and Agrarian Services Department are performing operation and maintenance works of irrigation projects. This major irrigation project in Sri Lanka needs a higher rate to maintain the irrigation system for operation. Rehabilitation work undertaken by foreign funded projects provided the necessary modifications to improve working conditions of head works and irrigation system. Operation and maintenance staff and machinery were financed by the state. Water distribution from the main sluice to distributor canal was operated by the state. Field canals are maintained by farmers.

Farmer participation

Farmer participation was greatly discussed in the last two decades. The rainfed irrigation system was entirely handled by farmers. Land owners or tenants get together and decide the land preparation and cultivation according to the season. In Sri Lanka, the two seasons, Yala and Maha, need careful land preparation and cultivation to time the flowering phase of rice to the June - July period for Yala and the December - January period for Maha to get the good harvest from paddy cultivation. Hence delay in rains can cause upsets in the practice. A short term paddy variety is sown when the season is short with the late arrival of rains. Otherwise farming is abandoned due to drought. The government has no control over the farming. The state handles land disputes and tenant farmer issues through the Agrarian Services Department. Cleaning the drainage canals is done under maintenance votes. Agrarian Services staff is less competent in technical matters as they are not doing rehabilitation or construction.

In the major and medium irrigation projects, the protection works of structures play a leading role in the maintenance. Operation work is limited to issuing water as decided by farmers. Major and Medium irrigation works needed construction of structures and embankments for the rehabilitation. Farmers who have organized societies with financial backing undertook these contracts. Few farmers of a society undertake these works and gain individual profits. The Farmer Organization retains 10% of all money and sublets the work to individual farmers. Contribution of 10% of work by farmers is compulsory if Asian Development Bank or any other bank assists the work.

Hence rehabilitation work was successfully done using the consultation from farmers. But the farmers are not rich due to the low level of profits from paddy cultivation. Cheap rice is imported from India, which brings down the market

price of rice in the local market. Rice is the staple food of all citizens and still self-sufficiency is not achieved. Droughts have caused low yields in many years. The Irrigation Department and Mahaweli Economic & Construction Agency have reached maximum irrigable area in the dry zone under the reservoirs. Presently 0.6 Mha rice fields are under them and it is proposed to reduce the burden of maintaining them any longer. Water releases are for rice cultivation only. State control is given for all irrigated crops under tanks.

Farmer Companies

The present situation is used to plan farmer companies. A Farmer Organization has no financial backing to deal with all expenditures necessary for the upkeep and maintenance of the reservoir system. Also it is in par with the state policy. Traditional farming has no deviation from the existing cropping pattern and cropping intensity of irrigated lands. More profitable ventures are necessary to increase farmer income. Other field crops have recorded more profits in few areas by growing export-oriented crops or market oriented vegetable crops. But this has a limitation in cropping intensity. No crop has a more permanent profit making ability than rice in the long run. New lands yield more income and gradually reduce income due to degradation, hence creating unemployment among farmers in a few years. Dependability on agriculture is very low when compared with industrial employment. The well-maintained reservoirs may be in danger if the decisions were not firm to sustain economic and social needs.

Privatization of Irrigation Systems

Privatization is defined as handing over the system to individual parties who are stakeholders of the system. They are not depending on the government funds but are earning profits for their own sustenance. They can decide on water use and land use. Cropping intensity, cropping calendar, cropping pattern are all decided by the directors of the company. When the system is given away by the state it is not a government property. Companies can undertake rehabilitation work, if it is fruitful to them. Expert help in the Irrigation Department can be obtained on contract. litigation staff can retain irrigation camps and premises but it is not getting funds to maintain camps. Hence the camps are fully vacated by the Irrigation Department or rented out for another department. Spare parts and stores maintained by the department will not be useful. Hence the stores material are to be shifted to a central area where the services are continued for all areas. The officers serving in the department may not increase due to curtailing of funds. Mahaweli Economic & Construction Agency reduced staff after paying compensation to 50% using donor funding. Mahaweli lands are to be handed over to the Irrigation Department according to earlier expectations but now it was decided to hand over to farmer companies.

CONSTRAINTS IN PRIVATIZATION

The pressure from aid groups is so high that it needs to take suitable action for privatization of irrigation systems. Some aid groups have given deadlines for the implementation. Therefore the handing over work should be done in a planned manner.

Owner Responsibility

ID and MECA realized the ownership needs of the system. The owner protects the system against all hazards and he passes the complete system to the next generation. Any damage done to the project is repaired so that the uses are not disturbed. Life span of the system is not unusually curtailed by the owner even at any cost. Hence ID and MECA always look at the rehabilitation work and request the government to provide funds. The experts in the ID and MECA always decide the needed repairs to the system and hence careful attention is given to all major components of the system. This superior maintenance care is not possible under an individual businessman whose primary interest is only to get a profit margin. The national budget is available to help any shortage in any funding requirement as the system is considered as a national asset. The new owner has no other asset to guarantee a funding source. The ownership requirement can be given on rental basis. In that case, the system is given on rent to the Farmer Company. The company receives the benefit but it has to supply operation and maintenance expenses. The benefit is to the company but it sells the product to the country, which has a national benefit. The necessary rehabilitation funds can be requested and taken on loan. But in case of default, the farmers are responsible for the settlement of the loan and their private funds are necessary to settle the loan. They are not allowed to sell the shares of the system as it is a property of the state. Then the company is not asking for heavy funds to repair the system.

Turnkey System of Handing Over

The government can entirely hand over the irrigation system to a company. In this case the farmers are stakeholders and they are the primary shareholders of the company. If the company selects new shareholders by multiplying the uses such as tourism, fishery, hydropower etc. then the net effect will be a payment of annual tax to the government for the period of operation. The present system of leasing of lands under land development ordinance has the annual tax calculated as 4% of the total value of the land. If irrigation water is issued, a water tax is scheduled but farmers do not pay this tax after political feedback. Hence the present tax is limited to land tenure only. Land development is coupled with colonization measures adopted to settle people in these colonies. The 2 ha land plot of land given in 1950 is now reduced to 1 ha per family selected from suitable people due to heavy demand and increase in population.

The 2 ha given in 1950 is either leased or fragmented to smaller pieces by grandchildren. Unemployment and education has shown a discouraging trend among farmers. Hence the privatization needs careful measure of shareholding in future. If the land units are taken as number of shares, the fragments create a problem in awarding shares. If the farmers are asked to purchase shares, water pricing is necessary to evaluate the use of water and individual input is measured by wages for labor. The present system of an individual farmer spending his money and labor for the cultivation is an easy approach for evaluation. Any deviation from this concept will be bureaucratic manipulations despite the low education of farmers.

Farmer Organization (FO) as a Company

This has a successful approach to the issue in the present situation. The major benefit of rehabilitation is given to the FO by awarding the contracts to its members. It has the employment benefit and the profit expected by doing a service to the nation. Big contracts are broken into smaller parts and the FO undertakes each part in successive order. RS. 0.9 million work is undertaken by 3 units of RS. 0.3 million at any time. The FO completes the work and undertakes other works. The FO has taken over smaller tanks below 400 ha from the state. Farmers successfully do maintenance of these tanks but they come across difficulties in case of flood damages. Diversion structures need careful repairs as that diverts water to required farms. Failure of a diversion abandons the command area beyond that structure. Hence the FO with more diversion structures needs more 0 and M funds than the ordinary system with one sluice canal. The rehabilitation work is gauged by status of essential repairs needed to the system. A well-maintained system needs less rehabilitation. But the rehabilitation work is always associated with bad maintenance work or negligence of farmers. This is a negative aspect of rehabilitation, which facilitates the bad farmer. If the farmer gives 10%, the state will give 90% to the system from the national budget. Traditional habits of this type will be eliminated if the Farmer Company feels that the system belongs to them and nobody is supporting the cost of repairs in the future. This fact can lead to the failure of the company. What will be the situation if the company bankrupts is a question to be answered.

Benefits of Farmer Companies

Farmers are eligible to form into a company. They can form necessary capital by buying or selling shares. The share capital is the basic fund, which can support the operation of cultivation. A seven-member board of directors directs the company. They can make decisions for implementation of marketing facilities. Market-oriented products can be processed. Cropping pattern is directed by it with individual capacity. Rice can be reduced against vegetables. Hence this flexibility is necessary for the agrarian laws of the country. Then farmer can irrigate various

export- oriented crops with suitable processing capacity and preservative conditions. The income will be doubled and profits will be shared by shareholders. The company needs a management office and a work site as the case may be. It has additional maintenance costs, which will be a burden to the company. Cash crops need more employment from men and women. Hence it can absorb marketing, transporting, machine hiring and any undertaking in the future. The traditional farmer has a low potential for financing, but the company is a stable unit which can tolerate losses. If the company is large enough, it can undertake other commercial activities in the area. Further construction works also can be undertaken. The primary benefit is the relaxation on the part of the government. State controlled water resources development will come to an end. The annual budget for ID is RS. 1300 million for the work to be done in improvements, flood damages, new projects, operation and maintenance of existing works, design and investigation for future works, etc. It will be reduced by RS. 50 million if O&M works are handed over. But this will not show a remarked decrease unless capital projects are curtailed. As the island is now 75% developed in water resources, it will not be a problem. The solution will be a profit making industry with economical use of water. For the better taxing process, water pricing is necessary. The amount of surface water used and the amount of ground water used has to be priced for all industries. International investors also can join these companies.

Danger in Handing Over of Irrigation Systems to Farmer Companies

The present system of water resources development is a continuous process and hence it will last long to produce rice to the nation with all the set backs in operation and maintenance. If companies are given the freedom to develop, land and water resources, it will change the cropping pattern and cash crops will be cultivated. The rice production will be dropped remarkably. Eventually the rice price will go up. When a drought occurs with global effects on crop failure, Sri Lanka has to face a famine. Available surface water is not properly used in rice production in that situation.

The criticism used against utilizing 70% of water for rice production and obtaining low yield and low income, which will waste time, money and material is a fact when considering the true nature of importation of rice at a cheaper rate from India. The critics (economists) also point out that cash crops can generate more profit by low crop water requirement. Hence dry zone areas suitable for vegetables shall be developed for new vegetables, which need little water and no rainfall. Heavy rain fall is not suitable for vegetables.

Traditional cultivation shifted for cash crops can damage the land quality and soil quality. Degradation in soil quality by harmful pesticides, fertilizers and salinity can cause permanent damage to the lands in irrigation systems. This damage done by profit makers will be permanent and irretrievable. Hence gambling on the land

is not recommended. Girkin cultivated lands experienced degradation as recorded in Mahaweli Project.

Pollution of lands is a definite criterion as a result of cultivation with suitable chemicals imported to the country. Natural manure is not sufficient to get a high yield and artificial fertilizer will definitely degrade the soil quality. The land fertility is generally reduced from a high level at the beginning to a low level in 10 years. This is due to reduction in NKP sources in the topsoil. Hence we expect companies to degrade the soil and abandon the command area very soon. The result will be unemployment and famine in the dry zone areas. To avoid this situation, new command areas are needed to use same source of water.

Upstream and downstream conflicts will rise as the spill water sources are limited in many projects in the future. Hence water rights are associated with pollution levels and quantity needed. A new efficient legal procedure is necessary to justify industrial disputes of farmers. Development of new lands will be a problem, as the lands given under privatization will not be changed for quite a long time. Perennial crops such as coconut, cocoa, banana may take precedence in cash crops when rice is replaced. Continuous rice production of the country will be affected. A common dispute arbitration board is necessary to look after the individual activities of Farmer Company, as narcotics cropping is a very high income earner.

CONCLUSION

State control in irrigating 600 000ha of lowlands can be handed over to farmer companies in the near future if the farmers are ready to organize farmer companies. The donor agencies must separately form finance companies and insurance companies to avoid financial collapse in farmer companies. Water pricing is needed to collect revenue from each company, as the traditional water use shall not disturb community balance and heritage. Government planning becomes more critical as the decision making is passed on to profit n-takers as against the present system of rice producers. Cancellation of expert advice from the Irrigation Department will be a national loss, which was developed in the course of a century. Future planning to develop a river basin will become a problem if water rights are already granted to a company. It is yet to understand the impact of terrorist activities on the farmers in light of privatization.

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