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A Review of Alternative Strategies for Improving Farmer-Managed Irrigation Systems in Sri Lanka

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Cover photograph by Anura Widanapathirana: Undugoda-Bandaraela Tank in Kandy District, Sri Lanka, earmarked for rehabilitation under the National Irrigation Rehabilitation Project.

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Executive Summary

THE PRESENT STUDY is an outcome of research carried out by the author under the Farmer-Managed Irrigation Systems (FMIS) Program of IIMI. The study was based mostly on available literature, and partly on the author's experience in the small-scale irrigation sector under the District Integrated Rural Development Programs (Hambantota and Badulla) of the Ministry of Plan Implementation and under the FMIS theme of IIMI in the North Central Province. The study reviewed three government strategies and two nongovernment strategies which have been implemented as assistance programs to improve and enhance the small irrigation sector during the last two decades. It was also based largely on the research findings and presentations made at workshops on specific subjects conducted by IIMI and the Agricultural Research and Training Institute (ARTI).

The intervention styles of these alternative strategies were reviewed in terms of approach, planning and implementation, farmer mobilization, and degree of success. The Village Irrigation Rehabilitation Project (VIRP) has made considerable impact on the physical improvement of malfunctioning schemes, increasing the water delivery to a certain extent. However, in the area of farmer mobilization for efficient water management and sustainable system management, the intended targets have not been achieved owing to poor farmer involvement throughout the rehabilitation process. Two different styles of strategies in the Integrated Rural Development Programs (IRDPs) have been reviewed. The World Bank strategy of the Kurunegala program was more or less similar to the VIRP strategy, both of which assisted in the rehabilitation of village irrigation schemes concentrating basically on the irrigation component. The rolling planning strategy of the Hambantota program evolved a systems approach comprising an integrated development package. The overall IRDP approach was more organized and coordinated, and the Hambantota program in particular has shown successful results in

system management. The Anuradhapura Dry-Zone Agriculture Project (ADZAP) exemplified ineffective project planning, designing and implementing. Although the project envisaged alleviating poverty by assisting *chena* (swidden) cultivators to become permanent farmer settlers, its highly politicized and bureaucratized implementation prevented the beneficiaries from receiving the intended benefits.

The NGO style of intervention by the Freedom From Hunger Campaign Board (FFHC) has shown some success in the area of farmer mobilization even though the physical progress of the program appears to be comparatively slow. The National Development Foundation (NDF) which is a variant of **FFHC**, followed a more dynamic approach for farmer mobilization for both system improvement and management which have been assessed as successful although **NDF** presently operates at a very small scale.

There are similarities as well as disparities in these strategies. The direct and top-down approach to varying degrees is a dominant feature in all state interventions while FFHC and **NDF** have followed a nongovernment approach which is either indirect or catalytic. The NGOs have developed their strategies through a *wew-sabha* (a kind of reservoir council) resulting in more farmer mobilization and participation than in the state strategies. The advantage of the blueprint-type state interventions over those of NGOs is their adherence to a systematic monitoring and evaluation process throughout the project period. The NGOs are poor in project-input management but they are fairly strong in farmer management.

The sustainability of system performance after the withdrawal of assistance is the boiling issue pertaining to FMIS in Sri Lanka. It is noted that achieving system sustainability by farmers' management is possible by properly blending the positive features found in all of these alternative strategies. Several aspects like rational selection of systems, proper farmer mobilization and participation, integrated project planning, land consolidation, ensured farmers' leadership, and proper management and coordination have to be reckoned in this regard.

Acknowledgements

THIS STUDY IS AN OUTCOME OF THE RESEARCH WORK I WAS ENGAGED IN DURING THE PAST YEAR, WITHIN IIMI'S PROGRAM ON FARMER-MANAGED IRRIGATION SYSTEMS IN SRI LANKA. IN CARRYING OUT THIS WORK, PAST STUDIES, SUCH AS THE RAPID-ASSESSMENT SURVEY ON INTEGRATED RURAL DEVELOPMENT PROGRAMS AND THE ASSESSMENT STUDY ON THE ANURADHAPURA DRY-ZONE AGRICULTURE PROJECT, THE RECENT ASSESSMENT STUDY ON THE FREEDOM FROM HUNGER CAMPAIGN BOARD'S REHABILITATION PROGRAM, AND THE WORKSHOP ON THE ROLE OF NONGOVERNMENT ORGANIZATIONS PROVIDED ME A GREAT DEAL OF INFORMATION ON DIFFERENT INTERVENTION STRATEGIES. APART FROM THESE, RESEARCH FINDINGS OF THE AGRARIAN RESEARCH TRAINING INSTITUTE, THE DEPARTMENT OF AGRARIAN SERVICES AND OTHER INSTITUTES WERE EXTENSIVELY USED IN REVIEWING ALTERNATIVE STRATEGIES FOR IMPROVING FARMER-MANAGED IRRIGATION SYSTEMS.

IN CARRYING OUT THIS STUDY I RECEIVED INVALUABLE SUPPORT AND ENCOURAGEMENT FROM A NUMBER OF PEOPLE AND ORGANIZATIONS. FIRST OF ALL I OWE A SPECIAL WORD OF THANKS TO DR. DAVID GROENFELDT WHO INITIATED THE IDEA OF THIS WORK. MY SINCERE GRATITUDE IS DUE TO DR. DOUGLAS J. MERREY, HEAD, SRI LANKA FIELD OPERATIONS, IIMI WHO NOT ONLY GAVE ME CONSTANT SUPPORT AND ENCOURAGEMENT BUT ALSO EDITED THE PAPER WITH VERY USEFUL COMMENTS ON THE FIRST DRAFT. THE CONSTRUCTIVE COMMENTS MADE BY DR. HAMMOND MURRAY-RUST TOWARD IMPROVING THIS DOCUMENT INTO A COUNTRY PAPER ARE GREATLY APPRECIATED.

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Lastly, I must note that I alone am responsible for the contents of this paper.

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September 1990

CHAPTER 1

Introduction

SINCE THE EARLY 1970s, both government and nongovernment organizations in Sri Lanka have been initiating minor tank rehabilitation programs aiming at better water management practices, increased agricultural productivity and thus, enhanced living conditions of the rural communities. The strategies of these assistance programs for minor irrigation improvement differ from one another in terms of intervention approach, selection criteria, planning and implementing procedure, farmer participation, and management practices. This paper summarizes these aspects of the different alternative strategies and makes a comparative assessment of the approaches in order to make recommendations for sustainable improvement and management of village irrigation systems.

As mentioned at the beginning, this study was based mainly on available literature which comprised survey reports, seminar papers, and other published and unpublished study reports on different aspects of the minor irrigation sector in Sri Lanka. Most of the research on minor irrigation systems was carried out during the last two decades. Information not available in the literature was obtained through interviews with the relevant heads of departments or agencies (e.g., the Department of Agrarian Services). While the author's field experience, particularly in state interventions like the Integrated Rural Development Programs and the Village Irrigation Rehabilitation Project, was useful in the study, findings of the recent studies and workshops carried out by IIMI enhanced the information found through the literature survey.

Irrigation is an integral part of Sri Lankan agriculture, since the very beginning of the island's recorded ancient civilization which dates back to the

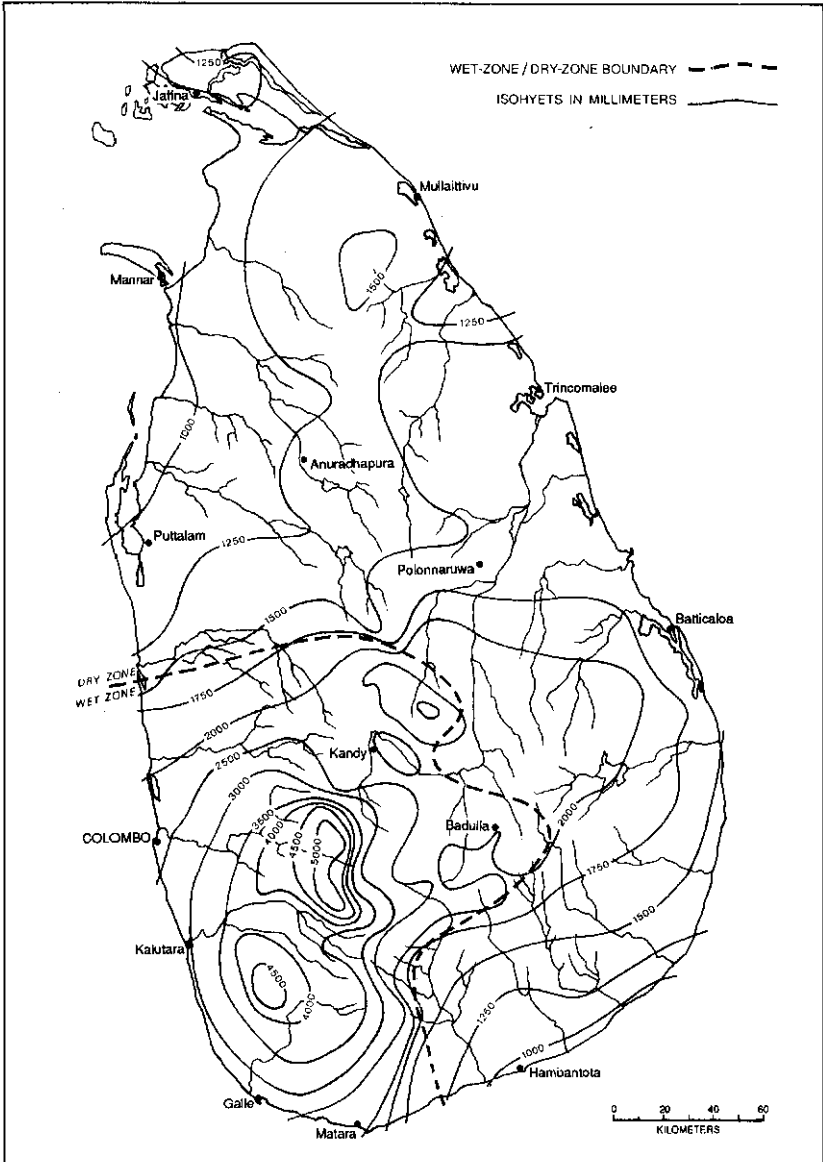
5th century B.C. Throughout this period of 2,500 years, the economy of the country has been based heavily on irrigated agriculture. The peculiarity of irrigation in Sri Lanka lies in its indigenous technology, the dedication of the country's rulers, full participation of the farmers, and the sustainability of the irrigation systems for centuries. The drainage pattern with a large number of river basins and the monsoon rainfall distribution have provided the basis for irrigated agriculture in Sri Lanka (Figure 1). A large number of irrigation systems come under the category of "minor irrigation schemes" which are also called "small irrigation" or "village irrigation." The International Irrigation Management Institute (IIMI) has categorized them as Farmer-Managed Irrigation Systems (FMIS). The scale of FMIS varies from very small irrigation schemes to large complexes of systems (in Nepal some FMIS extend up to 15,000 hectares [ha]) but according to the Sri Lankan classification, FMIS are those systems which have command areas of 80 ha (200 acres) or less. These systems come under the purview of the Department of Agrarian Services (DAS).

The livelihood of dry-zone peasants of Sri Lanka is inseparably linked with the village tank which is the first element of a threefold system: *wewa* (tank), *yuya* (rice field) and *hena* (upland swidden).

Out of the total asweddumized (irrigated and rain-fed) area minor irrigation accounts for 40 percent and contributes to about 30 percent of the total irrigated area. According to the estimates of the Ministry of Lands and Land Development, there are some 23,000 village irrigation schemes, out of which 13,000 are tanks and the rest, anicut schemes. Another source reveals that in 9 districts of the dry zone, there are 7,758 village tanks (FAO 1980). The average command area of these tanks varies from 4 to 56 ha (10 to 140 acres). It is also estimated that 50 percent of the total village irrigation schemes in Sri Lanka are in working condition, providing ample opportunities for rehabilitation and/or improvement by different types of intervention. Today, with the recent Mahaweli development, the total share of minor irrigation schemes would still be a third of the total irrigated area in Sri Lanka.

The total area of Sri Lanka is 6.5 million ha (16.2 million acres) with an estimated population of 16 million. The rural population is about 80 percent of the total and agriculture accounts for 25 percent of the gross domestic product, 70 percent of the export earnings, 50 percent of the total employment, and 40 percent of the total government revenue. The area under permanent cultivation is 2.25 million ha (5.56 million acres) of which rice accounts for

Figure 1. Map of Sri Lanka showing river basins and isohyets of mean annual rainfall.



0.7 million ha (1.73 million acres). The majority of irrigated agriculture is in the dry zone where 70 percent of the country's irrigation is found; over 90 percent of the dry-zone irrigation works are under village irrigation (Gunadasa et al. 1980). The village irrigation sector is predominant in the dry zone. Almost all of these systems in the dry zone are village tanks. In the wet zone, anicut schemes (stream diversions) are dominant while in the intermediate zone both village tanks and anicuts are equally important.

The small-scale irrigation systems developed in the early period of Sri Lanka's history were community-based and essentially farmer-managed. The small reservoirs were collectively constructed, maintained and managed by the communities. The village was based on a tank and when more tanks were constructed for increased population they were called *gamgoda*. Since the inhabitants of early dry-zone settlements had been farmers for generations, irrigation discipline has been an important part of their way of life throughout history. The experiences of developing small-scale irrigation systems managed by village communities had probably led to the development of larger irrigation systems found in the dry zone (Gunaratne & Maddurna Bandara 1989).

The 12th century witnessed the beginning of the collapse of the highly developed irrigation systems that flourished in the dry zone up to then. The irrigation systems were abandoned, as the communities that depended on them migrated toward the wet zone of Sri Lanka. When the British introduced the plantation industry in the 19th century and abolished *rajakariya* (a task a person was duty-bound to do for the king), the irrigation sector in all parts of the island deteriorated further. Soon after, the British realized the importance of reviving these systems and started state-intervention programs for assisting minor irrigation systems.

State intervention to refurbish minor irrigation works thus commenced during the British colonial period (about the mid-19th century). The British recognized the need to revive practices and customs that facilitated the construction, repair, and maintenance of irrigation works and those which regulated water distribution and agricultural practices. Before Ceylon (now Sri Lanka) gained independence in 1948 the rulers made attempts to meet the food requirement from within the local production resulting in the improvement of irrigation schemes, mainly large-scale irrigation works like Dewahuwa, Padaviya, Rajangana, etc. Emphasis was given to restoration of minor irrigation only in the late 1950s which became more intense since the early 1970s.

CHAPTER 2

An Overview of Alternative Strategies

THE DECENTRALIZED BUDGET introduced in 1972 made provision for each Member of Parliament (MP) to take under his or her wing the improvements of physical infrastructure in his or her constituency. Minor repairs to village irrigation schemes thus constituted one of the popular items in the decentralized budget estimates since then; the decentralized budget funds also comprised the only financial resource available to attend to immediate repairs of the minor irrigation systems in the villages. **As** the annual decentralized budget allocation per constituency was limited to approximately US\$83,000 (Rs 500,000) during the 1970s, the improvements to minor systems were restricted to repairs to the sluice, spill and bund of a working tank. Rehabilitation or complete refurbishment or even major improvements were not possible within the decentralized budget whose allotments had to be used for other infrastructural development works as well. With the introduction of direct investment in small irrigation systems, since 1978, the decentralized budget **was** relieved of shouldering the responsibility of small irrigation sector works in some districts.

State intervention in the minor irrigation sector has substantially increased since 1978; several development programs were initiated during the early 1980s. The first ever large-scale project **solely** meant for minor irrigation development in Sri Lanka is the Village Irrigation Rehabilitation Project (VIRP), which commenced in 1980. It differed from other state or NGO interventions in that it did not cover just one or a few districts but covered the dry zone in its entirety consisting of 14 districts where the potential for rehabilitation of minor irrigation existed. The project comprised the components of rehabilitation, modernization, and water management, which were

crucial for productivity and sustainability of minor systems. The VIRP covered 1,200 minor schemes in the dry zone (with small pockets in the wet and intermediate zones), and 31,500 ha of irrigable area benefiting 20,000 to 25,000 fann families (World Bank 1981).

The concept of the District Integrated Rural Development Programs (District IRDPs) introduced by the 1977 government brought large-scale investment in integrated sectoral development at district level. The minor irrigation sector was one of the priority project areas identified within IRDPs by both the Government of Sri Lanka and various donor agencies. As the irrigation sector plays a crucial role in the agricultural economy of the dry zone in particular, eight of the district IRDPs in the dry zone picked up irrigation projects (both minor and major) for integrated development; the minor irrigation sector was basically improved under a "package program." It is noteworthy that the World Bank-funded IRDPs (with long-term loans) have more sector-biased minor irrigation components while bilaterally funded (outright grant) IRDPs have a package program where physical improvements to irrigation systems are linked with several other socioeconomic components (e.g., Hambantota IRDP). During the initial 5-year period of the first few IRDPs, 25 to 35 percent of the total investment was allocated to the irrigation component (mainly minor irrigation sector).

The Anuradhapura Dry-Zone Agriculture Project (ADZAP) is the next massive project geared for improvement of the minor irrigation sector in the largest district of Sri Lanka, Anuradhapura, which is in the North Central Province. The project commenced its activities in 1981. The ADZAP was funded by the Asian Development Bank (ADB), the International Fund for Agricultural Development (IFAD), and the Government of Sri Lanka. The project aimed to provide a viable farming system through careful development of local resources as an alternative to semi-shifting chena (swidden) cultivation. The project had the components of rehabilitation of minor tanks, for both rice and upland cultivation, livestock development, rural roads and agricultural infrastructure. The project work terminated by September 1989 after seven years of operation including a two-year extension period following the targeted five-year period (1982-1987). Transformation of chena cultivation into a permanent farming system had been emphasized as the major element of this strategy.

In parallel with these government strategies for minor irrigation improvement, a few nongovernment organizations also emphasized the need for the

improvement of the minor irrigation sector starting from the early 1980s. Of these NGO interventions the Small Reservoir Village Community Rehabilitation Project comes under the National Freedom From Hunger Campaign Board (FFHC), a statutory board which has been functioning under the auspices of the Ministry of Agriculture since the 1970s. The scale of intervention of FFHC in terms of money was small compared to any state-intervention strategy but it covered several districts embracing a large number of small irrigation systems. The FFHC strategy was to restore village reservoirs with the help of beneficiaries themselves to assure the supply of water for rice and other crops. The strategy emphasized the use of manual labor and available local resources rather than the use of heavy machinery and equipment and major emphasis was laid on "tank organization" or *wew-sahha* in organizing the activities involved, based on the "people's participation" concept. The FFHC had tank rehabilitation projects in eight districts with major clusters of tanks in Anuradhapura, Puttalam and Moneragala districts. By mid-1989 it had rehabilitated over 135 tanks out of a target of 222 village tanks. There were over 3,089 families involved with a target developed area of 2,501 ha (6,178 acres) of highland.

The National Development Foundation (NDF) is a variant of FFHC, and has developed a strategy for renovation of irrigation reservoirs in Kurunegala District. The NDF's strategy is more community-based and it is a real NGO by definition. The tanks are selected, planned and renovated by the village community and financial contribution is made by the villagers. the Government of Sri Lanka and NDF. It also emphasizes farmers' contributions in terms of labor and other resources but whenever necessary, suitable machinery is used for heavy work involved in tank renovation, supplementing beneficiaries' work. As a first phase of tank renovation, ten small tanks have been renovated by NDF in Kurunegala District with the active participation of the farmer organizations.

There were other NGOs involved in minor irrigation both directly and indirectly as a result of their activities in the broad field of rural development; these have been reviewed at an IIMI/ARTI jointly sponsored workshop in March 1989 (Dayaratne and Wickramasinghe 1990). However, the scale of intervention by other NGOs in the minor irrigation sector was small in terms of area, number of beneficiaries, and investment. As such, in this study only the strategies of FFHC and NDF are reviewed in detail, in addition to the three major strategies (VIRP, IRDP and ADZAP) developed by the Government of

Sri Lanka. These five strategies are described in the following chapters in order of the magnitude of their interventions.

The strategies are presented with particular attention to the aspects of selection criteria, planning procedure, implementation methodology, farmer participation, water management, pro rata (i.e., unit cost), and sustainability. Some recommendations are also given in the **last** chapter after comparing the strengths and weaknesses of each intervention.

CHAPTER 3

The Village Irrigation Rehabilitation Project

OF ALL POSTINDEPENDENT state interventions in small irrigation, the Village Irrigation Rehabilitation Project (VIRP) **was** the biggest in terms of its focus **on** village irrigation and water management, the area covered and the cost involved. The VIRP strategy is described in Appendix I. The location of the VIRP project area is given in Figure 2.

PROJECT IMPLEMENTATION

Organization

Like many other **blueprint-type** projects, VIRP **too** was a systematically planned project; when it came to implementation all the drawbacks that characterize blueprint projects surfaced from the very beginning.

From **the** organizational point of view, the project-specific problems started when the government **introduced** the VIRP rehabilitation procedure by means of the existing bureaucratic management. Apart from the top-down control of the same department, a **lack** of cooperation between the two major implementing agencies, the Irrigation Department and the Department of Agrarian Services (DAS), developed as a result of different responsibilities for project implementation. The Irrigation Department had to complete upstream development and hand over the systems to DAS for downstream development and water management. The Irrigation Department had to deal

with physical resources like land and soil while DAS had to deal more precisely with the most dynamic element – the human resource. The serious lack of coordinated project implementation, especially during the first three years of the project caused problems when it came to the handing-over phase. These are a few aspects of the VIRP strategy that caused problems or poor performance (Medagama 1986).

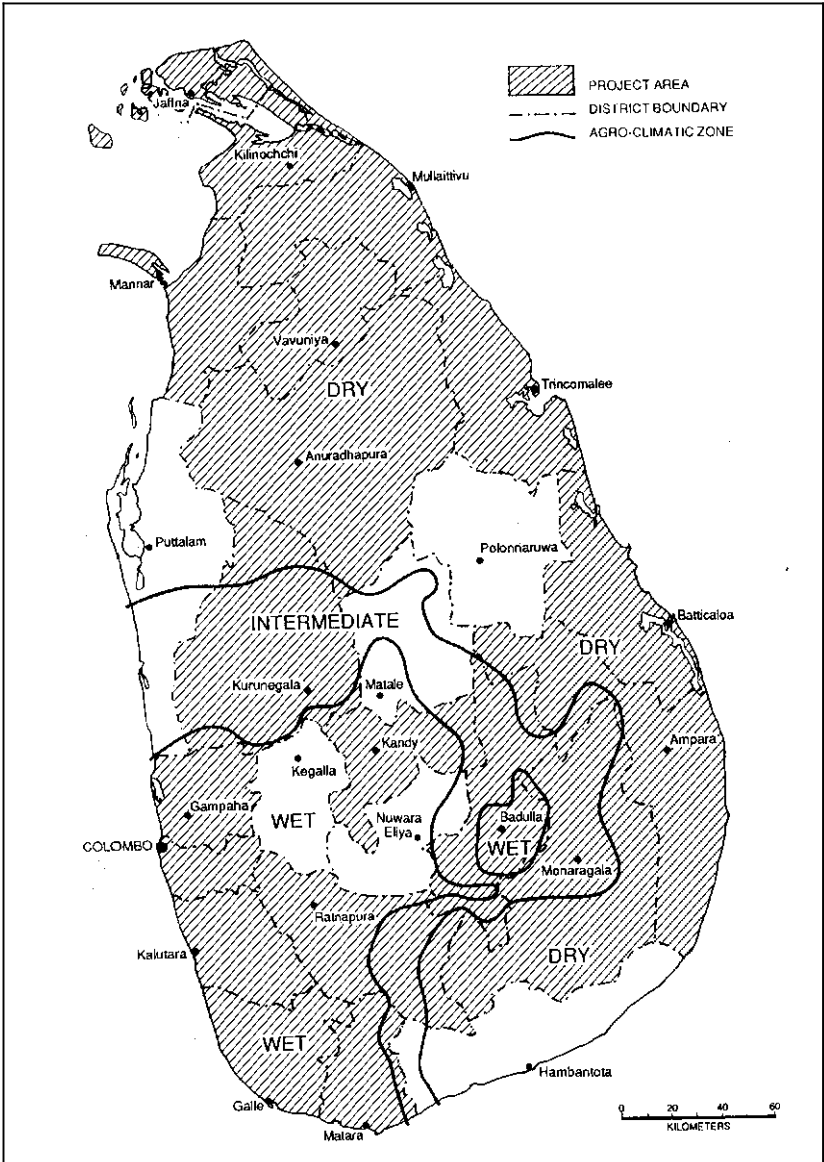
These problems were encountered during the four stages of implementation: investigation stage, design stage, construction stage and operational stage.

Investigation Stage

During the investigation stage, the selection of the most deserving tanks was problematic as the data available in the Paddy Lands Registers, maintained by the Agrarian Services Centers, were often incorrect. This called for field surveys which proved to be difficult. There were instances where the elite managed to include their tanks in the project by giving the names of their relatives as owners even though there were only one or two owners registered in the Paddy Land Register of the area. On the other hand, selection imposed from outside the community did not encourage farmers to come forward with their suggestions for rehabilitation of their tank (Abeyratne and Perera 1986). It was therefore essential to give due recognition to an organized farmer community without adhering to a fixed number of farmers in tank selection.

The approval for the investigated and selected tanks was sought from the District Agricultural Committee. This was very easily given if the local MPs were satisfied that their selections were included in the final list. The list was then forwarded to the VIRP Steering Committee in Colombo where again a formal approval was given. The World Bank Staff Appraisal Report envisaged a meeting of the farmers and officers of DAS and the Department of Agriculture before the full survey and design preparation, but this was not put into practice in the implementation stage, especially, prior to 1983. The Irrigation Department was always technically oriented and did not seek the farmers' views in the process of surveying and designing which they regarded as their area of expertise. As a result, there were schemes rehabilitated prior to 1983 without structures needed for improved water management and thus these schemes were not taken over by DAS (Medagama 1986). It was also

Figure 2. 7th Village Irrigation Rehabilitation Project of Sri Lanka: Location of project area.



found that not only did the implementing agency responsible for construction not hold farmer meetings, but that it was not prepared to change the designs according to the farmers' suggestions. This was an outcome of uncoordinated and compartmentalized design planning from the initial stage. During the post-1983 period, however, this situation gradually changed when the project called for more coordinated implementation.

Construction Stage

During the construction period, Irrigation Department which was the implementing agency, had to follow normal government financial regulations and award the tender to the lowest bidder, and complete a given number of works during a given financial year. This prevented the farmers from getting the contract for construction even though they needed it. Furthermore, in most cases the contractors did not hire farmers in the tank village for labor work which resulted in less involvement of the farmers in supervising the construction on the one hand, and difficulty in getting their participation in water management at the operational stage by DAS, on the other (ibid). It has very often been proven that these rules and regulations pertaining to tenders are obsolete as they were framed during the colonial period. They should be changed to suit the requirement of the present community-based development.

Operational Stage

When it came to the operational stage, the situation was more bureaucratic particularly in the matter of handing over the rehabilitated system by Irrigation Department to Department of Agrarian Services for the implementation of the Water Management Program. As the farmer communities were excluded from this process the farmers continued to regard the system as state-owned property. The serious consequence of this was that farmers lost the much needed "sense of ownership" for the system and increased the "rate of dependency" on the state for system management. Therefore, when DAS took over for water management the fragile element of community ownership was lost and the expected Water Management Program became difficult to be implemented.

Issues and Problems

By the end of 1989, Irrigation Department had completed and handed over to DAS some 985 tanks out of the target of 1,200 under the rehabilitation program which commenced in 1980. The modernization program started in 1983 and by the end of 1989, DAS had exceeded the target (500 systems) by completing 504 schemes. The Water Management Program was introduced to all these systems, but it was operational at satisfactory levels only in the systems where community participation was sought from the very beginning of the process. Difficulties had occurred in organizing farmers for sound water management practices in some cases, especially in the pre-1983 period during which Irrigation Department worked in isolation without giving due consideration to the role of beneficiary farmers; this becomes very crucial at the later part of the process when water management is the key to system sustainability.

The problems and issues encountered at the implementation stage could be summarized as follows:

- a) Noninclusion of farmers' knowledge and experience in the design process has resulted in drawbacks and damage at the "operational stage."
- b) Consequences of tank bed cultivation could have been avoided if farmers had been consulted and convinced of the ill-effects of this type of cultivation from the beginning.
- c) The damage done to the head and downstream structures (control gates, farm turnouts, pipe outlets) by farmers was the result of their non-participation in the process.
- d) Over 60 percent of the farmers have claimed there were problems of physical work after the rehabilitation due to the fact that Irrigation Department did not consult the local residents (Abeyratne and Perera 1986).
- e) Most farmers have indicated that they came to know about the rehabilitation only after the contractor arrived in the village to commence the construction (Herath et al. 1986).
- f) The downstream earthworks that were to be done by the farmers were impeded by them as they were under the impression that the entire work had been contracted on tender: they thought they should not work since they had not been consulted.

- g) When farmers were treated in two contradictory approaches in the rehabilitation process (i.e., not consulted at all) and in water management (i.e., active participation sought) it became impossible to organize them in the anticipated manner.
- h) A tussle between the two implementing agencies (Irrigation Department and Department of Agrarian Services) with regard to “handing over” and “taking over” had not been resolved until the latter part of the project. The World Bank mission of 1986 recommended a separate block allocation to DAS to rectify the defects and to do the repairs needed after “taking over” from Irrigation Department. This allocation was effectively used to complete the remaining civil works when and where needed.

Progress of the Water Management Program

The Water Management Program of VIRP planned the use of rainfall and tank water more efficiently than the usual practice: it planned the expansion of command areas by improving the dependability of water supply and equitable allocation of water among farmers. All tanks rehabilitated by Irrigation Department and tanks modernized by DAS since 1983 were included in the Water Management Program. There were three components in the Water Management Program of DAS (Medagama 1986):

Although the Agricultural Planning Team (APT) was designed to implement the Water Management Program in close contact with the farmers, in practice, the farmers regarded it as an outside organization since they were not represented. In short, APT, to the farmers, was a group of government officials who performed their duties for “government-owned irrigation systems.”

The Farmer Representative who replaced the *vel-vidane* (Irrigation Headman) was supposed to play a vital role in the Water Management Program which included operation of sluices, supervision of water deliveries, collection of daily rainfall data, and chairmanship of the tank committee. In most cases, however, there was a vicious circle where the Farmer Representatives did not perform as expected resulting in the farmers’ reluctance to pay the due remuneration to the Farmer Representatives which in turn resulted in the deterioration of the latter’s enthusiasm and willingness to carry out their duties. Another blow to the Farmer

Representatives' functions was the introduction of the Cultivation Officer who was assigned to implement the Water Management Program under small irrigation schemes and who became the official agent of DAS at the village level. The Cultivation Officer has the legal right to act against the farmers who violate government rules and regulations and to resolve their conflicts. Therefore, in practice, the position of Fanner Representatives in the overall Water Management Program has been undermined by other positions introduced into the existing hierarchy of the government (*ibid*).

The other important institution established for the Water Management Program by VIRP is the "tank committee" consisting of village-level government officials (Cultivation Officer, KVS' Divisional Officer) and a few farmer representatives, including the Farmer Representative and the group leaders who represent the tracts of the command area of a tank. The Farmer Representative is the chairman of the tank committee. At the tank committee meeting the formulated Water Management Program is presented for formal approval. Issues in regard to dates of maintenance work on the bund and channel system, clearing the scrub jungle, the cultivation calendar, and the water rotations are discussed and decisions made on corrective measures.

The study conducted by the Agrarian Research and Training Institute (ARTI) discovered four major issues regarding the concept of the tank community (Abeyrdne 1986, Medagama 1986). They are summarized below.

- a) The "one tank - one village" concept on which the tank committee was based is no longer relevant with state penetration to the rural areas and with many other changes including demographic changes, resulting in very low functionality of the committee.
- b) The very high investments of various sorts in village irrigation schemes have resulted in a reduction in the farmers' sense of ownership of the tank. According to the ARTI study, 67 percent of the farmers considered that the state owned the scheme; this attitude was an obvious outcome when the farmers were not involved in the process from preconstruction stage

¹Agricultural extension officer at the field level.

²To facilitate the Water Management Program, the command area of a tank is divided into a few tracts, and groups are formed to represent each tract.

through construction stage. They were often reluctant to form a tank committee prior to rehabilitation.

- c) Because of population pressure and land fragmentation in the villages farmers were compelled to look for alternatives like cultivating cash crops and doing nonfarm activities for income. Therefore, the functional utility and social validity of instituting a tank committee were questionable. Rice cultivation under the tank was rarely a full-time endeavor.
- d) Some potential users of the tank were not represented on the tank committee simply because they did not own land under the system; for example, a considerable number of families living around some tanks depended upon fishing in the tank. Resolving conflicts over water was difficult if all such beneficiaries were not represented.

Though state penetration for rural development seemed to be very high through VIRP, it was very low in the case of tank committees as the latter were not backed by legal provisions; this is another reason for their sustainability to be questioned.

THE DECREE OF SUCCESS

The Staff Appraisal Report (World Bank 1980) had made provision for project evaluations but this component has not been sufficiently covered except for the ARTI study carried out on behalf of VIRP and a few studies on selected locations to fulfill other research interests. Under evaluation studies, an allocation of US\$197,125 (Rs 5.9 million) has been made for a physical resources evaluation study, a socioeconomic evaluation study, and other studies. These financial resources have not been used for a systematic evaluation which should cover performance evaluation as well as impact evaluation.

The field-level investigations done by DAS and the ARTI study on VIRP, however, revealed several facts which could be treated as some sort of impact evaluation. These facts are summarized below in the order of their importance:

1. The farmers' involvement in the rehabilitation and management process of VIRP has not been very successful. The project has been justified by the need for rehabilitation; but a high rate of success could not be achieved

when **90** percent of the landholdings were below 0.4 ha (1 acre) and farmers did subsistence agriculture.

2. The state claimed the village irrigation systems were virtually farmer-managed systems, but the farmers' attitude toward irrigation schemes as well as other physical infrastructure was quite the opposite. They expected almost every service including irrigation system improvement and management, education, health, agricultural input, and food subsidies from external agencies.
3. The Water Management Program of **DAS** has proven somewhat successful as 63 percent of the farmers under VIRP have indicated that their water supply had improved after the introduction of the program. In spite of the fact that the Water Management Program was implemented through bureaucratic institutions.
4. Because rural courts have been abolished conflicts among farmers over water use and system management had to be resolved by external agencies like the agent of **DAS** (the Cultivation Officer) whose service was sought by farmers to overcome the problems of water allocation, distribution, and violation of irrigation rules; the role of Cultivation Officer has developed in parallel to the implementation of the Water Management Program of VIRP.
5. The Water Management Program of VIRP achieved a high degree of success in terms of availability and adequacy of water as the number of farmers reporting **water shortage in an area has been reduced by three to four times**. A study has been done on these aspects by the University of Sri Lanka (Herath et al. 1986).
6. The number of farmers reporting bad channel maintenance and illegal water tapping has declined considerably indicating an improved water management *practice* under rehabilitated tanks.

Further studies will have to be done on overall performance and impact of VIRP in order to identify the weaknesses and strengths of the project before it is replicated elsewhere. The National Irrigation Rehabilitation Project (NIRP) which includes medium-scale schemes as well, is currently under formulation as phase-II of VIRP. Lessons of VIRP should be learnt by in-depth studies in the abovementioned areas before the NIRP's implementation. One such attempt was made by IIMI to look at the aspects of state policy and practice in a study carried out in two VIRP systems in Ratnapura District (Abeyratne 1989).

CHAPTER 4

Integrated Rural Development Programs

INTRODUCTION

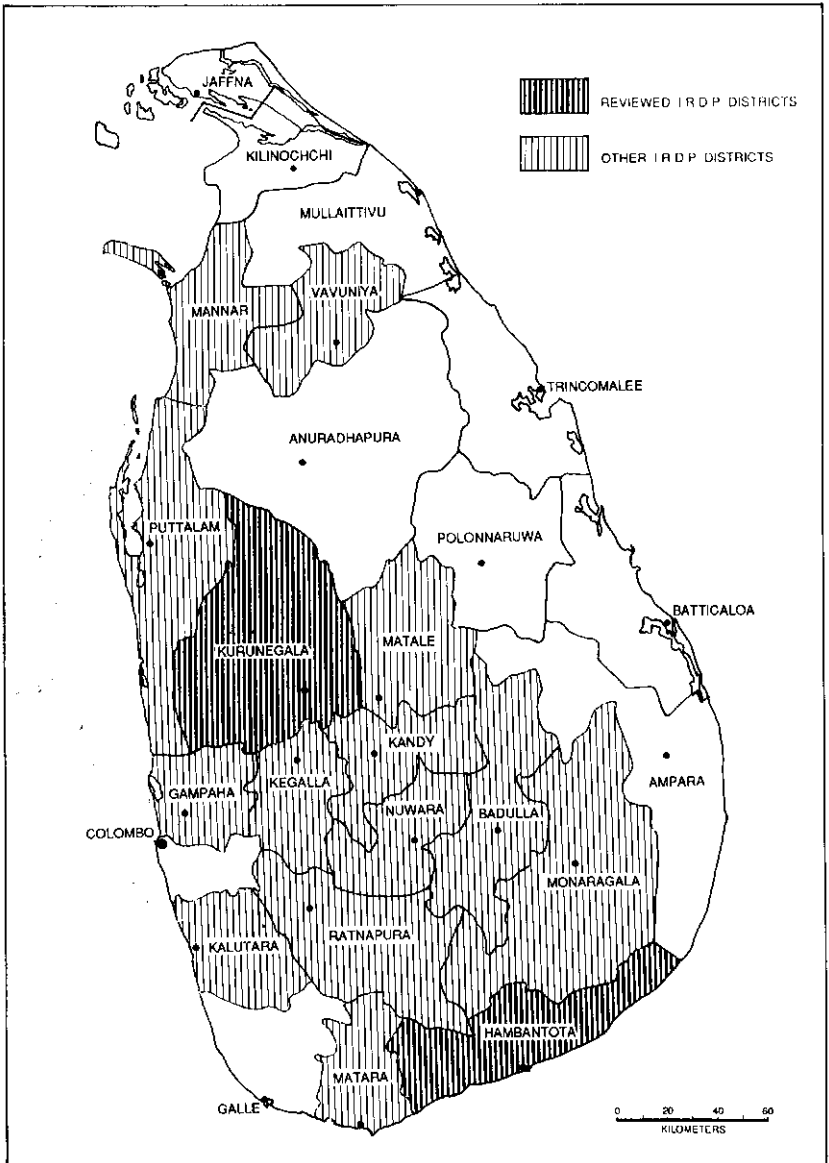
IN SRI LANKA, the decentralization of development efforts started in the early 1970s and culminated with the introduction of the Integrated Rural Development Programs (IRDPs) at district level in the late 1970s. The IRDPs were initiated in order to channel resources into those districts which did not benefit from the major national development efforts under the Mahaweli Project. The IRDPs were originally planned for three districts in 1979, namely Kurunegala, Hambantota and Matara. They were subsequently extended to the dry zone, and have covered 14 districts by 1988 (see Figure 3).

The district IRDPs represent a renewed emphasis on the development of the rural areas to improve the conditions of the rural population. Even more importantly "it represents a new approach to accelerating the development of the rural sector" according to the Director of Regional Development Division of the former Ministry of Plan Implementation (Perera 1982).

The conceptual and theoretical aspects of this strategy have not been formally discussed, evaluated, or accepted at the inception of the IRDPs. The basis of this strategy was created by several governing ideas which follow:

- a) The broad and general objective of IRDPs was to improve the income, the employment and the general standard of living of the rural population.
- b) The level of investments and planning activities were to be replicable so that in course of time all eligible districts should have similar projects.
- c) The IRDPs would be implemented in predominantly rural districts not served by the Mahaweli projects.

Figure 3. Integrated Rural Development Programs in Sri Lanka.



- d) No special authority was to be created for implementing, executing or managing the planned activities: the existing governmental apparatus was to be used.
- e) Greater attention was to be paid to the more backward areas within the district.
- f) The project activities were to be carefully selected taking into consideration the main economic problems and potential of the district.
- g) A short-term and medium-term outlook were to be adopted, particular attention being directed at eliminating bottlenecks in the service-delivery systems and the production patterns.
- h) Project activities would be incremental to the other ongoing and planned development measures undertaken under existing programs.
- i) The project activities were to be less capital-intensive in nature.
- j) Maximum flexibility in the choice of project activities was to be allowed for taking into consideration the district-specific rural needs and the planning procedure.

Significantly, the idea embodied in the last item permitted maximum freedom for the district-level planners to use their best initiatives and capacities in the planning and implementation of projects within the district (Perera 1985).

Different approaches have been adopted in the planning and implementation of the IRDPs in different districts, indicating the preference of the donor agencies and the government's flexibility in dealing with those agencies. Based on this diversity of approaches three major IRDP "models" have been identified. The first is the blueprint or program-approach model of the World Bank funded projects; the second is the fixed sectoral subproject (rolling plan) model, and the third is the annual program model. The last two models are connected to bilateral donors. The first is depicted as setting out a clear plan of operation over a fixed period of five years at the outset with only minor modifications subsequently. The latter two models take an instrumental approach adapting to experience and new initiatives (Rao et al. 1983 and Perera 1982). These different models are mainly the result of different working procedures of the funding agencies, rather than of any deliberate choice depending on the appropriateness of any model to any particular district or to any chosen strategy.

Starting from Kurunegala District the World Bank's blueprint approach has been extended to other districts like Matale, Puttalam, Badulla,³ Vavuniya and Mannar. The subproject (rolling) model evolved from the Norwegian Agency for Development Cooperation (NORAD) aided Hambanlola District IRDP and then it was extended to Monragala IRDP. The annual program model evolved from the Swedish International Development Agency (SIDA) aided Matara IRDP and was subsequently extended to the Netherlands funded Nuwara-Eliya IRDP and Ratnapura IRDP.

IRRIGATION PROJECTS OF IRDPS

Whilst VIRP is a district-level project meant solely for irrigation development, IRDPs are district-level programs under which different sectors have been identified as projects. Irrigation is one such sectoral project within the broad framework of rural development. These programs are defined by the World Bank as District Rural Development Programs dropping the word "integrated" while all the other programs are called IRDPs anticipating a certain degree of "integration" among sectors and activities of the overall program.

Irrigation is, thus, one of the sectoral projects or subprojects of IRDPs which usually contain 12-15 subprojects. In most IRDPs the irrigation sector is the highest in terms of annual allocation of funds, the number of schemes and the area covered, and the activities involved.

It is noteworthy that IRDPs which include an irrigation component have given high priority to minor irrigation or farmer-managed irrigation systems. All of the World Bank funded IRDPs are located in the Northwest, the Northern and Central provinces of the country. Since 1984, owing to civil disturbances, work in IRDPs in Vavuniya and Mannar districts was suspended temporarily. The strategy adopted by the World Bank for minor irrigation development was more or less similar to that of VIRP.

³The Badulla IRDP is funded by the International Fund for Agricultural Development (IFAD) following the World Bank approach.

The other two types of models have a more flexible approach and have developed a strategy particularly in the minor irrigation sector following a package program within the subproject.

For the sake of better understanding and comparison of the strategy of IRDPs with regard to minor irrigation intervention, two district IRDPs were included in this study: one was the World Bank funded Kurunegala IRDP and the other was the NORAD funded Hambantota IRDP. Particular references are made to these two district IRDPs which are representative of the others, while other district IRDPs will also be referred to wherever applicable.

THE KURUNEGALA IRDP

The difference between VIRP and the World Bank funded IRDP is that the former is a minor irrigation rehdhilitation project covering 14 districts while the latter has a minor irrigation component among its other physical, economic and social development components. The World Bank strategy in Kurunegala IRDP is described in the Staff Appraisal Report (World Bank 1978), and "Village Irrigation Schemes" is a subcomponent of the irrigation and Water Management Project which includes major irrigation and water management components as well.

Project Planning and Implementation

After identification of the project components, detailed surveys, investigations and estimates for tanks and anicut were carried out by the Irrigation Department which is the implementing agency for the civil works of the whole irrigation and Water Management Program. At the time of the World Bank staff appraisal some 130 village irrigation schemes had been identified and the rest of the schemes was selected in a phased manner during the initial years of the project implementation.

There were only a few sources of information about village irrigation schemes, namely, the lists of tanks and anicuts submitted by farmer organi-

zations, lists forwarded by politicians (Members of Parliament), and lists of investigated schemes prepared by technical agencies. As the number of schemes and investment for each electorate on village irrigation rehabilitation had to be equally distributed during the first selection period, some difficulties occurred in terms of selecting the most deserving schemes in the most backward areas. The selection criteria drawn up, however, constituted the deciding factor which prevented very small and nonfeasible schemes from getting selected. More village tanks were selected from the western and northern dry-zone electorates of the district while anicut schemes were selected from the intermediate zone of the southern and eastern areas of Kurunegala District.

Almost all of the village irrigation schemes were working schemes or schemes very recently neglected and in a state of disrepair. Thus, completely abandoned schemes were not refurbished under the project but improvements were made to the existing bunds, sluices, spillways, channel systems, and their distributary structures in the case of tanks and to the sluices, spillway structures, and overflow structures in the case of anicuts. The rehabilitation work involved small to large repairs to the different components of existing tanks and anicuts rather than the restoration of anciently neglected tanks which needed complete reconstruction. As such, there were farmers already owning land in these tank areas and land alienation or resettlement problems did not occur in the process of village irrigation rehabilitation of the Kurunegala Integrated Rural Development Program.

The Irrigation Department was the sole authority for investigation, detailed survey, and improvements to the headworks of the schemes. Implementation of the Water Management Program including the special improvements to downstream structures was the responsibility of the Department of Agrarian Services. Both departments were given machinery and equipment needed for the rehabilitation and for the Water Management Program.

Project Management

All IRDPs in the country were implemented under the auspices of the then Ministry of Plan Implementation (presently the Ministry of Policy Planning and Implementation). The Regional Development Division of the Ministry

coordinated the program at the national level and its district-level project office coordinated the entire process of the program at the district level.

At the end of 1988, i.e., after 10 years' implementation, the project activities of the Kurunegala IRDP were completed? During this period the project was reviewed periodically by the District Coordinating Committee in which all the heads of the implementing agencies, the Government Agent, the Project Director and politicians were represented. At the District Coordinating Committee, progress of the different projects was reviewed, problems and issues discussed and remedial measures taken: the issues beyond the purview of the District Coordinating Committee were directed to the National Coordinating Committee which comprised heads of the national agencies. The National Coordinating Committee meetings were held annually or *biannually*. For the implementation of irrigation subprojects Irrigation Department and Department of Agrarian Services were equally important.

Progress of the Project

Out of the planned 500 village irrigation schemes 453 were completed by the end of 1987 with a total expenditure of approximately US\$3.7 million (Ks 110.8 million). As in the VIRP schemes there were defects in construction during the initial years of the project. The construction work was monitored and revised by the Project Office and the World Bank periodically, and the quality of the construction work improved over the years.

The "handing over" of completed works by Irrigation Department and the "taking over" of them by DAS created some problems in regard to the project-specific items involved in the Water Management Program during the initial years. For the same reasons described in the last chapter under VIRP, the Water Management Program was affected by misunderstanding, lack of coordination between Irrigation Department and Department of Agrarian Services, noninvolvement of farmers from the inception of the program and bureaucratic control over project activities and farmer organizations. The DAS was

⁴Although for consistency and for convenience the term Kurunegala IRDP (instead of Kurunegala RDP) is given here, the World Bank did not consider the Kurunegala project as "integrated."

the sole authority for implementing the Water Management Program, and it has developed its program using the Agricultural Planning Tcdm effectively since 1983 in parallel with VIRP (Medagama 1986).

According to the project management of the Kurunegala IRDP, the Water Management Program could not be implemented successfully in all the tank areas owing to technical and social reasons, but all in all DAS managed to cover around 60 percent of the rehabilitated schemes in implementing the Water Management Program.

As one may expect, sectoral development initiated by the Kurunegala IRDP showed its own problems since this program was the first of its kind in the island and it took time for the staff involved to successfully implement the targeted activities. It was also highlighted that additional staff needed for the implementation of the Water Management Program could not be recruited immediately in the early period and the staff naturally took time to adapt themselves to the new setup as they followed the process of "learning by doing." It was observed that the absence of an effective mechanism, particularly during the early years of the project, to accommodate the farmers' needs as regards the design and implementation of the minor tank rehabilitation component was a deficiency (Sepala Asoka et al. 1988).

The village irrigation scheme subcomponent of the Kurunegala IRDP was replicated in other World Bank funded programs like those in Matale and Puttalam and the lessons learnt in Kurunegala were applied to these IRDPs. These latter programs initiated their activities in 1981 with sufficient years of experience from the first IRDP.

The visual socioeconomic impact of the project was the increased area taken under cultivation: under most of the tank areas the command area has been increased at least by 10 percent while the cultivated acreage (in most of the schemes) has been increased by 50-100 percent according to the progress reports.⁵

⁵Kurunegala IRDP Progress Report submitted to the Ministry of Plan Implementation.

THE HAMBANTOTA IRDP

The Hambantota District Integrated Rural Development Program (HIRDP) was the first IRDP that evolved the model of self-planning or planning below the national level. "The program aims at achieving an increase to income, employment, and production as well as improvement of social conditions and living standards of the men, women and children of the Hambantota District, with special emphasis on the poorest groups" (Main agreement between NORAD and the Government of Sri Lanka - 1979).

The strategy to achieve its objectives was also given in the agreement:

- An integrated approach, whereby efforts within various fields are related to each other.
- * A method of recurrent planning whereby information from ongoing activities is continuously fed into a revolving planning procedure.
- * A method of concerned participation of the population of both sexes in a decentralized planning and implementation process.

This strategy was quite different from the World Bank's blueprint. The rolling planning strategy at the district level was highly encouraged, though details of this concept are not stated in the agreement. The need to strengthen the district administration regarding planning implementation, monitoring, and evaluation of development efforts was however stressed. The project proposals were prepared at the district level and each proposal was agreed upon by NORAD and the Ministry of Plan Implementation. This was a variant of other IRDPs funded by multilateral as well as bilateral donors. An annual project meeting was held to review the development of the program. There was a clear emphasis on an annual cycle of events with annual planning.

Planning and Implementation of Irrigation Projects

At the inception of HIRDP in 1979, several subprojects were identified in haste for immediate implementation. The irrigation component was one of the first projects identified, planned, and implemented. Over a third of the total investment of HIRDP during the first and second five-year periods of the program was on irrigation work. Three different activities took place in developing the irrigation sector.

- a) The rehabilitation of Kirama Oya diversion scheme consisting of 20 anicut schemes (weirs).
- b) The establishment of settlement clusters under the rehabilitation tanks in the eastern part of the district on a package program which included the development of all the physical, economic, and social components.
- c) The rehabilitation of village tanks in the western part of the district.

The Kirama Oya scheme as a whole was a major irrigation scheme covering over 1,200 ha (3,000 acres) but the individual anicut schemes were operated by farmers, showing all the elements of a farmer-managed irrigation system. The project assisted rehabilitation of the sluices, spills and channel system, and distributary structures of each anicut system resulting in an increase in the cultivated and harvested area in both maha and yala. Because, at the macro level the management of the Kirama Oya system was done by the Irrigation Department and at the micro level or the individual anicut level farmers managed the system, this scheme is a good example of a jointly managed irrigation system. During the first few years of implementation, defects in the project design began to emerge as a result of planning without sufficient investigation and so on. Subsequently, the project was supplemented by other physical components as well as water management and credit programs. The experiences gained under the Kirama Oya scheme were extensively used for planning of the Uruboku Oya scheme which was a similar diversion scheme, but which took more than six years for detailed investigation and planning alone.

The settlement clusters in the rehabilitated tank areas constituted a project evolved through HIRD's own "learning by doing" process as an outcome of the original project titled "Rehabilitation of 87 Tanks in the District." The restoration of abandoned tanks in the eastern part of the district involved a series of mutually dependent components, because the earmarked tanks were not working tanks and were located amidst extensively *chenaed* (swidden) areas. The main components of the settlement projects were irrigation works, land development, re-forestation, housing and other facilities, domestic water supply, production support, and social infrastructure (education and health). With the restoration of each tank under settlement clusters, land allotments of 0.8 ha (2 acres) of rice land and 0.4 ha (1 acre) of highland were alienated to the settlers. With the gradual resettlement of the farm families, other facilities had to be provided under a package program which included the abovementioned components.

Starting from 1980, three settlement clusters consisting of 18 tanks and one medium-size settlement were established. These clusters were located in the Assistant Government Agent divisions of Hambantota and Tissamaharama (presently in three divisions) where chenacultivation was the dominant land-use practice. Under these three clusters, namely **Mattala** (7 tanks), **Weliwewa** (6 tanks), and **Gonnoruwa** (5 tanks) and under Maha-Aluthgam-ara tank settlement, some 1,385 families became settled permanent farmers, owning 960 ha (2,370 acres). This project was identified, formulated, and implemented by the district-based planning staff showing a great amount of flexibility. There was adequate opportunity to include additional components or to exclude unnecessary items from the original project proposal depending on the implementation experience and suggestions made by the farmers. The latter clusters were actually planned taking into consideration the ideas of the prospective beneficiaries. However, at the inception of this program there was no opportunity to consult farmers since they were yet to be selected. Instead, views of the farmers of the neighborhood were used and settling of farmers prior to and along with the rehabilitation was encouraged as far as possible. However, the weaknesses of the project implementation during the early years were later removed based on periodic reviews conducted jointly by NORAD and the HIRDP office (Prestgard and Dayaratne 1983; Dayananda and Hazandeen 1984; Dayananda and Karunaratne 1986).

Rehabilitation of village tanks in the western part of the district involved improvements to working tanks (strengthening the bund, repairs and improvements to sluices, spillway and channel systems). Over 40 village tanks were rehabilitated under this program and project activities were identified, organized and arranged with the active participation of farmer organizations, particularly during the second and third phases of the subproject.

Supplementary agricultural programs, namely, water management, agricultural credit and crop cultivation, were incorporated into all of these irrigation subprojects. In the settlement clusters, the organization of farmers for receiving the intended benefits from the project was sought through the involvement of "Sarvodaya" which is the biggest national nongovernment organization in Sri Lanka. It has carried out cultural and spiritual development of farm families for better functioning of the irrigation-cum-settlement systems in all three clusters since 1981. The experiences gained by this NGO assistance in improving the management of small-scale irrigation schemes under settlement clusters were reviewed by a recent IIMI study (Inge

Jungeling 1989). At the latter part of the project, however, Sarvodaya became another "contractor" rather than a catalyst, involving itself in physical construction work (rural roads, channels, etc.) thereby deviating from the community development work it was supposed to attend to.

Project management was done by the project office/district planning unit, which was responsible for overall planning, implementing, and monitoring of the project. Apart from the District Coordination Committee, the project office developed a subcommittee for minor irrigation rehabilitation to discuss and review its progress. Staff from Irrigation Department, DAS and the agencies involved in community development of the minor irrigation based villages and settlements participated in these meetings. Many implementation and management problems were solved through these committee meetings. Further, NORAD, the funding agency, also used to review the irrigation subproject biannually through a group of local and/or foreign consultants resulting in more improvements supplemented into the project periodically. For example, new schools and health facilities were provided to tank-based settlements as a response to a request made by farmers to the review team in 1984 (Dayananda and Hazandeen 1984).

The strategy adopted for the tank-based settlement has been regarded as the first breakthrough of HIRDP's development planning methodology, which during recent years, (1985 onwards) was effectively used for more local-level planning under IRDPs.

THE DEGREE OF SUCCESS

The main contrast between the IRDP and the VIRP approaches is that minor irrigation rehabilitation under the former is one component of a program having several development components while the latter is solely meant for rehabilitation and water management without going into other socioeconomic problems of the village communities. A project like VIRP covers several districts; the district is the lowest administrative unit directly managed by a centrally controlled department. In an IRDP, project management is more decentralized and it operates from the district downward, and the IRDP strategy has developed more local-level planning entities like the *Pradeshya*

Sabha (Assistant Government Agent division level), *Gramodaya Mandala* (lowest administrative division level), and village-level voluntary organizations aiming at beneficiary participation. Farmer organizations become difficult to establish when the project management has not penetrated into the grass-roots level. The IRDP minor irrigation project as a whole has shown success compared to other state interventions.

All IRDPs, particularly those in the dry-zone districts, have implemented irrigation-cum-water management programs covering about 2,000 tanks and anicut schemes benefiting at least 40,000 ha (100,000 acres) and 10,000 farm families. This figure is comparable to VIRP's 1,200 schemes in the 14 districts.

It is also noteworthy that although the implementing agencies for management of these village irrigation systems are the same (i.e., Irrigation Department and DAS), aspects of implementation, monitoring and progress control are more successful in the case of IRDPs than of VIRP, due probably to the fact that IRDPs are managed by a separate Government Ministry with a regular mechanism of reporting at all levels of implementation, while VIRP is only managed by a national-level VIRP coordinating committee which is also housed in the DAS headquarters; furthermore, the coordination, both vertically and horizontally (at district level), has made the strategy of IRDPs more efficient than that of VIRP. This effective coordination and integration with other agencies is highlighted in a review done in Hambantota (Whist et al. 1984).

CHAPTER 5

The Anuradhapura Dry-Zone Agriculture Project

INTRODUCTION

THE ANURADHAPURA DRY-ZONE Agriculture Project (ADZAP) was essentially a rural development project in Anuradhapura District, the largest district of Sri Lanka, and its main objective was to raise food production and increase the incomes of about 4,000 landless families practicing cultivation through the establishment of a viable system of combined rain-fed and irrigated farming integrated with livestock development. The target families were expected to be permanently settled and given landownership rights.

The original project identification was done in 1978 by an agricultural sector project identification mission from the FAO Investment Center. The Agricultural Finance Corporation of India under the Asian Development Bank technical assistance carried out the feasibility studies of this project and the detailed project proposal was completed in early 1980; this was approved at the end of 1980. The implementation of ADZAP commenced in June 1981. Originally, the project was scheduled to be completed by the end of February 1987. This period was later extended to mid-1989 (Project Review Mission 1986).

During the initial years there were persistent problems in project implementation which included inadequate budgetary appropriations and the lack of coordination between the implementing line agencies. As such, the project was reformulated in November 1984 by limiting its scope and financing. The ADZAP was funded by the Asian Development Bank (ADB), the International Fund for Agricultural Development (IFAD), and the Government of Sri

Lanka. The total project cost was estimated at US\$20 million (Rs 610 million) in 1982.

The ADZAP has been thoroughly reviewed, studied and commented on by various agents including foreign missions, local research organizations like ARTI and IIMI, and by individual researchers and scholars. In addition, ARTI organized a two-day workshop on ADZAP in April 1989 which extensively reviewed all its aspects and came out with certain recommendations. IIMI conducted a special rapid-assessment survey of ADZAP during the latter half of 1988 and produced its report in April 1989; this was published as an IIMI Working Paper (Ekanayake et al. 1990). In this rapid-assessment survey, IIMI particularly looked at the irrigation component of the project and generally reviewed other aspects like upland development and status of the settlement.

The ADZAP strategy in terms of its irrigation-cum-water management component is reviewed in this chapter based on the findings of the above-mentioned surveys and studies. The whole ADZAP strategy is summarized in Appendix 3.

PROJECT PLANNING AND IMPLEMENTATION

According to the reformulation of the project in 1986, ADZAP was scaled down both in **scope** and in financing, but the concept and objectives of the project were allowed to remain intact. The IFAD share of financing was reduced from US\$4.5 to US\$7.8 million. The main adjustments made to the scope of the project were: a) decreasing the number of tanks from 600 to 138; b) reducing the command area development from 8,100 ha (20,000 acres) to 1,620 ha (4,000 acres) and upland development from 27,935 ha (69,000 acres) to 4,860 ha (12,000 acres) with a corresponding reduction in the number of command cultivator settlers from 10,000 to 4,000; c) increasing the investments for development of command areas and adjacent uplands; d) decreasing the credit component from US\$5.5 to US\$1.8 million commensurate with the revised target of 4,000 settler families; and e) extending the loan period by two years up to 30 June 1989 in accordance with the project extension.

Construction Stage

The Irrigation Department was responsible for construction of headworks including the main canal leading from the sluice, but in several cases it did not construct the main canal; the Department of Agrarian Services was left to shoulder that responsibility. In contrast, the Irrigation Department constructed field channels in some other cases in addition to the main canal which work was something beyond their responsibility. Where the downstream development was the responsibility of DAS, the development works of certain tanks were supposed to be undertaken by the farmers. During the first years of the project, farmers were given the option of clearing their own land and receiving payment from the project, or of asking the project's contractor for the scheme to do the clearing; but farmers were not consulted about this during the latter part of the project (i.e., since 1986). The explanation given was that they took a longer time to complete work and that some of the leveling work needed machinery.

Since the upstream development works were carried out by the Irrigation Department prior to the selection of settlers, the labor of the latter was not used, although residents (chena farmers) of the surrounding area were often hired as laborers who became project beneficiaries later on. However, during the construction period, prospective settlers were not certain whether they would be selected as a result of the long-time gap between the construction and actual settlement of the beneficiaries. Upstream development undertaken by the Irrigation Department was a relatively easy task as physical improvements to the bund, sluice, spill, and main canal were, in most cases, done without involving the beneficiaries. According to the IIMI rapid-assessment survey findings, all the tanks renovated had improvements to bund, sluice and spill; some 3X percent of the tanks had improvements to all components including the entire length of the main canal; and 21 percent of the tanks got all the components plus field channel outlet structures as well (Ekanayake et al. 1990).

Although a set of selection criteria for both tanks and settlers was available it was not strictly adhered to during the implementation period. In tank selection, the first method was for the Project Management Office to ask officers of the Department of Agrarian Services to report on abandoned tanks suitable for restoration during the early stage of the project. Usually, the

Cultivation Officer was the informant in this regard. He sent the information on tanks suitable for renovation mostly in consultation with farmers in the area and sometimes on his own initiative. The second method of selection was for a group of chena farmers primarily based around an abandoned tank to send a request through a political leader, the Rural Development Society or the local branch of the political party, to be forwarded to the Project Management Office. The Irrigation Department sent the preliminary list of tanks to the ADZAP office and it was found that irrigation officials too were responsible for selecting tanks in a few cases, while the farmers, in most cases, lobbied for rehabilitation of working tanks rather than the development of an abandoned tank. According to IFMI's survey, over two thirds of the tanks were selected on requests made through the Rural Development Societies (Ekanayake et al. 1990).

Settler selection, as described earlier was carried out a tier upstream development of the tanks. The farm families of the area were notified of a "land *kachcheri*" (gazetted meeting) to be held for one tank or several tanks together. At the land *kachcheri*, officers from the Land Commissioner's Department and Project Management Office interviewed the applicants for selection. Although the set criteria comprised the basic requirements, political affiliation was also an implicit criterion. More than a third of selected settlers however, were prior cultivators in the area and in the *thulana* (tank-bed); about 14 percent of the settlers selected by the land *kachcheri* were partly replaced by political selectees, and 29 percent of the settlers were selected by the land *kachcheri* based purely on the set criteria (Ekanayake et al. 1990).

A discrepancy that occurred during the implementation period was the inequity in the distribution of allotments, owing to the absence of a clear-cut procedure. A few examples of this serious drawback are: a) there were more prior residents than could be accommodated under the new scheme in a few cases (some selectees were allotted only upland areas in such cases); b) the size of upland allotments was reduced from 1.2 ha (3 acres) to 0.8 ha (2 acres) to accommodate all farmers who claimed prior cultivation and residence; and c) in one surveyed tank a little over half of the settlers were given normal allotments while the rest were given 0.8 ha (2 acres) of upland allotments only. The people without allotments in the command area were not considered as "project people" resulting in their not being entitled to credit and other project benefits (Ekanayake et al. 1990).

The rate of settlement was just over 51 percent. It was reported that the majority of the farmers who have settled are either those who were living in nearby villages within a distance of 3.4 km (2 miles) or those who were from far away places (over 7 km [4 miles]). The rate of settlement is considerably lower in the group of settlers who have residences within the range of 3.4-5 km (2-3 miles) from the tank. This was due, probably, to their having other means of income, being located very close to the main road. These settlers appeared to be reluctant to risk coming to tank settlements, where irrigated cultivation was not possible for several consecutive years.

Downstream Development and Water Management

The downstream development carried out by the Department of Agrarian Services included land leveling, bunding, construction of field channels, and some irrigation structures. The work was done by the DAS staff, contractors as well as the farmers at different locations, as the work done by the farmers alone in the initial year was not very effective. Therefore, after 1986, DAS hired private contractors to undertake more difficult areas of land development which involved the use of heavy equipment. Since there was no income during the earlier stage of settlement, financial assistance (a maximum of Rs 2,000 per farmer) was given to farmers up to the first harvest of each scheme depending on the farmers' share of work. In practice, only a portion of the entitled Rs 2,000 was paid to the farmers because part of the money had to be utilized for the work by hired contractors. With farmers' involvement, downstream work of only about 30 out of the 83 tanks could be done by the end of 1985. The work was slow. Machinery was needed as some tanks had command areas with thick jungle and earth humps. Some farmers left their plots owing to these difficulties. The DAS then had to use heavy machinery through contractors to complete the job.

Construction of field channels and downstream structures comprising drop walls, pipe outlets, etc., was the primary role of the Department of Agrarian Services. Only about a fourth of the desired channel structures could be installed by DAS; the remainder comprised repairs or reconstruction of early work done by contractors under the Irrigation Department's supervision. The governing factor in the need for repairs to once constructed structures was the time gap between Irrigation Department's completion of

work, and DAS' start of work which on average was about 3 years according to IIMI's study. Apart from these delays, other reasons for reconstruction were poor quality work, wrong design, and misplaced turnout structures within the command area. These construction works were given to contractors by DAS. Although preference was given to the Rural Development Societies for farmer involvement, in practice, it too used to subcontract to private contractors. Only about 5 percent of downstream development works in the tanks were done by the Rural Development Societies themselves while they subcontracted 24 percent to private contractors and 14 percent to a Technical Assistant (who applied for the contract under a false name). Private contractors alone contributed 81 percent of this work.

The DAS had to attend to construction and repair works coming under the purview of the Irrigation Department thus diverting the resources intended for water management and downstream work of the former to some of the works of the latter. Even though farmers' involvement was reduced during the early part of the project, because of the availability of the labor of settled farmers during the latter part of the project downstream development works of the project were done with relatively high involvement of farmers compared to upstream development. When DAS took over a tank from irrigation Department for lowland development the Divisional Officer of DAS arranged a meeting with the participation of all beneficiaries; at this meeting a farmer was elected as the Farmer Representative and a group of five or six farmers including the Farmer Representative was selected to the Tank Committee.

Status of Irrigated Agriculture

Irrigated agriculture was not possible throughout the post-project period in most cases, but a third of the total number of tank areas was cultivated during 1986/1987 maha and a fifth during 1988 yala. Even in the cultivated area, the extent irrigated was limited to a few acres, especially during the yala season. Furthermore, the command area cultivated was rain-fed rather than irrigated. One reason for not irrigating was the limited volume of water in the tank while some farmers did not cultivate their plots even though there was enough water in the tank. Only some selected farmers in several tank areas with sufficient water were able to cultivate during successful seasons. Settlement problems comprised another reason for not cultivating irrigable area by some farmers.

Technical problems **that** occurred after construction also constrained irrigated cultivation in a number of tank areas. The major technical problems found were the permeability of the tank bund which allowed the water to drain away, the wrong level of the main canal from which some fields could not be irrigated, the insufficient catchment area, and the lack of water in the catchment area.

Because of these problems most of the farmers have expressed their doubts about the possibility of cultivating the total command area of most of the **tanks**. Of the 21 surveyed **tanks**, only 15 percent (during yala 1989) and 18 percent (during maha 1988) of the command **area**, respectively, could be cultivated, according to the farmers. The true irrigable area corresponds to the estimates of the Technical Assistant of DAS which indicated that 60 percent of the tanks have catchments insufficient to meet the requirement of the planned command area. Poor rains have been experienced in most of the tank areas after 1984/1985 resulting in the cultivation of only a limited extent of the command area.

A limited number of tank areas selected for a pilot Water Management Program in 1984/1985 maha showed successful harvests, as **DAS** gave guidance to farmers who used the **tank** water sparingly following the *Walagambahu* system." However, as described earlier, irrigated agriculture could not be practiced in the majority of **tank** areas or in parts of **tank** areas during the past owing to lack of sufficient rains, low water-holding capacity of the **tanks**, insufficient catchment area and technical defects of the improved components.

As a result of these combined factors, the Water Management Program could not be carried out apart from a few **tank** areas where the pilot Water Management Project was conducted in 1984/1985 maha. The Water Management Program of DAS which **was** introduced to other parallel programs like VIRP and IRDPs could not be implemented because several requirements were not sufficiently fulfilled. The need for water management did not arise as there was no water in the tank (to manage). Thus, ADZAP has provided only a few comparable elements of the Water Management Programs such as

⁶This is a system where the whole preparatory stage of cultivating including clearing, plowing and sowing is conducted using **only** rain-fed water and where tank water is used only about a month after sowing

basic institutions like the Farmer Representative and the Tank Committee that were elected in most of the settled tank areas.

Project Management

The Ministry of Agricultural Development and Research (1977-1988) **was** the principal agency responsible for overall project management. The detailed annual planning, budgeting and implementing of individual project components rested with the relevant line department and agencies. In accordance with the loan agreement between the Asian Development Bank, the International Fund for Agricultural Development and the Government of Sri Lanka, a National Project Coordinating Committee was appointed to assist the Ministry in project implementation. This Committee comprised the heads of the ministries and departments directly responsible for the major components. Although the Project Appraisal Report had identified 19 institutions to participate in the committee meetings, some 27 institutions have participated in the regular meetings (Niyangoda 1989). Whilst National Project Coordinating Committee functioned at the national level, a Project Implementation Committee was established at the district level under the chairmanship of the District Minister, Anuradhapura, to determine a policy and to facilitate project-level coordination and implementation. The National Project Coordinating Committee met on an average of twice a year while the Project Implementation Committee met every two-and-a-half months.

The main project management body was the Project Management Office, which had the functions of developing implementation arrangements, establishing budgetary and reimbursement procedures, **and** attending to day-to-day implementation activities of the project. The Project Management Office was managed by a Project Director who worked full time in the project. Three subject matter specialists in the fields of engineering, agronomy, and live-stock were **also** appointed full time to assist the Project Director by liaising between the relevant department and the project office.

Although the project structure suggested by the **Staff** Appraisal Report was created, the introduction of political leadership into the management of the project gave **way** to a series of project planning and implementation problems which constituted the very basis of the project's failure. This rate of politicization has not been identified in **any** other project implemented by

state intervention. The main reason for the high degree of politicization may be the fact that the donors were not directly involving themselves in the project management compared to many similar projects.

THE DEGREE OF SUCCESS

A direct way of judging the success of a project would be on how far the set objectives have *been* achieved. Compared to other state interventions in the improvement of small irrigation systems in Sri Lanka, ADZAP has shown a considerably **low** degree of success according to many observers and evaluators (Ekanayake et al. 1990; Navaratne 1990; Niyangoda 1989).

The overall objective of establishing a technically viable and economically attractive farming system in place of the chena, in order to raise food production and increase the farmers' income, is not something that is readily measurable, as the *prolonged* drought in the North Central Province during the latter part of the project period hindered the desired scale of cultivation under many of the rehabilitated tanks. The package given under the program has been appreciated by the beneficiaries of some **tank areas**. The farmers' *main* satisfaction appeared to be the fact that they had become permanent cultivators owning 1.6 ha (4 acres) of land including rice land. Wherever the farmers faced difficulties, the rate of farm establishment was rather low and only about 30-40 percent of the farm families have been settled in a few such settled tanks (Navaratne 1989).

The importance of upland cultivation in the project has been the most striking observation in this project although this component had not been given due attention by the project authorities from the beginning. The average cropping intensity in a sample of 21 tanks was 51 percent during yala 1988 and 74 percent during maha 1987/88. The corresponding values for irrigated cultivation in the command area are 15 percent for yala and 18 percent for maha. Therefore, ADZAP is more successful in upland farming than in irrigated farming. Irrigated cultivation in the command area called for more labor at the initial stage whereas upland cultivation was easier and a familiar practice for a group of ex-chena cultivators. Apart from the low rainfall during a few years, the unsuccessful lowland cultivation was seriously

affected by design defects like overestimation of command area, wrong and/or insufficient catchment area, defects in the bunds and **tank** beds, and mistakes done in planning the sluices, gates, canals and outlets.

The expected extent of rice lands to be developed is 1,903 ha (4,700 acres) of which 1,745 ha (4,311 acres) have been developed: but according to the estimates prepared by the **DAS** office at Anuradhapura the cultivable extent would be only 1,050 ha (2,595 acres) provided that all the **tanks** get filled up. This is an obvious result of "overplanning." The rice extent under each tank has been the binding factor for new settlers and owing to the unreliability of cultivation of **expanded** lowland even during the rainy years, a considerable number of selected settlers have either deserted their allotments or not settled there at all. The total expenditure incurred for upstream and downstream development is a little over US\$4.04 million (Rs 121 million) in 1987, and the pro rata (excluding other supporting expenditure) has been approximately US\$2,325 (Rs 69,600) per ha (US\$942 [Rs 28,200] per acre) for the total developed area, but this would be US\$3,865 (Rs 115,700) per ha (US\$1,564 [Rs 46,800] per acre) when the actual irrigable area of 1,050 ha (2,595 acres) is **taken** into account. When the total project expenditure of US\$ 12.76 million (Rs 382 million) and the **total** number of 4,000 families are taken, the project has spent over US\$3,175 (Rs 95,000) per settler family which is comparatively a very high figure for a small-scale irrigation/settlement scheme. Thus, in the sense of cost-effectiveness **ADZAP** has had a low rate of success, particularly in the **area** of irrigated agriculture which is the main concern of the present review.

Although the project envisaged halting the chena cultivation by helping chena farmers to become permanent settler farmers, it was found that chena continues to play a role in the agricultural livelihood of the settlers. It is, however, not clear whether this practice will disappear once the farm families are fully settled and the fertility of the current chena fields is depleted over a passage of time. The low rate of settlement is a contributing factor for the low degree of success and other intended benefits in the area of irrigated cultivation. According to the **IIMI** survey, the settlement rate is as low as 20 percent. Other sources reveal that out of 3,416 allotments only 958 settler families (28 percent) had been settled by the end of 1986 (Niyangoda 1989). By the end of 1984, the construction of 80 tanks had been completed and it was expected to settle 3,500 beneficiaries by the end of 1986. It is also reported that out of the tank areas where farmers settled early, seven tank settlements have been

completely **deserted** by the settlers. What happened here was that settlers **moved** in, received the **World Food Program** assistance (food aid), put up temporary huts, cultivated **chena** crops (maize) during **maha** and left the land **when the World Food Program** assistance was withdrawn. The settlement aspect **was** thus unsuccessful **because** of the inherent weakness of the project plan which lacked basic **needs of the** settlers such as housing, drinking water, education, and health. **As** the rate of **politicization** was very high, unsuitable **persons** received land for "remote cultivation" and not for "settled cultivation"

Apart from the limited number of positive aspects of the project which **are** **outside** "irrigated agriculture" as described **earlier**, ADZAP strategy has been a failure in terms of irrigation and water management aspects (Navaratne 1989, Ekanayake et al. 1990). The identified reasons for this failure vary from administration to technical aspects. **There** are at least five such reasons. First, the very **high** political domination and intervention in project management including financial allocations, selection of tanks and settlers, **and other** project activities have greatly contributed to **malpractices** and deviation from the project design. Second, self-management of the project activities presented in the system by line agencies as a result of bulk allocation of funds and insufficient financial control **by the** project authorities **is** not found in any other multi-sectorial program. Third, project steering by executing agencies of the Ministry of Agricultural Development and **Research** and the **donors** (ADB and IFAD) was insufficient, resulting in the mismanagement of project funds and activities. Fourth, there was obvious lack of team work at the field level to achieve intended **benefits** by the officials of the line agencies, which hindered the development works to a great extent. Finally, the absence of a **rolling planning** strategy according to the ground situation also hindered the project from achieving its objectives. The blueprint did not allow the incorporation of additional facilities **needed** for permanent settlement.

At the early period of the project it had to be scaled down drastically (number of tanks to 23 percent and settlers to 40 percent of the original targets) as the implementation of a bigger project appeared to be difficult. At the closure **of the** project the targeted figures of rice area, upland **area**, settlers, and other benefits also have become even less. Thus ADZAP is an example of planning "more" and achieving "less." It is also noteworthy that the obvious lack of an in-built **element** to achieve farmer participation for the **entire** project cycle is closely related to the negative aspects of ADZAP, apart from the

administrative and technical drawbacks described above. Achieving the fullest participation even under working **tank** conditions such as **VIRP** and some **IRDP** intervention **has** proven **a** challenge to **the** irrigation management specialists, **and** when it comes to rehabilitation of abandoned tanks in a case like **ADZAP**, it calls for more careful planning for farmer participation **as** “new tanks” involve more “hardware” (e.g., labor for construction) leading to tricky “software” (farmer organizations).

CHAPTER 6

The Small Tank Rehabilitation Program of the Freedom From Hunger Campaign Board

INTRODUCTION

THE SRI LANKA National Freedom From Hunger Campaign Board (FFHC) was first established by a Parliamentary Act (No.15 of 1973) under the umbrella of the then Ministry of Agriculture and Lands, with a view to successful implementation of rural development programs of its own. Being like a public corporation, FFHC has followed the strategy of nongovernment organizations (NGO) in carrying out its village development activities.

The development philosophy emphasizes: a) people's participation and alleviation of rural poverty; b) promoting and encouraging labor-intensive projects; c) helping chena cultivators to become settled farmers by providing permanent land with facilities for irrigation; and d) assisting the poor people to enhance their living standards. The primary objective of the Board's program is not the mere restoration or renovation of small tanks, but the improvement of the quality of life of the people living in the tank country.

The FFHC is an example of a true government-organized NGO where a rather rigid "blueprint" type small tank rehabilitation program exists. The FFHC's strategy for improving small tanks has been subjected to various studies during the past few years. These studies comprised those done by the FFHC officials, independent research work, and studies carried out by organizations like ARTI and IIMI. The studies done by IIMI include a Workshop (March 1989) on the Role of NGOs in Improving Minor Irrigation Systems in Sri Lanka and an assessment survey conducted on the Thanthirimale project during the latter part of 1989. The report of the latter will be published

as an IIMI Working Paper (Dayaratne and Moragoda [forthcoming, 1991]). The **participatory** aspects of FFHC's tank **rehabilitation** program have been reviewed by the **Project Director** of FFHC at another IIMI Workshop (Wijetunga 1986). Recently, an assessment study was done by Jayantha Perera on FFHC's Rehabilitation of Scattered Village Reservoir **Communities** in **Anuradhapura District** as compared to the National Development Foundation's Tank Renovation Program in Kurunegala: these **assessments** have been presented in two different papers (Perera 1987 and 1988). At the IIMI Workshop on the **Role** of NGOs, Vimaladharma has critically reviewed the two approaches (Vimaladharma 1989).

PERFORMANCE

According to FFHC sources, the **Board** has completed the **rehabilitation** of 135 tanks as of June 1989. Nearly 3,100 farm families are estimated to have **benefited** from this program and the total extent of developed area under the program is approximately 2510 ha (6,200 acres) of rice land and 1,880 ha (4,650 acres) of highland. The total expenditure incurred on the program is a little below US\$2.27 million (Rs 68 million), which gives a total expenditure of over US\$10,000 (Rs 300,000), approximately, per tank settlement if the total is considered as 222 tanks. The targeted amount has been **increased** as a result of the rather **high** overhead costs of the Board and the price escalation **during** the latter part of the project **implementation phase**.

The construction of reservoirs involves: 1) raising the **dam** by **earth** Filling and compacting by draft power; 2) repairing the old spill; 3) constructing an additional concrete sluice of the step type; and 4) providing a **feeder** channel and anicut at the head of the canal to divest water. According to the farmers, the village-type sluices found in the abandoned tanks have been subsequently **changed** to step-type sluices as a general principle of the Board. The farmers found these step-type sluices to be inefficient.

The project performance varies according to the location of different tank clusters. The Thanthirimale cluster of tanks within the Anuradhapura District was assessed as a comparatively successful project because the Chief Incumbent of the Buddhist temple has been playing a significant role in tank

selection, tank construction, wew-sabha formation, and overall project activities. The settler families of most of the tank settlements in the Thanthirimale project were either relatives of the Chief Incumbent or parties known to him. Because of this connection the Chief Incumbent had control over them, so that settlers strictly adhered to the Board's project activities leading to a measurable success in the latter. Over 75 percent of the settlers had been settled in the Thanthirimale area prior to the project under the colonization efforts carried out by the Chief Incumbent of the Thanthirimale temple. Therefore, unlike in ADZAP or any other state settlement program, the need for the "settling-in" process did not arise. In other words, FFHC intervened in a tank settlement project for groups of people who had been occupying a kind of "tank country" (Dayaratne and Moragoda [forthcoming 199 II]). The FFHC's assistance was sought mainly by the Chief Incumbent himself for the restoration of the tank systems and for the better organization of farmers under a "land consolidation" program.

In Thanthirimale, 72 wew-sabhās have been formed for the implementation of the tank restoration program. But the planned fund for settlers (see Appendix IV) has not been raised, and consequently, no maintenance could be possible under any of these tanks. However, it was reported that clearing of the bund of most tanks has been done every year. During the post-project years up to 1986, it was possible to cultivate in some of the restored tank areas for a few seasons, while the 1983/1984 maha was a good season for all the tank areas because farmers were able to cultivate the irrigable extent with rice or other crops. For the last four to five seasons, however, irrigated agriculture has been a failure and farmers seem to be reluctant to attend to maintenance work or even to clean the bund.

As an alternative to irrigated agriculture, homestead and market-gardens have been developed in most of the settled tank areas. Well-irrigation of homestead farms has been rapidly increased in the highland area because the project assistance for dug-wells could be utilized to construct cultivation wells each of 3-meter (10-ft) diameter. Some people have constructed a cultivation well jointly (one for two farmers) using the project money, as the Rs 6,000 given to a farmer was not sufficient to construct a cultivation well. In Thanthirimale it was observed that more than 50 percent of the farmers have constructed their wells while others have at least dug the pit aiming at supplementary irrigation for homestead cultivation. Over 80 percent of farmers in Thanthirimale have developed some kind of homestead farm at

least as a means of their subsistence. The total area of their highlands (0.6 ha) including market-gardens has been developed by only a few farmers (16 percent) who own a water pump for well irrigation. It was noted that one successful farmer in each tank settlement has practiced upland fanning in the 0.2-0.4 ha (0.5-1 acre) highland allotment, and that he has managed to buy a water pump out of his own savings.

The wew-sabha system could not perform well during the past few years owing to the continuous dry spell. Wew-sabha buildings have been constructed for each completed tank settlement, but they are often not utilized for the intended purposes of wew-sabha meetings and the storage of agricultural inputs. The failure to have rice cultivation for a few consecutive years and the farmers' indifference to the wew-sabha organization were the reasons for not utilizing these buildings often. In any case there were far too many buildings: there was a building in each settlement including those having only three to five members only; there were two or three such buildings within an area of one square kilometer. The construction of one building for 2-3 settlements serving 15-25 settler families would have prevented this waste.

THE DECREE OF SUCCESS

The FFHC's strategy of mobilizing beneficiaries' labor and their participation in construction, operation and maintenance of the irrigation system is more progressive and promising compared to state interventions, but there are notable shortcomings in its implementation. The FFHC's strategy too has been criticized as being a somewhat rigid blueprint approach compared to other NGO interventions like the National Development Foundation (Vimaladharma 1989). It is also argued that FFHC's model village concept is a romanticized version of an idyllic Sinhala dry-zone village and planning for its resuscitation under this strategy has become a top-down imposition.

Although participation is restricted since the FFHC's strategy has perceived beneficiary participation merely as contribution of labor for construction work, farmers' views on changing some aspects of the design and project benefits have been taken into consideration during the implementation stage of the program in Anuradhapuru. The establishment of wew-sabhas has, to

a certain extent, provided an opportunity to the villagers to be partners in the rehabilitation exercise with the project officials. During the construction period and initial years of the post-project period the wew-sabha system has allowed its members to discuss their needs and to plan action with the assistance of officials of the Board. This has definitely brought about positive aspects of group attitude, self-reliance, and a sense of ownership to the system among the wew-sabha members, who were otherwise scattered farmers practicing chena or *pittani* (meadow) cultivation without any permanent means of livelihood.

Unlike many other interventions which merely plan only for the irrigation component, FFHC's land consolidation component has given each farmer of a group of encroached cultivators ownership of a land area of 1.4 ha (3.5 acres) for cultivation. This is similar to interventions adopted by ADZAP or some IRDPs; and FFHC being a statutory board managed to get the cooperation of other agencies like the Land Commissioner's Department and the Government Agent. The ownership of land has made a tremendous change in the settler families, who have been motivated by a development package which is a common goal.

The selection process appears to be sound but in its implementation, a considerable number of small tanks were also selected whose rehabilitation was not feasible. For instance in Thanthirimale, of the 70 tank areas, 31 have less than 10 beneficiaries and 13 have 3-5 families. This has happened under the influence of the Chief Incumbent of the temple of the area, and most such tiny tanks had been encroached on by his relatives or known parties. The ill-effect of this kind of selection has been that a large sum of money (e.g., US\$5,000 to US\$8,350 [Rs 150,000 to Rs 250,000] per tank benefiting only three families) has been spent on very small tank areas with a very limited command area. It is also observed that most of these tank areas are occupied by one extended family unit, which has both positive and negative impacts. The positive impact is the formation of very coherent farmer groups led by an adult male of such an extended family; and conflicts among wew-sabha members are minimal under this situation. The negative impact is that more feasible tank areas and eligible landless farmers have been left out of the program.

Another drawback in this strategy appears to be the long delays in receiving project benefits by the settlers. There were complaints by the farmers that they were yet to receive the part payments due for land develop-

ment, dug-well construction, cultivation loans, etc. A noticeable drawback in the Thanthirimale FFHC Project was the long gap between the claim for incentive payments to land development and receiving the same from the District Project Office (Dayaratne & Moragoda [forthcoming 1991]). The project accounting system too has not been developed to an acceptable level at **least** by a general reviewer, resulting in some mismanagement of funds at the district level. Farmers have reported that this has led to a certain degree of corruption hindering the intended benefits reaching the target families.

Construction activities take a fairly long time when manual labor is used. Thus, the main criticism leveled against the FFHC's strategy was the use of beneficiary labor alone. This, according to the findings of the IIMI study on FFHC, has led to other problems like farmer disappointment resulting in the long gap between the completion of construction of one item to the beginning of another, and the need for repairs to some items already completed even before a **link was** used for any cultivation purpose.

CHAPTER 7

The Tank Renovation Project of the National Development Foundation

INTRODUCTION

THE NATIONAL DEVELOPMENT Foundation (NDF) is a true nongovernment organization established in 1979 under the Societies Ordinance of Sri Lanka as a nonprofit voluntary agency. The NDF is a variant of FFHC, and was based on the same principles of farmer mobilization but without any link to government agencies. The NDF attempted to avoid the negative features of FFHC in order to develop an open, pragmatic, and more flexible approach to rural development.

The stated objectives of NDF were to: a) build up villagers' self-confidence to handle their political, economic, cultural, and social affairs by themselves; b) help villagers to identify their resources and mobilize them to their advantage with the least external help; c) assist villagers to realize their strengths and power so that they would be able to know their rights and demand them; and d) mobilize villagers at the grass-roots level with the help of change agents to organize themselves into groups to carry out development efforts in rural areas.

The policies, projects and areas of development of NDF were decided by the management council which comprised seven members. The NDF has hitherto implemented four development projects, namely, Tank Renovation Projects, Bio-gas and Integrated Farming Project, Income-Generating Project for Women, and Muthukandiya Rehabilitation Project. The important aspects of all the projects were the opportunities given to women and children in the

development exercise and getting beneficiaries to decide on programs that suited their socioeconomic and environmental concerns.

The NDF has over eight years' experience in planning, implementing and evaluating several regional development projects. The magnitude of its projects, however, is small compared to that of other interventions as it has only tried out a series of pilot or preliminary programs. Nonetheless, the impact of these projects has created a certain positive reputation among the rural development and academic circles. The NDF's development program has been reviewed recently by several agencies and individuals. Apart from the donors' reviews, Jayantha Perera has carried out an appraisal in 1988 as a sequel to his Appraisal of the Small Tank Rehabilitation Program of FFHC (Perera 1987). At the IIMI/ARTI Workshop on "The Role of NGOs in the Improvement of Minor Irrigation Systems in Sri Lanka" too, NDF's strategy was presented and discussed as one of NGOs directly involved in irrigation improvement (Magedaragamage 1989). At the same Workshop Kapila Vimaladharma (1989) presented a paper comparing the strategies of FFHC and NDF in the renovation of village irrigation schemes.

The renovation of minor tanks in Kurunegala and Puttalam districts has been one of the six projects NDF identified in carrying out its rural development program. This tank renovation project was funded by the Australian Freedom From Hunger Campaign (AFFHC). In 1984, NDF selected 16 minor tanks in Kurunegala District for renovation following its development strategy which is given in Appendix V.

PERFORMANCE

Out of the 16 tanks selected for its pilot project in Kurunegala District, NDF had completed the renovation of 10 village tanks by the end of 1989. A total of 172 farm families had benefited and 88 ha (218 acres) had been irrigated by the project. The NDF's tank renovation project had increased the total irrigable area under each tank by 10-25 percent. The command area of these 10 tanks ranges from 2.8 ha to 15 ha (7 to 36 acres).

Farmers' organizations have been formed for each tank and a "Small Farmer Federation" for all project tanks had been created to cope with the

overall operation and maintenance of the renovated tanks and for the socioeconomic benefit of the farm families. The value of farmers' contribution toward the renovation of these tanks had amounted to US\$3,275 (Rs.98,000) of which US\$2,600 (Rs 78,000) was in cash while that of DAS had amounted to US\$10,000 (Rs 300,000) for services and supplies. The NDF's contribution from AFFHC funds had been a little over US\$40,000 (Rs 1.2 million). Thus, a total of about US\$53,500 (Rs 1.6 million) had been spent for the pilot project. If this amount is taken as base cost, pro-rata cost is US\$608 (Rs 18,200) per ha and the project had spent US\$310 (Rs 9,300) per farm family. The NDF's future programs will be based on the experiences of the pilot project and will be used in other districts including Kurunegala and Puttlam.

THE DEGREE OF SUCCESS

The NDF had developed a strategy superior to AFFHC's strategy. It had made efforts to overcome shortcomings of the latter. There were at least three elements which were more progressive than other interventions of improving the village irrigation systems:

- a) The renovation program was totally planned, designed and implemented with the actual participation of the beneficiaries; this is not seen in any other strategy.
- b) Manual labor as well as machinery for construction work were used for making the best use of available resources.
- c) Flexibility in planning and implementing the program was decided by the beneficiaries, in contrast to blueprint programs of other organizations.

The project is reported to have been completed in two phases, one in 1984-85 and the other in 1985-86. After renovation of these tanks, farmers were made the operators under the farmers' organization. The DAS and NDF gave the necessary support for system management. The farmers faced a severe drought in 1986 after this renovation. Because they had consumed their seed rice for food there was a shortage of seed rice for the 1987 yala. The NDF organized additional funds from the Oxford Committee for Famine Relief (OXFAM) for credit to the farmers for inputs for the coming season through the Small Farmer Federation. The Small Farmer Federation has managed to

collect loans after the harvest; a few farmers could not pay **back** the loans and they were not eligible for further loans.

Farmer groups were organized, a group fund was established, and sub-committees for different activities like water management were formed. This process has helped farmers to elect their farm leaders, to enact a constitution for the society, to open a group **bank** account, and to discuss their needs and problems with NDF and other agencies. The group funds have been increased and are used for annual maintenance **work**. Although the drought of 1986 hindered some anticipated benefits, beneficiaries of this project have organized themselves to build credit and marketing institutions to ascertain their own capability to achieve their socioeconomic objectives. **As** a result, there is self-confidence among farmers in using their own resources in a place where people were not aware of such resources earlier; there is a sense of responsibility and community consciousness in a place where beneficiaries themselves used to damage the bund and channel for illegal water-tapping; there is at least one crop of rice or alternative crops with assured water supply in **the** rice fields where even a maha crop was not possible for the total command area for several years; and more land could be brought under cultivation (Perera 1988).

As an overall impact of the above project benefits, the average yield of unmilled rice per acre has increased from 1,800 kilograms per hectare (kg/ha) (35 bushels per acre) to 4,640 kg/ha (90 bushels per acre) according to the project evaluation sources (ibid). Whenever the entire command area cannot be cultivated owing to climatic conditions (reduced rainfall during the dry season) the farmers begin to cultivate on the *bethma* system or to go for other field crops. This type of group cultivation arrangement could only be possible by a communal decision-making mechanism, which has developed through NDF's strategy. **As** it appears at present, the established positive features of NDF, namely, group discussions, group activities, communal consciousness, sense of responsibility, sense of ownership of the system, financial and physical resources mobilization among themselves, leadership building, mutual help, and adaptation to agricultural innovation have bound the irrigation systems together. The Small Farmer Federation which is the umbrella organization of the ten groups of farmers has been functioning as a mechanism for continuous system operation. The ability of this type of organization to sustain a system without falling is something that should be evaluated when the project becomes self-managed in another few years.

CHAPTER 8

Farmer First and Farmer Last: Conclusions and Recommendations

THE ALTERNATIVE STRATEGIES reviewed in the previous chapters have developed their own different intervention approaches and methodologies to reach almost the same goal, namely, improvement of small irrigation systems in Sri Lanka to increase the income level of the beneficiary farm families.

CONCLUSIONS

Several conclusions could be drawn from the comparison of these major government and nongovernment interventions for minor irrigation:

- a) Minor irrigation systems with limited catchment areas in the dry zone suffer more from lack of adequate water to support the earmarked command areas even in the maha season than those in the intermediate zone; this has partially contributed to failures experienced by ADZAP and FFHC in Anuradhapura District, apart from their design and implementation deficiencies.
- b) Generally, the IRDP minor irrigation component has been successfully incorporated into other supporting services involving all the relevant agencies so that project coordination has become more effective than either in VIRP or in ADZAP.
- c) Administration at district level has caused easy implementation and monitoring compared to centrally controlled projects.

- d) More problem-oriented irrigation projects (like in HIRDP's tank-based settlement clusters) could be implemented as an outcome of the rolling planning strategy of bilaterally funded IRDPs.
- e) Coordination among agencies as well as between farm families and agencies is easier at district level than in the centrally coordinated projects like VIRP.
- f) Participatory system management is within the reach of IRDPs whereas the centrally controlled top-down strategy (VIRP) is more bureaucratic, obstructing farmer participation at initial stages (e.g., HIRDP has managed to implement a successful Water Management Program in the majority of the rehabilitated tanks).
- g) Although ADZAP was district-based in theory, it could not achieve the successful results of IRDPs in practice, partly due to the fact that the project was managed centrally by the Ministry of Agriculture which did not have experience in implementing an irrigation-cum-settlement project, and partly due to the poor degree of monitoring of the project activities.
- h) The high degree of politicization in ADZAP as a result of the in-built weaknesses in project planning and implementation has caused a negative impact on the selection of tanks and farmers.

The development components of the alternative strategies are compared in Table 1 whilst qualitative development indicators are compared in Table 2.

The top-down approach of varying degree is a dominant feature in all state interventions while FFHC and NDF have a nongovernmental approach. In origin and administration, FFHC too is close to being a state intervention but it has developed an NGO strategy as most of its donors are also well-known NGOs. All the state interventions have a direct style and FFHC has adopted an indirect style as beneficiaries are consulted through *wew-sabhas*. The NDF has gone even further, adopting a catalytic style of intervention by its "change agent" approach.

Farmers' mobilization in blueprint-type World Bank and ADB funded programs is very poor resulting in little farmer participation throughout the process. The rigidity of the "blueprints" in VIRP, the Kurunegala IRDP and ADZAP has failed to place the farmer first. Some of these strategies have made unsuccessful attempts to mobilize farmers at the latter part of the project, which have proved impracticable. With their high degree of flexibility, the strategies of HIRDP and NDF have proven that a correct approach of

Table 1. Alternative strategies: Comparison of development components.

	VIRP (1)	IRDP (2)	IRDP (3)	DZAP (4)	FFHC (5)	NDF (6)
No of schemes						
- planned	1,700	500	19	132	222	16
- completed	1,489	4.53	18	87	135	10
Total cost (Rs '000)	900,000*	10,800	17,900	82,660	67,825	1,600
Pro-rata cost (Rs)						
- cost per hectare	45,000	9,590	18,500	59,000	15,415	18,200
- cost per family	29,030	4,410	14,600	95,665	21,800	9,300
lime span (years)	8	10	10	8	10	5
Development package						
- lowland/new (ha)	e.v.	e.v.	0.8	0.4	0.8	e.v.
- highland/new (ha)	nil	nil	0.4	1.2	0.6	nil
- water management community activities	yes no	yes no	yes yes	yes yes	yes yes	yes no
No. of beneficiaries	31,000	25,000	1,385	4,000	3,089	172
Area developed (ha)	20,000	11,554	1,682	6,480	4,390	88

Notes: e.v. = Not applicable as extent varies

*Including expected cost for final year [1990]

†KIRDP = Kurunegala IRDP.

Sources: Irrigation Department. The IRDP office, Kurunegala. The IRDP office, Hambantota. The Sri Lanka National Freedom From Hunger Campaign Board. The National Development Foundation. The Ministry of Agricultural Development and Research.

farmer mobilization, to get them to participate in the overall process of problem identification through self-management, is the key towards sustainable system management. In other words, farmers have to be put first for their direct involvement since O&M and self-management have to be achieved in the sphere of village irrigation. What has happened in blueprint, centrally controlled, bureaucratic-type strategies is that as soon as assistance is withdrawn there is a deterioration of improved components, as no mechanism has

Table 2. Alternative strategies: Comparison of qualitative development indicators.

Strategy indicator	VIRP	KIRD P	HIRDP	ADZAP	FFHC	NDF
a) Pre-project condition	working	working	abandoned	abandoned	abandoned	working
b) Nature of intervention	State	State	State	State	NGO	NGO
c) Style of intervention	direct	direct	direct	direct	indirect	catalytic
d) Farmer mobilization**	poor	poor	moderate	poor	moderate	good
e) Farmer participation**	moderate	moderate	good	poor	moderate	poor
f) Resource mobilization	external only	external only	external only	external only	external & local	external & local
g) Flexibility	low	low	high	low	low	high
h) Management	central	district	district	district	central	local
i) Donor influence	high	high	moderate	moderate	low	low
j) Bureaucratic control	high	high	moderate	moderate	moderate	low
k) Existence of ongoing monitoring/evaluation	high	high	moderate	moderate	low	low
l) Orientation	project	project	target area	project	project	target group

* KIRD P = Kuru rala IRDI

** Based on the qualitative analysis of previous studies: i.e., Abeyratne 1986 Medagama 1986, Perera J. 1987 & 1988, and Ekanayake et al. 1990.

been developed to make farmers the managers of their systems. Seeking the farmers' participation merely for the Water Management Programs at the tail end of a project would not be adequate, owing to the fact that by the end of the program these strategies have created a high rate of dependency on the state, instead of a sense of ownership among farmers. These strategies have thus failed to show sustainability which is the "penalty" for putting farmer last.

Another feature of a flexible type of intervention is that its management is more decentralized to district or project level, and it is more target-group

or target-area oriented. This is quite opposite to the blueprint-approach where projects are carefully controlled resulting in a high degree of bureaucratic procedures; furthermore, donors have an "upper hand" to control the project activities, whereas target-oriented projects have a higher degree of freedom and flexibility to plan the project and funds to suit the needs of the beneficiaries.

One positive feature adhered to by the state strategies is the presence of a mechanism for ongoing monitoring and evaluation. This has not been made a condition for NGOs. The NDF has developed a kind of feedback through its coordinators for monitoring purposes but it is not adequate. The FFHC on the other hand, being a government organized NGO with a less-flexible program, has not developed an acceptable monitoring and evaluation tool, which in turn has caused overexpenditures and mismanagement to a certain extent.

The comparison shows that all the alternative strategies reviewed herein have positive as well as negative qualities. Although qualitative or subjective judgments have been made in comparing aspects like farmer participation and farmer mobilization, they have been derived from previous studies done by various authorities as indicated. The terms "good," "moderate" and "poor" have been used herein in a broader sense to distinguish the contrasts among the different strategies. What are considered as good or bad (positive or negative) qualities are in terms of performance, impact and system sustainability of village irrigation. The state intervention strategies with a blueprint-type approach in this context have more negative qualities than good qualities. And flexible, target- or problem-oriented strategies have more positive qualities as they have tried to tackle the most debatable problems of farmer mobilization and people's participation. This does not mean that these strategies are one hundred percent perfect or sound, but that their positive features could be made use of for a better strategy in the future for achieving "real" farmer-managed irrigation systems.

RECOMMENDATIONS

Based on the above comparison, certain recommendations are suggested for the better use of resources for sustainable management of village irrigation

systems in Sri Lanka. These recommendations necessarily call for further refinement based probably on specific action-research. The strategy/strategies that carried positive or negative elements for the recommendations made are indicated in parentheses.

* **Selection of systems and beneficiaries:** A situation report on real ground conditions based on unbiased surveys is desirable to select the most deserving systems and beneficiaries in order to avoid the political, bureaucratic and project biases; this should include an "application" process from the local farmers. In tank selection, selecting all the abandoned tanks (systems) in a catchment should be avoided as far as possible in order that the most feasible ones qualify in every aspect (positive: HIRDP, NDF; negative: ADZAP, FFHC).

* **Farmer mobilization:** The beneficiary farmers should be mobilized and involved in project activities from the very beginning of the intervention to ensure their confidence and active participation throughout the process; resulting in spontaneous "take-over" by the farmers themselves to continue the system management. A kind of "in-built" catalytic process is highly recommended in this regard (positive: NDF; Negative: VIRP).

* **Project designing:** During the design stage it is of vital importance to incorporate aspects like the size of the catchment area, the tank capacity and the duty, and the relationships among canal system, command areas and crop management (negative: FFHC, ADZAP).

* **Organization for planning and implementation:** To mitigate organizational, construction and water management issues that crop up during the planning and implementing stage it is recommended to establish a "vigilant implementation body" in the form of a "Reservoir Council" which should include farmer representatives and relevant officers of the agencies concerned; the present Reservoir Council should be given enough teeth to cope with the above issues (positive: NDF; negative: FFHC).

* **Integrated program planning:** To avoid risk of crop failure in unimodal rice-based agriculture, innovations for an integrated plan including crop diversification both in rice and rain-fed upland areas are required. Off-farm activities and community work should be included in any sustainable strategy (positive: HIRDP, FFHC).

* **Farmer participation in project activities:** Farmers and their families should be involved in project activities as a means of off-farm employment

during the construction period and to ensure their continuous adherence to the project so that they would participate in the Water Management Program and system management during the critical post-project period. The background should be such that the farmers should feel they are the dominant and integral part of the process and not mere recipients or dependents of a set of externalities (positive: HIRDP, NDF).

* **Land consolidation and regularization of ownership:** Whenever land tenurial and ownership problems occur in a project area, land consolidation and regularization of ownership are a prerequisite of an integrated approach. It has been found that ownership to a land block could do wonders to the farmers' lives and thereby to the related agricultural development (positive: HIRDP, FFHCJ).

* **Attitudinal change of officers for common benefits:** For better results of a project aiming at village irrigation improvement, the field-level officers should be dedicated and should always be flexible and humble to minimize the officer-farmer gap and to do away with the state "bureaucracy." Here the rationale is that the "officers should understand farmers fully" rather than the other way round (positive: NDF; negative: VIRP).

* **Ensure farmer leadership in the program:** Farmers should lead the Reservoir Committee and farmer leaders should be elected annually allowing new and young energetic farmers to participate in the management of the system and to generate group funds for the common benefits. This will help to eradicate the domination of the local elite in a program of common interest (positive: NDF).

* **Project management and coordination:** To ensure horizontal project coordination and to prevent top-down (vertical) management, subdistrict or project-level management with the representatives of beneficiaries is recommended. Linkages among all parallel agency people are desirable for coordinated activities (positive: HIRDP, NDF).

* **System sustainability:** Physical, institutional, and management sustainability of the system should be made an explicitly articulated objective throughout the project from the formulation to the "handing over" phase by a mechanism developed following the above recommendations.

In summary: the correct approach of a strong assistance strategy should include: 1) the careful selection of viable systems; 2) the building up of coherent farmer groups based on their needs; 3) the actual involvement of farmers in the design and implementation process; 4) the indirect and catalytic

nature of assistance to gradually minimize the dependency attitude: 5) the integration of irrigation system into a more "complete system" including the presently missing elements of diversified crops, nonirrigated agriculture, nonfarm activities, environmental considerations, and other socio-physical aspects of the community; and 6) the establishment of a kind of "farmer union" or "federation" to cope with their problems pertaining to system management, marketing and other institutional aspects, and social needs.

Although none of the strategies reviewed in this paper contains an acceptable in-built mechanism with all elements for sustainability, all of them possess one or more elements which need to be collected, integrated, refined, and tested toward developing such a mechanism for system sustainability in the context of Farmer-Managed Irrigation Systems.

There is no short-cut method for system sustainability apart from involving farmers to take charge of their systems throughout and after the intervention process. Farmers should be the "agents" for management rather than the recipients of bureaucratic directives.

APPENDIX I

Strategy of the Village Irrigation Rehabilitation Project

Introduction

ACCORDING TO THE Staff Appraisal Report (SAR) of the World Bank (1981), it was planned to rehabilitate 1,200 village irrigation systems, modernize 500 more similar systems, and promote systematic water management in the rehabilitated and modernized systems. The **VIRP** envisaged to encompass some 31,500 ha of irrigated land with the objective of increasing agricultural production and farmers' income. The number of farm families estimated to have benefited is 20,000-25,000. The **VIRP** has covered 14 administrative districts of Sri Lanka, most of which are in the dry zone with some extending their areas to the intermediate and the wet zones (Figure 2). In the rehabilitated and modernized tank areas the cropping intensity was expected to be increased from 82.5 to 116.2 percent, with an increase of 43 percent in per capita income.

The project **was** planned initially as a five-year plan from 1980-85 and subsequently its life **span** was increased by another two years up to 1987. The estimated project cost was US\$43.6 million (Rs 784 million) with main budgetary allocations for civil works, equipment, staff costs, training, evaluation, and technical assistance (World Bank 1981:27-37).

To achieve the objective of rehabilitating 1,200 village irrigation systems, modernizing 500 similar systems and promoting a systematic water management methodology, **VIRP** has developed a strategy including a set of special selection criteria, project planning, and a program for water management and maintenance.

Selection Criteria

In selecting tanks, emphasis was given to the rehabilitation of schemes with less investment to get maximum benefits and to enhance the performance of the system. The highest priority was thus given to minor schemes providing greater returns to improvement and repair and to those having any interaction between neighboring tanks in the catchment or between anicuts on the same stream; the lowest priority was accorded to long-abandoned schemes ("safe" systems) which required complete reconstruction.

The criteria developed are summarized below.

- a) Command area was to be not less than X ha (20 acres) unless a tank was in a cascade system where water flowed from one tank to another and improvements were required to provide safety for the system downstream.
- b) Systems in occupied areas with easy access were to be given priority.
- c) The useful storage of the tank was to be not less than 0.91 hectare-meters/ha (ha.m/ha [1.5 acre-feet/acre]), 0.76 ha.m/ha (2.5 acre-feet/acre) and 0.46 ha.m/ha (1.5 acre-feet/acre) of command area in the dry, intermediate and wet zones, respectively.
- d) The useful tank storage was not to exceed 70 percent of yield potential computed from the iso-yield curves of the Irrigation Department.
- e) The tank was to benefit at least 10 families.
- f) The area brought under direct main irrigation was to be at least ten times the privately irrigated submerged lands or three times the other cultivated submerged lands.
- g) The soils of the catchment area, reservoir and the command area were to be suitable for their respective purposes.
- h) The pro-rata cost at mid-1980 prices excluding price contingency etc., was not to exceed Rs 12,350/ha (Rs 5,000/acre) for existing areas and Rs 24,700/ha (Rs 10,000/acre) for incremental areas. These costs have been increased to Rs 21,600/ha (Rs 9,000/acre) for existing areas and to Rs 43,225/ha (Rs 18,000/acre) for incremental areas since 1986.

Project Planning

The project aimed to increase agricultural production and farmer income in existing village irrigation schemes by: i) rehabilitating village tanks and

anicuts; ii) strengthening the major government institutions involved in village irrigation; iii) initiating a systematic Water Management Program; and iv) establishing evaluation programs designed to assist project implementation and the preparation of further programs.

The project had three major features: a) civil works, b) operation and maintenance, and c) project evaluation and investigation.

The *civil* works component comprised rehabilitation of 1,200 schemes by the Irrigation Department entailing repairs to and remodeling of tank bunds, sluices, spillways, anicuts and irrigation distribution systems including field structures; modernization of working schemes by the Department of Agrarian Services (DAS) with a view to facilitating the introduction of the Water Management Programs; and provision of survey material during construction-maintenance, quality-control equipment and the necessary transport vehicles. Nearly three fourths of the total project costs came under this component of the Irrigation Department.

The *operation and maintenance* component comprised strengthening of the capacity of DAS to service the O&M of minor irrigation through incremental staff, equipment and vehicles; the introduction of systematic Water Management Programs on project schemes; and support for ongoing training programs in basic technical skills as well as management training programs.

The *project evaluation and investigation* component included monitoring of project impact on agricultural production by the DAS field staff and the Sri Lanka Freedom From Hunger Campaign Board (FFHC) with the Department of Census and Statistics; systematic data collection and evaluation programs by the Land and Water Use Division of the Department of Agriculture and regular socioeconomic evaluation studies of project impact by the University of Peradeniya.

The Water Management Program

The Water Management Program (WMP) was planned with the main objective of making optimum use of rainfall and stored water. The planned Water Management Program consisted of the following activities:

- a) Construction of field channels with control structures.
- b) Introduction of a rotational water supply system where appropriate.

- c) Plowing and sowing as early as possible in maha.
- d) Introduction of after-harvest plowing following either the maha or yala crop so as to keep the soil open for easier rainfall infiltration and plowing early in the following season.
- e) Operation of the sluice to ensure stored water would be used only to supplement rainfall during maha and yala, with the sluice closed when irrigation requirements could be met by rain.
- f) Closure of the sluice at night to prevent night irrigation.
- g) Introduction of a stand-by rationing system when stored water supplies would fall short of normal requirements.
- h) Promotion of short-duration rice varieties to reduce water requirements and to ensure an early harvest.
- i) Promotion of irrigated upland crops during yala wherever soils would permit it.

For the formulation of the Water Management Programs an Agricultural Planning Team (APT) was planned to be appointed for each project district. The APT was to comprise a Technical Assistant, an Agricultural Instructor (Agronomist) and a Divisional Officer (for institutional aspects). To ensure that physical improvements were consistent with operational procedure a preliminary Water Management Program was prepared even before the rehabilitation work was completed. This program was carried out by the Tank Committee. The relevant officer of APT would undergo additional training in water management, initiated and developed by DAS in consultation with the Department of Agriculture at the Maha Illuppallama In-service Training Institute. Emphasis was given to ensure cooperation and consistency between the Department of Agriculture and DAS training which included practical issues and extensive field practice on neighboring tanks.

The project proposed to cover schemes in convenient locations which would be selected during the early years in order to facilitate supervision by the limited DAS staff. The project planned to provide funds to DAS to undertake limited civil works necessary to modernize working tanks located close to the rehabilitated tanks of the project and they would be included in the Water Management Program. This type of modernization of working tanks would cost Rs 50,000 per scheme (at 1980 prices) and some 500 schemes were earmarked under the project to be started from 1983, allowing time for water management organization of DAS to be established and to gain the much needed experience on the rehabilitated tanks by the civil works

program of the Irrigation Department. For the other rehabilitated schemes (not located in convenient locations), the water management improvement proposed (e.g., early plowing, closure of sluice when it rained, etc.) would be implemented by the farmers themselves with the help of DAS and Department of Agriculture field staff (CO & KVS). The DAS would also be responsible for undertaking maintenance and repair work where such work was beyond the capacity of the farmers. The normal allocation limits for such minor works have been increased from Rs 50,000 to Rs 100,000 per scheme. The DAS would also be equipped with the necessary machinery and personnel to meet maintenance and emergency requirements of minor constructions.

APPENDIX II

Strategy of the Kurunegala Integrated Rural Development Program

THE VILLAGE IRRIGATION schemes project included the rehabilitation of some 500 village irrigation schemes comprising both tanks and anicuts. The project works included:

- a) Repairs to and/or strengthening of embankments.
- b) Repairs to sluice and spillway structures of the tanks and overflow structures of anicuts.
- c) Replacement of sluice gates for tanks and installation of new gates for anicuts.
- d) Desilting **and cleaning of field channels**. Further, the land clearing for any new areas brought under cultivation would be done by the farmers themselves.

A set of socioeconomic and technical criteria had been drawn up for selecting village tanks and anicuts for rehabilitation.

Criteria for Village Tanks

- a) The command area under each tank should not be less than 8 ha (20 acres).
- b) The useful storage of a tank should not be less than 50 percent of the yield potential.
- c) The tank should directly benefit at least ten families.
- d) The rehabilitation costs should not be more than Rs 7,000 per incremental irrigated acre (or Rs 17,290 per ha) at 1978 prices.
- e) The tank bed should not be of pervious soils, and the tank should have been filled at least three times in the **past 10 years**.

- f) The total area benefited should be at least ten times the privately owned land to be submerged, if any.

Criteria for Village Anicuts

- a) Catchment areas for an independent anicut should not be less than 1.0 square mile (2.6 km²).
- b) The distance between two anicuts on a stream should not be less than 1 mile (1.61 km) and the catchment area between two anicuts should not be less than 0.5 square mile (1.3 km²).
- c) The command area should not be less than 12 ha (30 acres).
- d) The anicut should directly benefit at least 15 families.
- e) The rehabilitation cost should not be more than Rs 7,000 per incremental irrigated area (17,290 per ha) at 1978 prices.

Lift Irrigation

The project also made provision for 20 traditional type motor pumping units of 6-inch size and 2 of 12-inch size for lift irrigation from perennial streams and other water bodies for relief during periods of unexpected dry spells. The locations for constructions of forebays and main feeder channels were along perennial rivers like the Deduru Oya and the Maha Oya.

Improved Water Management

All the rehabilitated village irrigation schemes (as well as major schemes) were included in the improved Water Management Program. The recommended method for village schemes was the highly successful model developed at the Maha Illuppallama Research Station over several years since the 1970s. This model emphasized the advantage of the cropping calendar, the avoidance of staggered cultivation, the use of proper varieties and the mobilization of

group action through education and training. The support to carry out this model under the project included construction of regulators, control structures, flow measurement devices, and equipment required for effective water management. Additional staffing for efficient water distribution and management was also provided.

APPENDIX III

Strategy of the Anuradhapura Dry-Zone Agriculture Project

THE ADZAP WAS designed to establish a technically viable and economically attractive farming system including irrigated rice and rain-fed upland crops. According to the report of the review mission of the ADB in 1986, the revised project **scope** included the following activities:

1. Rehabilitating **138** minor tanks (decreased from **600** tanks).
2. Providing agricultural infrastructure and extension for permanent upland farming and intensified irrigated lowland farming in 1,620 ha (4,000 acres) of command area (reduced from 8,100 ha [20,000 acres]).
3. Strengthening the livestock sector.
4. Providing agricultural support services.
5. Establishing a management unit for project implementation, coordination and monitoring.

The minor tank rehabilitation consists of two components, namely, upstream development and downstream development.

Selection Criteria

The ADZAP strategy included two types of selection criteria, one for selecting bunded tanks and the other for selecting farmers to settle in the new allotments associated with those tanks. The criteria of selection for minor tanks which were expected to have significant potential to support irrigated agriculture, were as follows.

- a) The command area of each tank should be greater than 8 ha (20 acres) with a storage capacity of 0.91 hectare-meters per hectare (**3** acre-feet per acre) of command.

- b) Existence of nearby settlements to provide services and a labor pool during the construction stage.
- c) The investment cost (pro rata) was to be a maximum of **Rs 37,000** (in 1982) per ha for upstream works (catchment, tank bed, bund, sluice spill) and **Rs 15,000** per ha for downstream development (land clearing, channel construction, and channel outlets).
- d) The internal rate of return for each tank was to be at least 15 percent per year.

In selecting settlers, the official selection criteria of the Land Commissioner's Department were to be followed. These required that the beneficiaries should be farmers who were: **1)** over 18 years of age, **2)** married, **3)** in residence in the area for over 7 years, and **4)** totally landless. The planned package of land for selected settlers under each tank was 0.4 ha (1 acre) of irrigated land and 1.2 ha (3 acres) of highland: the strategy was the assisting of chena cultivators to become permanent settlers mainly by allowing them to cultivate upland areas while the limited irrigated area was for subsistence.

The project design included several closely related activities which were the components of the agricultural infrastructure improvement. These activities were: a) land use planning and soil conservation; b) establishment of permanent upland farms; c) intensification of irrigated lowland agriculture; d) strengthening of the Maha-Illuppallama Research and Training Center; and (e) strengthening of the extension and establishment of demonstration plots. Being the most important aspect of ADZAP, proper land use planning was required at the levels of overall project design, village, and individual farm. Although the Project Appraisal Report is not very specific about land use planning for overall project design, it was implied that the final selection of tanks for rehabilitation must consider allocation of lands for major activities in the district. The land use planning at village level was a very specific requirement while at the farm level, allocation of lands for different cropping patterns to indicate land occupancy was also required (Somasinghe 1989).

A viable farming system was supposed to be developed as a key element under the project through the intensification of agriculture in the irrigated lowland area. The essential requirement for crop intensification was the saving of tank water for a second crop after the maha season by timely cultivation and the cultivation of suitable varieties for optimum use of the

maha rainfall. A project-specific Water Management Program was designed to achieve these objectives.

The rehabilitation process consisted of three components:

1. Upstream development work carried out by the Irrigation Department including surveying, engineering design, and repair and construction of tank bunds, spills, and sluices.
2. Downstream development work undertaken by the Department of Agrarian Services, including land clearing and construction of channel networks.
3. Implementation of 20 “pilot schemes” for water management. also undertaken by the Department of Agrarian Services.

APPENDIX IV

Strategy of the FFHC Board's Tank Rehabilitation Program

THE MAIN FOCUS of the rural development program of FFHC was on village tank restoration. The strategy adopted by FFHC to achieve its objectives has been: 1) the restoration of tanks which have been neglected over the years; and 2) the renovation of working tanks (*Purana wewas*) which are still supporting the traditional communities in the dry zone but are mostly in a state of disrepair. Due to the export-oriented commercial agriculture that prevailed among the dry-zone tank-based communities, subsistence agriculture was neglected and farmers tended to make a living by chena cultivation in areas where there were fertile permanent lowland and upland crops based on village tanks. The continuation and expansion of chena cultivation all over the dry zone have upset the ecological balance of the environment and have impoverished the land, resulting in shrub jungle and bare land in place of the earlier climax forests.

The FFHC's strategy centered on the belief that this adverse trend of chena cultivation can be reversed by the farmers themselves with a little guidance, technical training, and financial assistance in matters that are beyond their present capacity (Wijetunga, 1986).

Tank Selection

"The Board does not intend to implement a small wewa renovation programme of its own. Instead it enters into a partnership with the farmers living in and around the abandoned wewas by using the means of storing water as a focal point of rallying them into a wew-sabha (Reservoir Councils [sic])

and then helping these wew-sabhas to plan and implement their own development programmes. The Board set out in January 1979 to ascertain the magnitude of this programme and to build a fact-finding system which would permit people to plan such programmes and to organize the continued monitoring of their progress and achievements. As a first step the Board numbered all the wewas (reservoirs) which had been shown on the one-inch-to-one-mile (1:63,360) scale topographical map of the country.

“Over 18,000 wewas have been numbered almost all of which are in the dry zone. It was noticed that many abandoned wewas had escaped the notice of the topographical surveyor because they were covered in scrub jungle and were located in country infested with wild animals. When these are included, the total number of wewas and reservoirs will exceed 30,000. Of this number about 7,000 or nearly a quarter are still in working order and supporting wewa-village communities” (ibid).

The FFHC developed a selection process which began with the request from villagers for the renovation of their tank, and was complemented by a socioeconomic survey and a feasibility study before the preliminary selection was made. The availability of lands within the tank system was ensured after which a bund capacity survey was carried out before obtaining the clearance from the District Agricultural Committee and the Irrigation Department. After these technical stages a *wew-sabha* was formed when tank renovation or rehabilitation work commenced.

Restoration Process

Tank selection for the village tank rehabilitation program of FFHC was based on the objective of improving the quality of life of people living in areas outside the command areas of the major- and medium-scale irrigation schemes. The tank renovation program was coupled to wew-sabhas of the beneficiaries who took the lead in deciding their work plan for the development of their own community. The FFHC's general policy was the use of manual labor in the construction work which was the prime responsibility of the wew-sabha members and their families. The whole bund work was done in this manner and it provided an opportunity to the members to earn a living with

the attendant benefits of their own development. One half of the value of work was paid for (at Rs 40 per cube [100 cubic feet]) while the other half was considered as the farmers' contribution to tank restoration. During the first three months, each family could earn Rs 700 to Rs 1,000 through this labor-based construction work. It was hoped to motivate people for participatory development through this process.

The FFHC Board emphasized the importance of the ancient tank-based culture where practices such as the "three-fields" system were followed for centuries; it also emphasized the revival of such traditional agricultural and other cultural practices before going into modern technology. The three-fields system of ownership in the command area allowed the farmers to cultivate rice at least in one part of the aswedumized area which is divided into three fields during critical periods. The farmers would be entitled to an allotment in each of the three fields, — upper, middle and lower field of the command area — under which each family would get an allotment or *panguwa*.

The small tank rehabilitation process involved two important stages, reconstruction of the tank system and settlement of landless families under them. The rehabilitation was supposed to be organized by the participation of the Rural Development Society which was the village level nongovernment organization meant for rural development. One Rural Development Society normally represented more than one tank area or one hamlet. The Board, however, felt that the poorest of the poor farmers who were the target group of its tank rehabilitation program were not adequately represented in Rural Development Societies since the local elite were the office bearers, who were not generally interested in the upliftment of the poorest group. Therefore, to bring about the direct participation of the poorest farmers, the *wew-sabha* was established since 1980, making the tank the focal point of activity to harness the resources of all farmers. This reservoir council was similar to what existed in the ancient times but with modifications to suit the present context. The *wew-sabha* members would decide the construction programs and the settlement activities with the consent of the majority of the members. Some 200 such *wew-sabhas* were set up for the implementation of FFHC's tank rehabilitation program, based on a model developed in the Jhala Digana Tank village in Anuradhapura District (ibid).

Construction Stage

Restoration of some 200 tanks was the original target of the Board. These village tanks were located in 5 districts in the form of 10 tank clusters. The districts were Anuradhapura, Matale, Moneragala, Puttalam, and Trincomalee. The average cost of construction per tank was estimated at Rs 215,000 (in 1986) and planning, monitoring, and labor wages were to be met locally. The farmers were paid for their labor work at a rate of 50 percent of the total value of work on the basis of volume of work. According to FFHC's implementation guidelines for tank restoration, no type of machinery was used and contractors were not employed. The earthwork of each tank was done manually by the wew-sabha members and their families. This was practiced for two purposes:

- a) It enabled the participating members to earn a living while working for their own development.
- b) It helped to motivate the people and to prepare them to be active farmers in the management of their own lands and the tank system.

The tank construction comprised three major activities: a) the reservoir dam reconstruction up to a height of 9 feet above the spill level; b) the reconstruction of the sluice for controlled release of water; and c) the reconstruction of the water distribution system in order to ensure the equal distribution of water. The useful storage of the tank was expected to be 0.91 ha.m per ha (3 acre-feet per acre). The Board introduced the step-type sluice in place of the village-type sluice. It was also expected that the wew-sabha members would attend to the repair and maintenance work of the tank and channel system at all times after the restoration. The tank maintenance fund and "shramadana" (donations of free labor) were used for these post-project activities. Although the maintenance of a working tank was generally a responsibility of the Agrarian Services Department or the Irrigation Department, the Board made a "condition" that beneficiaries should maintain their own tank system.

The Board's strategy of land consolidation was to encourage wew-sabha members to relinquish their present ownership of land to the state and then to claim a package of land which consisted of 0.8 ha (2 acres) of rice land, 0.2 ha (0.5 acre) of homestead and 0.4 ha (one acre) of highland totaling 1.4 ha (3.5 acres) for each family. This was equal to or even more than the benefits

obtained from any land alienation process implemented under state intervention. Thus, FFHC provided a significant opportunity to each farm family, otherwise lacking landownership or a means of permanent livelihood, to have an economic unit of land. The total cultivable area including the lowland has been increased considerably. The expected average size of a tank area was 20 ha (50 acres) of irrigable land with a membership of about 25. But in the implementation stage, the size of an average tank area has been diminished. According to the recent assessment study done in Thanthirimale by IIMI, the average size **was** less than 8 ha (20 acres) with 10 families: there were some tanks with only 3 families having a command area of only 2.5 ha (6 acres). The range of irrigable area was thus 2.5 to 20 ha (6 to 50 acres).

The use of stored water in the small tank systems **was** meant to prevent crop failure during dry spells. Rain water was intended to be used for land preparation work, and tank water was not expected to be issued throughout the cultivation season as happened in major irrigation schemes. Prior to the main cultivation season and monthly thereafter, farmers of the wew-sabba were supposed to meet to plan the cultivation calendar under their tank and to decide the variety of rice grown and dates for fencing the perimeter. The farmers were also expected to plan and participate in the agricultural development in their homestead and market-gardens and to decide on the size of the livestock that each farm family could maintain.

Agriculture Support Assistance

Dispersed individual families dependent **upon** chena cultivation were expected to organize themselves into coherent groups under the wew-sabba to plan and manage their socioeconomic activities including community development and social welfare. In fulfilling these socioeconomic objectives the FFHC Board provided supplementary assistance like interest-free loans and agricultural inputs. Each wew-sabha cultivating rice was provided with a free sprayer for common use. The wew-sabhas were also encouraged to raise their own funds for necessary purchase of agricultural inputs prior to cultivation and store them in the room of the wew-sabha building, for the use of all farmers.

Agricultural development outside the tank command area was also well-planned by the Board, aiming at a balanced crop development. The homestead and market-garden farming (1.5 acres) were enhanced by providing assistance for a dug-well which may be used for supplementing irrigation for upland crops in addition to domestic use. The assistance for a well was Rs 6,000 which was an outright grant for each family settled under a tank system; it was paid both in kind and in cash.

In addition to tank restoration and other agricultural development activities, each wew-sabha was provided with a grant of Rs 65,000 for the construction of a permanent building; the bare-minimum equipment was also supplied to this building which was to be used for holding wew-sabha meetings and for storing agricultural inputs.

The FFHC's tank rehabilitation program was funded by four foreign agencies namely Welthungerhilfe, Switzerland Intercooperation, Australian FFHC, and Community Aid Abroad (Australia).

APPENDIX V

Strategy of the National Development Foundation

Tank Selection

THE CRITERIA FOR selection of minor irrigation systems included: a) the capacity of the tank; b) the economic backwardness of the community that depended on the tank; c) the farmers' desire for external help to improve their irrigation systems; d) the **lack** of help from any other source to renovate the tank; and e) the landownership pattern under the tank.

The specific objectives of the tank renovation project of the NDF were the following:

- a) To renovate village tanks with the help of the beneficiaries *so* that they would develop some sense of ownership of the tank and maintain it by themselves.
- b) To initiate and develop a suitable institutional arrangement which would effect a proper coordination system between farmers and government officials.
- c) To introduce modern agricultural techniques to farmer groups.
- d) To promote traditional practices of water management and related activities.
- e) To train a team of local youths as change-agents of agricultural development.
- f) To organize informal educational programs for farmers in irrigation water management.

These objectives were to be achieved following sequential stages of farmer mobilization. The NDF coordinators first approached the farmers to carry out preliminary investigations such as their socioeconomic background

and technical aspects related to the renovation program. The first step was to meet individual farmers to have a friendly dialogue leading to bringing them together into coherent groups. Then the group discussions were held to organize them into independent farmer societies, where a society fund was collected with farmers' contributions. This group-formation process took several months. The socioeconomic survey was then carried out, during which period free interaction took place between the **NDF** coordinators and the farmer groups. The technical survey was then conducted by the Technical Assistant of the Department of Agrarian Services with the farmers' participation which was particularly forthcoming in the tank bed, catchment, bund, and command areas.

Planning Procedure

On the basis of the information collected by these surveys, a report was prepared by the NDF coordinators with the assistance of youths who were selected to represent each tank for training as "change agents." They motivated the farmer societies to evaluate their own situation and to collectively discuss the project activities during the intervention stage. Because of this farmer participation at the initial and design stages, farmers were well aware of the tank capacity, the quantity of water each rice tract could receive, and the procedure of maintaining the catchment area as well as the other tank components.

The systematic procedure which included group discussions, youth training and informal farmer training would lead to introducing an effective Water Management Program under each tank. Supplementary to the overall program, the farmers appointed committees to implement the different programs for water management, down-stream development, catchment development and forest cover conservation. The farmer fund was created with the contributions made by farmers in cash or from their harvest in kind (0.5-1 bushel [10-20 kg] of grains). After the preliminary surveys, technical reports and visits by the Technical Assistant, a ratification meeting was held with the farmers and the technical officer to finalize the program with the beneficiary consent. Then the proposal was sent to the prospective donors through the NDF head office for funding. Once the project was accepted and approved, it was notified to the farmer organizations and to the implementing

agencies who prepared the detailed estimates for implementation. The work plan was drawn up to implement the renovation activities where responsibilities of farmers as well as agencies were clearly defined.

The Renovation Stage

Four groups of organizations were involved in the whole process of tank renovation of the National Development Foundation. They were: 1) the Tank Committee; 2) the National Development Foundation; 3) the Australian Freedom From Hunger Campaign [AFFHC]; and 4) the Government of Sri Lanka. As NDF had put farmers first, a prominent place was given to beneficiaries who were represented in the Tank Committee which was involved ~~from~~ the initial project identification to the post-project evaluation. Farmers were the informants to the Technical Assistants of the Department of Agrarian Services about water distribution difficulties. They contributed labor for rehabilitation and also shared a certain percentage of renovation costs with NDF.

The NDF had played the role of facilitator for the farmers' work, by motivating them into groups to plan the renovation programs, channeling the AFFHC's funds, and coordinating government assistance to the individual tank level. Whilst AFFHC **was** the chief funding agency for the project, the Government of Sri Lanka contributed its share by extending the services of DAS and the Irrigation Department for physical renovation of the tanks and institution building for the intended Water Management Program. The NDF had encouraged farmers through its experimental tenure project, to take over the operation and maintenance after rehabilitation and to generate a sense of ownership of the systems among themselves.

The pre-renovation condition prevented the cultivation of the total command area even during the wet (maha) season owing to defects in the ~~tank~~. Before renovation the tanks were typified by defects in sluice, heavy siltation, weak hunds and leakage of stored water. These defects resulted in reduced cultivation (between **1/4** to 1/3 of the total command area during the maha season). Most of these tanks did not have any yala cultivation for 25 years or so, owing to these defects. Under the drought relief program of the government, farmers of some of these tanks participated in the food-for-work type *shramadanas* for tank maintenance work in the late 1970s and early 1980s.

But there was no catalytic process to motivate farmers to rally into groups for achieving common goals.

The construction work started just after the action plan was approved by NDF and the farmers. The period of construction was usually the dry season, during which no cultivation was possible and the beneficiaries could continuously work in the tanks. The farmers participated in physical work which included clearing the tank bund and channel and all earthwork. The farmers accepted (as under FFHC) Rs 40 per cube (100 cubic feet), which is half the farmers' estimate of Rs 80 (the standard rate of DAS for the same was Rs 110). The remaining Rs 40 per cube was kept as the farmers' contribution for other costs. The filling, leveling and compacting of earth were carried out by using heavy machinery which is in variance with the FFHC approach. The farmers contributed money (from their earnings) to hire tractors to transport earth for bund filling. The DAS provided a tractor at a subsidized rate of Rs 375 a day for 15 days. The farmers filled the bund with the dug-out earth from the tank bed. They also attended to masonry work of the sluice and spill construction. The farmers contributed 50 percent of their total earnings while each farmer collected Rs 60-75 per day from the construction work.

Wherever the tank renovation called for extensive dredging (e.g., Mawathagama tank) NDF hired a bulldozer from DAS to attend to such heavy work. For this work farmers raised funds for fuel for the bulldozer and they contributed Rs 500 for each acre cultivated under a given tank.

During the renovation period, initially, the farmers received DAS-organized drought relief assistance while NDF paid the farmers their dues according to their work records as early as possible. In the renovation process resources received from all four parties involved were substantial. These resources included finance, labor, machinery, materials, and services. These resources with the sources are summarized below.

* **The Farmers:** Fifty percent of the value of the labor used for earthwork and periodic shramadana work; contribution from their saving stores and bank account, and money collected by selling the fish catch in four tanks.

* **The Department of Agrarian Services:** Services of the Technical Officers, without any service commission; provision of heavy machinery at a low charge; other general administrative and liaison services to resolve encroachment and other land matters with the Government Agent and the Land Commissioner's Department.

* **The National Development Foundation:** Being coordinator and facilitator in channeling finances and services from other agencies such as the farmer, the **DAS**, and **AFFHC**; and above all motivating farmers for resource mobilization and management.

* **The Australian Freedom from Hunger Campaign:** A fund of over Rs 1.2 million as the contribution channeled through **NDF**.

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