WATER MANAGEMENT AT KIMBULWANA OYA SCHEME

A Case of

Technical Leadership and Farmer Participation

Research Study No. 81

November 1987

AGRARIAN RESEARCH AND TRAINING INSTITUTE,
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FOREWORD

The Kimbulwana Oya Irrigation Scheme in the Kurunegala District has been cited as an example of a successful water management project, particularly in view of the fact that farmers and government officials worked as active partners in the participatory approach to water management in this scheme. More importantly, the project also shows that public officials, with a sense of dedication and commitment can catalyse an innovative role to develop a new style of management for irrigation systems. The ARTI initiated a study to examine the factors that contributed to this close co-operation between officials and farmers and to study the novel institutional mechanisms operating in the scheme in detail, with a view to distilling the salient aspects of effective water management under major irrigation systems in Sri Lanka.

The ARTI commissioned Dr. A.J. Weeramunda, Head of the Department of Sociology, University of Colombo to carry out this in-depth study in the Kimbulwana Oya as a special study under the USAID/ID/ARTI Gal Oya Water Management Project. This monograph is the outcome of that study. Dr. Jayantha Perera, Research Associate (formerly Head, Irrigation Water Management and Agrarian Relations Division), coordinated the study on behalf of the ARTI and edited the monograph for publication. Professor Norman Uphoff and Professor Walter Coward Jr. of Cornell University commented on the study in the different stages. I thank all of them for their valuable contribution.

J. Alwis
DIRECTOR

ACKNOWLEDGEMENTS

The research on which this report is based was conducted on behalf of the Agrarian Research and Training Institute, Colombo, between December, 1984 and May, 1985, as a special study under the Gal Oya Water Management project. I am grateful to the Agrarian Research and Training Institute for having provided me with the valuable opportunity of delving into this crucial subject, and to several colleagues including Dr. Jayantha Perera of Agrarian Research and Training Institute and Dr. Norman Uphoff and Dr. Walter J. Coward Jr., both of Cornell University, USA, for their insights into and comments on the material presented here.

A.J. Weeramunda

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INTRODUCTION

Apart from exogenous factors such as variations in climate or limitations in hydraulic technology, the management of water in the context of Sri Lanka's peasant agriculture could be expected to face several practical problems arising from socio-economic factors including the diversity in the size of holdings, the tenurial status of the cultivator, types of inputs he uses, and his social, political, and cultural background. Added to this diversity, which calls for constant checking and re-checking of amounts of water issued, and the timing of water issues, management has to contend with the fundamental fact that the peasant cultivator is primarily interested not so much in the common good as in his own individual plot, and in maximizing his returns from it.

Diversity and individualism among peasants lay at the heart of managerial problems experienced at the Kimbulwana Oya Scheme (hereafter, the KO Scheme) from its inception in 1956. The Scheme, situated in the Kurunegala District (Northwestern Province), has a capacity of 5100 acre feet and provides water for about 2000 households. Unsatisfactory water management prevailed till about 1980 when the KO Scheme underwent physical rehabilitation through World Bank funds administered under the Kurunegala Integrated Rural Development Program (KIRDP).

Along with physical improvements of the irrigation system, the KO Scheme witnessed the launching of a social experiment in water management which was initiated by government officials at the local-level. These officials, who worked in collaboration with farmers and farmer representatives, introduced a set of institutional mechanisms that have taken water management in a positive direction, a fact which merits attention in view of the problematic aspects attributed earlier to the Sri Lanka peasant context.

Objectives of the Study

The objectives of this in-depth study were:

a) to describe and analyze the current water management system with a view toward elucidating factors contributing to its success;
b)to determine the extent of farmer participation in water management, and how this participation has been achieved, laying particular emphasis on community development activities and their impact on water management;
c) to examine the strengths and weaknesses of the system at present, and
d) to indicate what problems remain and to suggest steps for remedying them.

Methodology

The approach adopted was that of a case study, and sought qualitative and quantitative data on a variety of aspects including history, ecology, physical setting, social organization, land ownership and land tenure, agronomy, employment patterns, off and on farm water management, leadership, and local-level politics.

Data Collection

Data were obtained from several different sources.

a. Secondary sources: (e.g. records of weekly meetings of the Water Committee, and records of Colonization Officer (CO)[1] relating to land ownership and water management.

b. Structured questionnaire: The questionnaire, administered to a stratified random sample of approximately 10% of farmer households, sought responses to standard topics such as age, sex, educational level, occupation(s), family size, and caste status of household head.In addition, information was collected on land ownership, types of crops grown, inputs used, expenditure and income relating to crops, whether they received water on time, whether they received the amount of water required, whether there were conflicts among farmers, and between farmers and officials over water, farmers' opinions on water management, extent of indebtedness, and farmer participation in associations and societies in the community.

c. Interviews: Data were also collected through informal interviews with farmers and with water management officials.

d. Participant observation: This was made possible by having two research assistants reside at the scheme and keep a record of their observations.

Sampling

Three categories of settlements were taken into consideration for sampling purposes, namely, (i) the colonization scheme proper, (ii) encroachments on protected areas within the colonization scheme, and (iii) traditional villages. Although farmers in all three categories of settlements received water, preliminary investigations revealed that there were differences in land tenure, location, accessibility to water, and social background according to type of settlement. Existing administrative boundaries within each category of settlement were also used to distribute the total sample size on a proportionate basis as follows:

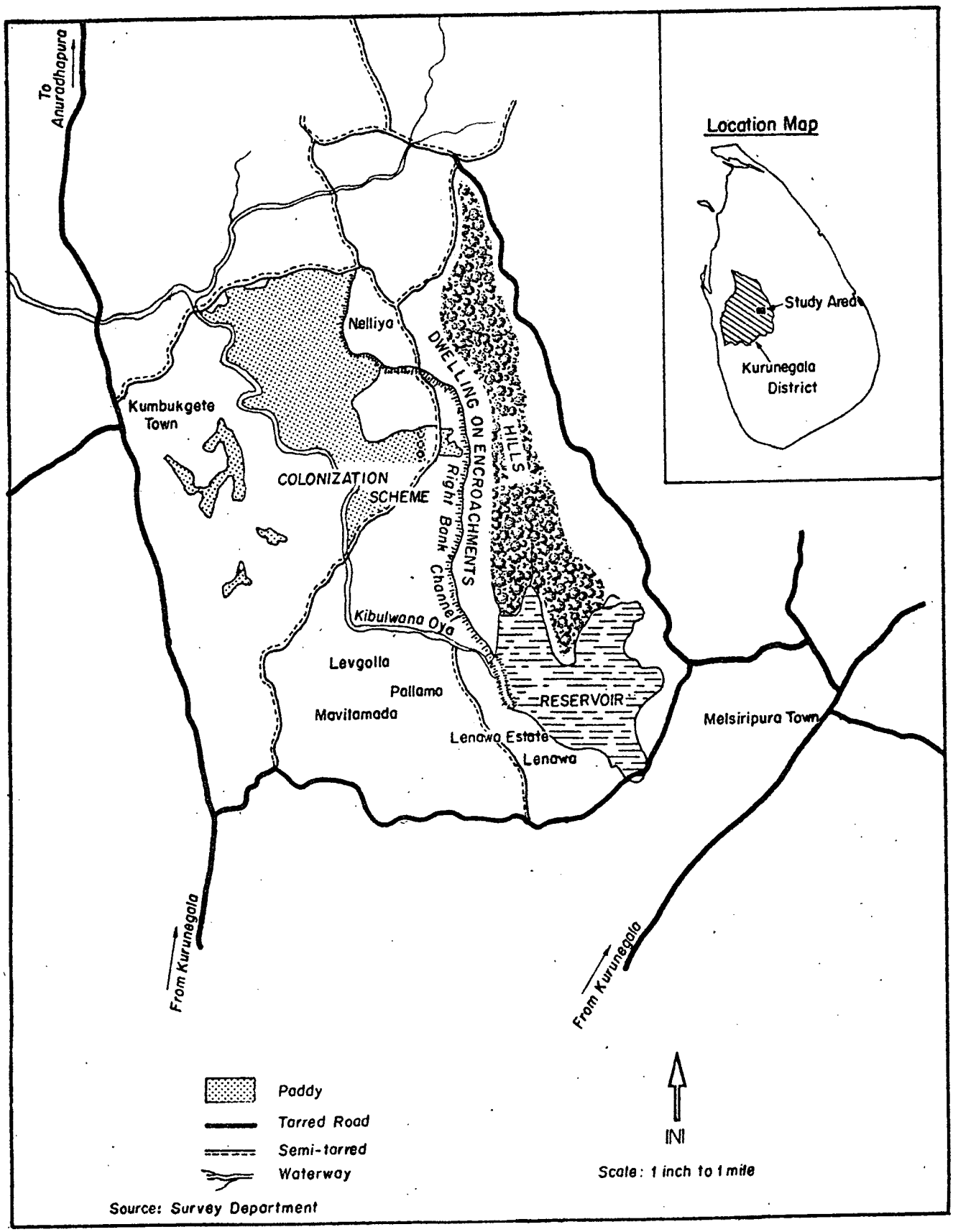
Category of Settlement			Number of Households Sampled	Total
1. Colonization Scheme:				
(i)	Unit 1		14	
(ii)	Unit 2		22	
(iii)	Unit 3		21	57
2. Encroachments:				
(i)	Unit 1		5	
(ii)	Unit 2		14	
(iii)	Unit 3		73	92
3. Traditional Villages:				
(i)	Right Bank:	Nelliya	18	
(ii)	Left Bank:	Ganegoda	1	
		Levgolla	7	
		Malasnawa	9	
		Mawilamada	8	
		Pallama	4	47
			Total	196

Setting

The KO Scheme is situated 16 miles north of Kurunegala town. The main approach to the scheme is a five-mile stretch, partly tarred and partly gravel, heading west and starting about a mile south of Melsiripura town situated on the Kurunegala-Dambulla road. This access road winds through the village of Lenawa, the Lenawa coconut plantation, and along the dam of the KO reservoir. The scheme can also be approached through a gravel road from the town of Kumbukgete on its western side (See Map 1)

The reservoir, regarded as a creation of Mahasen, a Sinhalese monarch of the 4th Century A.D., probably constituted a link in a chain of many reservoirs, both great and small, forming the backbone of the country's hydraulic civilization which flourished in the North Central Province from about the second century B.C. upto the thirteenth century A.D.. As Sinhalese monarchs of subsequent periods moved their citadel to the southwest, particularly as a result of invasions from South India, the vast irrigation networks also fell into decay. Interest in the restoration of these irrigation works and re-settlement of the depopulated Dry Zone was initiated during the period of British colonial rule (1815 to 1948) with the setting up of the Central Irrigation Board in 1897, and rigorously pursued during the tenure of Hon. D.S. Senanayake as the Minister of Agriculture and Lands before the granting of Independence. Interest in the restoration of Kimbulwana Oya reservoir had been initiated by the late Sir John Kotelawala, then member of Parliament for the electorate of Hiriyala, following independence in 1948. Settlement of the first batch of 88 colonists from neighboring villages of mostly low caste (padhu) people were apparently rushed through to precede the crucial General Elections of 1956 as a vote-catching strategy for the United National Party (UNP). The UNP retained its seat in the Hiriyala electorate to which the Kimbulwana Oya area belongs although it suffered a massive defeat in the Island as a whole from the Sri Lanka Freedom Party (SLFP).

Map.1. Location of Kimbulwana Oya Scheme



Although the historical account is extremely abbreviated here, one cannot miss the long-standing connection between irrigation and power politics. In ancient as well as in modern periods of Sri Lanka's history, irrigation and settlement have served as mechanisms for extending state power into the countryside, and for harnessing water and people to serve the interests of the State. Kimbulwana Oya Scheme was no exception, for its restoration brought in its wake bureaucratic officials and a new system of bureaucratic supervision and control of peasant life. Land and water were no longer free resources, but were administered by such officials as the Colonization Officer, an employee of the Department of Lands, having authority over practically every aspect of colonists' lives.

The KO Scheme has undergone several changes since its inception. Within the past three decades, the population of the colonization scheme grew steadily through natural increase and in-migration from the surrounding countryside so that the present population is 4430 persons. A corresponding increase took place in the extent of paddyland as seasonal migrants and second-generation colonists encroached on prohibited areas and converted them into paddyland, thereby adding 300 acres to the original extent of 816 acres in allotments to colonists. In 1977, the government raised the level of the reservoir from the original height of 14 feet to 18 feet, and thereby increased the irrigable extent from 1000 to 1200 acres. It needs to be noted that the area actually irrigated today exceeds this amount by 450 acres, an anomaly arising from a decision, made in 1960, by the Department of Irrigation to provide water to paddyland in the surrounding traditional villages of Nelliya (with 284 acres) and villages on the Left Bank (with 250 acres). The villagers had petitioned the government for water through the local Member of Parliament, and political considerations such as winning votes appear to have dominated bureaucratic rationality. For, in giving water to the surrounding villagers, the pressure on the limited supply of water in the reservoir was stretched beyond its limits.

Farmers use reservoir water for cultivating paddy during both Yala and Maha seasons. They do not use this water for cultivating highland crops

such as chillies, manioc, banana, and vegetables. Usually, highland cultivation depends on rain-water, and is situated in half to one acre encroachments made on the hillsides along the reservoir or paddy fields. The residential allotments in highland (1 acre in extent for colonists) are almost always cultivated with coconut trees which yield a little income and also contribute to the daily diet. The highland allotment also serves as a tethering place for a pair or two of buffaloes and/or local breeds of cattle, the former being indispensable for the ploughing operations of the average farmer, those who own or can afford to use tractors are a handful[2].

Though somewhat isolated, the KO Scheme has a minimum of infrastructural facilities. Transport to town and back is partly by a Transport Board bus service which takes a circular route from Melsiripura town to Lenawa village to Kumbukgete town. From there, the service enters the KO Scheme through the village of Nelliya, and heads back to Melsiripura town along the Scheme's semi-tarred roadway. This is done usually three times a day, and villagers also use tractor-cum-trailer method of transport whenever such a vehicle goes to town. Melsiripura has an assortment of grocery stores, roadside restaurants, bicycle repair shops, a private doctor's office, a post office, and a bus station. The KO Scheme has its own post office, a government dispensary with a resident apothecary and dispenser, and two government schools providing an education up to the 12th grade. From 1981, the Scheme came under the patronage of the International Human Assistance Program (IHAP), a world-wide organization based in the United States, and providing funds for small-scale, self-help activities usually not covered by large aid programs. The IHAP has a project manager who lives in the Scheme. It has begun a variety of community development projects which include converting an unused government building constructed ten years ago for a market place into a nerve center for community development activities. This building now houses various training and employment projects such as sewing, cookery, coirwork and ekelwork classrooms, masonry and carpentry training workshops, a bank, and a library. The IHAP has also helped farmers to construct two anicuts, thereby helping to irrigate an additional 30 acres

of paddy. It has also re-built some roads and canals with contributions in labour made by the villagers. Recently, it donated a weeder, a sprayer, and a tape measure each to the eleven farmer representatives working in water management.

Activities of the IHAP complement spontaneous and occasional self-help projects which groups of villagers initiate through the various associations and societies to which they belong, such as Rural Development Societies, Credit Societies, Funeral Aid Societies, and those associated with Buddhism which is the religion of practically every villager in the Scheme.

Media and marketing provide some of the main channels of interaction with the external world. Although the area has no electricity, practically every house has a transistor radio, and a handful of the richer villagers own TV sets operated by car batteries. Two people are rich enough to own a motor car each which they hire out for emergencies such as taking the sick to Kurunegala Base Hospital which gets first preference by villagers when seeking treatment for serious illnesses. A car hire costs about 250 rupees and can be a drain on family finances. The area is also served by an outlet of the Co-operative Wholesale Establishment for the sale of fertilizer and purchase of paddy at the guaranteed price. In addition, there are about fifteen individuals who buy paddy from the farmers and re-sell it in the nearby towns. Weedicides and pesticides are not available within the Scheme and have to be purchased from towns. A private trader operates a store for the sale of fertilizer, and three others have mills for processing paddy.

Method of Presentation

The description and analysis of water management at KO Scheme will be presented as follows. Chapter II of the report will deal with a description of the salient features of the system of water management put into operation from 1980. Chapter III will examine the various factors that may have contributed to the efficiency and success of the water management

system from the perspective of both farmers as well as government and other officials involved. Attention will be given particularly to the systems of water management that prevailed in the past along with a discussion of their relative merits and demerits from the perspective of the present system. Chapter IV will go on to examine the limitations of the present system from the agronomic, economic, and sociological dimensions laying special emphasis on the lack of farmer participation and its implications for the long term viability of the water management system. Chapter V will examine types of rural leadership in respect of water management, in particular, and of village affairs, in general. Chapter VI summarizes the main findings and presents conclusions with a brief excursion into the possible ways for improving the present system of water management.

Chapter Two

CHARACTERISTICS OF THE WATER MANAGEMENT SYSTEM

The Water management system may be described with reference to two, interrelated dimensions,namely, physical and social.

2.1 Physical Dimension:

The physical system (See Map 2) consists of the main reservoir which is located within the catchment area for water accumulating through seasonal rainfall in the general region. The paddy fields are generally situated on the sides of undulating terrain lower in elevation than the reservoir. Terracing is the main type of land preparation, although many paddy plots are also found in the relatively flat stretches on the valley floor. Sandy soils predominate so that there is a high degree of seepage.

Main Channels

Water collected in the reservoir is issued to the outlaying fields through two main channels which are designated as Right Bank and Left Bank Channels and each equipped with sluice gates. The Right Bank Channel carries the greater volume of water irrigating about 85% of the total paddy acreage. The channel is situated along the sides of rocky outcrops forming the western boundary of the reservoir, and takes water in a northwesterly direction to the fields in the colonization scheme and the traditional village of Nelliya. The Channel, which is approximately 3 miles long, feeds three small reservoirs from which the Nelliya paddy fields are in turn irrigated. The Left Bank Channel, travelling a length of about one and-a-half miles in a southerly direction, feeds two small reservoirs which in turn irrigate the paddy fields in the traditional villages of Mawilmada, Malasnawa, Ganegoda, Lewgolla, and Pallama.

Off-takes

Each of the two main channels are punctuated by several off-takes which are equipped with cast-iron gates situated more or less equidistant from one another. These metal gates have replaced the wooden structures which had been installed when the irrigation system was first restored in 1956, and are a legacy of the physical improvements carried out under the KIRDP. The metal gates can be kept under lock and key by the officials concerned, thereby eliminating illicit tapping of water or taking water by force.

There are a total of 22 off-takes, 17 of which regulate water on the Right Bank Channel, while the remaining 5 are located along the Left Bank Channel. Of the former, 12 are situated along the main channel itself, and the other 5 are found further afield where the paddy acreage is so extensive that a single off-take from the main channel is not capable of supplying the required amount of water.

Field Channels

Field channels radiate from the off-takes in different directions, the length of each field channel being determined by the extent of paddy fields to be irrigated and the contours of the terrain. There are a total of 51 field channels, their length varying between 2 chains and 50 chains, in a few instances.

Outlets

Each field channel is connected to a paddy field through an outlet, which is usually a cement pipe about eighteen inches long and 4 inches in diameter. Each farmer has to purchase his outlet from the Department of Irrigation through the Technical Assistant, the field-level official in charge of irrigation matters. The flow of water through outlets is regulated by the method of stuffing them with a handful of straw. Excess water from each field drains into adjacent fields, and where there are none, into waste canals. These drain the water into the Kimbulwana River, which flows in a northwesterly direction skirting the entire stretch of paddy.

Measuring Poles

One of the improvements made through the IRDP was the installation of measuring poles near all off takes to enable farmers and officials to monitor the amount of water required for each issue and the amount discharged.

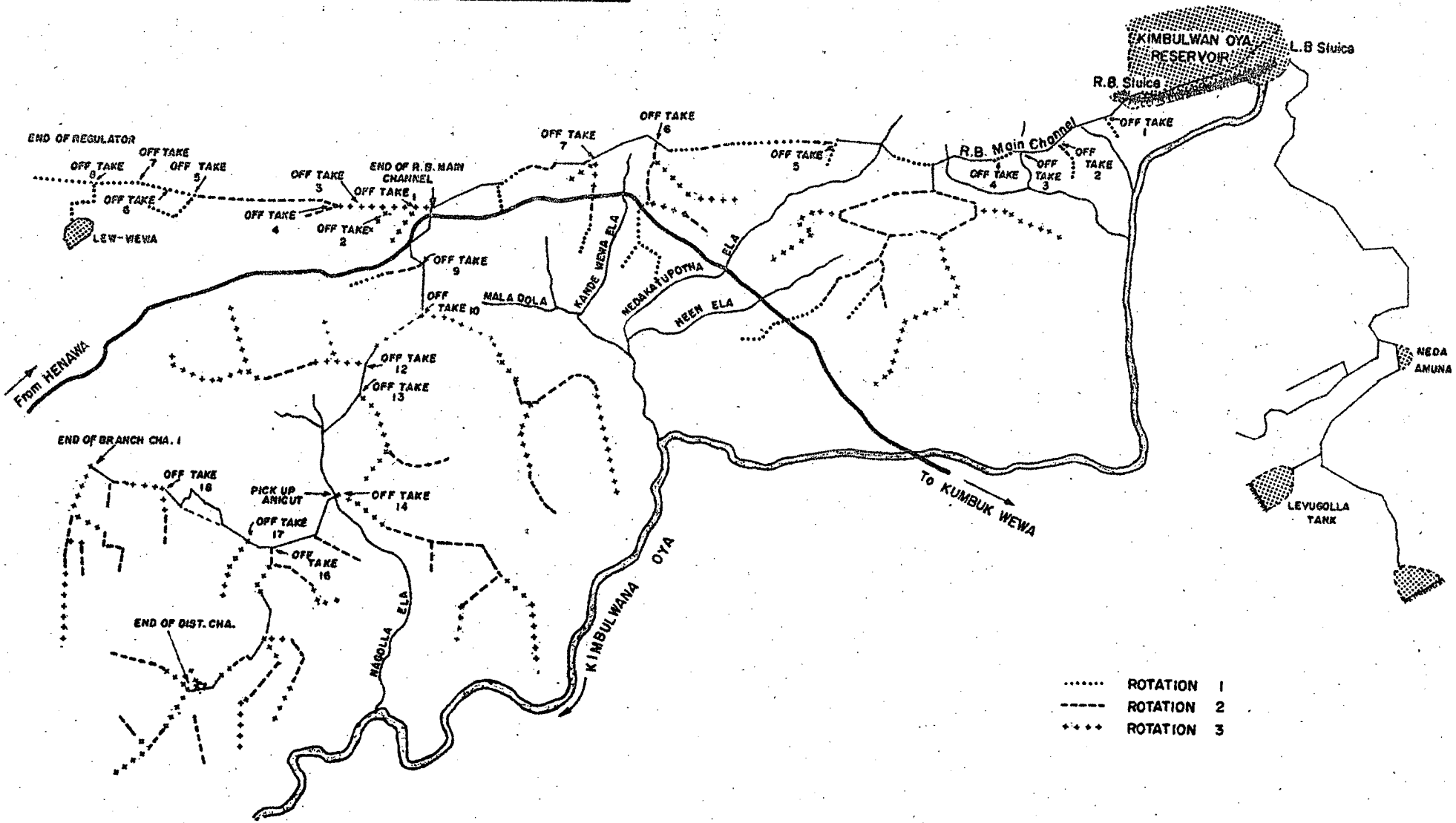
Taken ensemble, the physical system acquired some degree of complexity from the fact that the hydraulic structures, beginning from the dam and ending with the waste canals, follow the contours of the land. The field channels, for example, are not of uniform length of width. Each channel has a particular acreage to irrigate, and has its own peculiarities with respect to structure of soil and elevation. All of these physical variations call forth variations in the amount of water needed.

The implication of such a system, as sketched out above, for officials in water management are many. Ideally, they have to develop an awareness of the physical complexities and ensure that too much or too little water is not issued at any given time. Furthermore, slight changes in the physical system could occur when farmers try to make unauthorized extensions or modifications in the channels or indulge in illicit tapping of water. Continuous, extensive, and close monitoring of the physical system becomes necessary. This is virtually beyond the capacity of a single individual and requires instead a well-coordinated system of information-transfer among several individuals, each having specialized knowledge of different segments of the physical system. When variations in exogenous factors such as rainfall, type of paddy crop, size of holding, and cleaning of channels are also taken into consideration, the burdens on management become proportionately complex.

2.2. Social Dimensions

Even with the physical rehabilitation work undertaken by the KIRDP which included the renovation of the bunds along the main channels,

Map.2. KIMBULWANA OYA SCHEME



Source: Technical Assistant
Kimbulwana Oya Scheme

officials who were present at the time of rehabilitation were faced with the central fact that the amount of water that would accumulate in the reservoir from seasonal rainfall would not be sufficient to irrigate all the fields in the command area in Maha season and even a fewer number in Yala season. The problem of water shortage was not, however, one caused by climatic conditions peculiar to the area. The dramatic increase in the local population both through higher rates of natural increase as well as through in-migration caused expansion of the area under paddy. The surplus population began to make encroachments on areas prohibited for purposes of conservation, and to convert these encroachments into paddy land. In addition, various deficiencies, such as illicit tapping, poor maintenance of channels, and corruption in the system of management prevailing up to 1980 did not allow for a maximum use of the available supply of water.

Thus, it is very likely that the physical rehabilitation of the irrigation system, in and of itself, would not have solved the problems in water management. It is in this context that the social experiment initiated by a few local-level government bureaucrats has full meaning. These officials, working together with farmer representatives, formed a supervisory body or a managerial hierarchy which, in the course of the last five years, has acquired certain well-defined features.

The lowest rung of the supervisory body, which calls itself the "Water Committee" consists of 11 villagers elected by farmers as their "channel representatives" so that each represents the farmers cultivating along a given channel or set of channels. Technically, they are assistants to Cultivation Officers, the latter being salaried government servants functioning under the Department of Agrarian Services, and appointed for each Grama Sevaka Division to supervise extension work, water management, and cultivation problems in general. There are three such officers appointed to work in the area falling within the scheme. However, the elected

representatives of the farmers are informally referred to as Vidane or Vidane Mahattaya by both villagers and government officials showing a preference for the more traditional term reserved for Irrigation Headmen (Vel Vidane) of an earlier period; throughout this report, the informal term will be used in keeping with the spirit of popular usage.

Apart from the Cultivation Officers under whom the Vidanes function, the latter take directions with respect to water management from two other officials, namely, the Technical Assistant (TA) and the Colonization Officer (CO) about whom mention has already been made. Both these officials are roughly similar in rank although, in matters relating to water management, the former takes ultimate responsibility, while the latter takes the more formal role of serving as presiding officer at Water Committee meetings. The Committee meets every Tuesday to discuss and evaluate the water needs of farmers, decide on water issues, arbitrate disputes over water, and to take disciplinary action against farmers who violate the rules of water management.

It needs to be noted that, although the Vidanes are elected representatives, the Water Committee of which they are a part functions within an essentially bureaucratic and disciplinarian framework; it is within this framework that farmer representation and participation take place. Though the Vidanes represent farmers, they are, by and large, executors of the decisions and plans made by the higher-level officials. Thus, in the event of an overt conflict of interest or opinion between Vidanes and officials, the definition of the situation demands that the former will have to yield ground to the latter.

The disciplinary tenor of the social organization of water management was in fact set at the very inception of the new social experiment. The critical evolutionary step was the decision of the TA to demonstrate to the farmers that all the fields could be

irrigated using the available water supply as long as farmers adhered to certain rules. The TA's report[3] on the exercise indicates that considerable pressure had to be used to ensure conformity of the farmers even though it had become clear to the latter that the new techniques of water issue were effective. For example, ".....Vidanes ..... were asked to police the area during rotation issues. The procedure worked satisfactorily during day, but during night illicit tapping was being done by encroachers. The representatives do not (sic) police the area during the night for fear of reprisals" (Page 3). The methods adopted to ensure conformity were legalistic in nature, and consisted of negative sanctions, which are in force up to now, in addition to physical supervision and vigilance of officials. Farmers had complied at the beginning, but had protested when they saw the first signs of danger to their crops. The first reaction was panic. The TA's report continues: "They sent a petition to the GA (Government Agent, the chief administrative officer of the District) saying that they were not getting enough water .....

The investigators and the farmers were taken around the Unit 3 area by the Irrigation Department personnel to see if there are areas abandoned or with stressed (sic) crops but found none of it. It was then explained to the GA that this procedure is a must if the farmers were to take advantage of the limited available water. The officers were convinced and advised the farmers to adhere to the implementation practices of the Irrigation Department" (page 4, inserts and emphasis added).

It is evident, therefore, that officials of the Irrigation Department took on a parental and paternalistic role viewing farmers as people who were not quite aware of what was good for them. Officials also assumed that farmers' compliance had to be "secured" (term used in the TA's report) by enforcing a set of negative sanctions. For example, in an attempt to stop the grazing of cattle along the main channels, the TA decided to take the cattle to the

local Police station, and ".....it was found that it took very long to prosecute a case. Hence a system was agreed (sic) not to release the arrested cattle until the owner repaired the earthwork ..... On this method about 90% of the problems were solved" (page 5, insert added). Furthermore, when the report says that "the given instructions were rigidly implemented" (page 6), it states the literal truth, for the new rules were enforced unilaterally and without regard to the person of the offender. One of the well-known stories about this stage of water management history is about a traditional Irrigation Headman (Vel Vidane) who had to pay the penalty of repairing the earthwork for allowing his cattle to graze along the channel. Penalties were not only applied equally, but also applied swiftly.

2.3 System Management at Present

There is little doubt that the water management system, in spite of being an external imposition and legalistic in orientation, is efficient.

Its efficiency is based on:

(a) making maximum use of water available in the area including rainfall,

(b) reducing discord within the farming community, and

(c) providing water for all categories of farmers including those who have no legal right to water by virtue of being encroachers.

2.3.1 Maximizing Available Water Supply

The techniques adopted by the Water Committee to ensure the maximum use of the water supply are as follows:

(i) Water conservation:

This is primarily achieved through efficient use of rainfall. Rains occurring at the start of or during the cultivation season are made use of for ploughing and other operations requiring water. Thus, whenever rains occur, water issues are either reduced or stopped depending on the amount of rain received in the area. Another method is to delay the issue of water as much as possible to allow for the rain to fall; water is issued subsequently when it is certain that rains will be delayed indefinitely or that they will not occur. Although the Committee may decide beforehand that water would be issued at a certain time or on a certain day, the actual act of opening the main and secondary sluices by the Irrigation Labourer has to be authorized by the TA or by the CO if the TA is not within reach when an emergency occurs. The actual issues are, therefore, orchestrated by the TA who may even make a quick trip to the scheme on his motorbicycle or by a vehicle belonging to his Kurunegala office if rain falls at a time when water was to be issued; he gives instructions to the Labourer to reduce or delay the issue of water after consulting others in the Committee informally.

The need to make maximum use of rainfall has also led the TA and the Committee to advance the start of the cultivation seasons so that they coincide with the period of rainfall. Thus, from 1980, when the cultivation of both seasons began after rehabilitation work was complete, the Maha season had been advanced from October 10th (in 1980/81) to September 16th (1982/83) According to the TA and the CO, this practice has had the beneficial result of saving water for Yala so that water shortages are fewer in that season. According to them, a second advantage is that a "third" season of crop could also be cultivated before Maha using water remaining in the reservoir as was done after Yala 1983; farmers in Unit 3 (being closest to the reservoir) were given water to cultivate cowpea on paddyland after havesting the Yala rice crop. It is noteworthy that the amount of water saved in the reservoir has increased gradually from 450

acre-feet at the end of Yala 1981 to 1650 acre-feet at the end of Maha 1982 with a further increase up to 3000 acre-feet at the end of Yala 1982.

A second method of water conservation has been to issue the minimum amount of water required for cultivation operations. This amount is decided upon through discussion among members of the Committee. Measuring poles installed at off-takes indicate the minimum number of inches required for outlying fields. However, due to differences in soil composition or elevation certain fields may and do require more than the specified minimum. When farmers experience shortages for their individual fields, they have to request more water in writing through the Vidane who then meets the CO or the TA and obtain permission to release more water through the secondary sluices. Specification of a minimum thus serves an important purpose besides saving water: it promotes greater attention of the farmer on the water supply, and reinforces patterns of communication between farmers and officials.

The practice of issuing the minimum water has, of course, been realized through experimentation given the wide range of physical and locational differences among different allotments of paddy. For example, at the first trial held in 1980, it will be recalled how some farmers had panicked when their fields began to wither due to insufficient water and had sent a petition to the GA. Even today, there are some farmers who dislike the minute control of water through the method of using measuring poles, and refer to it as the "metric system of water control" saying it with an obvious tongue-in-the cheek. Such criticisms appear to stem from the fact that minimum water issues went against traditional cultivation practices such as allowing water to stand in the field once the rice was grown and was about to reach the flowering stage. The rationale behind this practice, which farmers referred to as "keeping the water tied up", was that the stagnant water would retard the breeding of harmful insects which would attack the rice plants when

they begin to flower. The Water Committee had decried this practice as a form of wasting water. Having stopped water issues, the Committee had also told the farmers that the old practice of storing water would lead to a waste of fertilizer which farmers would have applied during this period as it would get drained away when the stagnant water was released.

A third method of conserving water and avoiding waste has been to ensure the proper maintenance of the entire hydraulic system. For example, villagers reported that, prior to 1980, the main sluice could not be closed properly although water issues were supposed to have stopped; this led to a swift depletion of the stock of water in the reservoir. Although this defect had adverse consequences for most farmers in the scheme, it had brought benefits to people who cultivated vegetables and other highland crops (including tobacco) on the reservoir floor as this was extremely fertile due to the silt and mud accumulating from the runoff from surrounding hills.

Villagers also reported that some of these vegetable farmers had, on occasion, blocked the closing of the sluice gates by dumping huge granite stones. There was also the allegation that the TA of that era had allowed these practices to continue since he himself cultivated portions of the reservoir floor using hired labour, and had even received cash gratifications from those farmers.

One of the main achievements of the present system management has been the proper maintenance of the rehabilitation work completed under the KIRDP including not only the main channels but also the 11 foot wide strip of land along the main channels. This was achieved through several strategies:

(a) keeping encroachers out of the 11 foot wide strip by asking anyone violating the rule to abstain from it and using coercion and persuasion to obtain compliance.

(b) enforcing negative sanctions against those who cause damage to the main channels by allowing cattle to graze there or to bathe in the channels. Offenders are warned, and if they persist, they are asked to repair the bank of the channel by cutting a section of ground and applying it to the damaged area.

(c) exerting pressure on the farmers to clean field channels and make them free of weeds before the start of every season. Reminders are issued to those who lag behind through the Vidanes. One method of forcing farmers to comply is by not giving water to any user of a particular channel that is not entirely cleaned even if some have done their portion of cleaning. While this upsets the farmers who have dutifully done their share, the action of the Committee gets the message across. Where and when farmers do not comply (as it usually happens with allotments held by absentee owners who have taken lands on lease or mortgage), the Vidanes have no other option but get the channels cleaned using hired labour for which they can charge 4 rupees per every 1 1/2 foot from the farmer. There are a few Vidanes who prefer to clean the channels on their own when farmers do not co-operate perhaps because they prefer not to antagonize farmers by imposing fines or demanding payment.

(ii) Rotational Issue of Water:

The second technique for making maximuim use of the available water is through a system of rotational issues, being a result of innovative experiments carried out by the TA and the Water Committee. It was the TA's idea that the sandy soils predominantly found in the area allow a relatively high degree of seepage, and thereby not only involve a loss of the available water but also tend to deprive water to the tail-enders due to a reduced flow. As it was evident to the irrigation staff that the entire acreage within the command area could not be irrigated at one issue, it was decided to do it by portions. It

was found by trial and error that about 450 acres or a third of the total acreage could be irrigated at one issue. The next logical step was to create a system whereby there would be three separate issues of water for three sections in the command area and for every major step of cultivation requiring water namely, ploughing, planting, and fertilizing. The total acreage was divided into three, roughly similar number of divisions, each making up a total of 450 acres. Following traditional water management practice, water was first issued to the section farthest away from the reservoir, then to the section in the middle, and last to the section closest to the reservoir. Each issue of water lasted about 12 hours so that in the course of one and-a-half days the entire paddy acreage was irrigated. Furthermore, as a means of increasing the flow to ensure that all farmers obtained at least the minimum water, each of the three major sections was divided into two or three sub-sections depending on the acreage in each section, and water was issued to the subsections in the same order as mentioned for the major sections.

2.3.2 Reducing Discord Within the Farming Community

As a co-operative endeavour, wet rice cultivation requires consensus among farmers given the fact that they have to use a common resource, namely, water. Regulation of water needs communication, and for communication to take place, there has to be harmony. One of the positive outcomes of the new water management system has been the drastic reduction of the degree of discord and dissension that had prevailed among farmers earlier. The lack of water for cultivation as well as the absence of a well-organized management system had resulted in conflict, suspicion and open fighting among farmers, and even between farmers and officials. Many farmers referred to the fact that they had to lay awake at night in their fields during water issues to make sure that there was no illicit tapping along the channel.

By contrast, the assurance that water will be issued to every field has resulted in a much greater degree of harmony today. For example, of the 180 farmers who cultivated Maha and Yala season of 1983/84 (out of the total household sample of 196), an overwhelming majority (91%) stated that they had no conflicts with other farmers over water problems. Of the remainder who did have problems, 12 had to deal with illicit tapping by their neighbours, and 2 wanted to do illicit tapping but were prevented from doing so by their neighbours (see Table 1). A still fewer number (6%) stated that they had disputes with water management officials (4 over timing of water issues, 3 over insufficient water received, and 3 over illicit tapping by other farmers about which officials had not yet taken any action). As Table 3 indicates, a large majority of farmers (72%) expressed satisfaction with water management during Yala, and a still larger number (86%) for Maha. The fact that over three-fourths of farmers expressed satisfaction about Yala is an achievement for the Water Committee since Yala is the season known for water shortages.

Table 1 Farmers Having Conflicts with Neighbours Over Water

	No	%
Number stating "Yes"	16	09
Number stating "no"	164	91
	180	100

Table 2 Farmers Having Conflicts with Officials Over Water

Number stating "yes"	10	06
Number stating "no"	170	94
	180	100

Table 3 Farmers Opinion on Water Management

	During Yala		During Maha	
	No	%	No	%
Number satisfied	129	72	155	86
Number dissatisfied	49	27	25	14
Number undecided	2	1	0	0
	180	100	180	100

2.3.3 Providing Water to All Categories of Farmers

The ability of the water management system to incorporate all segments of the farming community has not only reduced discord among farmers but also contributed to the system's efficiency. As noted earlier, the availability of water and land in the area attracted large numbers of in-migrants who encroached on prohibited areas, and began to take water illicitly.

In addition, the water needs of traditional villagers living in the vicinity of the colonization scheme had also increased due to the increase of the village population and expansion of area under paddy.

The Water Committee overcame what used to be a chronic source of conflict and disharmony by issuing water to encroachers once they paid a fee of 200 rupees per acre. This would entitle the encroacher to receive a cement outlet, a visible symbol of formal membership in the system management. With more water being conserved now, the Committee gives permission to farmers who require additional water for highland crops or newly-opened paddy plots (usually on relatively high ground) to pump water from a nearby channel by paying 15 rupees per hour of pumping.

Chapter Three

FACTORS PROMOTING SUCCESSFUL WATER MANAGEMENT

In the foregoing discussion, attention was drawn to the disciplinary character of the management system with its tendency to emphasize the role of the government official as a supervisory agent having a paternalistic attitude to the average farmer. This has been evidenced in the conscious attempt to regulate and control behaviour of the farmers through a system of negative sanctions which have also brought about the desired result of compliance to the management system and to its hierarchy of officials.

The quasi- participatory character of this pattern of accommodation is reflected in the term "water control" used by officials and farmers alike when they talk about the present system as opposed to an older term "water distribution" which older farmers use when they talk about earlier systems. The latter term does not suggest the existence of a structure of authority and control which is implied by the former. Nonetheless, the tendency of the farmers in general to comply with the requirements and rules of the management system at present may be attributed to a complex of factors: (i) farmers perception of the present system as being more efficient than past systems and therefore more capable of delivering economic benefits, (ii) farmers perception of how officials carry out their duties, (iii)social, economic, and cultural characteristics of farmers and (iv) advantages accruing to officials in water management, and perception of their own role(s).

3.1 Farmers' Perception of Advantages

Farmers are keenly aware that the present system is a definite improvement on previous systems of water management, and to explain this point adequately it will be necessary to delve into the history of water management at KO scheme.

3.1.1. Historical Background to Water Management

The reconstruction of the KO reservoir had been specifically undertaken to settle landless villagers from the adjacent areas where people had traditionally depended on rainwater or, on occasion, water from deep wells to engage in cultivation of tobacco and vegetables on chena. Some villages like Nelliya were fortunate enough to have small, rain-fed reservoirs which could irrigate between 25 and 50 acres. Most other villages had to depend on rainwater to cultivate rice for one season namely, Maha. According to an older informant, people in his low caste padhu (or "menial worker" or padhu) village of Hipawwa could only cultivate rainfed paddy once in about 5 years.

By 1955, the reservoir was completed and the Department of Lands had cleared the jungle and cut down the large forest trees. In the same year, many landless villagers from the Divisional Revenue Division known as Mana Paha had sent petitions to the GA and a land kachcheri to scrutinize applications and recruit colonists had been held in Kurunegala. The first batch of 88 colonists were each given 2 acres of potential paddyland and 1 acre of highland in Unit 3, the first sector opened for settlement. Colonists were also given agricultural tools, and 200 rupees each to construct a watch hut. The government also paid them 80 rupees an acre for clearing roots and stumps, and 60 rupees an acre for making ridges along their paddy allottments. In addition, they were given a subsistence of 30 rupees a month for 6 months.

Although the task of completely clearing the paddy area of roots and stumps was a gradual and tiresome process especially with no proper irrigation provided, in the first year itself the colonists cultivated rice on their allotments for paddy. During the second year, the irrigation system had begun to function, the government having placed the business of water management in the hands of two Irrigation Headmen (Vel Vidane). These men were from prominent families in the locality and lived in their respective villages and looked over the water management from a distance. According to one old farmer, no real water management

was involved or necessary: "There was plenty of water, and the Irrigation Overseer would come in the morning, open the sluices, and close them in the evening".

However, by 1958, when more colonists arrived in the newly-opened Units 1 and 2, and with the increase in the number of farmers due to the influx of encroachers from neighboring villages, the government increased the number of Vel Vidanes to 10. Their main duties were to decide when to start the cultivation season and the calendar of agricultural activities, to maintain peace among farmers in matters relating to irrigation and agriculture, and to act as representatives of farmers (though they were not elected officials) when dealing with the government bureaucracies. According to one retired Vel Vidane, their modus operandi was as follows: "A week or two before the cultivation season a meeting of all Vel Vidanes of the scheme takes place. We get together, discuss, and make up a "program" . We present this at the "cultivation season" (kanna) meeting, when the DLO[4]., the CO, and the GA, and the Irrigation Department gentlemen gather. All farmers participated at that meeting. Those officials check the defects in our program, change what has to be changed, include their own ideas, and get it approved by the whole assembly. Sometimes, we as officials have to change the programs by four or five days after listening to what the farmers have to say. Regardless of what programe we made,they were implemented according to the ideas of the farmers. We did not do what the farmers disliked".

Although the old Vel Vidane may have wanted to cast aspersions on the present system of water management by making the system of his day look more democratic than it really was, it is very likely that a greater degree of farmer interest and participation may actually have prevailed then than at present. At the same time, according to this informant, negative sanctions had been applied to enforce conformity since the officials could always threaten to take legal action against errant farmers. He stated, however, that the Vel Vidanes had to personally supervise water issue, and walk the length and breadth of their area to make sure that no illicit tapping took place. He attributed this lack

of unity among farmers to their social heterogeneity as they came from various castes and village backgrounds to the colonization scheme and to the scheme as a whole[5] .

The vel vidane system prevailed until 1964 when it was replaced by the Cultivation Committees (CCs), which were statutory bodies set up under the Paddy Lands Act of 1958, and supervised by the Department of Agrarian Services.

The CCs were designed to allow for adequate representation of farmers in the management of agrarian matters as they were to be constituted by elected representatives. Their tasks were to protect the rights of sharecroppers, maintain small irrigation works with monies collected from farmers as acreage taxes, and act as instruments of extension.

Each Unit of the KO scheme had its own CC by 1964, and one of the noteworthy aspects of the new managerial system was that it enabled a segment of the village population consisting of school teachers, "native" (ayurvedic) physicians, and small traders, who were second-class citizens at the time of Independence in 1948, to become rural leaders and have a hand in rural administration and rural development. In addition, all members of the CCs, including the rural elite, were farmers. In this sense its composition had a democratic flavour, making it quite different from the vel vidane system which was reserved for the rural "aristocracy" and landed gentry. Perhaps, the most significant characteristic of the CC system was that its membership was strongly politicized. They had patronage ties with local politicians particularly in the wake of the ideologising and feverish political (and "nationalistic") consciousness which the election compaign of the late S.W.R.D.Bandaranayake evoked within the Sinhala rural sector.

It appears that, with all the potential it had for becoming a popularly constituted council for managing and arbitrating problems of the rural people, by the rural people, for the rural people, several factors prevented the CCs from conducting their business, including water

management, efficiently. Political cleavages and party affiliations appear to have been a severe handicap, and even interfered with the way in which the CC members came to office. Thus, although the representatives were in theory to be elected by the general body of farmers living within each CC area with the Divisional Officer presiding at the election, the practice was that the local branch of the ruling party selected the candidates from its own cadre. Furthermore, the local Member of Parliament had to approve the list of elected officials. In the case of the KO Scheme, while the local Member was from the party in Opposition (i.e. United National Party), the party in power was the Sri Lanka Freedom Party. As a result, a compromise appears to have been achieved so that members of the CCs came from both political parties. The built-in political cleavages hampered the CCs in a rather direct manner since every major decision had to have 7 out of the 12 members agreeing to it. The lack of agreement undermined the ability of the CCs to be decisive when dealing with problems of water management. Politics, in other words, contributed to an anomic situation in water management.

The second major handicap was the lack of a sufficient water supply to irrigate all the fields in the command area. At the same time, the CCs were not equipped with the professional or technical expertise so as to maximise the existing water supply as was done from 1980. They adopted basically two methods of issuing water. The first was to issue water to all the fields for about 2 or 3 days at a stretch after which the main sluice was closed. Subsequent issues of water were on a rotation based on a two section system, the half situated away from the reservoir being irrigated first, and the half close to the reservoir irrigated next. The second method which replaced the first by 1970 was to stop the general issue of water altogether and issue water on a sectoral basis. The entire acreage was divided up into two sections, upper and lower, and water issued for the lower section first (for 4 days), and then issued for the upper section (for 3 days) the difference in number of days being due to the extent of paddy land in each section. However, regardless of the number of days during which water was issued, there were always shortages. Water management had to undergo an overall change to redress

this crucial problem including addition of new elements such as technical expertise, innovativeness, and dedication to solving the problems in the field.

The lack of a sufficient supply of water for both seasons led to all types of anomic actions among farmers. For example, when the CCs constructed dams across certain channels to raise the level of the water and increase its flow, some farmers had broken these dams down as they blocked or delayed the flow to their fields. At that time, the gates at the off-takes were of wood and farmers could break these down and throw away the padlocks. When water was being given to the tail-enders, the head-enders would not wait, and would quickly open their outlets. Fights broke out when encroachers, who had no legal right to water, would take water from the channels. An ethos dominated by personal power and might rather than consensus prevailed. According to one farmer "Only those who would drink some arrack and shout obscenities could get the water they needed". One former CC member, who used to go out of his way to settle quarrels over water, and defied "hooliganism" of some farmers observed "In those days, people would not listen even to what we had to say".

Contributing to this state of affairs was the incapacity of the CCs to maintain a semblance of authority over the farmers. In addition to political cleavages already mentioned, a very real source of division was the populist character of the membership. Ties of commonality and neighbourhood with farmers prevented the officials of the CCs from taking any disciplinary action when it was necessary. As one former CC officer commented: "No one was prepared to prosecute a fellow farmer even if the latter was in the wrong. The members of the Committee would say: 'we will pardon the offender the first time'. No one was willing to go against a farmer from his own section by coming forward to give evidence against that farmer". He added that members would sometimes make appeals on compassionate grounds by saying: "A farmer will do some wrong when he just cannot help it" and that farmers did not object sometimes to illicit tapping" because they could not stand back and see another farmer's crop wither and die".

Corruption and graft amongst the CC members was another factor. Groups of farmers would go and bribe a CC officer to open the sluices ahead of schedule, and this action prompted others who could not afford to bribe to take water by force. Other officers with some wealth had taken lands on lease and made sure that their fields got more water by lowering outlets. Such actions encouraged others to flout the rules of water management.

The end product of two decades of water management prior to the present system was that neither the simple traditional authority of the vel vidane system nor the system based on popular and politicised leadership under the CCs was capable of efficient water management. Yields were as low as 40 to 50 bushels per acre and farmers were plagued with the presistent risk of not having enough water. The problems increased in Yala when there would be even less water than in Maha. It is very likely that these hardships, along with diminished returns from paddy, contributed to rural indebtedness, as well.

Characteristics of the New System.

In contrast to the previous systems, the new form of water management introduced from 1980 has several distinctive features which in the farmers' view, have contributed to its efficiency and popularity among them. These are:

a) Hierarchy of authority:

Practically all farmers are aware that there is a clear-cut hierarchy of authority which determines such matters as when water is to be issued, who issues it, and who takes punitive action. This type of authority did not exist under the CC system so that no decisions could be taken. One vidane commented: "During the CC days, there was 'no definite person.' Now there is one: farmers can 'meet me directly and tell".

Though farmers know that there is one person having responsiblity at the lowest level of the hierarchy, they are keenly aware that the authority

of their vidane is legitimized by the structure of bureaucratic authority emanating from the higher levels of the management system. They also acknowledge that bureaucratic authority, as manifested in the person of the government official and in a body of bureaucratic laws that are enforceable through a court of law, is indispensable to run the management system. One Vidane expressed the villagers' perception of government bureaucrats and bureaucratic law as follows: "We cannot do without government officials. They have an effect on peace in the village since there is something called "officials' law" and since it is in operation. We as Vidanes, can only "take care of" the peace in the village. And, without government officials we cannot "do all things in peace."

It may be stated, therefore, that farmers participation and representation in water management take place within a bureaucratic framework which not only provides leadership but also sets the rules, procedures, sanctions, and laws, and provides legitimacy to the very system. However, it has to be noted that the interaction between officials and villagers is certainly not a one-way process; if that were the case, the management system at the KO Scheme would be a mere extension of the regional bureaucracy. The innovative factor is the Water Committee which provides a well-defined context within which the bureaucratic and rural "cultures" or "worldviews" inter-mingle, where farmer representatives assume characteristics of bureaucrats and bureaucrats undergo a degree of parochialization. The Committee bridges, within its temporally and spatially limited arena, the traditional distance between bureaucrats and villagers, with each side undergoing temporary immersion in the element of the other. And, the very fact that the former could come down to the village, traverse the length of its fields, and even adopt the village idiom may serve as powerful motivating factors for farmers to adopt and accept bureaucratic leadership.

The complex nature of the interaction between the two "cultures" could be illustrated to some extent through an excerpt from the research assistants' verbatim report of a session of the Water Committee held in

May, 1985. As usual, the meeting takes place in the front porch of the official quarters of the CO at the Scheme. The TA, two Cultivation Officers, and 6 Vidanes are present with the CO presiding. All four government officials are seated at a table, and facing the 6 Vidanes. Whereas the former are seated in chairs, the latter are seated on the type of long bench used in government school by children, thus giving the atmosphere of a teacher/student interaction. Although the day and time of the meeting are set, the agenda is not, thereby giving the meeting a relaxed air of informality.

TA (opening the meeting) : We can give water to an additional 15 to 20 acres paddy. Let's select them from the area where field channel 23 is.

CO : Yes, that way we can help some needy people also.

TA : If an anicut is made a little beyond Ranhamy ayurvedic physician's house, water can be given to Nikagolla area (a part of the colonization scheme).

Vidane (from Nelliya)(standing): Can't we also take water from the Katupotha area (another part of the colonization, but close to his village)?

TA : But the expectation is to irrigate about 200 extra acres. That's why (I) talked about land around field channel 23. What we are trying to do is to do this work with the resources in this area. If the farmers do the channel work themselves, it's easy for us.

CO : (distributes among vidanes copies of a notice giving water issues)

TA : Although the DO[6], AI[7], and DLO came for the last cultivation season meeting, none of you (referring not to Vidanes, but other farmers in the Scheme) came. I am also disappointed when few Vidanes come for this meeting. Just as the "pious layman" somehow pushes himself towards the temple on poya day, we also have to come here every Tuesday. We don't have to spend that much time here. Even half-an-hour is enough.

It would be noted that the TA has used the term, "we" in two senses: (a) to refer to officials in the Department of Irrigation, and when talking about farmers' responsibility in constructing channels if they wanted more paddy land to be irrigated, and (b) to refer to the collectivity at the Water Committee meeting including himself, other officials, and the Vidanes.

However, the ability to oscillate between different levels does not appear to be a privilege open to the Vidanes when they deal with the average farmer. They believe that, as farmer representatives, they have to adopt the method of conciliation and persuasion without making any explicit claims to authority. For example, one of the common problems for management is how to get the field channels cleaned before water is issued to commence each season. Although each farmer is expected to clean his stretch of channel, there are some who do not comply . One Vidane explained his strategy of obtaining farmer compliance as follows: "There is a fine of 50 rupees for every one-and-a-half foot of channel not cleaned. If we do not want to fine, we can also use labourers and retrieve the cost from the farmer. But I somehow get them down "even by scolding" and get (the channels) cleaned. They are our people, aren't they? We do not want to harrass them. We are people who came to office through election". In dealing with other violations, such as grazing cattle along channels, the Vidane would stop at the scene and scold the individual tending the cattle, asking the latter to take the cattle away. There is no attempt made to take punitive action, although when the new management began offenders had to pay a penalty. Again, the laxity was explained by one Vidane in terms of the electoral principle: "We will not take legal action. If we go to do that, we will not get their vote".

Thus, from the perspective of the Vidane the formal bureaucratic rules cannot be applied in their pure form even if farmers have given their approval to the rules implicitly or explicitly. Instead, rules have to be re-interpreted to fit the idiom of inter-personal behaviour appropriate to the village context. In doing so Vidanes have to show a high degree

of leniency for fear of losing popular support. To some extent, therefore, villagers recognize that formal rules and village "politics" are two distinct worlds. The TA has taken pains to bridge this gap by seeking to transfer the responsibility of managing water from officials to farmers. According to one farmer, this effort has had mixed results so far: "The TA has told us to consider this irrigation system as our own. He has said: 'Do not put buffaloes in the channels because it is going to ruin your own irrigation system. What do I care?' Therefore, we don't put cattle (in the channels) now. If anyone breaks this rule, farmers complain to the Vidane. When confronted with this, farmers who put cattle do not get angry since they know that they are doing the wrong thing. Farmers accept what the Vidane has to say since they are afraid they will not be given water".

To a great extent, therefore, the two worlds have to be bridged by the exercise of authority and power from the top. Conformity is achieved partly due to fear of losing benefits, fear of punishment, or losing favour of those above or below oneself. As indicated in the words of the above farmer, fear of not being given water is one way of ensuring conformity of farmers. Fear is also a tool in the hand of the TA to control the Vidanes. As one former CC office bearer stated: "Now there is no corruption among the Vidane because the Cultivation Officers and the TA are there. The Vidanes are afraid that if they get caught, they can be dismissed. If the 'gentleman' (referring to the TA) writes to the GA, the Vidane can be dismissed. No one else has that power". The TA himself believes that the stick is as important as the carrot to create conformity, and interprets the tendency toward compliance as a historically conditioned attitude: "As a nation, we are a people who work out of the fear for the stick, the sword, or the gun. We respect the 'king's punishment' (raja dandanaya). We have to have a project law. People know that they should not put buffaloes into the channel, but they do it anyway".

b) Specificity of function:

Each level in the water management hierarchy has a specific set of

functions so that no confusion exists among farmers as to how to deal with the system. Farmers know that, although there will be discussion and debate about the details, the ultimate decisions will be taken by the TA. They also know that the Vidanes are their channels of communication, and that the burden of regulating the flow of water rests on the latter. As one Vidane stated: "If the fields are far away, and we tell the farmers to close their outlets at midnight, those farmers are not going to close them till 2.00 a.m. If we tell others to open their outlets at noon, they are going to open them at 10.00 a.m. We have to do that "duty" ourselves, and if we do not, it would not get done". Similarly, although the TA and the CO jointly supervise water management, the ultimate responsibility lies with the former. Thus, the closing or opening of the sluices cannot take place without the knowledge and consent of the TA. The keys to all the sluices are in the custody of the Irrigation Labourer who is directly responsible to the TA. The Labourer sees his duties as follows :"I work according to what the TA tells me, and according to his time table. When farmers tell their needs to the vidanes, they (vidanes) go to the CO who tells the TA. Earlier people had no system. They would ask me to issue water at this time and at that time. Now people know about the system, and I have a problem as a result".[8]

c) Promoting harmony among rural population

As noted earlier, the ability of the management to provide water to farmers who were deprived of this essential resource has contributed to the growth of harmonious relations within the farming community as a whole while contributing to efficient water management itself. Farmers see this as a positive aspect of the system in that it ignored bureaucratically determined divisions and classifications within their community. Whereas the CC system overlooked the needs of some farmers by seeing them as "encroachers", and forced them to take water illicitly, the encroachers have been incorporated into the new system management. Similarly, water saved through various conservation methods has been made available to people in the traditional villages. For example, at the conclusion of the research period, the Water Committee was deliberating on a proposal to

provide water for an additional 20 acres which were suitable for paddy cultivation in the the village of Nelliya. By contrast, when colonists were experiencing water shortages in the sixties, they were reluctant to share the reservoir water with people in the surrounding areas, and had even shown signs of overt hostility to the villagers on the Left Bank by going there armed with swords and guns when the latter had petitioned the government for water.

(d) An additional season:

Another advantage from the farmers' viewpoint is the possibility of having a third crop such as cowpea or chillies after Yala and before the start of Maha season using the water saved at the end of Yala. This had been tried with some success on 354 acres of paddyland in Unit 3 at the end of Yala 1983, and there is the likelihood that the experiment would be repeated in the future.

(e) Increase in land values:

It is the opinion of farmers that, with irrigation becoming more certain than before, there has been an increase in the cash value of paddyland. This has meant that in the event they wish to lease or mortgage their land they are now able to get a higher value than before. The per acre average is now 4000 rupees compared with 500 rupees (for a lease) when water was uncertain.

(f) Reducing indebtedness:

According to some farmers, the new water management has increased yields through better irrigation and thereby enabled farmers to pay off long-standing debts, especially, in those instances where a portion of the paddy allottment has been leased out.

3.2 Farmers' Perception of Officials

Change in farmers' perception of officials has been a very significant factor in winning their compliance to and acceptance of the water management system. The image that officials have given to the farmers is that they (the officials) are performing service and even over-extending themselves to make the water management a success. For example, the willingness of officials to come down to the level of the farmers is regularly demonstrated when the former arrive at the Scheme to attend the Water Committee meetings.

In addition, farmers also appreciate the leadership given by the TA who has earned their respect due to several personal qualities, which make the farmers compare the TA favourably with other officials whom they know or had known earlier. These qualities are:

(a) his technical knowledge:
From the farmers' point of view, the TA has "a very good knowledge of rainfall so that he can predict. We have checked his prediction and he is correct" (the words of one farmer). Many farmers also praised his close observation and knowledge of the field situation so that he could point out even minor defects in the irrigation system. To quote a second farmer: "The TA is good because he makes a check by walking through the fields looking for even seepage holes". Others stated that when he began the experiments with water management he had also conducted a survey of encroachers to estimate their water requirements since encroachers had been an unknown entity up to that time. The TA had also done a study of the soil composition of the scheme, and has maintained a rainfall chart with the assistance of the Irrigation Labourer. This intimate knowledge not only gives him a strategic advantage over his subordinates and farmers in general, but has also earned him the farmers' admiration.

(b) his neutrality:
This is also seen as a positive aspect of the TA. For example farmers referred to the measures he had taken to ensure this neutrality as

follows: "He eats breakfast at lunchtime, and he does not take anything from us, not even a young coconut. He brings his own lunch packet and does not even go into a house to eat it. He has his meal on the dam or under a tree, and drinks water from the reservoir. He does not take a soft drink offered to him at a meeting. He says that if he takes even a cup of tea from someone, he will not be able to do his job, and that he will have to be grateful for the tea he drank. The irrigation labourers had gone to see him for the New Year and he told them to take away the biscuits they had brought and give them to their children. One man had taken him a Buddha statue, and he (the TA) had said: 'I cannot take it nor can I refuse it', and asked that man to place it anyway (in the TA's home) where the family lights the lamps".

(c) his initiative:

Youthful initiative is perhaps a term for characterising the unconventional approach adopted by the TA to solve problems and one which has earned him the admiration of farmers. They have vivid memories of how he dressed in swimming trunks and, holding a flashlight, had walked by himself into the dark tunnel under the reservoir to tighten the bolts of the main sluice and stop a persistent leak. One vidane stated: "The cold water that fell on his head that day gave him a permanent cold, which he has not been able to get rid of even after 5 years". By this gallant action he had saved the Irrigation Department the money it would have been spent to hire a professional diver.

These personal qualities of the TA as a leader appear to have influenced his subordinates including the vidanes who also regard their work as a form of public service. However, these qualities have also made the TA somewhat indispensable to the system, for, in the words of one farmer: "The services of a gentleman just like the TA will be needed to carry on the system".

3.3 Socio-economic Characteristics of the Farmers:

Another way of accounting for farmer compliance is in terms of the complex

of social and economic characteristics of the farming population as a whole. Thus, their acceptance of the system management even without full participation may be attributed to:

(a) Age structure:

According to the household survey, about a third of the household heads are over 60 years of age while another third are between 40 and 60 years of age (see Table 4). According to the youthful farmers, a large number of farmers of the older generation are acquiescent and submissive to the dictates of officials. They also alleged that fear of officials was a reason why a majority of farmers do not wish to make any open criticisms of the system or point out its weaknesses. In this context, it is noteworthy that the initial protests against the early innovations of the TA were led by a youthful farmer (then about 35 years old) who later became a vidane and an avid supporter of the TA.

(b) Educational level:

Low educational attainment appears to be another factor contributing to inadequate participation and a high degree of compliance. Thus, according to the survey, it was found that only 10% of the household heads had completed their education up to the 10th grade, and about as many who had never attended school (see Table 5). Lack of formal education invariably places the farmer at a disadvantage when dealing with officials who have had a formal education.

(c) Village background:

Another fact that emerges from the survey is that almost all household heads with the exception of 16 who had come from the Low Country (or coastal regions) are from traditional villages in the immediate vicinity of the Scheme. It can be seen from Table 7 that more than 75% of the heads of households have migrated from villages within a radius of 25 miles from the Scheme. Deference to officials may be seen as a characteristic of the average peasant from the traditional villages in this region.

d) Caste background:

It may also be added that a about a third of the household heads are from castes lower than Cultivators (goigama), the highest rung in the Sinhalese caste hierachy. In the colonisation scheme including encroachers, the number from non-cultivator castes is a little over half (see Table 8 and 9). Furthermore, though many rules of traditional caste etiquette are not to be seen today, persons of lower castes tend to show deferential behaviour toward those of the Cultivator caste, and particularly toward members of the old village elite who are also from that caste. Conversely, people of the Cultivator caste do not visit lower caste households or participate in household ceremonies involving commonality with lower caste persons. This pattern of avoidance is reflected in a move by a group of about 20 Cultivator caste men, under the leadership of a retired Irrigation Headman, who set up their own funeral-aid society and their own cemetery in 1968, and severed links with the funeral -aid society of their area which had a majority of people from the lower caste of Menial Workers. It is noteworthy that the Water Committee has one vidane who is from the latter caste while all others are from the Cultivator caste. However, caste differences have not led to any conflict or dissension within the Committee.

The persistence of caste-bound sentiments at the level of farmers indicates to some extent the implicit acceptance of status inequality as a basis for social behaviour among the latter. It is likely that, in addition to economic and educational differences between farmers and officials in water management, deferential behaviour based on caste may be a factor promoting tacit acceptance of the management system.

Table 4: Age Structure of Household Heads

Age Group (in years)	No. of Household Heads	%
21 - 30	9	4.5
31 - 40	52	26.5
41 - 50	35	17.5
51 - 60	37	18.9
61 and over	63	32.8
	196	100.0

Table 5: Educational Levels of Household Heads

Level of Education	No. of Household Heads	%
No education	22	11.
Grade 1 to 3	53	27.
Grade 4 to 6	73	37.
Grade 7 to 10	27	13.
Grade 11 and over	21	10.
	196	100

Table 6: Whether Household Heads were Born in the Scheme or not

	No. of Household Heads	%
Born in the Scheme	24	12.
Not born in the Scheme	172	88.
	196	100

3.4 Advantages for Officials

Direct material advantages accrue primarily to the Vidanes who receive a remuneration in kind, namely, half bushel of paddy an acre per farmer at the end of each season. This adds to a substantial amount since, on the average, each Vidane represents about 80 farmers. It should also be said that these officials invest considerable time and energy in their work to justify their remuneration, particularly by attending weekly meeting of the Water Committee, supervising water issues, settling disputes, and paying attention to complaints of farmers.

Many of the Vidane regard the remuneration (referred to as salaris, a corruption of the English word, "Salary") as a stable or sufficient income source, although some did say that they have between 10 and 25 farmers defaulting every season. Many of the defaulters are just not able to afford this payment, and others avoid payment because they are non-resident operators who have taken the lands on lease or mortgage. Although Vidanes have a right to prosecute defaulters, they simply choose to ignore them for reasons reflected in the following statement of one

Table 7 Location of Village of Birth of Household Heads Not Born in the Scheme

Distance to KO Schemes (in miles)	No.	%
0 to 5 miles	47	23
6 to 10 miles	52	30
11 to 15 miles	10	5
16 to 20 miles	12	7
21 to 25 miles	11	6
26 and over	41	23
	172	100

Table 8: Caste Composition of Household Heads Sample

Caste	NO	%
Cultivator	119	61
Non-Cultivator	77	39
	196	100

Table 9: Caste Composition in Colonisation Scheme

Caste	No	%
Cultivator	73	49
Non Cultivator	76	51
	149	100

Vidane: "I have no problem collecting salaris. If people give, I take. If they dont' give, I am not going to ask, or take legal action. Why should I get angry with people for a small amount of paddy. I do not give a different type of service for those who do not give. Because of that, those who were not giving earlier are giving now". However, there were other vidanes who said they gave minimum service and did not go out of their way for farmers who did not pay.

Rewards for officials are also non-material or symbolic in nature. Many of the Vidanes stated that they looked at their work as a form of "social service" a term also reserved for holding office in the village-level societies and associations devoted to community development. The fact that they are addressed as Vidane and Vidane mahattaya, the terms for the traditional Irrigation Headman, is a way of giving and receiving social recognition and status, particularly since a majority of them are not members of the landed gentry in the area. Similar advantages also accrue to the higher level officials such as the TA and the CO through international attention as well as national recognition that the Scheme has received. Visitors from other colonisation schemes arrived in Kimbulwana Oya during the course of the year, and the TA and CO have got chances to address seminars and workshops on water management. The TA has also gone for further training abroad.

Chapter Four

LIMITATIONS OF SYSTEM MANAGEMENT

Paradoxically, the limitations on system management stem from the very bases of its strength and efficiency. It was pointed out at the outset that the social aspect of management was essentially disciplinarian and legalistic in character, with a tendency toward enforcing compliance through the exercise of bureaucratic authority in place of participation from the farming sector. The management believes that the system will gain the acceptance of all farmers once its merits become self-evident. For example, the CO stated that although about 10% of farmers do not give their full co-operation as yet, eventually all farmers will do so since those who did not co-operate were "still used to the traditional ways" (his words). The attitude that a disciplinary framework is a precondition for any type of water management is shared to some extent by the Vidanes, one of whom stated: "Initially we have to be a little tough".

Whereas the above type of organisation for water management allows for speed and efficiency in the short run, it may and does run into complex practical problems in the long run. Thus, the principal limitation of the management appears to be its relative immunity to criticism from within and outside itself. This is consonant with the bureaucratic change model which has been superimposed on the local peasant population, a model in which only the farmers have to change and not the change agent(s) or the change model. However, immunity or blindness to the practical complications created by the management system itself has been perceived by the more discerning farmers or at least by the more vocal ones. Their criticisms of the system can be considered under three headings namely,

i) the management system itself

ii) the agronomic consequences of the system

iii)the economic consequences of the system

4.1 Management System

The main criticism voiced by some villagers was that the management was unable to accommodate diverging opinions from within or outside it. As one dissident Vidane said : "The Vidanes do not go against the TA. If they go over one official, and try to voice their grievances to an official higher-up, they (the Vidanes) will "get cut off" . The implication was that officials will always stick together was expressed by another villager in terms of the following adage: "officials eat salt from the same pouch" to mean that this fraternity will see to it that farmers will never come out ahead in a confrontation with them.

Another observation put forward by this same Vidane was that free discussion in the Water Committee was allowed as long as nobody questioned the wisdom of the present system or of decisions made by the higher level officials. In his words: "If I (as Vidane) say that the present system is not profitable for the farmer, all the others will throw me out by my ears as far away as India. Therefore, I say "yes sir" and wait. No other Vidane is prepared to tell you even the little I am saying". Apparently, a sense of absolutism prevails even within the Water Committee from the point of view of members who disagree. The Vidane added: "If I say something at the meeting that the TA will not agree with, he will say that he learned differently when he was in the Philippines, and that we should do it that way".

A related criticism was that the average farmer had no voice in deliberating about the timing of cultivation operations, issue of water, and preparing water schedules. The farmers who pointed this out said that the entire program of cultivation was prepared by the TA who, with the consent of the CO and Vidanes, carried it through without considering the needs of farmers. A second Vidane offered the view that a small group consisting of the TA, the CO and a Vidane who was a close associate of the TA decided on all these matters in advance.

The method of conducting cultivation season meetings came specifically under fire. Referring to the meeting held in February, 1985, to decide the Yala season schedules, the above mentioned Vidane proceeded with his criticisms as follows: "The farmers' ideas were not asked on each point in the program, and even if they were asked, there would be no point in expressing them. We can only listen and write down everything in the notebooks. The TA has got all the Vidanes in his power. We do what is said and remain silent". The research assistant's notes on the above meeting indicate that it was a mockery of farmer participation. Although there were about 10 government officials each representing a different government department, there were only 23 farmers from among the 2000 who should have attended but did not. An excerpt from the research assistants' notes reported : "The GA enters the room where the meeting is to be held, and asks the other officials: "Why aren't the farmers present? It was like this during the last kanna meeting too". The CO replies: "Sir, there were enough farmers at the last meeting".The GA retorts: "No. No. There were very few. I can remember very well". The GA begins looking the records. The CO replies : "Sir yes. yes. It was only at the last Yala meeting that many farmers were present". Although there was no quorum of farmers to have an official kanna meeting for 1985, Yala and though the GA had declared there was only going to be a discussion of the program, the officials finalised programme at this meeting.

The question remains as to why there is lack of farmer particpation in the key event of the agricultural calendar. According to a third Vidane, the meeting had been scheduled by the GA on the recommendation of the TA and the CO at a time when most of the farmers were still busy with the harvesting of the Maha crop. No farmer was foolhardy enough to leave the field at the most crucial time particularly when there had been incidents of harvests being stolen in the night. Why then did the officials decide to hold the meeting at that time? It appears that the management was very anxious to finalise the plans for issuing water for Yala as early as possible since the reservoir was overflowing on account of abundant rains, and since it wanted the farmers to use the excess water as soon as

possible. Delay in holding the meeting would mean delay in giving the farmers enough notice to commence the next season. Thus, the objective of maximising the water supply, which is one of the positive aspects of water management, has become an end in itself, while pushing aside the views of farmers. Participation, of course, can involve delay in procedures, but it appears that if there were adequate farmer participation, some costly agronomic consequences could also have been avoided as seen from farmers' criticisms of water management from a second perspective.

4.2 Agronomic Consequences of Water Management

The tendency to pursue water management as an end in itself or to over-manage water could be inferred as a result of a lack of farmer participation leading to a lack of communication between managers and farmers. Instead, a paternalistic and disciplinarian attitudinal structure prevails within the management.It assumes that it has little to learn from the farmer, and that the flow of information should and can only be from official to farmer. The power exercised by the official to decide on water issues and schedules of cultivation can impose arbitrary limits into agriculture and determines its agronomic outcomes as well. Two crucial areas of peasant agriculture which have been affected as a result are (a) over-emphasis on rice cultivation as opposed to cultivation of other crops and (b) the deleterious effects of the wrong timing of the cultivation calendar for paddy.

4.2.1 Over Emphasis on Rice Cultivation

The idea that reservoir water should primarily, if not solely, be used for the cultivation of rice appears to dominate water management policy not only at the KO scheme but also at the national level. Although this policy may have had certain advantages by way of providing the staple diet of rice for a large majority, the rigid pursuit of the policy without regard to farmers' perceptions of its ecological and economic suitability appears to have produced outcomes considered unfortunate by some farmers.

Traditionally, the area around the K.O. scheme had been used by local villagers for the cultivation of not only the customary chena crops such as millet, sesame, vegetables, and maize, but also market crops such as tobacco (the chewing variety). From about 1960, villagers had also begun to grow cigarette tobacco particularly in the highland areas within the traditional villages such as Nelliya. Wealthy men in these villages gave loans to small farmers who undertook cultivation on the condition that the produce would be sold to the former. These wealthy men also owned tobacco barns for drying the harvest which would later be sold to the Ceylon Tobacco Company. The company not only held a monopoly of the cigarette industry but also subsidized the building of barns where the drying took place.

The above picture changed drastically with the construction of the reservoir and the opening of the settlement. Rice was now being cultivated in the lands used for chena crops, and highland agriculture was slowly pushed to second place. This transformation was due to several interrelated factors. The land which the villagers had used within the village for highland cultivation was being diminished due to growth of the village population. In addition, prices for tobacco and other highland crops such as chillies had declined while cultivation of rice was more economically and ecologically feasible. The transition looked so attractive that in 1960 the villagers around the Scheme petitioned for and obtained water to their village reservoirs, and increased the area under paddy.

However, the villagers have also found that today conditions have reversed since they have to spend more for inputs in paddy and obtain relatively low prices for the rice while inputs for highland crops are low, and prices for highland crops have risen. One villager stated that the net income from an acre of chillies is almost double that from an acre of paddy.

Although the logical alternative for farmers who are concerned about maximising cash incomes would be to revert to large-scale cultivation of highland crops, the principal constraint remains land. The only land where they could undertake such cultivation is paddy land, and they realise that the present system management is not geared to accommodate needs of this kind. An informant from the village of Nelliya articulated the problem as follows:"We cannot change from paddy due to the irrigation system. The government will not allow it since it is giving water for paddy. But, water is poisonous for tobacco. One farmer by himself cannot cultivate tobacco (on paddy land) since water will seep from the adjoining field". It needs to be noted that not every farmer wants to make this transition,and that the above statement is made by one who has a profit orientation to farming and also has an additional means of livelihood through a village trading store which he operates. There are other farmers who prefer to continue rice farming because it assures them of their minimum subsistence requirements, and shuts the door to starvation if not to poverty. At the same time, there are a handful of villagers who prefer to cultivate paddy on a capitalistic basis with several allotments they have taken on lease or mortgage and who can afford the inputs required.

Be that as it may, some evaluation of the present irrigation policy for the scheme is called for, particularly,one considers the fact that costs of paddy inputs have been steadily increasing to a point where rice farming is virtually beyond the capacity of the small farmer interested in subsistence. Secondly, an evaluation of irrigation policy would question whether it would not be more rational and economical to revert to the previous system of growing non-paddy crops in Yala season instead of investing immense human labour and time to conserve water for two seasons of paddy. The system management might be prepared to undertake such evaluations if it were more in touch with the views of farmers and their collective experience. In fact, in the early seventies when there was poor water management and an insufficient supply of water for Yala, the TA of that time had

asked the farmers to cultivate highland crops on paddyland. Farmers remember that particular season as one of the best they have had in terms of farm outputs for chillies, cowpea, mung beans and tomatoes.

4.2.2. Deleterious Effects of Wrong Timing of Cultivation Season

As noted earlier, the management has steadily been pushing the cultivation calendar forward to make maximum use of rainfall so that a reserve of water would be available at the end of every season. While the management has achieved its objective, the new agricultural calendar has, in the opinion of some farmers, led to harmful consequences for crops and outputs of paddy.

According to these farmers, this unexpected outcome which defeats the very objectives of irrigation has been brought about by a constellation of agronomic and other factors which are as follows:

(a) Insufficient period of fallow:

Pushing the start of the cultivation season forward has resulted in a reduction of the period of fallow between Yala and Maha season. In turn, this has set in motion certain negative consequences. One, is the increase in weeds. As one farmer observed: "when you allow more than one month of fallow the seeds of wild plants will die with the heat of the sun, and what is left will be destroyed by the weedicides. If not, with the start of (water issue for) cultivation, the weeds will grow up fast and they will mature when the rice plants are at their flowering stage. At this stage, it is not good to spray weedicides because the rice plants will be affected, and the weeds may also not die even after you spray them". This means that farmers have to use more weedicides thereby increasing their cost of production. A second farmer added that due to a shorter fallow period, seeds from the paddy crop of the previous season which fell on the ground would grow along with the plants of the new season. Invariably, the two varieties would have different growth cycles and their water requirements would also be different.

Many farmers offered the opinion that the stubble from the previous season would not have sufficient time to rot and decay due to insufficient fallow. Then, when water was issued to the fields, the stubble would release a heat which caused the young rice plants to wither. Another of their objections was that there was not enough time for the fields to be fertilized by the droppings of cattle and other processes of decay. One farmer also stated that they had to work like machines without a sufficient period of rest between seasons. When farmers complained, the TA and CO had urged them to use more weedicides and fertilizer little realizing what this additional expenditure meant for a large majority who are subsistence farmers.

(b) Conflict between cultivation season and climate:

The second major and common criticism was that the method of advancing the seasons has brought about a conflict between the life cycle of the rice plant and the climatic pattern causing adverse effects on the paddy crop.

(i) Rains have fallen at the wrong times, for example, as in last Yala when rain fell during harvest so that many farmers lost as much as half their crop. Others who salvaged their crop from the mud could not sell it for a good price since the buyers condemned it saying it was "mud rice" (mada vi).

(ii) Insect pests also increased due to wrong timing. For example, one farmer stated that if the maturing of the plant takes place in January as in traditional times, the intense heat of the sun during that month would cause pests to die. This climatic control of pests could not take place last Maha since the Committee had started the season in October instead of in December. In addition, last Maha, a fungus had attacked the rice plants, and, one hour after the farmers had sprayed a fungicide, the rains had fallen and washed away the chemical. Farmers added that the crop of Yala 1984 was being delayed due to rains since the season had commenced in February instead of April as was the custom. The Committee

has countered these complaints with the argument that climate has changed all over the country, and that they could no longer trust the old schedule of cultivation.

(iii) According to another farmer, the lack of a sufficiently long dry period could have an adverse effect on the soil structure of the fields, and even on the hydraulic system which does not go through a wet to-dry-to-wet transition any more, the fields being wet most of the time.

(iv) The most immediate consequences have been crop losses and loss in incomes for many farmers. This has come about through a combination of the factors mentioned above. Some farmers said they lost as much as half the expected yield last Yala and Maha, while others have suffered similar losses for the last four seasons (i.e. two years). A few farmers did so badly after Yala 1983 that they had to sell the plough animals to buy their provisions. Others stated that the crop from Maha 1984 (during the period of field research) happened to be considerably higher (64 bushels per acre) than that of Maha 1983 (54 bushels per acre) since the cultivation schedule fell in with the traditional cycle accidentally: the Water Committee decided to delay the first water issues due to delay in the rains.

(v) A more complicating outcome is lack of uniformity amongst farmers about the seed variety they use for each season or the time they begin planting . For example, according to the survey, about a third of the farmers had not used the appropriate seed for the previous two seasons (i.e. they had used short-season type for Maha, and long season type for Yala, instead of the other way around). Farmers stated that they could not find appropriate type of seed at the time they needed it. On account of the poor harvest in Yala 1983, they had consumed the amount they would have kept for seed so that they had no seed for Yala of 1984. The same problem had taken place for Maha season. With depleted stocks of seed, the sale price of locally available seed had sky-rocketed to as much as 120 rupees a bushel. They could not purchase seed from the Department of Agrarian Services since it too did not have adequate stocks. The only

thing they could do was to use the seed from the harvest they had just completed, which would of course not be the appropriate seed type.

Water management schedules had however, been set on the assumption that all the farmers had the appropriate type of seed. The result was that farmers who could not use the right type of seed would either have too much water or too little for different stages of cultivation leading to complications in the system management as well. Some farmers also stated that differences in the type of seed would have other negative consequences for farm output: "The diseases from insects will increase since the insects will breed in the plants that will mature early and, having multiplied, attack the plants that would mature later but in larger numbers than before".

4.3 Economic Implications of Water Management

The success of water management should be evaluated in terms of what it has done to improve the economic level of the average farmer. Although sufficient time has not elapsed since the new system management began to make final conclusions, indications are that there has not been an appreciable increase in the level of economic prosperity of the average farmer, particularly those in the colonisation sector. Colonists have been plagued by indebtedness and poverty for a sufficiently long period that extricating them from this condition cannot take place in a short time, and even less so by a mere change of technology.

More efficient water management, notwithstanding some of its negative agronomic and other effects pointed out already, has given some farmers a chance to stave off poverty, if not eliminate it, whilst enabling others to achieve good yields. At the same time, it has accelerated the process of economic deterioration of farmers who were on the poverty line or plagued by chronic indebtedness by bringing about an increase in the value of paddy land. The latter phenomenon appears to have promoted speculative activity centered around leasing and mortgaging of paddy land, and created a class of capitalistic farmers who use leasing, mortgaging, and moneylending as methods of capital accumulation.

4.3.1 Alleviating Economic Backwardness:

On the average, farmers in the colonization sector do not give evidence of enjoying a high level of economic well-being in contrast to farmers in traditional villages around the colonization scheme. If one were to take the degree of indebtedness of the households in the sample as an indicator, it would be seen that approximately half their number (82 out of 196) have taken loans in 1984. Almost always these loans are in the form of cash or consumer goods to meet the subsistence needs of the household, and to be paid back at the end of each harvest (see Tables 10 to 14). It is also noteworthy that of those who have taken loans only a third have managed to pay them back with another 22.1% paying back partially, and almost half not having paid any part of the loan.

The extent of indebtedness is also indicated by the scale of leasing and mortgaging of paddy land. According to an account prepared for the researcher by 9 out of the 11 Vidanes, the total amount of the debt through mortgaging and leasing out of land among a total of 186 farmers is close to 3 million rupees so that on the average each farmer has a debt of about 16,000 rupees (see Table 15).

If material possessions are visible signs of prosperity, then a majority of households, particularly those in the colonisaion scheme, appeared in the course of field visits to be in an abject state of poverty. The houses themselves were drab, gloomy, and cheerless shelters having little or no furniture, and no signs of cultivating the homestead with vegetable or other crops or ornamental plants. Both adults as well as children in these homes were poorly clad.

Household expenditure patterns indicate in some way the extent of economic deprivation. It will be seen from Table 16 that some people (32%) did at least manage to buy a radio in the course of the last five years. A similar number also bought furniture (32%), push bicycles (27%), or added an extra room, usually a kitchen made of

cadjan or brick (22%). The fact that these changes took place within the last five years is an indication that at least a quarter of the village population has had an improvement in their standard of living during the period of the new system management. A smaller, but sociologically significant, minority had enough capital to start new ventures such as buy tractors, rice mills, water pumps, or start a trading store (7%), or purchased motor cycles (5%) or built new houses (16%). Almost always, the relatively well-off inner core had salaried employment or were engaged in trade, and moneylending, or operated large extents of paddy land (see Tables 17 and 18).

The economic backwardness of many in the colonization sector could be attributed to the rapid increase in the number of dependents on the family allotment of 2 acres of paddy, which became inadequate after the second generation. Although many went out and established encroachments, farmers stated that a majority of encroachers were not from the colonization scheme but from outside. The situation has been aggravated by the absence of secondary occupations in the area. According to Table 19 and 20, it will be seen that of the 64% of household heads having secondary occupations, about half are in agricultural and other forms of manual labor which do not yield a substantial income.

Given this rather dreary picture for a majority of farmers it is unlikely that any single technological change such as efficient water management could bring about a radical economic change although it could conceivably brake the progress of poverty if not eliminate it. Viewed in this light, the negative agronomic consequences discussed earlier have a crucial importance since a series of poor yields could tilt the fragile balance of existence toward abject and irrevocable poverty for some farmers.

Although some officials in Water Management may claim otherwise, yields in the years following the introduction of the new system management do not show a remarkable increase. For example,

according to the records of the CO for an unspecified year prior to 1977 (and possibly during the period of the CCs), the average yields per acre for Maha and Yala were 44.3 and 31.6 bushels, respectively. Compared with the production data from the household survey, there is an increase by 10 and 7 bushels, respectively, for the two seasons of Maha 1983 and Yala 1984. Of course, the latter 2 seasons were poor seasons due to unexpected rains and insect and other pests about which mention has already been made. If yields from subsequent seasons improve as farmers were expecting for Maha 1984, then there is reason to have hope. But this was a season which fell out of line with the management's cultivation schedule due to delay in the rains. If the Management continues to insist on having its way, and ignore farmers' demand to delay the seasons, it would only hasten the economic collapse of many smallholders who are on the margins of poverty, and who cannot take unnecessary risks or afford the high costs of inputs.

4.3.2. Alienation of Land

One of the indirect consequences of efficient water management has been the increase in the value of paddy land which has seen a ten-fold leap from 1980 to 1985. This has been due not so much to the increases in yield (which are a matter for debate) as to the potentiality for increasing high yields under the new system management. One farmer expressed the situation as follows: "Paddy land has now become good land. There is competition among buyers now. They know that the paddy will ripen. Now water goes to every field. That is why land has gone up in price".

In recent years, both farmers (usually marginal farmers or those who have already alienated their land) as well as "people with money" who may be richer farmers living in the community or traders in the nearby towns, have increasingly become engaged in speculative activity over land. People with money may lease land from farmers and cultivate it themselves. However, when they take land on mortgage,

the usual practice is to allow the origial holder to cultivate the land as a sharecropper who gives half the harvest as payment of the interest due on the mortgage. According to one Vidane mortgaging has become more popular than leasing since the owner can continue to gain a livelihood as a sharecropper whilst getting a large sum of money. Thus, an owner can get about 5000 rupees an acre if given out on lease for a season, but can get a lump sum of 30,000 or 40,000 rupees in addition to half the harvest every season, if he gives out on mortgage. The fact that he will probably be unable to redeem the land has turned him into a speculator looking for a buyer who will agree to pay a price (usually about 1000 rupees) more than the current mortaged value. The former may repeat this several times earning a little cash every time until he cannot acquire any more than the maximum value in that year. These activities have had the combined effect of precipitating the marginal farmer into debt, promoting alienation of land, and inflating the value of land itself. According to some villagers at least half the allotments in the colonisation scheme have either been leased or mortgaged out in this manner.

Table 10: Farmers who Had Taken Credit in 1984

	No.	%
Farmers who had taken	82	42
Farmers who had not taken	87	58
	169	100

Table 11: Value of Credit Taken (in Rupees)

Range	No.	%
1 to 1000	29	35
1001 to 2000	18	22
2001 to 3000	18	22
3001 to 4000	5	6
4001 to 5000	2	3
5001 and over	10	12
	82	100

Table 12: Number of Loans Taken According to Sources

Source	No	%
Bank	14	15
Government Agency	2	2
Local Credit Society	16	17
Private Trader	20	21
Local Moneylender	2	2
Friend or Relative.	41	43
	95	100

Table 13: Purpose of Obtaining Loans

Purpose	No.	%
1. Consumption Needs of Household	90	96
2. Other	5	4
	95	100

Table 14: Number of Loans Paid Back at the end of 1984

	No.	%
Totally paid	31	33
Partly paid	21	22
Not paid at all	43	45
	95	100

Table 15: Mortgaging and Leasing of Paddyland in 9 Out of 11 Vidane Divisions.

Division	No. of Farmers	Acreage A	R	P	value (in Rupees)
1.	39	50	0	0	556,300
2.	31	60	0	0	649,000
3.	17	21	0	0	262,500
4.	14	14	1	36	153,000
5.	20	24	2	0	527,000
6.	21	39	1	0	228,000
7.	19	14	0	10	202,000
8.	16	16	1	0	205,000
9.	5	5	2	0	36,000
	182	245	0	6	2,818,800

Table 16: Changes in the Material Status of the Household During past five years.

Type of Change	No. of Household Heads	% of Total Number of Household Sample
1. Built New House	31	16
2. Repaired or Extended Present House	43	22
3. Bought Radio	75	38
4. Bought Furniture	64	33
5. Bought Jewellery	7	4
6. Started New Enterprise	13*	7
7. Bought Push Bicycles	54	28
8. Bought Motor Bicycles	9	5
9. Bought Other Equipment	14**	1

* These include 8 who bought tractors, 3 who bought rice mills, and 2 who opened trading stalls including a store for illicit liquor

** These include 4 water pumps, 4 sewing machines, 2 bullock carts, and 4 television sets.

Table 17: Distribution of Highland and Paddyland Units

No. of Units	No. of Holders for Highland	No. of Holders for Paddyland
0	0	8
1	113	129
2	65	40
3	8	13
4	7	2
5	2	4
6	1	0
	196	196

Table 18: Distribution of Land Units According to Type of Tenure and Acreage (for Paddyland).

Acreage	Colony	Encr.	Free hold	Leased In	Leased Out	Mortgaged In	Mortgaged Out	Rented In	Rented Out	LRC
1 to 25	9	13	8	2	0	0	1	1	0	3
26 to 5	7	22	22	6	0	1	2	7	0	2
6 to 1.0	26	12	22	9	1	5	5	9	1	7
1.1 to 1.25	0	1	1	0	0	0	0	0	1	0
1.26 to 1.5	6	3	3	2	0	0	0	0	0	1
1.6 to 2.0	60	2	7	1	1	2	2	0	2	2

(For lack of space the remaining distributions are as follows:
2.1 to 2.25 - 1 unit in freehold and 1 unit Rented In
2.26 to 2.5 - 1 unit under Encroachment
2.6 to 3.0 - 1 unit under Encroachment and 2 units Leased In
4.6 to 5.0 - 1 unit under freehold).

Note: There is reason to believe that the units under "Colony" have been over-reported and could in fact be much lower.

Total 196

Table 19: Main Occupation of Household Heads

Occupation	No.	%
Farming	174	88
Salaried Employment	10	5
Trade	3	2
Labour	2	1
No Occupation	7	3
	196	100

Table 20: Secondary Occupation of Household Heads

	No.	%
Farming	13	20
Trade	19	29
Local Level Officials	3	4
Labour	29	45
	64	100

Chapter Five

PARTICIPATION AND LEADERSHIP

It is clear from the foregoing chapters that the mere fact that water has been made available for cultivation does not allow us to assume that a water management system has attained long term economic, agronomic or social viability. The lack of communication between farmers and officials has been identified as a key factor contributing to the inability of the management to evaluate itself and its performance adequately, and in terms of farmers' perceptions and needs. The result has been a dissociation if not a polarisation between officials and farmers to the extent that neither party is willing to listen to the other. This situation applies to the critical and vocal farmers, whilst the silent majority follow a path of compliance. It remains to be seen why and how this lack of communication has come about. Why have the structures set up for participation in water management failed to evoke a participatory response? What are the obstacles? These questions could be answered by focusing on the related themes of participation and leadership.

5.1 Farmer Participation:

It will be recalled that there are 11 channel level associations of farmers who are supposed to meet regularly, and communicate their needs and opinions through its elected representative to the Water Committee. Evidently, these associations do not function at optimum levels; only two Vidanes reported that they met regularly with their channel level organisations. At the same time it appears that farmers have thrust the entire decision-making burden and, in some instances, even the task of irrigating fields when water issues are made on the shoulders of the Vidanes. A few Vidanes pointed to this attitude of complacency of the large majority of farmers as one reason why they do not care to participate at the kanna meetings. Farmers thus assume that the Vidanes will perform their responsiblity, little realising that (except in the

case of one or two critical Vidanes) their representatives cannot and do not go against the authority of the TA and the CO. Another factor promoting complacency could be that farmers pay some remuneration to the Vidanes for their services and thus feel that they do not need to waste time attending meetings.

It is also evident that the increased burdens placed on the Vidanes due to farmer inaction could contribute to a sense of frustration among the former. Although they may not have voiced this during interviews, a Vidane who resigned his post in 1984 gave his reasons for resignation as follows: "As Vidanes, we have to hear insults. We have to go after the farmer to get two bushels of paddy. We are told we can prosecute defaulters, but when we look at the laws, we are told (by lawyers) we cannot prosecute. Then we are told to settle it amicably. If farmers don't give (the paddy), we cannot do anything. We are doing this to digest the food we eat . This Vidane position is like the white shawl of the pious layman it is there today and gone tomorrow. If the head-enders have cleaned the channel and the tail-enders have not, no one in that channel is given water. If the farmers don't (clean), I have to hire labourers and do it with my own money. That money has to be charged from the farmers. If they do not pay me back, I cannot do anything. As I had no economic strength to hire labourers, I used to get down into the channel and clean it myself. Because of these things I resigned".

Apart from farmer complacency, an additional reason for the rather low degree of farmer participation is the exclusion of youthful farmers from participatory structures. A thirty-six-year-old farmer explained that the younger farmers also tended to be more critical than those in the older generation. He elaborated the method of exclusion as follows: "When the young farmers try to protest or criticise at a meeting, one of the first things that the officials will ask such a person would be "Are you the legal owner of an allotment?". The answer would invariably be "No" since the allotments (in the colonization scheme) would still be in the name of the parents, and this would disqualify the youths from speaking at or even attending a meeting.

However, the youthful farmers pointed out that though they had no official right to attend meetings, they were the actual cultivators of the allotments since a majority of the so-called original allotees are now 60 years of age, do not cultivate the land themselves, and have no strength or interest in attending meetings. Those that do assume a subservient and compliant attitude showing deference to the officials.

It is not surprising, therefore, that being deprived of overt means of expression the youth have resorted to informal protest. For example, at the time of field research there was talk that the youths were preparing a petition protesting against the untimeliness of the cultivation schedule. They had staged a protest about eight years ago against the CO of that era, and put up posters and made speeches. Some of them pointed out that the present system of Vidanes was not democratic, although it was claimed to be so. The present Vidanes had been elected over five years ago whereas farmers were made to understand they were being elected for a period of 18 months. Still others asserted that if an election were held, all the Vidanes would lose.

Although the old generation of farmers in the colonisation scheme are relatively acquiescent and compliant while youths tend to be more critical and vociferous, the situation appears to be in the reverse in the traditional villages nearby. There it is the older men, particularly those who had held local level-office before as Irrigation Headmen or village Headmen who tend to be critical of officials. For example, the two Vidanes who tend to be critical of water management even at meetings of the Water Committee are both members of the traditional village elite from nearby villages . One of them stated "all the others do what the officials want. I have heard that the T.A. has complained about me to the DO (Divisional Officer). The farmers do not have faith in kanna meetings as things do not get done their way ".

Thus, several factors may underlie the subservient attitude of the older colonists. One reason could be the colonisation context itself which fosters a dependency of the colonist on the official who dispenses any

and all benefits granted by the government. This dependency could be aggravated when the colonist has to uproot himself from his familiar village context and accept the patronage of the official. The colonist also realises that being in the good books with the official is infinitely more advantageous than being antagonistic toward the latter. In addition, the role of caste and educational factors in promoting compliance has already been noted.

The attitudinal and socio-economic differences between people in the traditional villages and those in the colonisation scheme particularly with respect to the older generation,appears to have a differential impact on the degree of co-operation that officials receive from farmers for water management. For example, the records on water management refer inter alia to defiant actions on the part of villagers:

(a) In 1983, People of Levgolla Village construced an unauthorised dam across the Left Bank;
(b) In 1983, people of Mailamada and Levgolla villages had bribed the Irrigation Labourer to issue water at irregular times;

(c) In 1983, people of Thihawa broke the padlocks installed in the off-takes and took water;

(d) In 1984, people of Nelliya village obstructed the flow of water to the adjacent village, and;

(e) In 1984, people of villages along the Left Bank refused to clean their portion of the main dam so that colonists had to do it for them;

The above types of acts had occurred even among farmers in the colonization scheme, particularly during the anomic period of the CCs but had virtually stopped when the new system management came into operation. Why farmers in the traditional villages are not so acquiescent may be due to a variety of factors:

(i) The traditional villagers still appear to have a resentment against the setting up of a colonization scheme practically within their old chena lands.

(ii) The villagers feel that the government and its agencies treat them like second-class citizens, while the colonists, many of whom are lower in the caste order are entitled to many privileges including priority in water rights. As one villager from Nelliya stated: "The TA and other officials don't show the same 'enthusiasm' toward us. Some of the minor irrigation repair work they began is still not completed. Our farmers had to make temporary repairs in the channels to continue farming. If a big rush of water comes, these repairs will get washed away".

(iii) One Vidane from the traditional village sector said that people in his area prefer to stick to the old cultivation calendar (for example, starting Yala after the Sinhalese New Year), and added" "Many farmers in our section don't want to work according to the (Committee's) schedule because they know they will have problems. They scold us when they begin (cultivation) work. I tell them: 'If you also go to the kanna meeting, you could come to some decision. But other villagers think that since the officials'decision is not going to change, there is no point in going".

(iv) The location of villages also complicates problems. As the villages are situated at the end of the two main channels, the flow of water is not rapid enough. Meetings of the Water Committee take place within the colonization scheme, and this means Vidanes from the Left Bank have to walk or travel about five miles. They say this is too far for them.

5.2 Leadership

The discussion so far indicates that more than one type of village-level leadership exists. It would be necessary at this point to re-capitulate the types of leadership and in what ways they do or do not relate to water management. Roughly three types of leadership can be identified:

(i) Traditional village elites:

They are found in the traditional village sector and in the colonization context, and have held positions of leadership such as Irrigation Headman and Village Headman in former times. Today, they do not dominate public life, although they are economically active and continue to amass wealth in the form of land and through trade. Two members of this landed gentry have served in the Water Committee having been elected by the farmers from their respective villages.

(ii) Government Officials

Although government officials are not conventionally regarded as village-level leaders, they assumed leadership positions as a result of the social experiment with water management from 1980. Leadership was taken by the officials at a level higher than village-level government officials such as the Grama Sevaka.

Government officials such as the TA and CO stand in direct opposition to traditional elites. For example, one individual who came into conflict with the TA at the commencement of the new system management was a former Irrigation Headman living in the colonization scheme. When asked to pay the penalty of cutting a portion of ground and heaping it on the channel for having his cattle graze along it, the Headman tried to use his influence with the TA's father-in-law who is a landed proprietor in Kurunegala. This strategy did not succeed as the TA refused to allow influence to change the application of the rules.

Though government bureaucrats represent the forces of state penetration into the countryside, in this case, primarily through irrigation and land settlement, the TA and the CO appear to have taken this one step further and assumed the role of local-level leaders. The TA, in particular, has overcome the limitations and constraints built into his position and developed a sense of dedication and personal interest in respect of farmers. Notwithstanding inadequacies in system management, the ability of the TA to combine technical skill with personal

committment has earned for him the admiration of a large majority of farmers . This is particularly communicated through comments from the farmers themselves such as "If the TA says something, people will do it or ". As long as he is there, we will have no problems", or "To continue this system of water control we will need officials exactly like that gentleman". As opposed to popular leadership, we may be able to distinguish this new role of the official through the use of the term "bureaucratic leadership".

(iii) Non-elite Leaders:

In addition to and as distinct from traditional village elites, a diversified type of popular leadership is also present within the community. Unlike in earlier times, this new leadership is not concentrated in the hands of a few dominant individuals or families, but is spread out among many who are from the ranks of the middle and even poor farmers. A majority of the Vidanes in the Water Committee are from the middle level of village society, and a few of them from even lower economic levels. Many have also acquired leadership qualities by serving as office bearers in a plethora of associations and organizations at the local-level such as the Rural Development Societies, the Credit Societies, Funeral Aid Societies, and the Gramodaya Councils. These non-elite leaders are essentially a product of the spread of literacy and political consciousness following independence and more so after the political changes in 1956.

The success of the new water management system may partly be attributed to the link-up between government bureaucrats and this stratum of non-elite leaders. For water management was not simply a matter of pushing an ideology but also involved discipline, hard work, attention to detail, punctuality, and a formalistic approach to problem-solving, being values which the government bureaucrats brought into water management.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

In describing and evaluating the water management system for the KO scheme, this study has adopted a holistic approach paying attention to several different factors such as social aspects of management, the socio-economic background of farmers, attitudes and approaches of officials, demographic factors, and the agronomic and economic implications of system management. These were seen as working in an interrelated manner defining and determining the physical and social outcomes of system management. Considered as a whole, water management at the KO scheme was observed as having the following characteristics:

(i) It is disciplinarian in structure and character:

The disciplinary approach was adopted at the commencement of the new system management when the government officials in charge of distributing water formulated various rules along with strong sanctions to bring about conformity and compliance of farmers. This type of outlook toward farmers and toward management of rural problems was in keeping with the spirit of bureaucratic administration in Sri Lanka although the KO scheme appears to be one of those rare instances in which officials strived to apply the system of bureaucratic management consistently, comprehensively, and fairly.

(ii) It has combined the disciplinary outlook with elements of participation and persuasion:

The officials used the technique of demonstration to win compliance of farmers. This was done by exercising the authority they had as officials among villagers. They also made provision for some representation of farmers within the ranks of the management by allowing elected farmer representatives to participate in the process of decision-making with respect to timing of water issues, deciding cultivation calendars, arbitrating disputes, and enforcing rules and sanctions.

Officials, including farmer representatives, usually used persuasion when dealing with farmers who failed to comply with the rules rather than apply leglistic measures,although the threat of legal sanction was always in the background. At the same time, officials have taken pains to raise the level of consciousness of the average farmer about his responsibilities in maintaining the water management system. Officials at all levels in the managerial hierarchy realise and concede that without the present system of supervision and externally-applied discipline and control the water management system would not be as efficiently run as at present.

(iii) It is an efficient water management system:

Efficiency is evidenced in both technical and sociological aspects of water management. On the technical side, the management depends on the physical rehabilitation work that has been carried out under the IRDP including the renovation of bunds and channels, the istallation of metal gates to secondary sluices so that they can be kept under lock and key by the officials, and the provision of outlets to each field and measuring poles to regulate water issues.

Efficiency is also evidenced in attempts by officials to make maximum use of the available water supply through the use of occasional rainfall so that water in the reservoir is used as a last resort. One technique adopted by the management has been to advance the cultivation calendar to make use of the heavy Maha rains and thereby cut down on the use of the reservoir supply. Water conservation has also resulted from the better maintenance of the hydraulic works including field channels by enforcing rules prohibiting grazing of cattle along dams, and engaging the services of farmers to keep the field channels clean.

A second technique has been through the development of a method of rotational water issues so that all the fields would be irrigated on an area basis taking account of the amount of water in the reservoir, the amount of seepage that naturally occurs in the region, and the acreage as a whole. This method of rotational issues has been developed by the

technical staff through trial and error and by a process of adapting technical know-how to local needs and peculiarities of the local situation such as differences in elevation, soil composition, size, and location among holdings. Officials have to exercise constant vigilance and surveillance and develop personal familiarity with these peculiarities in order to correct deficiencies that naturally occur or arrest violations.

A third technique has been to issue farmers the minimum amount of water needed although they may be used to having larger amounts or believe that the amount they receive is not sufficient. Once the minimum amount has been issued, more water can be given when required by the farmer and when the latter activates the channels of communication available for this purpose, namely, the Vidane of the section to which the farmer belongs.

Efficiency is also shown in the relatively smooth distribution of water so that there are very few conflicts amongst farmers or between farmers and officials about water issues. This is achieved by adhering to schedules of water issue without making exceptions on the basis of political affiliation or other factors, and by supervising the farmers when water issues are made so that no farmers will resort to illicit tapping or taking more than the prescribed amount of water.

The management has also demonstrated its efficiency and fairness by providing water for encroachers who had been denied rights to water earlier and who thereby became a constant threat to peace and to the efficiency of water distribution in former times.

The ability of the management to save water and to accumulate a surplus has laid open the possibility of increasing the acreage irrigated at present and also for providing water for cash crops such as cowpea and chillies during the inter-seasonal fallow period.

(iv) Farmers and Officials perceive the water management as a success:

The perception of the present system management as a success is largely

based on the perceived advantages of the system for both farmers and officials. Almost all farmers consider that the present system of management is an improvement on past systems of water management which primarily took two forms. The first was non-representative and prevailed during the period when water management was in the hands of Irrigation Headmen appointed by the government from among the ranks of the village elite. The second was representative and populist in character and prevailed when the Cultivation Committees composed of elected farmer representatives.

Both non-representative and representative forms of water management were not able to perform the task of distributing water efficiently and smoothly. Lack of technical knowledge was a problem common to both. In addition, Cultivation Committees tended to be divided due to different political beliefs of office bearers. Ties of friendship and neighborhood among groups of farmers prevented them from adopting an impartial and objective attitude when dealing with farmers who broke the rules.

By contrast, farmers perceive the present system as being capable of doing what it is supposed to do, namely, provide water for two seasons of paddy cultivation. They also see the system as free of corruption and political conflicts. They know that there is little or no confusion as to the structure of authority in the system, and that each level in the hierarchy knows what its obligations and duties in relation to water management are.

The system has advantages for the management,as well. It offers material remuneration for the Vidanes who are entitled to a fee in kind to be charged from each farmer at the end of each harvest. For officials at higher levels successful water management has won them recognition and opportunities for expanding their knowledge and technical expertise through training in Sri Lanka and abroad.

(v) <u>The system is based on bureaucratic leadership:</u>

The management system is essentially hierarchic in nature with direction

given by the TA in consultation with the Water Committee. Leadership is seen not merely in the degree of technical expertise that the TA has applied to the system management but also in combining this expertise with a high degree of personal commitment, initiative and enthusiasm. His dedication to the work at hand, and the ability to execute it without favour or corruption has earned for the TA a following among the farmers who see him as indispensable to the efficient functioning of the system. They are doubtful whether other officers or others who will take his place will maintain the same degree of enthusiasm and neutrality.

(vi) The long-term viability of the present system management is doubtful

The fact that a majority of farmers agree that the present system management is successful and that it performs its basic functions efficiently and smoothly does not mean the system has long-term viability. First, the system is built on compliance premised on farmers' knowledge that water will be issued efficiently, and that violations of management rules will not go unnoticed or uncorrected. Compliance is derived from an attitudinal framework that results from a response to an external, supervisory, paternalistic, and punitive agent. Compliance is also based on a passive attitude that does not call for enthusiasm or creativity. Consequently, the management has fostered among the farmers the idea that the system could be and should be managed by the officials concerned.

In response, farmers have conveniently jettisoned responsibility onto the shoulders of the management, and have developed an indifference to their own obligations such as cleaning channels and being present when water issues are made. If this were to continue over a period of time, the Vidanes, who have to bear the brunt of the system's functioning at the grass-roots level, will find the work disproportionate to their reward. There are indications that this is being experienced by a few.

A second factor that calls into question the long-term viability of the system management is the management's interpretation of farmers'

compliance to mean that the system is faultless, and that critical comments will disappear with time. On the one hand, it is possible to attribute the compliant attitude to the socio-economic background of a large majority who are from traditional village backgrounds, and who have developed a dependent attitude to government officials as a result of being colonists. Many of them are also relatively uneducated, and come from the lower strata of the caste hierarchy. Furthermore, farmers who have the right to attend meetings are advanced in years, and have given up their interest in attending meetings or in conducting cultivation.

On the other hand, the management has excluded the youthful, critical, and vocal minority from the decision-making process. This has not only resulted in poor attendance at the crucial meetings, but also developed within the management an indifference to the agronomic and economic complications of a negative nature. These pertain in the main to crop losses due to pests and rains resulting from the wrong timing of cultivation seasons. Whereas the management has thought in terms of maximizing the water supply through this strategy, it has meant economic loss to some farmers. This action has also reduced the traditional fallow period thereby adversely affecting fertility of the soil, weed control, and the general health of the plants.

Management's lack of attention to local needs and ecological peculiarities has also resulted in an over-emphasis being placed on cultivating rice throughout the year instead of exploring possiblilities for growing other crops such as tobacco and vegetables during the Yala season when there is inadequate rain.

The economic implications of the wrong timing of the cultivation seasons appear to be most severe for the smallholder who is on the borderline of poverty, for a reduced crop can tilt the balance in favour of indebtedness and starvation. At the same time, heavy inputs in the form of chemical weedicides, insecticides, and fertilizer occasioned by the adverse effects of wrong timing of cultivation seasons can be a drain on

the resources of the small farmer although farmers who are capitalistically inclined may not experience such a difficulty.

It is also observed that the agronomic crises mentioned above can be critical for a large majority of farmers who appear to be at the poverty level anyway as seen from the high degree of indebtedness, low material comforts, and poor standard of living amongst many farmers, particularly those living in the colonization scheme. On the other hand, efficient water management has pushed land values higher than before and encouraged speculative activity among farmers who are already in debt, and promoted the growth of a capital-owning class who are engaged in mortgaging, leasing, and buying land from farmers.

Finally, long-term viability has been undermined by the inability of the management to allow criticism and evaluation of the system both from within and outside it. The atmosphere of fear within the ranks of the Vidanes, the compliant attitude of the large majority, and the belief among the critical minority that their views will not be heard jeopardize the management itself as a socially constituted entity.

Conclusions

Some general conclusions can be put forward in terms of the findings and the analysis so far made:

(a) The management system is an innovative social experiment in village-level leadership:

Large-scale irrigation systems are not only ways of harnessing physical resources for the common good, but also ways of harnessing people for the welfare of the nation-state. In achieving these twin objectives, a crucial role has been performed by the government bureaucracy which has had a relatively long history dating back to British colonial times, and is equipped with a distinct sub-culture shared by professionally and

technically qualified men and women who have been recruited as administrators.

It appears that the water management system introduced at the KO scheme from 1980 involved some unique and interesting departures from the bureaucratic traditions in Sri Lanka, in general. For, the government officials initiated not merely a technological but also a social experiment. While changes were being instituted in the hydraulic system for better distribution of water, changes were also instituted in the social system through the evolution of a managerial interface between government officials and farmers. Of the two domains of change, the changes taking place in the social system were crucial for several reasons:

(i) The new interface allowed bureaucrats to assume developmental and leadership roles at the local-level. On the one hand, government officials had to transcend social and other limitations imposed on their behaviour by their office, status, training or sub-culture. They had to go through a process of immersion or participation in village life.

(ii) On the other, the new interface encouraged farmers to take on bureaucratic and managerial roles, and develop a range of skills relating to water management. Thus, in addition to purely technical knowledge, they had to learn how to deliver services without fear or favour, overcome political and other ideological divisions, work according to a schedule, learn to attend regular meetings, and develop a measure of enthusiasm to a single, specialized objective.

It has to be noted that the re-definition of roles of bureaucrat and farmer did not involve a total relinquishment of roles they regularly performed. Thus, farmers had to interact with officials in a framework defined in bureaucratic terms and subject to bureaucratic authority. At the same time, villagers have not developed the degree of technical competence which will make bureaucrats dispensable.

(b) In historical terms, the new social experiment in water management can be viewed as a synthesis of two(antitheoritical) types of water management existing in the past.

It combined the authoritarian system of the Irrigation Headmen with the populist managerial system which prevailed in the Cultivation Committees. The new elements in the synthesis are the harnessing of non-elite leaders in the village for water management, and the adoption of rational methods of water management.

(c) In the new system management, leadership has grown out of a problem-solving process in which officials and farmers were participants.

The focus or motivating factors were not political or ideogical. In fact, these were insignificant concerns. This has implications for rural development strategy, in general, since it highlights potential advantages that could be derived from taking a problem-oriented approach. In spite of some major limitations, the social experiment at the KO Scheme has shown that the basic approach adopted is feasible.

Recommendations

The interface that emerged out of the social experiment at the KO Scheme does not seem to have realized its full potential as yet. The evolution of this potential would depend on gradual modifications of its salient features in terms of changing needs and expectations of farmers and officials .

It would be recalled that the crucial elements in the managerial interface are authority and participation and that the principle of participation is subject to the principle of authority. This difference in degree between the two principles can be viewed in evolutionary terms. That is, the greater emphasis on authority rather than on participation would have had adaptive advantages to the system in the

context of the soical, cultural, and technological conditions prevailing during the system's infancy.

However, it has become evident now that new elements and forces, such as the vocal, critical youth who are also willing to take on responsibility, have to be taken into consideration, and the original relation between authority and participation re-aligned. This would have to be done if we expect the system to survive through time, and it could only do so by being open to change. Thus, whereas authority to an excessive degree would have been functional when dealing with an uncritical or compliant farming population, it would become dysfunctional (in the same degree) when dealing with a critical and educated farming population.

Such a re-alignment of the relation between authority and participation would involve several behavioural and institutional modifications in the managerial interface:

(a) officials would have to develop a greater sensitivity to needs and perceptions of farmers from all sectors and all age groups

(b) farmers and farmer representatives would have to enlarge their technical and managerial skills

c) segments within the village population that are willing to shoulder responsibility for water management, such as the youth, should be allowed to do so, and be given formal representation in the Water Committee

(d) A system of rewards (short-term and long-term) should be identified to benefit those who are involved in the managerial process. Rewards should be material and non-material, for example, of an educational nature, particularly to motivate youthful participants.

NOTES

1. This list of households had been compiled by the Colonization Officer at the KO Scheme, and was available for scrutiny at his office.

2. With the expansion of the local population and overflow of excess population into the neighbouring forest and areas kept apart as "reservations", there has been a tremendous pressure placed on pasture for cattle. This pressure has been accentuated by recent prohibitions on the grazing of cattle along dams and channels as a way of preserving the system of irrigation. Traditional grazing grounds such as the catchment area surrounding the reservoir are also now unavailable since they are being cultivated by neighboring villagers and by the excess population from the colonization scheme.

3. An unpublished and undated paper based on an original report provided by Mr. A.M.S.S. Gunadasa, Technical Assistant, under the title "The Evolution to Effective Water Management: The Kimbulwana Oya Scheme".

4. Refers to District Land Officer who handles problems relating to the use of government-owned land at the Divisional Revenue Division Level.

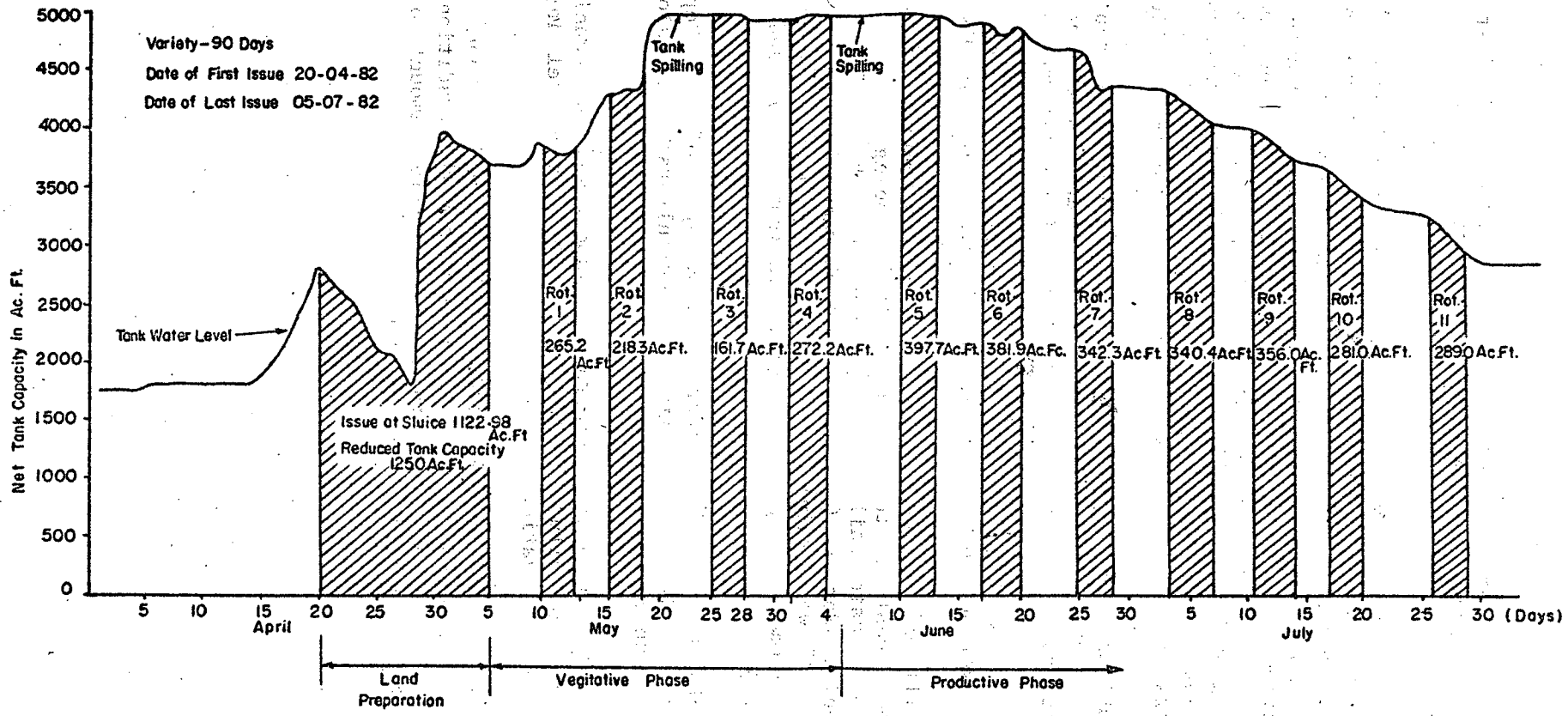
5. At the time of the survey, the 196 household heads belonged to 8 different castes, the majority (61%) being of the Cultivator (govigama) caste while the remainder were distributed as follows: 22% Menial Worker (padhu), 10% Fishermen (karave) caste, while another 10% were thinly distributed among 4 other castes: Drummer (9), Washerman (5) , Potter (1), Blacksmith (2), and Untouchable (rodi) (2).

7. Refers to Divisional Officer, an employee of the Department of Agrarian Services, who handles agricultural extension at the Divisional Revenue level.

8. Refers to Agricultural Instructor who supervises the technical aspects of agricultural extension at the field-level including the work of the Cultivation Officers.

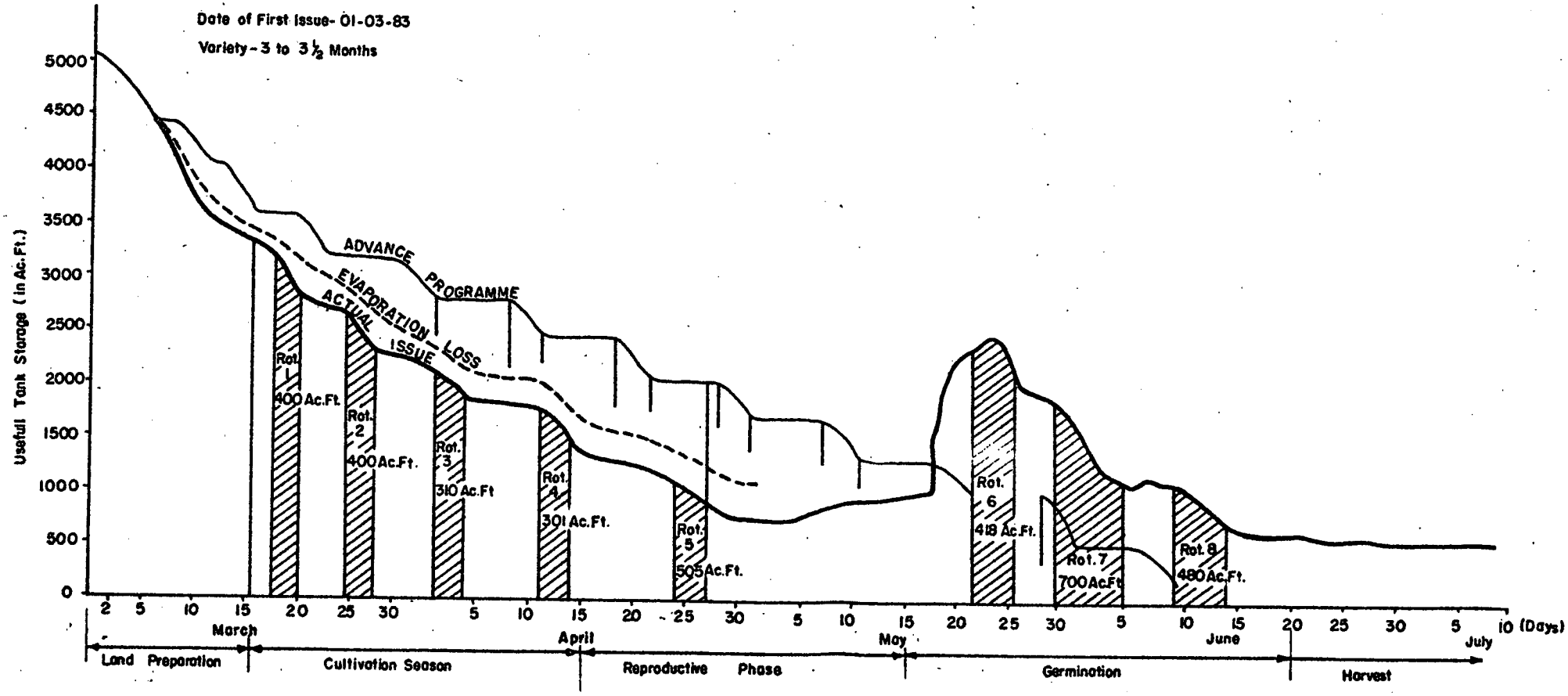
9. Incidents of corruption at this level are not unknown. There have been a few instances when some farmers from the traditional villages were able to obtain more than the specified amount of water by bribing the Laborer with some liquor.

KIMBULWANA OYA SCHEME, 1982 Yala Issue



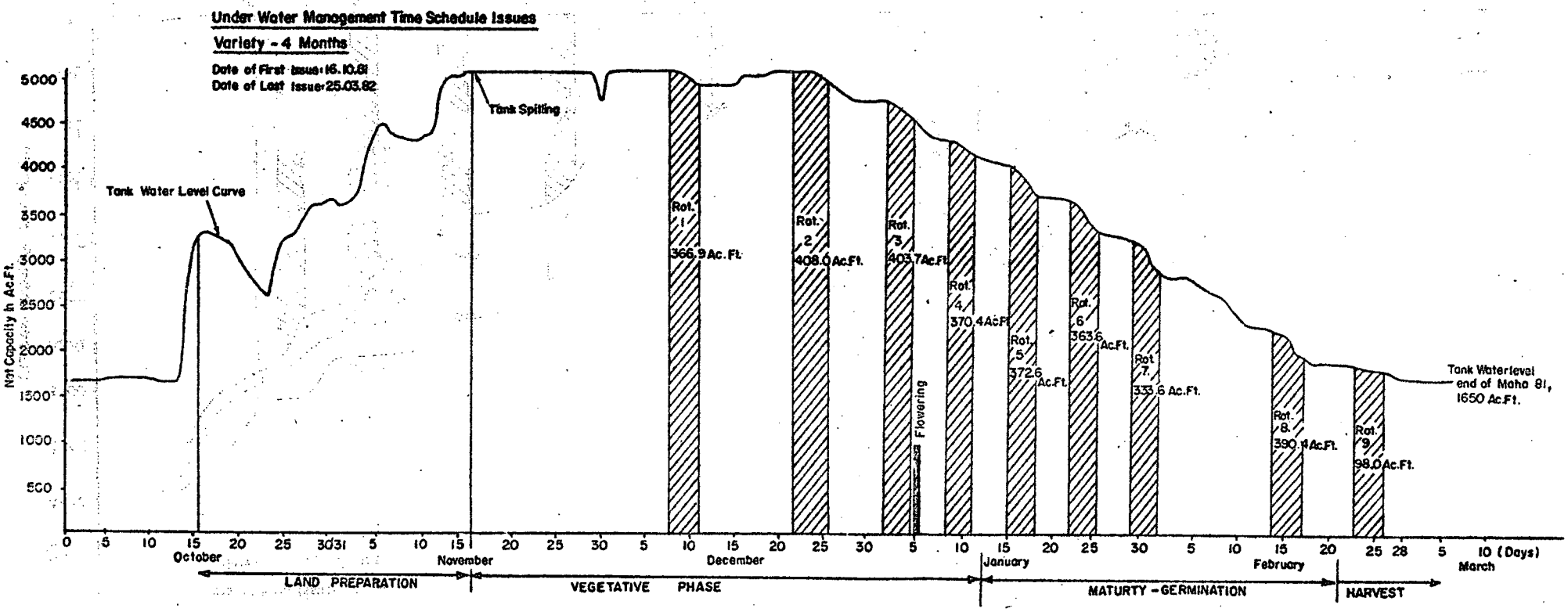
Source: Technical Assistant
Kimbulwana Oya Scheme

KIMBULWANA OYA SCHEME, 1983 Yala Cultivation Programme



Source: Technical Assistant
Kimbulwana Oya Scheme

KIMBULWANA OYA SCHEME, 1981-1982 Maha Issue



Source: Technical Assistant
Kimbulwana Oya Scheme