

STATE INTERVENTION IN SRI LANKA'S VILLAGE IRRIGATION REHABILITATION PROGRAM

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INTRODUCTION

The main objective of this paper is to discuss state involvement and its implications in the implementation of the Village Irrigation Rehabilitation Program (VIRP) in Sri Lanka.

Sri Lanka has a total area of 6.1 million hectares (ha; 23,500 square miles) with an estimated population of about 15.5 million. About 75 percent of the population lives in rural areas. Agriculture accounts for over 25 percent of the Gross Domestic Product (GDP), 50 percent of total employment, 70 percent of export earnings, and 40 percent of government revenue. Out of a total of about 2.25 million ha under permanent cultivation, rice accounts for about 0.7 million ha which is divided between the two zones, dry and wet. The Wet Zone is situated in the southwest quadrant and the Dry Zone lies in the north eastern, and south eastern areas of the island.

The Dry Zone contains 70 percent of Sri Lanka's irrigation and 93.4 percent of these are village irrigation works (Gunadasa et al. 1980:1). Population density in the Dry Zone is only 28 per 100 ha (73 per square mile), whereas the Wet Zone has 270 people per 100 ha (700 per square mile).

Importance of Village Irrigation Systems in Sri Lanka

Village irrigation (minor irrigation) is classified as an irrigation work serving below 80 ha (200 acres) of agricultural land.¹ Although it is difficult to get an accurate count of village irrigation works, the Lands Ministry estimates that there are 23,000 of which 13,000 are village tanks (small reservoirs used for irrigation and domestic water supply) and 10,000 are *anicuts* (weirs) or stream diversions. About 50 percent of these are in working condition, although their efficiency varies. According to the Food and Agriculture Organization (FAO), there are 7,758 village tanks. The Freedom from Hunger Campaign estimates that there are 18,000 village tanks, and that there could be another 12,000 tanks abandoned, of which 52 percent are in working condition. A Department of Agrarian Services (DAS) study suggests that there are about 8,500 working tanks in the Dry Zone.

Village irrigation schemes in the country play a pivotal role in the agricultural economy. Of the 0.7 million ha under rice nearly 30 percent is commanded by village irrigation schemes, of which 75 percent are located in the Dry Zone. The following discussion will be restricted to the Dry Zone where most schemes are tank schemes. Although VIRP envisages rehabilitating tanks in the Dry Zone and weir systems in the Wet Zone, a greater emphasis is given to the former.

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Background of Irrigation in the Dry Zone

History shows that people who settled in the Dry Zone constructed earthen bunds across the natural drainage basin to collect runoff water. Nearly 70 percent² of the annual total rainfall in the Dry Zone occurs during the Northeast Monsoon from late October to January, the main rainy season. It was imperative for the Dry Zone settlers to build these village tanks in order to supplement rainfall for agriculture in the wet season and to conserve water for domestic and agricultural activities in the dry season. These tanks have become the focal point of rural social, economic and cultural life in the Dry Zone, and the presence of many village tanks shows how successful the village community became as an agricultural economy by overcoming the acute shortage of water in the area. Water rather than land ultimately set the limits to cultivation and to the size of the population that could be supported (Somasiri 1978). Over time, these village tanks deteriorated and, because the seat of the kingdoms shifted from the Dry to the Wet Zone, most village tanks were abandoned and are now in a state of disrepair.

Sri Lanka (Ceylon) was under three foreign rulers -- Portuguese, Dutch, and British -- from 1505 until 1948. The British, who ruled Sri Lanka from 1796-1948 -- from 1796-1815 they ruled only the maritime provinces -- realized the importance of irrigation networks to the rural economy. An irrigation department was established in 1900 to renovate and maintain major irrigation works, while the Provincial British Government Agent attended to maintenance of the village irrigation works.

The first ordinance to facilitate the revival and enforcement of ancient customs regarding irrigation and cultivation of paddy lands was enacted in 1856. Thereafter it was revised on six subsequent occasions. The last ordinance, Number 32 (1946), made an attempt to define village irrigation as any that is: 1) constructed by the proprietors without government aid or with the aid of masonry works and sluices supplied free of charge by the government, and 2) maintained by the proprietors.³

After independence in 1948, it has been every successive government's priority to attain self-sufficiency in food. To achieve this goal, one strategy was to expand the irrigable area under rice through the development of major irrigation works and national ventures like the Accelerated Mahaweli Scheme. Meanwhile, governments could not neglect the large number of farmers who lived below poverty level under the village irrigation schemes. In order to raise their living standards, the State intervened by rehabilitating and modernizing village irrigation schemes to overcome the water constraint and to intensify cultivation under these village schemes.

STATE INTERVENTION IN IRRIGATION PROJECTS

The Village Irrigation Rehabilitation Project (VIRP)

Objectives. The Government of Sri Lanka with the assistance of the World Bank has embarked on a program to rehabilitate 1,200 village irrigation systems and modernize another similar 500 schemes, and to promote systematic water management in the

rehabilitated and modernized schemes. In addition to these activities, VIRP envisages strengthening the major government departments involved with village irrigation works, particularly the Irrigation Department (ID), by providing survey, drawing, construction, maintenance, and quality control equipment in support of the civil works program, and by strengthening DAS's capacity to service the operation and maintenance (O&M) of minor irrigation works by providing additional staff, training, equipment, and transport facilities.

Benefits. Through the physical rehabilitation of deteriorated village irrigation schemes and the introduction of improved water management, VIRP envisages increasing agricultural production and farmer income. The rehabilitation work is expected to minimize uncertainties relating to irrigation water on 31,500 ha, benefitting 20,000-25,000 farm families. It is also expected to increase cropping intensity from 82.5-116.2 percent in the rehabilitated and modernized schemes, with an increase of 43 percent in per capita income.

Project area and costs. VIRP covers 14 administrative districts, mostly within the Dry Zone. The Project period was five years (1980-85), but an extension has been given up to the end of 1987. The total investment cost of the Project is Rs 784 million (US\$28 million)⁴ with the main budget going to civil works, equipment, staff costs, training, and evaluation assistance (World Bank 1981: Annex A).

Implementing agencies. The ID is responsible for the VIRP's rehabilitation works. Rehabilitation includes repairing and remodelling tank bunds, sluices, and spillways, and improving the distribution systems, including the provision of appropriate field structures. The DAS is responsible for introducing water management activities. Specific water management programs are to be drawn up for individual tanks in consultation with farmers.

Tank rehabilitation.

1. Selection criteria. In general, the emphasis in the selection of tanks and anicuts for rehabilitation is on schemes that would give maximum returns with minimum cost. Lowest priority is accorded to minor works that have been abandoned long ago and are in need of almost complete reconstruction. The following specific criteria are used for the selection process:

- a. The tank's command area should not be less than 8 ha (20 acres), unless a tank is in a cascade system where water flows from one tank to another and improvements are required to provide safety for the tanks downstream.
- b. Tanks in inhabited areas with easy access should be given priority.
- c. The useful storage of the tank should not be less than 0.91 hectare-meters per hectare (ha-m/ha; 3 acre-feet per acre or ac-ft/ac) for command areas in the Dry Zone, 0.76 ha-m/ha (2.5 ac-ft/ac) for the Intermediate Zone, and 0.46 ha-m/ha (1.5 ac-ft/ac) for the Wet Zone.

- d. The useful tank storage should not exceed 70 percent of the yield potential computed from the iso-yield curves of the ID.
- e. The tank should benefit at least 10 families.
- f. The area brought under direct *maha* (wet season) irrigation should be at least 10 times the privately irrigated submerged lands or 3 times other cultivated submerged lands.
- g. The soils of the catchment area, reservoir, and command area should be suitable for their respective purposes.

2. Rehabilitation costs. The maximum cost for a project, including all civil works and physical contingencies valued at mid-1980 prices, excluding price contingencies, engineering and administration, should not exceed Rs 12,350/ha (US\$441/ha) for existing areas plus Rs 24,700/ha (US\$882/ha) for incremental areas (*ibid*). Since 1986, the pro-rata cost has been increased to Rs 21,600/ha (US\$771/ha) for existing areas plus Rs 43,225/ha (US\$1,544/ha) for incremental areas.

Water management. The main objective is to make optimum use of rainfall and stored water. To formulate programs, an agricultural planning team (APT) is appointed in each project district. The APT consists of a technical assistant, agricultural instructor (agronomist), and a divisional officer (for institutional aspects). The program is carried out by a tank committee (TC), which will be discussed in a later section. In general, programs perform the following activities:

1. Constructing field channels with control structures.
2. Introducing a rotational water supply (RWS) system where appropriate.
3. Plowing and sowing operations as early in *maha* as possible.
4. Introducing post-harvest plowing following either *maha* or *yala* (dry season) crops to keep the soil open for easier rainfall infiltration and plowing early in the following season.
5. Operating the sluice to ensure that stored water is used only to supplement rainfall during *maha* and *yala*, with the sluice closed when irrigation requirements can be met by rains.
6. Closing the sluice at night to prevent night irrigation.
7. Introducing a standby rotation system when stored water supplies fall short of normal requirements.
8. Promoting short-duration rice varieties to reduce water requirements and ensure an early harvest.

9. Promoting irrigated upland crops during yala whenever soil moisture permits.

State Intervention in Small Tank Systems in Sri Lanka

The purpose of the VIRP is to increase agricultural production in the Dry Zone. This involves deliberate State intervention to rehabilitate small tank systems and initiate related water management programs. But the cost of such activities exceeds Sri Lanka's budgetary capabilities and State intervention to obtain assistance from donor agencies becomes imperative.

Although attention is mostly concentrated on the Accelerated Mahaweli Program, it has also become the government's responsibility to see that the small-scale farmers who operate small irrigation systems in the Dry Zone have opportunities to improve their living conditions. But problems arose when the government tried to introduce the VIRP through its existing bureaucratic institutions. This is exemplified by the results of VIRP's efforts to increase cropping intensities in the project areas.

The shortage of water is a predominant feature in the Dry Zone, and drought conditions become acute during the dry season from May to August (Abeyratne 1956). There are strong winds, and air and soil temperatures are high (the evaporation rate from a free water surface during the dry season is 6 mm per day). The water shortage is further aggravated by the lack of reliable ground water.

To overcome this shortage of water, farmers in the Dry Zone have adopted their own traditional system of land use through experience. The center of the Dry Zone village is the tank. Historically, the tank systems belonged to the community, and it is the community that managed the water resources for its own benefit. Farmers who lived near tanks adapted their lives to compensate for the lack of physical resources in their environment. Houses are grouped on one or both sides of the tank on relatively high ground beside or below the tank bund, on which drought susceptible fruit and tree crops are grown. Rice is continuously cultivated under irrigation from the tank. In addition, *chena* (slash and burn) in the uplands is utilized to grow pulses, oil seeds, spices, vegetables, and other crops. This type of cropping pattern is ideal for farming in the Dry Zone, showing that farmers have successfully adapted to the natural environment by evolving a tank-based economy.

It is unlikely that VIRP activities to increase cropping intensities in the Dry Zone will yield the results expected by the government without consideration of the problems of water scarcity and the compensating social mechanisms evolved by farmers. Government agencies must consider current research results when setting norms of water use efficiency. If they don't, construction agencies may take the wrong path in designing and remodelling village tanks, and the farmers will face the consequences. For example, according to VIRP documents, a tank in the Dry Zone should have useful water storage of at least 0.91 ha-m/ha (3 ac-ft/ac) in order to be selected for rehabilitation. This emphasizes that the efficiency of water management will be based on utilizing 0.91 ha-m of water per hectare. In order to achieve this, it is necessary to plan various water conserving strategies. However, research done at the Maha Illuppallama Research

Station shows that under reddish brown earth (RBE) -- which is imperfectly drained soil -- a total of 1.057 meters of water is required for short term (3.5 month) rice varieties.

This experiment was done during maha, and effective rainfall was taken into consideration (Nayaka Korala 1983). Thus, the irrigation requirement under RBE during the rainy season for short term rice varieties exceeds 0.91 ha-m/ha.

THE REHABILITATION PROCESS

Large sums of money have been invested in the rehabilitation program of VIRP. Out of a total of about Rs 466 million (US\$16.6 million), Rs 383 million (US\$13.7 million) has been allocated for physical rehabilitation of existing village schemes. The component for rehabilitation is about 80 percent of the total investment (World Bank 1981:64). In a situation like this, donor agencies as well as the government, have considerable interest in proper planning, monitoring, and evaluating the physical and financial progress of the rehabilitation program, and also in seeing the rehabilitation program completed on time.

As mentioned earlier, the physical rehabilitation program was entrusted to the ID, which is a well-established construction agency of the state. The broad technical guidelines and planning procedures are clearly laid down in the supporting documents of the VIRP Staff Appraisal Report (ibid). The major drawback is that the rehabilitation component and subsequent water management component are conceived of as two separate issues. There is a rigid demarcation of responsibilities laid down in the VIRP Staff Appraisal Report -- the construction program is entrusted to the ID, while implementation of the water management program is the responsibility of DAS. But it is common sense that unless the irrigation system is properly planned and designed, implementation of a water management program will be difficult.

Another important factor is that construction agencies have given low priority to obtaining the cooperation of the farmer/beneficiaries of these rehabilitated schemes. This situation is described by Murray-Rust (1985):

The majority of irrigation agency personnel in responsible positions have received their training as civil engineers with a natural and inevitable bias towards design and construction of physical infrastructure. Even in developed countries, engineers assigned to undertake tasks of operation or maintenance are regarded as poor cousins, a trend even more marked in most developing countries. Design and construction are the cornerstones of professional recognition by the engineering fraternity and there is every reason for young engineers to gravitate towards these activities for their advancement in an agency as well as for their own job satisfaction.

This attitude tends to increase misunderstandings between construction agencies and farmer/beneficiaries.

From the 1940s, the government's heavy involvement in rehabilitation, with help from external donors, led the farmer/beneficiaries to think that the government owns the village tank and has the primary responsibility to rehabilitate any village scheme that falls into disrepair.

The rehabilitation process under VIRP can be divided into three major stages: pre-construction, construction, and operation and maintenance (O&M).

Pre-construction Stage

A large number of small tanks and anicuts have been rehabilitated by the ID. According to a recent progress report, the ID is expected to complete 718 schemes (both anicuts and tanks) before the end of 1986. They have already completed 418 of these. The DAS has completed 156 schemes and is expected to complete another 306 before the end of 1986. In this discussion, I will only consider the rehabilitation of tanks by the ID under VIRP.

Pre-construction starts with the initial identification (preliminary investigation) of a project for rehabilitation. The procedure for the construction agency is laid down in the "Guidelines for Investigation, Planning, Designing and Estimating Village Irrigation Rehabilitation Works" (World Bank 1981: Annex A). Several criteria were laid down for the selection of the tanks. One of the main criteria is that more than 10 families must benefit. The only official source of this information is the Paddy Lands Register maintained by the Agrarian Services Center but this is often incorrect. The construction agency itself has to ascertain the correct number through field survey and this has proved difficult. There have been instances where one or two owners registered in the Paddy Lands Register their close relatives' as owners of rice fields in order to qualify a tank for rehabilitation.

Because the selection criterion based on 10 farm families is inadequate, criteria based on economic and social conditions must be used. Frequently the affluent class tries to use social and political pressure to place their tank on the rehabilitation list. When that happens, even without the knowledge of the construction agencies, the credibility of the officers involved is lost. It also increases misunderstanding between the bureaucracy and the beneficiaries. What is more, the investment cost cannot be justified because only a few farm families benefit in such a situation.

Unfortunately these selection criteria are imposed from outside the local community and do not encourage farmers to come forward with suggestions about having their tank rehabilitated. If the needs of the community are given due recognition, it tends to want to participate in organizing and implementing future development (Abeyratne and Perera 1985).

After approval is obtained from the competent authority of the ID on the preliminary investigation reports, the proposals are submitted to the local district agricultural committee (DAC) for formal approval. In the DAC, each member wants to know the number of schemes from his constituency that have been earmarked for construction.

Although local departments are also represented, they are much less interested. There have been instances in which, after obtaining DAC approval for specific projects, both the ID and DAS have gone to a particular site to do surveys. This shows that though DAC approval is sought as a formality, the agencies pay little attention to it.

After obtaining DAC approval, the list of proposals is submitted to the VIRP steering committee in Colombo. Again, approving the list of projects is a formality. Yet this approval is necessary in order to have the cost of the rehabilitation program reimbursed by the World Bank. Such formalities are clear instances in which state intervention has penetrated the whole program.

According to the Staff Appraisal Report (World Bank 1981), at the commencement of the full survey and design preparations, a meeting should be arranged with the officers of the DAS and the Department of Agriculture at the site, together with the farmer representative (FR, also called *vel vidane*) and the farmers who would benefit from the scheme. Proposals should then be discussed with the officers and farmer/beneficiaries, and their views obtained.

Although the VIRP envisages that the construction agency will follow the above procedure, this type of consultation was never held prior to the 1983 construction program. As a result, the DAS has undertaken the responsibility for the meeting and arranged for a discussion with the construction agencies and farmer/beneficiaries. Hesitation to have this type of dialogue with the farmer/beneficiaries can be understood considering that the ID is fully responsible for its design and construction work and feels it is unnecessary to obtain the farmers' views regarding its areas of expertise. As a result, it was observed that some of the schemes rehabilitated prior to 1983 have still not been taken over by DAS. DAS officials often complain that these schemes lack enough downstream structures to implement an improved water management program.

As mentioned earlier, meetings to explain the project proposals and to arrange for farmer participation in the project were not held by the construction agencies. Instead, the APT gathered the farmers and invited ID officials to explain their proposals and ratify the decisions made by the ID. At some of these ratification meetings, it was observed that the construction agency was not prepared to alter any plans according to suggestions made by the farmers. When confronted with their failure to involve farmers, the construction agencies tried to cover themselves by saying that they had held ratification meetings. However, just holding meetings does not constitute farmers' involvement unless the construction agency is amenable to farmers' suggestions.

The Construction Stage

After designing a scheme, preparing the estimates, and gaining approval by the competent authorities, the ID must call publicly for tenders and the normal government financial regulations have to be followed in awarding tenders to the lowest bidder. The construction agencies have to work according to a schedule in order to complete the project within a financial year. Thus, the construction agency does not have the power

to award the work to the farmers even if the latter want to take over the contract. The donor agencies, in consultation with the recipient government agency, lay down the conditions that have to be followed in the tender procedure.

The lowest bidder who gets the contract often commences work without employing the local labor available in the village. In many instances, it so happens that the tenderers are complete outsiders to the villages where the tanks are located. The farmers are not given a chance to supervise the work or even to inquire about what is happening to their village tank. This situation may lead to misunderstandings between the farmers and the construction agencies. The net result is that it is difficult to get the farmer to participate when it comes to implementing the water management program. It is often observed that after DAS takes over the rehabilitated scheme from ID, it becomes difficult to get the farmers involved in implementing the water management program (Medagama 1982:10-12).

These procedures, rules, and regulations should be amended in order to allow more farmer participation in rehabilitation. It is interesting to note that some rules and regulations pertaining to tenders were framed during the colonial regime when the British were suspicious of the local administrators. Some financial rules have since become obsolete and should be amended to suit the present context.

Post-construction Stage

Once construction is complete, ID hands over the refurbished scheme to DAS to implement an improved water management program. The process of "handing over" and "taking over" takes place between the two departments and excludes community participation. As such, it appears to the farmers that the rehabilitated schemes belong to the State and not to the community, and, therefore, those living and cultivating under these schemes are merely recipients of government services (Abeyratne 1986:14). In short, the sense of community ownership of the rehabilitated schemes is lost by the time DAS takes over the scheme from ID and tries to introduce water management.

Problems Encountered

Construction agencies and other officials who come to a particular village to work are seldom familiar with such environmental factors as the micro-variations in terrain, stream flows, and catchment areas. Local farmers are the most knowledgeable about their environment. The omission of local knowledge and experience from the design process is a serious drawback. If construction agencies consulted local farmers, many serious mistakes could be avoided. An example is seen in the Badulla District where a tank breached after construction. According to the construction agencies there were two possible causes of which they were unaware: first, when constructing the tank bund, an existing anicut underneath caused the bund to be washed away during heavy rains. Second, a family living upstream might have damaged the bund for fear of having their houses inundated. In another example in Badulla District, the construction agency learned after constructing the scheme that the command area came under a forest reserve, thus

precluding any agricultural activities. Had the construction agencies contacted local farmers, these problems might have been averted.

Tank bed cultivation is a common practice in the Dry Zone. When the farmers are not briefed correctly about the full supply level and high flood level, they continue to cultivate the tank bed even though it is prohibited. After rehabilitation, farmers who do tank bed cultivation realize that their crops will be affected and, in some instances, damage the tank bund and the sluice in order to save their crops. This situation could be avoided by dialogue between the construction agencies and the farmers.

Similarly there are many instances where downstream structures like control gates, farm turnouts, and pipe outlets were damaged by the farmers after they were constructed by ID. The farmers say that those structures do not serve any purpose and even hinder the flow of water to their rice fields. If farmers are briefed correctly, willful damage would be minimal. In other cases, measuring devices which were constructed downstream were often damaged or demolished. A typical example is a rectangular weir that was constructed to measure the discharge from the sluice. This measuring device has a baffle to break the velocity, which is viewed by farmers as an obstruction. With a weir just outside the sluice, farmers think they are unable to utilize the dead-storage in the tank which is normally used by buffaloes and for domestic purposes during dry spells. To prevent such difficulties, any plan that construction agencies intend to introduce should have the concurrence of the farmer/beneficiaries or it may serve no purpose at all.

A study undertaken by the Agrarian Research and Training Institute (ARTI) on behalf of DAS revealed that less than one percent of the farmers said that they were consulted or even kept informed of the design plan or its progress. About 60 percent of the farmers who said that there were problems in the physical works after the rehabilitation program attributed those problems to the fact that ID did not consult the local residents (Abeyratne & Perera 1985:78). A second study conducted by the University of Peradeniya revealed that most farmers indicated that they knew about rehabilitation only after the contractor arrived at the site. It also noted that farmers were very interested in knowing the various aspects identified for the rehabilitation and about the budget set aside for such work (Herath et. al. 1986:9).

The VIRP documents (World Bank 1981) stress that the views of the farmers should be obtained regarding their contribution toward implementing the project. It should be explained, for example, that farmers will be required to dig field channels and drains in accordance with designs specified by DAS in order to facilitate water management and distribution. But, in practice the farmers contribute little mainly because at the start they are not consulted nor are their responsibilities explained. When DAS tried to explain that farmers must contribute by digging field channels, farmers suspected that the item had been included in the estimate, that the contractor had not performed his duties, or that officials were conniving with the contractor to get the job done through the farmers. Such misunderstandings seem inevitable when farmers are not consulted.

The government should not approach the farmers in one way for rehabilitation and in a completely different way for management. This situation was highlighted during the 1986 World Bank Review Mission, which went so far as to say that DAS discriminated against the tanks rehabilitated by ID and gave priority in developing water management programs to tanks modernized by DAS. DAS explained that it was easier to introduce a water management program where they were involved with the farmers from the beginning, and this explanation was accepted by the Mission team.

The tussle between DAS and ID remains to be solved. To help remedy the situation, the Mission recommended to government authorities that a separate block allocation should be given to DAS to rectify defects and attend to urgent repairs after taking over ID schemes. The important issue that arises here is not the tussle between the two government departments but the failure to follow the required procedures and involve farmers.

WATER MANAGEMENT PROGRAM

Program components. All irrigation schemes that are to be rehabilitated by ID are, in principle, considered for the DAS water management program. The major goal of this program under VIRP is to use rainfall and tank-stored water more efficiently than at present and expand command areas by improving the dependability of water supply and allocating water equitably among the farmers. The DAS water management program has three components:

1. Civil works for improving field channels and providing control structures for efficient delivery of water; installing measuring devices to measure seepage and conveyance losses; and providing and upgrading drainage facilities.
2. Improved agricultural practices for dry sowing of rice during maha with early rains; plowing immediately after maha and yala harvests to facilitate early land preparation for the following season; growing subsidiary crops (non-rice) in yala; promoting short duration varieties of rice in both maha and yala; and cultivating on time and adhering to the cultivation calendar.
3. System management for establishing farmer organizations (tank committee and farmer groups) for system O&M and for implementing the water management program; cultivating only part of the command area in periods of water shortage; setting up a rotational water supply system with fixed delivery schedules; allocating water from tail to head; and supplementing irrigation both in maha and yala.

Program organization. The Water Management Division of DAS is responsible for planning and implementing the water management program in the schemes rehabilitated under VIRP. At the national level, coordination is the responsibility of the Deputy Commissioner of the Water Management Division. At the district level, the program is

coordinated by the Assistant Commissioner. The farmer representative (FR) is the lowest link in the DAS hierarchy. Though he is elected from and by the farmer beneficiaries, his responsibilities and obligations are more to the officials rather than to the farmer/beneficiaries. The FR is entitled to a modest remuneration from the cultivators of his area. At the field level, the water management program is carried out by agricultural planning teams (APT).

The World Bank Staff Appraisal Report (1981) has defined the composition of an APT: there should be one technical assistant (TA) from DAS and an agricultural instructor (AI) from the Department of Agriculture, whose services should be obtained on a secondment. In implementing the program, the Water Management Division realized that the presence of an officer to deal with farmer organizations was necessary in the APT. A divisional officer (DO) who is in charge of Agrarian Services Centers under DAS has been appointed to the APT.

Farmer representation in the APT. As seen earlier, the APT is a local unit designed to implement the water management program at the district level. Though the APT is oriented to work closely with farmer beneficiaries, the farmers tend to think of it as an outside organization because they are not represented. DAS has tried to fill this need by appointing an officer to deal with rural institutions for the village farmer but it has had no serious impact. From the official point of view, the DO already fills the need (Abeyratne 1986:16). Adding another office in the APT, even with good intentions, shows that the state would like to consolidate its bureaucratic power over the farmer beneficiaries.

In the VIRP water management program, the local vel vidane or farmer representative (FR) is expected to perform a vital role. He has to operate the sluice and supervise water deliveries based on a predetermined rotation, as well as collect daily rainfall data and function as the chairman of the tank committee. In most cases, the FR does not function as expected. Under the Agrarian Services Law the FR's employment period is not specified and, thus, FR's have been performing their duties for the last seven years under tenuous contract. An amendment regarding this is to be brought before the Parliament. However, when FRs' performance is less than expected, the farmers become reluctant to pay the remuneration, and, in turn the FRs' enthusiasm to perform their duties decreases. Therefore, in practice, the FR system has proven less effective in the small tank schemes.

At first, the VIRP expected the FR to play the key role among the villagers. But with the passage of time, a cultivation officer (CO) was assigned the implementing role of the water management program under small irrigation schemes and began performing as the DAS official agent at the village level. His salary is paid by the State. The CO has become the officer whom the farmers approach to resolve their conflicts. The FR has become the lowest rung of the State mechanism at the village level. In cases where farmers violate government rules and regulations, or fail to clear their channels or maintain them properly, the CO has the legal right to prosecute them. In contrast, the FR can bring only social pressure to bear. Therefore, in practice, the position of the FR, the only farmer representative in the whole program, has become undermined by other positions introduced in the government administrative hierarchy.

The tank committee. According to VIRP proposals, a tank committee should be set up for every scheme earmarked for rehabilitation, consisting of village level government officials, such as the CO, the *krushi vyapathi sevaka* (assistant agricultural instructor), a divisional officer, and a few FRs.

With the formulation of a water management program, the command area of a particular tank is divided into tracts. Groups are formed around one field channel and each group selects a farmer as their leader. All group leaders and the FR of that particular tank, in addition to the above mentioned government officials, become members of the tank committee. The FR is the chairman of the tank committee (World Bank 1981:53).

At the tank committee meeting, formal approval is sought for implementing the water management program formulated by the APT. Issues such as the dates to perform maintenance work on the tank bund, clear scrub jungle, and desilt field channels, and issues connected with the cultivation calendar and water rotations are decided. Supply needs have to be reviewed and where necessary, remedial action taken by the local officials who are in the tank committee.

The ARTI study on VIRP highlighted three major issues regarding the concept of tank committees. First, it argues that the concept of a tank committee was based on the "one tank - one village" system that existed in the Dry Zone. With State penetration into rural areas, many changes have taken place, and this concept is no longer relevant. As village communities are exposed to interaction with agencies, the communities are no longer "closed" and must interact with one-another.

Second, with State penetration in the form of financial investment in village irrigation schemes, a doubt has arisen among farmers about their ownership of the tank. In the ARTI study area, 67 per cent of the farmers were sure that the State owned the irrigation works. This attitude could be the cause for the farmers' reluctance to form tank committees prior to rehabilitation. When they realize that they have no role to play in the pre-construction and construction stages, willingness to organize themselves is minimal.

Third, with population pressure and land fragmentation within the village community, farmers are compelled to look for alternative cash crops and other ways to generate income. In this context, the study questions the functional utility and social validity of instituting a tank committee (Abeyratne & Perera 1985:103-106).

Another basic contradiction in the tank committee system is that, although State penetration into rural areas is high with VIRP, at least on face value, State penetration through tank committees is much less. The tank committees are not backed by legal provisions. Because they are neither statutory bodies nor non-governmental organizations, tank committees could not last long.

DEGREE OF SUCCESS

It is clear that eliciting farmer involvement in the rehabilitation and management

process in VIRP is not a success story. Nevertheless, the need to rehabilitate village irrigation systems justifies the existence of a VIRP. In Sri Lanka, the size of land holdings is low compared to other countries. For example, 90 per cent of the land holdings planted to rice are less than 0.4 ha (one acre). With this land holding pattern, could we expect to increase farmer capacity to undertake rehabilitation programs? Farmers under minor tank commands are subsistence farmers who try their best to make ends meet in a given environment; they are not market-oriented.

Though we treat the village irrigation system as virtually a farmer-managed system, farmers' attitudes towards the system may be quite different. Farmers are used to obtaining services for their agricultural activities from external agencies. It is not only from the agricultural sector that these services are expected, expectations also extend to education, health, and food subsidies. The state provides free education up to university level. The state looks after the health of the people. About 50 per cent of the population is entitled to food subsidies from the state. In this situation, farmers too expect many state services. Therefore, establishing State organizations to assist an irrigation management program would not be something new.

According to the ARTI study, after the introduction of the water management program, 63 per cent of the farmers under tank systems with the water management program indicated that their individual water supply has improved. This is encouraging. It shows that farmers can gain even when the water management program is introduced through a bureaucratic institution.

The study also shows that external institutions have to intervene to resolve farmer conflicts. With the appointment of the CO any conflict that arises among farmers is referred to him, and by imposing irrigation regulations, he helps to overcome problems pertaining to water allocation and distribution. Formerly, violation of irrigation rules was referred to rural courts but with the abolition of rural courts the situation under village irrigation systems has worsened. Many farmers feel that there should be a judicial body to take punitive action against those who violate rules and regulations connected to agricultural activities. Social sanctions may not work due to the social conditions under a village irrigation system.

A study undertaken by the University of Sri Lanka revealed that, on average, the percentage of farmers reporting shortage of water in maha during flowering, tilling, and land preparation declined from 59.6 to 13.3, from 39.2 to 10.3 and from 31.7 to 11.2, respectively. These figures indicate that the water management program achieved remarkable success with regard to the availability and adequacy of water. But it is also important to note that the stored water situation in the tank during the dry period has not improved as expected. It could be assumed that there is a high potential to increase the productivity in maha rather than in yala, provided that institutional factors do not disturb the situation.

It is also interesting to note that with the above state intervention program, the proportion of farmers reporting bad channel maintenance and illegal water tapping

declined significantly, indicating improvement in water management in the rehabilitated schemes. This shows that there should be State agencies to guide farmers on the correct path.

RESEARCH ISSUES

There are many issues which need the attention of researchers in order to guide policy makers and implementing agencies.

1. *The degree of state intervention.* The foregoing discussion explained that there is a need for State intervention in the rehabilitation program, but that a clear cut idea does not exist as to the extent of that intervention. Some important questions could be posed here: Is it possible to get farmers involved in the process of rehabilitation and the water management program? What should be the strategy to elicit farmer involvement in this program? How do we implement the program within the existing institutional framework? What would be the role of the officials and farmer organizations? These issues were not clearly addressed by VIRP.

2. *Rehabilitation process.* Another important area of interest is the rehabilitation process of VIRP. Are the existing criteria applicable within the present day context? Should the rehabilitation procedure elicit any farmer involvement in order to obtain their knowledge of the local environment? How can bureaucratic attitudes be changed? What should be the role of construction agencies?

3. *Understanding the Dry Zone village economy as a whole.* It is also time that researchers tried to understand the Dry Zone village irrigation economy as a totality. Just looking at the Dry Zone economy externally does not give a clear picture of the various activities within the village community. An interdisciplinary approach should be used to diagnose the problems in the Dry Zone. Every activity in the agricultural system is related to the behavior of the village community. An in-depth study of the society might throw new light on problems that exist in the Dry Zone.

4. *Land tenure.* Many social scientists have tried to understand the Dry Zone farmer's behavior in relation to his decision making in managing and mobilizing available resources. It is important to understand the land tenure problems that exist in the Dry Zone economy in order to obtain better results from a project like VIRP. An important and relevant question that should be asked is whether the present day land tenure system produces better results even after introducing a state-involved rehabilitation program. This issue remains to be answered. Is the impediment to agricultural development in the village systems in the Dry Zone due to the mismanagement of their tank systems or to the inherited land fragmentation in the society? An in-depth study has to be undertaken on these issues. If the land tenure system is found to be a constraint, what action is recommended? What could be the role of the state in changing the existing land ownership pattern?

5. *Economic viability.* There is always a great concern among economists whether it is economically viable to launch a heavy investment program like a rehabilitation program with respect to the Dry Zone village system. Would it be possible to produce good results even without the civil works component, where about 80 percent of the total investment is concentrated? Would it be possible to resettle these village communities under the major schemes? Or is it possible to invest just a little money on rehabilitation and go ahead with a systematic water management program to obtain better results? As there is a likelihood of introducing the second phase of VIRP, addressing these issues would facilitate rational and meaningful decisions.

6. *Catchment development and protection.* Only about 50 percent of the existing Dry Zone tanks are in working condition. Why do farmers abandon these tanks? It is seen today that due to population pressure in the Dry Zone, many catchment areas and forest reserves have been cleared by farmers. Some are engaged in chena cultivation in the catchment area. This is really detrimental to the existing tank system. What are the best future policies with regard to protecting these catchments and developing them? It has become a social, economic, and a political problem. Therefore, study is essential before embarking on another foreign funded village irrigation project.

CONCLUSION

State intervention that was initiated during the British colonial period in the 1850s reached its climax in the 1980s with the introduction of VIRP. Before VIRP, there was only indirect intervention and the village community managed the irrigation systems. With the VIRP local capacity and capabilities are indirectly discouraged by the State agency rehabilitation process and the heavy involvement of officers in implementing the water management program. But the time will come when the State will find it difficult to maintain these rehabilitated systems with available state resources. It is still not too late to think of an appropriate and meaningful strategy to involve farmers in the whole process. Ultimately they will have to shoulder the responsibility of sustaining the efficiency of the irrigation system.

NOTES

¹See Agrarian Services Law Act no. 58 (1979): section 68.

²Seventy five percent probability of rainfall expectancy value in the Dry Zone is 750-875 millimeters (30-35 inches) per annum.

³See Irrigation Ordinance no. 32 (1946).

⁴The exchange rate in 1986 was US\$1.00 = Rs 28.00.

⁵I cannot recollect any instance where the proposals were discussed at the VIRP steering committee. The formalities are requirements of the donor agency's financial and administrative rules and regulations.

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