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Formal and Informal Water Management Systems: Cultivation Meetings and Water Deliveries in Two SRI Lankan Irrigation Schemes

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FORMAL AND INFORMAL WATER MANAGEMENT SYSTEMS: CULTIVATION MEETINGS AND WATER DELIVERIES IN TWO SRI LANKAN IRRIGATION SCHEMES

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EXECUTIVE SUMMARY

As population pressures in Sri Lanka have increased, irrigation in the Dry Zone has become more important. As this has occurred, the paddy economy has gradually shifted to the Dry Zone. Dry Zone irrigation projects have extensively relied on the transfer of water resources from Wet Zone rivers. Gal Oya and Kaudulla irrigation schemes are two such projects. The allocation and distribution of water in large tank-based schemes as somplex as the two above is not a simple matter. While many have studied the problems on water management in a generalized way, few have made studies of specific situations, and most studies deal with technical engineering issues rather than with the important social issues surrounding the distribution of irrigation water.

The two authors of this paper, Hammond Murray-Rust and Mick Moore, have made an extensive study of the way in which water is allocated and managed in the Gal Oya and Kaudulla Tank Irrigation Schemes. In this paper they compare and contrast their experiences during the yala, dry season, cultivation by focusing on the cultivation meetings (kanna). In principle, most major decisions relating to the allocation and distribution of water are made at these meetings. Both studies reveal the hollowness of the belief that on large-scale schemes, meetings of this type are effective decision making bodies. The studies illustrate the kinds of problems and issues that must be considered if more effective water management decisions are to be made at the scheme level.

Cultivation meetings, the main focus of this paper, are legally required to be held before each cultivation season for every irrigation scheme in Sri Lanka. During the meetings between authorities, technical staff, and users, key pre-season planning decisions are made. Such decisions include the fixing of the irrigation calendar, the calendar for other farm activities, the calendar for supporting services, and the rates at which fines will be levied.

However, it is clear that the cultivation meeting format, although ideally suited to small-scale projects involving limited numbers of people, breaks down under the pressure of large groups of people separated by social and spacial distance within the scheme. In large schemes, many cultivation meetings must be held. Obviously, the meetings cannot function as decision making arenas, since independent decisions regarding water delivery, etc. cannot be made throughout the scheme. Thousands of farmers may be involved in large schemes. Under such conditions, only a tiny fraction of the total will have the opportunity to express their opinion. Since decisions must be made on a daily basis at the local level, only general decisions can be fixed at the cultivation meetings. Finally, government agents who chair the

meetings are frequently transferred. Thus, the government official most directly responsible for decision making seldom has time to build up the appropriate technical information. As a result, most decisions are made by government officials prior to the cultivation meetings, which simply function to pass decisions on to farmers.

After reviewing the case material presented, one might conclude that the cultivation meeting system serves no useful purpose. In a manner of speaking, this is correct. Cultivation meetings no longer serve their original purpose of providing a democratic forum for decision making. However, the case studies suggest that the meetings perform other important and crucial functions in the irrigation system. They provide the farmers with an opportunity to publicly express their satisfaction with the job performance of irrigation officials. The publication of a scheaule for the supply of agricultural inputs gives farmers a better chance of receiving crucial inputs in a timely fashion. Evn if the meetings cannot provide a detailed schedule of water deliveries, they can give the farmers a broad indication of schedules in order to aid in individual planning decisions. From the official viewpoint, the meetings allow officers to assess the attitude of the farmers. Schemes that are chronically conflict-prone may be monitored, and attempts can be made to diffuse tension at critical moments.

After reviewing the problems with the cultivation meeting approach to management planning, the authors offer some alternative approaches. Some of these are already in use at other sites, and some have not yet been tried. One of the first alterations they suggest is the substitution of representative for the whole body of cultivators. Democratically-elected representatives would form a committee with officials to review planning problems on a regular basis. Not only would this approach allow every farmer to express his opinion, but it would also permit planning and decision making to go on throughout the irrigation season. The authors note that this type of arrangement is already being tried in five tanks in the North Central Province. However, the results of this experiment have not yet been assessed.

The authors point out that, although such an approach looks good on paper, the actual formation of a representative committee that is able to communicate with farmers is much more difficult. Committees tend to become political arena as areas compete for water. Another potential problem would be the position of the Government Agent and his assistants vis-a-vis the decision making process.

Another important problem with the present system of decision making is the lack of coordination between pre-season, long-range planning decisions (including those of cultivation meetings) and short-term, local operations throughout the season. In Gal Oya, it is difficult to predict both the discharge and timing of deliveries, while the Kaudulla data indicate that the timing of deliveries is more reliable than the amounts of water discharged.

It is conventionally suggested that farmers are to blame for water management problems at the field level. Analysis of data for the Gal Oya Project suggests that such problems are rooted in the management at much higher levels in the channel system. The inherent unreliability of water deliveries means that, even in years with high storage, it is not possible for farmers to predict either volume or timing of successive deliveries based on what they have been told. One cause of this lies in the relatively low ratio of available supply-to-anticipated demand that results when there are political pressures to extent the authorized area. The Irrigation Department is then forced to respond to rainfall in an attempt to conserve water in storage, and this disrupts predetermined delivery schedules. A second and equally important cause is the uncertainty associated with responsibility for various parts of the water delivery system. Ostensibly, the Irrigation Department controls the distribution of water down to the field level, but in practice it does not have the capacity to carry out this function. This places management under a strain while not providing farmers with the necessary service.

The authors suggest that a possible solution to this problem would be to assign managerial responsibility for distributary channels that encompass several field channel turnouts to the farmers. If the Irrigation Department scheduled irrigation deliveries to the head of each distributary rather than to the field channel, managerial requirements would be substantially reduced. Such a strategy would allow farmers to adopt management practices adapted to the particular local conditions. As a bonus, conflict between the government and farmers would be reduced.

Finally, this strategy could eliminate part of the problem involved with dividing up water and assessing water requirements. Under this system, water would be delivered on a volumetric basis, and water distribution would be fixed by farmer groups. Farmers then could make necessary managerial adjustments.

As the authors point out, Sri Lanka is a long way from adopting such a system. Records of discharges are not maintained, and the Irrigation Department would have to invest considerably more energy in main system management. Present efforts to organize farmers at the field and distributary channel level indicate that they are capable of accepting additional managerial responsibility. This is a first step in improving water management in Sri Lanka.

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AUTHORS' PREFACE

Hammond Murray-Rust was resident at Ampare District in the Gal Oya Scheme between November 1980 and August 1981, and returned in January 1983. The data on which the Gal Oya study was based were personally collected by Hammond Murray-Rust, with the assistance of M. N. Nazir, N. Ranjith, S. Azeez, and S. Upali. The study was carried out as part of the Cornell Rural Development Committee's (RDC) collaborative work on water management studies with the Sri Lankan Agrarian Research and Training Institute (ARTI). The research was supported under a cooperative agreement between RDC and USAID's Office of Rural Development and Development Administration (now Office of Multi-Sectoral Developrnent) in the Bureau of Science and Technology.

Mick Moore has intermittently visited the Kaudulla Scheme, but most of the data on which the case study is based are derived from research done by the staff of ARTI's Farm Power and Water Use Research Project, conducted in cooperation with the University of Reading (U.K.). In particular, R. Amarkoon personally collected much of the data reported here. Further valuable assistance was provided by Frederick Abeyratne of ARTI, John Farrington and Mike Ryan of the Farm Power and Water Use Project, and Dennis Holmes of the Hydraulics Research Station, Wallingford, U.K., who is coordinating a longitudinal hydrological study of the Kaudulla Scheme.

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CHAPTER I: INTRODUCTION

I.I Irrigation in Sri Lanka

Sri Lanka has a long history of irrigated agriculture. The system of reservoir (or tank) irrigation that developed in Sri Lanka enabled a major civilization to flourish for a millenium and a half. Irrigated rice was the major source of food for the population, which shaped its social structure, culture, and religious observances around the tanks. While the large tanks, such as Parakrama Samudra at Polonnaruwa, provided a central foci, thousands of smaller tanks more than matched the major schemes in total irrigated area. A dispersed, flexible system of irrigation management evolved, with the state playing a role but with a high degree of local initiative.[1]

For reasons that are still poorly understood, the system went into decline about 700 years ago. The bulk of the population migrated from the Dry Zone areas of the north and east, which were dependent on irrigation, to the Wet Zone in the southwestern quadrant of the island (Figure 1). In the Wet Zone, where the annual monsoon usually brings ample rainfall, most irrigation schemes are supplementary. As population pressures have increased, large-scale irrigation-cum-settlement schemes in the Dry Zone have played an increasingly important role in the growth of national paddy output. At present these schemes account for more than half of total paddy production. The "center of gravity" of the paddy economy has also gradually shifted to the Dry Zone, and this movement is likely to accelerate in the coming decade with the instigation of the Mahaweli Program. Because this program comes at the end of a series of projects that have exploited Dry Zone water resources, it relies heavily on the transfer of water from Wet Zone rivers.

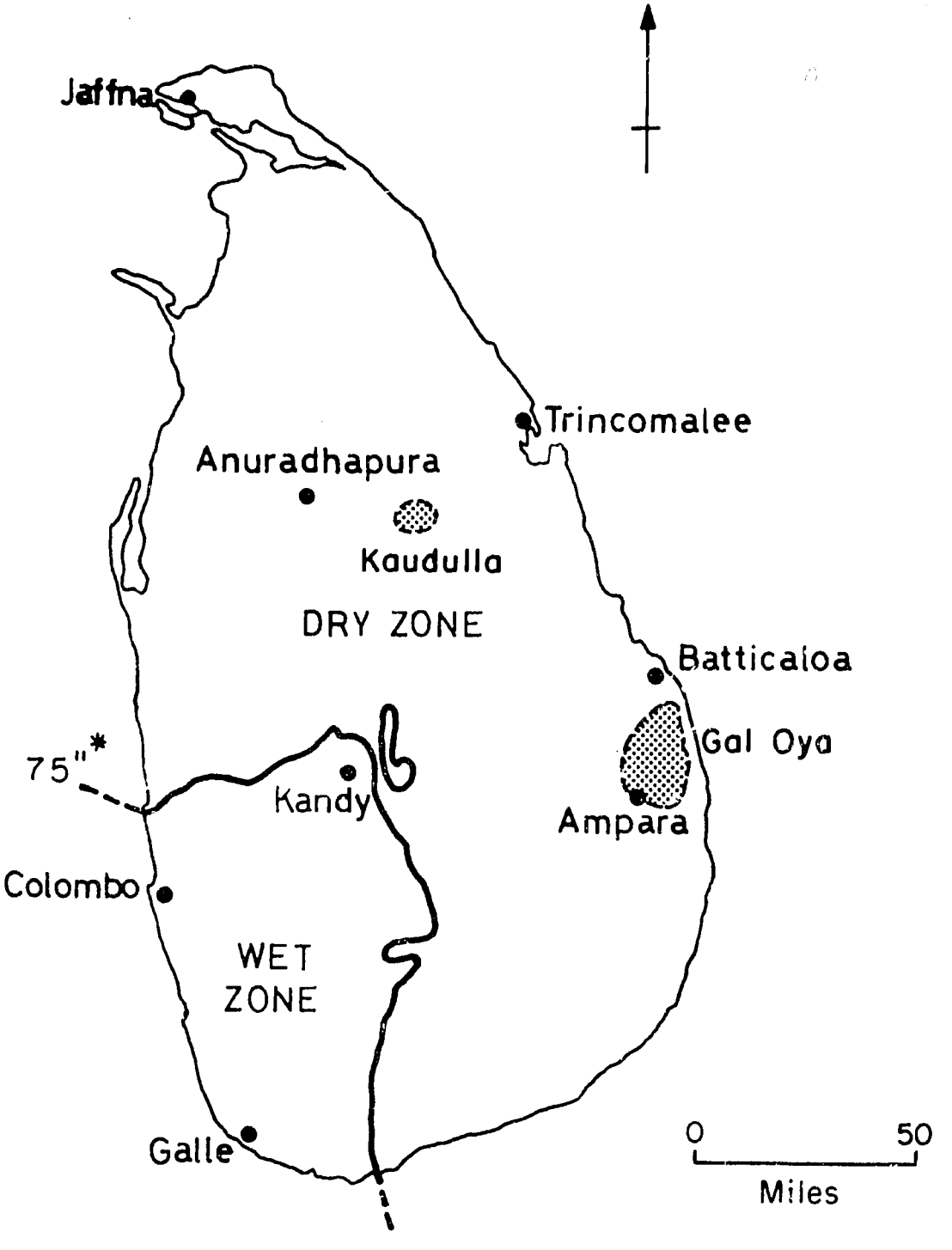

FIGURE 1: GAL OYA AND KAUDULLA IRRIGATION SCHEMES IN SRI LANKA

* The boundary between the Wet Zone and the Dry Zone is designated by the 75 inch annual rainfall isohyet

The technical and economic viability of the irrigation and settlement elements of the Mahaweli Program depend on lowering the water used per acre without adversely affecting yield per acre.

1.2 Scope and Purpose of the Study

Realization of the enormity and urgency of the water management problem has led, in recent years, to a mushrooming of investigative research, discussion, and report writing.[2] Much of this activity, in which the current authors played a small part, addressed problems of water management in a generalized way. People found themselves talking and writing about the Sri Lankan situation, thereby leaving themselves open to charges of overgeneralization and of neglect of the specific circumstances, history, and characteristics of individual schemes. It is only recently that substantial resources have been allocated to conduct detailed, first-hand investigations of water management practices at the scheme level.

By far the largest research exercise is that currently being conducted by the Agrarian Research and Training Institute (ARTI) as part of the Gal Oya Water Management Project. Gal Oya, a US $20 million project in Ampara and Batticaloa Districts to rehabilitate physical infrastructure and promote improved water management, is jointly sponsored by the United States Agency for International Development and the Government of Sri Lanka. The first author, a geographer turned agricultural engineer, has been part of the Cornell University Rural Development Committee's program of technical cooperation with ARTI.[3] The second author, a sociologist, has been intermittently working on water management aspects of a research project on farm power and water use in the Dry Zone.[4] This project, also conducted through ARTI, has been supported by the University of Reading. Of the three irrigation schemes in which field work was conducted under

this project, special attention was paid to water management issues in the Kaudulla Scheme in Polonnaruwa District.

Due to a fortuitous convergence of objectives and activities, the two authors found that they had comparable case material dealing with the way in which water was being allocated and managed in the Gal Oya and Kaudulla Schemes. Both case studies relate to the yala season, the dry season cultivation that falls in the first half of the calendar year. Cultivation depends almost entirely on water stored in reservoirs (tanks), and usually either cultivated area has to be restricted or water deliveries carefully controlled. The Kaudulla study relates to the 1980 yala season, the Gal Oya study to the 1981 and 1982 yala seasons. Both case studies focus on what are called cultivation meetings (kanna). In principle at least, most of the major decisions relating to allocation and distribution of water are made at these pre-season meetings. Both studies reveal the hollowness of the belief that meetings of this type are effective decision making bodies, and illustrate the kinds of problems and issues that have to be considered if more effective water management decisions are to be made at the scheme level.

It is not the authors' intention to specify how water should be managed in these schemes or in large schemes in general. Rather, the authors hope to illustrate how water is presently being managed, the ways in which this deviates from the nominal decisions made at the cultivation meetings, and the issues to be considered when contemplating improved institutional forums.

The case studies encompass two out of several dozen major schemes in Sri Lanka, the fourteen largest of which all have command areas in excess of 3,000 hectares.[5] As it happens, Gal Oya and Kaudulla differ widely from each other in many respects (see Table 1). It would not be an exaggeration to say that one could hardly find two more contrasting large irrigation schemes in Sri Lanka. This contrast, combined with both authors' less detailed investigations in a number of

other schemes, emboldens them to claim a broad measure of generality in support of their conclusion that, on another level, considerable similarities exist between the two schemes.

1.3 Water Management in Large Irrigation Schemes

Despite frequent references by bureaucrats and scholars alike to problems of water management in large irrigation schemes, there is little consensus as to what is specifically involved. In the context of this paper, it is useful to distinguish between the planning of water allocation and utilization, and the operation of irrigation infrastructure during a season. Although both functions are inevitably linked, the distinction can be useful with regard to the timing of irrigation activities and to the the various participants in each phase.

In almost every irrigation season it is necessary to have a plan for seasonal water allocation, both in terms of use (division among functions such as irrigation, power generation, and domestic supply) and spatial distribution within the particular scheme. Technical staff involved in water management tasks will be expected to produce estimates of available and expected water supplies, a task that is generally easier in reservoir-based systems than for run-of-the-river diversion systems. They should also be able to supply estimates of water requirements for alternative land uses.

The main function of irrigation planners is to develop a set of rules that can be used to allocate water according to different levels of availability and to inform users of the water conditions they can expect to experience in the forthcoming season. Water scarcity can be met by reducing the irrigated area, by changing to crops that demand less water, or by implementing more management-intensive operational strategies.

The success of the operational phase, which involves the temporal and spatial distribution of water during the season, will depend, at least to some extent, on the quality of decisions made in the planning stage. If decisions are made that are difficult to implement, those responsible for the operation of the system are placed in an awkward position. Should they try to follow the planning decisions, or should they adopt their own plans in response to short-run water availability.

Allocation activities will usually be more important when water supplies are well below normal, and particularly when there have to be severe restrictions on the total area that can be irrigated. In this case, there will be inevitable political and economic pressures to extend irrigated area beyond what was initially authorized according to technical criteria.

1.4 Cultivation Meetings

In Sri Lanka, a major event in the irrigation planning phase is the cultivation meeting. This is the only opportunity for authorities, technical staff, and users to meet together. While by no means the first stage in the process (planners sometimes meet first to prepare proposals to be presented to users), it is important because it is the key phase in the pre-season decision making process. Decisions announced at these meetings are legally binding for all parties. The Government Agent, as head of the administration in that district, is the only person who can alter or override decisions made at cultivation meetings.

It is a legal requirement that a cultivation meeting be held before each season for every irrigation scheme in Sri Lanka. In minor schemes, those with less than eighty hectares, the practice appears largely to have fallen into abeyance. This is partly connected to the often unsatisfactory performance of the government-instituted cultivation committees prior to 1977.[6] Meetings are held for all major schemes, those greater than eighty hectares, where operational activities

are the responsibility of the Irrigation Department (or, for new schemes, of the Mahaweli Authority).

Questions about the purpose and function of the meetings tend to elicit different answers from different respondents. In practice, the usual outcome of a cultivation meeting is a set of legal resolutions covering most or all of the following:

(1) The irrigation calendar—Key dates for the season are discussed and fixed, notably the first date for water delivery from the reservoir; the date on which sowing should commence; the date by which all land preparation should be completed; the date for commencement of rotational issues, if any; the form of rotational issues; the last date of water deliveries; and the final date for expected completion of harvest. Setting a calendar implies a choice, more or less explicit, about the types of paddy varieties to be grown. Maha (wet season) varieties normally require four to four and one-half months to maturity while yala (dry season) varieties require three to three and one-half months.

(2) The calendar for other on-farm activities—The dates by which field channels should be cleaned; watch huts erected; fencing around paddy tracts completed; and cattle removed from paddy-growing areas are fixed.

(3) The calendar for supporting services—The dates by which cultivation credit and seed (paddy and non-paddy) must be applied for by farmers and disbursed by the official distribution agency are fixed.

(4) The rates at which fines are to be levied—Fines for misdemeanors such as late land preparation, failure to clear irrigation channels, and water buffalo or cattle damage to standing crops are fixed. (Such fines are rarely imposed.)

These resolutions are typically reached after a discussion ranging over many topics and more or less liberally interspersed with particular or general complaints

from farmers about the way in which government officers perform or fail to perform their jobs. From the viewpoint of the Irrigation Department, the cultivation meetings fulfill the following functions (Maheswaran, 1976:1):

> Every engineer is familiar with the normal operating pattern in major irrigation schemes. During October of each year, or immediately after the tank fills up to a safe level, he receives a notice from the Government Agent (or an official authorized by him) informing him of a cultivation meeting to decide on the dates for cultivation procedures. On the appointed day the engineer presents himself at the meeting and tenders advice on the extents and the prospects for the season. The cultivators then proceed to make their various decisions regarding the dates for the various farming operations, varieties of seed paddy to be used, acreage to be cultivated, etc. The same series of decisions are made for the yala cultivation also, which would be at a meeting in about April each year. At these meetings, the engineer's advice may or may not be accepted.

The last sentence is critical; if decisions are made at the meeting that are contrary to the technical advice that has been tendered, the Irrigation Department engineer may be placed in a difficult, if not impossible, situation. The author is clearly aware of this, he continues (Maheswaran, 1976:1):

> When the engineer tenders his considered technical opinion at a cultivation meeting, the cultivators should make their decisions within the scope of the recommendations given by the engineer. If the decision made by the cultivators is detrimental to the national interests, then the presiding officer (the government agent) has powers to overrule such decisions.

In providing the Government Agent with these powers, the Irrigation Ordinance enables him to act unilaterally. If he wishes, the Government Agent can announce decisions in the form of a proclamation that excludes farmer input. Therefore, it is not in the interest of the farmers to reject government proposals made at cultivation meetings, because they may then face the prospect of a fiat.

According to official interpretation, the cultivation meetings are exptected to perform the following functions:

(1) To make decisions about the extent of land to be cultivated, the cropping pattern to be followed, the calendar for agricultural operations, supporting services and water management.

(2) To establish penalties for noncompliance with these decisions.

(3) To inform farmers about these decisions.

(4) To provide a forum for farmers to draw public attention to cultivation problems and to make complaints about officials.

Farmers would probably express varying agreement with this interpretation. Many cultivators, especially those in schemes where the formal democratic aspects of the decision making machinery works badly (see below), would tend to emphasize point 3. They see the meetings as serving to broadcast decisions already made by officers, not as an opportunity for farmers to exercise any influence over the decision making process. As we shall see, the farmers' viewpoint is not entirely wrong, although there may not be as much blame attached to officers as the farmers would like to suggest. Questions concerning the functions that are or might be performed through cultivation meetings are central to the discussion below.

It is useful to look in a little more detail at the particular form that the cultivation meetings presently take. This is a question that is particularly pertinent in light of the evidence presented below, which suggests that the once-per-season "democratic" meeting open to all farmers is a somewhat odd device for ensuring effective decision making in <u>large-scale</u> irrigation schemes serving thousands of cultivators.

Clearly, the organizational format of the cultivation meeting is ideally suited for small groups of farmers. An investigation into the historical background of the cultivation meeting process reveals that the structure has, in fact, been inherited from that used in small schemes. Over the past century, and especially during the last fifty years, the scale of new irrigation projects has grown rapidly. With the exception of a few large-scale works such as Kala Wewa and Kantalai, most irrigation development in the nineteenth and early twentieth centuries was in the

form of village tanks (Roberts, 1972; Farmer, 1957). There was a shift to larger-scale schemes after 1931, but the Gal Oya and Uda Walawe Schemes, which were initiated in the 1940s, dwarfed all previous projects. They in turn have been surpassed by the Mahaweli Program, which will link a large fraction of Sri Lanka's irrigable area into a single integrated system. The cultivation meeting has, however, been shifted from very small to very large-scale schemes with little change.[7] The cultivation meeting was an effective decision making body for small schemes for three major reasons:

(1) The main emphasis is on the calendar for cultivation and related activities and, where water is scarce, on the extent and location of land to receive water. Village tanks supplying a rudimentary channel network, with few effective or permanent water control structures, could be managed without great debate or many formal decisions concerning the allocation of water once it was released from the tank. Flow was more or less continuous, and disputes between farmers could be settled on an informal and personal basis. The point was to agree on a common calendar so that everyone would be ready to use the water once it was released.

(2) An open meeting was a relatively effective way of representing all of the (at most) several dozen farmers cultivating land under the command area of the tank. Each voice could be heard, and there was a good chance of reaching a genuine consensus.

(3) Since the issues at stake were relatively simple, there was no need for technical guidance. Rather, the need was for authoritative and administrative direction and to achieve a consensus among competing views and claims. Such direction could be provided by the all-purpose revenue officer responsible for general administration—that is, the village headman in smaller schemes and the Government Agent or Assistant Government Agent on those

schemes covering hundreds rather than dozens of acres. Where motor vehicles were not available or not suitable for rural use, the Government Agent could travel on horseback. As a busy man with wide-ranging responsibilities, he could be expected to attend at most one meeting per scheme per season. Further, once decisions had been made, it was expected that the vel vidane, an appointed water-master, would make day-to-day decisions regarding water distribution, although the Government Agent still plays a central role.[8] The agent chairs the meetings and is responsible for ensuring agreement and compliance among officers of several government departments over which he exercises at least a nominal supervisory control. These include the Agriculture, Agrarian Services, Irrigation and Land Commissioner's Departments, together with the rural banks, cooperatives, and the Agricultural Development Authority.

One major feature of the present format of the cultivation meeting that might not be expected given its historical origins is the high degree of formal democratic procedure inherent in the meetings. For example, resolutions are formally proposed and seconded by farmers before they can be accepted by the meeting. As will be seen below, these formal rules have to be widely circumvented in order to make the system workable.

The historical development of cultivation meetings also makes them less able to cope with the needs of contemporary large-scale schemes. Four areas where this is most acutely felt are the following:

(1) In very large schemes, such as Gal Oya and Uda Walawe, a dozen or more separate cultivation meetings have to be held in different locations each season in order to make farmer participation possible. The consequence is, of course, that the meetings cannot be arenas for decision making since separate areas within a major scheme cannot implement independent deci-

sions on matters like water delivery schedules. At most, the meetings serve to elicit farmer responses to proposed cultivation calendars and perhaps make marginal adjustments, but the real decisions must be made elsewhere.

(2) Since each cultivation meeting in the larger schemes nominally encompasses thousands rather than tens or a few hundred farmers and because there is no mechanism for choosing delegates, only a tiny fraction of all voices are heard. Attendance at meetings varies widely (see below), and even the best attended only attract a minority of farmers. It is not uncommon for meetings to fail to have a legal quorum. Under such circumstances, almost automatically, the Government Agent suspends the legal requirements. It is clear that there is no valid yardstick for assessing the representativeness of farmer views expressed at the meeting. Even if decisions are made with reasonable agreement by those present, dissidents can always challenge them, sometimes with great effect, claiming that certain categories of farmers were not properly represented.

(3) Cultivation meetings can, at best, make general decisions regarding water delivery calendars and rotations. Since day-to-day decisions have to be made in line with particular weather patterns and field-level water conditions, which cannot be known before the season commences, general decisions can only have a limited influence on short-term questions of water distribution within the total scheme. While there is considerable potential for discussing strategies to be adopted in response to weather and other variable factors, such discussions are not incorporated into the cultivation meetings. Water management, particularly from the farmer's perspective, is a process of continuous decision making. Nevertheless, cultivation meetings make decisions that will not be implemented for several months and that may end up being irrelevant. In many cases, modification of these decisions becomes a

complex procedure involving officials who are not directly connected with operational activities.

(4) Cultivation meetings are chaired by the Government Agent, whose position is subject to frequent transfers. It is quite common for a Government Agent to be involved in no more than two or three cultivation meetings for a particular area before he is moved. Not only does he lack technical expertise, but he rarely has time to develop any detailed knowledge of the local physical, social, and agronomic environment. In theory, this knowledge can be supplied by the Deputy Director of Irrigation responsible for the scheme and by other senior officers. But, in practice, these officials are also subject to frequent transfer. The only cadres who develop a more sound knowledge of scheme conditions are junior officers, who have a relatively minor role to play in the decision making process, though, particularly within the Irrigation Department, they have a major operational role. A consequence of this lack of accumulated experience among senior officials is a tendency to view all schemes as basically similar. That is, decisions made in one scheme are assumed to be equally appropriate for other schemes.

As will be seen from the details of the case studies presented below, each of these factors has a significant effect on the cultivation meetings and their effectiveness. Before presenting the case studies, we will first describe the administrative structure overseeing irrigation and then introduce the study locations.

1.5 Administrative Structure

Administrative responsibility for the operation of large schemes (those serving more than 200 acres) is vested with the Irrigation Department (ID), which functions under the Ministry of Lands and Land Development (MLLD). The ID has

its national headquarters in Colombo, with a Director of Irrigation and a number of Senior Deputy and Deputy Directors (DD). Some measure of decentralization is provided for by having Deputy Directors heading up each range (an area roughly at the level of a district in the government structure, but corresponding to hydrological areas). Ranges cover a number of schemes (projects), which are generally headed by an Irrigation Engineer (IE), though a large scheme is sometimes divided so that several IEs operation subproject areas. Below the scheme level, there are areas under the responsibility of a Technical Assistant (TA), who has some engineering training but is not a trained engineer. Under the TA are a number of field staff—the Maintenance Overseers (also known as Work Supervisors), Irrigators (operating gates off the main and branch canals), and Laborers (maintenance and other duties). This arrangement is graphically illustrated in Figure 2.

The range Deputy Director is responsible to his superiors in the irrigation Department on technical matters, but also to the Government Agent (GA), who is the chief administrative officer for the district and who has coordinating authority over all government officers within that district. (Since ranges and districts do not exactly correspond, this in itself creates problems apart from the difficulties of the DD serving both technical and administrative superiors.) The GA is assisted by Assistant Government Agents (AGA), who have coordinating responsibility for AGA areas (formerly District Revenue Office areas). IEs and TAs have no formal link to the AGA as the DD has to the GA, but the AGA often finds himself beset with requests or criticisms revolving around irrigation—the amount, timing, and distribution of water deliveries—so that involvement of the AGA in water management is common.

At the field level, the TA and his staff will have as much autonomy as their ID superiors allow. If the TA and his staff are not judged satisfactory by influential persons or by large groups, matters are taken up at higher political and

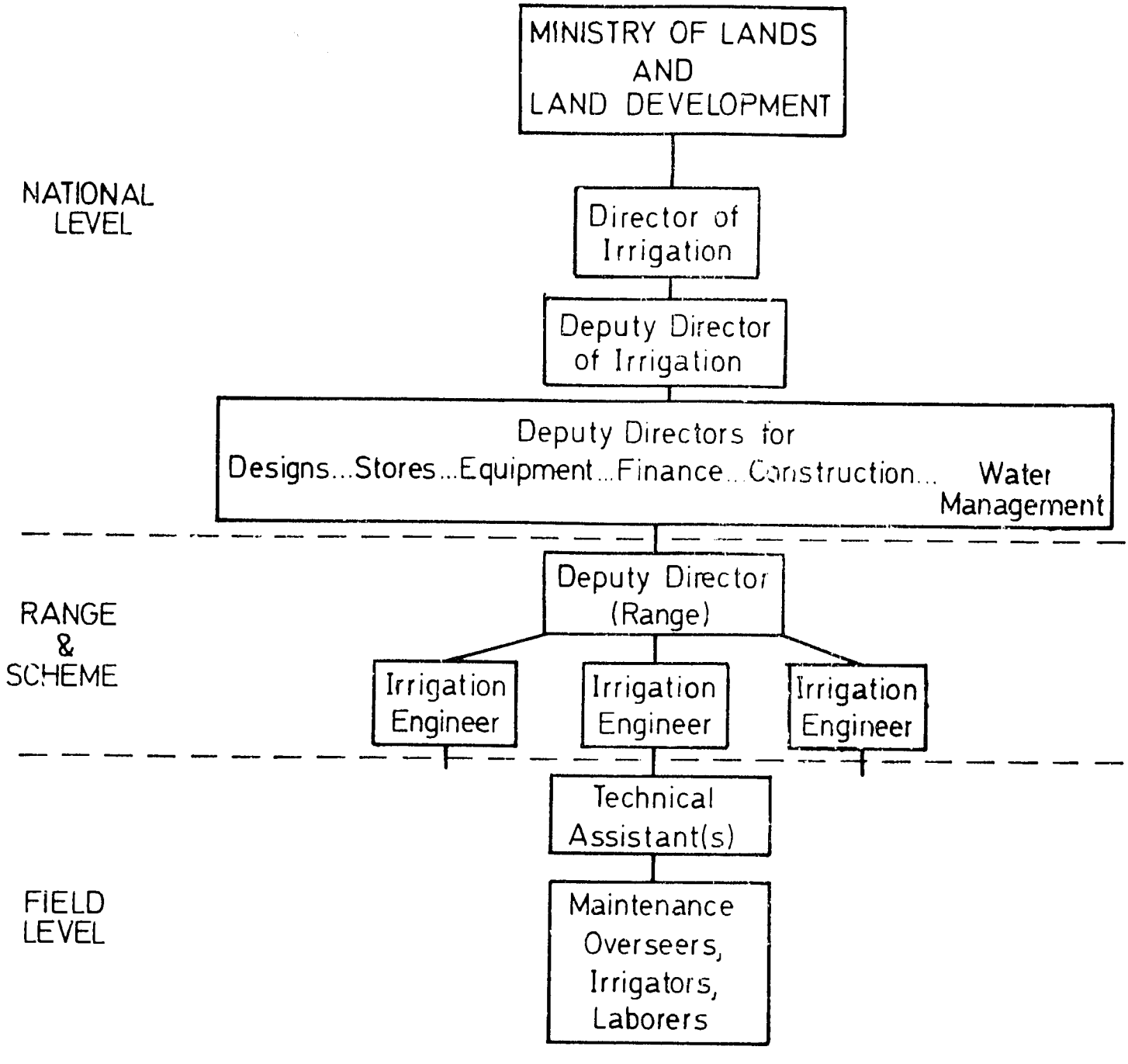

FIGURE 2: THE GOVERNMENT IN IRRIGATION IN SRI LANKA

administrative levels, with the effect that decisions at the field level are often overruled, or at least scrutinized from above by a member of Parliament or through ID administrative officials. The ministry has no official operational role in water management, although it is concerned with water management policy. As it has little technical expertise on the subject, however, engagement in policy matters can be difficult, with the ID having the advantage with a large and united staff when matters of ID interest are at stake. The central office seeks to achieve policy objectives and maintain a certain uniformity of operations through the range DDs, who are the classic "men in the middle." They have to deal with all the local problems and must be capable of adaptive and improvisational behavior (usually seen by the center as "deviation"). We are not concerned here with such administrative issues except as they bear on the processes of water management at the scheme level. We now turn to a consideration of the two schemes.

1.6 Gal Oya and Kaudulla Irrigation Schemes

Detailed accounts of the physical characteristics of the Gal Oya and Kaudulla Irrigation Schemes may be found elsewhere. Here, we simply want to indicate the major contrasts that exist between the two schemes. This provides some context for the case studies and helps to justify the claim that the similarities between these diverse schemes provide some basis for generalizable conclusions.

The main differences between the two schemes are sketched out in Table 1 on the following pages, and there is little need to elaborate on them. Almost all of the differences may be traced to two main sets of contrasts:

(1) Kaudulla is a recently developed project in which small amounts of land (two or three acres) were given to immigrant settlers. No private lands are incorporated in the scheme. In contrast, the Gal Oya area includes substantial holdings of private lands, often in large blocks, and there was less

Table 1: A Summary of the Major Differences Between Gal Oya and Kaudulla Irrigation Schemes

Gal Oya	Kaudulla
HISTORY	
1. A new scheme, begun in the 1940s, incorporating about 25,000 acres of previously irrigated land along the Gal Oya River.	1. An ancient scheme in disrepair reconstructed in the 1960s.
PHYSICAL CHARACTERISTICS	
2. Probably about 100,000 acres receive some irrigation water, although the nominal command area is about 130,000 acres.	2. Irrigates about 10,500 acres.
3. Water is extremely scarce in the yala season when less than half of the command area is irrigable.	3. Water is relatively more abundant.
4. System includes a large number of small tanks partially fed from the main tank and channel system.	4. Irrigation water only stored in and supplied from the main tank, plus one small tank at the tail end of the system.
5. Operated as a number of partially independent irrigation schemes.	5. Operated as a single system.
6. Includes large holdings of private lands incorporated into the project.	6. Includes no private land.
7. Includes large areas of encroached lands.	7. Includes relatively few encroachments.
8. A high proportion of soils are well-drained, red-brown earths and non-calcic brown earths.	8. A high proportion of soils are poorly drained low humic gleys.
9. Terrain is somewhat rolling.	9. Terrain is very flat.

Table 1 (continued):

Gal Oya	Kaudulla
PHYSICAL CHARACTERISTICS (continued)	
10. Sugar cane (10,000 acres) is grown in one part of the scheme.	10. Paddy is the only major crop irrigated.
11. The system is self-contained.	11. The system is now linked to the Mahaweli Project area and can receive Mahaweli water.
12. An irrigation and power generation project.	12. Solely an irrigation project.
SOCIOPOLITICAL CHARACTERISTICS	
13. Divided between Sinhalese and (mostly tail end) Tamil and Muslim areas.	13. Sinhalese farmers only.
14. Divided between two administrative districts and three irrigation engineers.	14. Falls within one district and one irrigation department range.
15. Located in a remote area; considered an unwelcome posting for most officials.	15. Located in one of the most developed parts of the dry zone; considered a reasonable posting.
16. A substantial number of large land holdings in the scheme.	16. Few large land holdings in or around the area.
17. Relatively high levels of landlordism and economic inequalities.	17. Relatively low levels of landlordism and economic inequalities.

Table 1 (continued):

Gal Oya	Kaudulla
SOCIOPOLITICAL CHARACTERISTICS (continued)	
18. In the lower portions of the scheme, tractors are the main source of draft power, and tractor ownership is a means of capital accumulation. In the upper end areas, draft animals predominate.	18. Power is mainly supplied by draft animals, which are distributed among landowners. Tractors are mainly hired from outside the scheme.
19. There is considerable tension in the relationships between farmers and government officers. There is a history of violence between farmers.	19. Farmer-officer relationships are generally good. Violence is rare.

equity in allocation of land holdings to settlers, a significant number of whom came from within the Gal Oya area. The scheme has been established for long enough that further inequalities have developed among land allottees, and landlord-tenant relationships have become well entrenched.

(2) Topography, soil, and the relationship between water availability and irrigated area make water much less scarce in Kaudulla than in Gal Oya. Consequently, the problems of inequality in water deliveries between "head-enders" and "tail-enders" are much more marked in Gal Oya.[9]

The interactions between the various factors need not be discussed in detail. Suffice it to say that compared to Kaudulla, Gal Oya is a far more difficult scheme to manage. Not only is water more scarce, but Gal Oya's channels cut across administrative boundaries. There are conflicting demands for water between paddy and sugar cane growers, and responsibility for operations is split among three separate Irrigation Engineers. Even before the scheme was developed, there were significant socioeconomic inequalities in Gal Oya, and these have been exacerbated by inequalities in access to water (Abeyratne, 1982). Because these inequalities largely coincide with ethnic boundaries, water management is even more difficult. It is commonly said that if water management can be successfully improved in Gal Oya, it can be improved anywhere in Sri Lanka.

NOTES

[1]The prominent Sri Lankan historian, K. M. DeSilva (1977:36) writes: "No doubt the maintenance of this system in good repair, apart from its expansion, required a sophisticated machinery of administration under central control. But it was the permanent institutions rooted among the people at village level which ensured the survival of the system during the periods of turmoil which were a regular feature of Sri Lanka's ancient history."

[2]See, for example, Chambers (1975); Murray-Rust and Kramer (1979); Moore (1980a and b); the papers of the seminar on Land Settlement Experiences in Sri Lanka held in Colombo in April 1981; references in these documents; and numerous consultancy reports.

[3]Details of this research are available in the 1980 Sri Lanka Yearbook of Water Management Research. (Colombo: ARTI, 1982.)

[4]For details, see Farrington et al. (1980).

[5]For a list of large schemes, see Farrington et al. (1980:7).

[6]These committees were created by the Paddy Lands Act of 1958, and the members were to be elected by all the farmers cultivating in a given tract (yaya) of irrigated paddy land. The committees were made appointive after 1972 (with the governing party exercising a predominant role) and, because of their politicization, were abolished in 1977 when there was a change of government. These committees are discussed in Norman Uphoff and R. D. Wanigaratne, "Rural Development and Local Organization in Sri Lanka," in N. Uphoff, ed., Rural Development and Local Organization, Volume I: South Asia (New Delhi: Macmillan, 1982) pp. 503-08 and 522-28.

[7]The exception is the very latest phase of irrigation development, the newly-developed "H" area of the Mahaweli Scheme, where water meetings are not held.

[8]The traditional position, vel vidane, was abolished in 1958 at the time the Cultivation Committees were created. By custom, this role was usually monopolized by better-off (and better-connected) families in each community. Although there might be some consultation with the cultivators in an area, the appointment was made by higher-level authorities. The role of elected "farmer-representatives"

NOTES (continued)

was introduced in the Agrarian Services Act of 1979, and, given local familiarity with the vel vidane role, the new position is commonly called by the old name in Sinhala.

[9]There are a wide range of data now available to illustrate the development of socio-economic inequalities between "top-enders" and "tail-enders" in Sri Lankan irrigation schemes. These have been prepared for publication by the second author and others (Moore et al., forthcoming, 1982.)

CHAPTER 2: THE GAL OYA CASE STUDY

2.1 Scheme-Level Conditions Affecting Water Management

As indicated in Chapter 1, both the scale and complexity of the Gal Oya Scheme are such that many decisions have to be made at the district level before cultivation meetings are held. The District Agricultural Committee (DAC), made up of district-level officials and chaired by the Government Agent, has to consider the water situation and needs for the whole area, though, as will be seen, there are still many unresolved problems of coordination despite preplanning. To understand the nature of the proposals presented to farmers at the cultivation meetings, it is first necessary to examine the scheme-level decisions that are made and the extent to which they can allow for farmer suggestions or changes at cultivation meetings.

Four major criteria have to be considered by the District Agricultural Committee when formulating the overall plans for any season. These are allocation of water among uses; allocation of water among areas; coordination of water deliveries between the different areas governed (presumably) through cultivation meeting decisions; and the relationship between the cultivation meeting areas and the channel network serving them.

Allocation of water among uses—During the planning phase of the Gal Oya Project, it was envisaged that the main reservoir, Senanayake Samudra, would have multiple functions. Not only was it intended to provide irrigation water, but also to act as a flood control structure for the Gal Oya Valley, to provide domestic water supplies for most of the settlements within the scheme, and to supply water for power generation at the headworks at Inginiyagala. Locations are shown in Figure 3. Before each season, water in storage has to be allocated among these

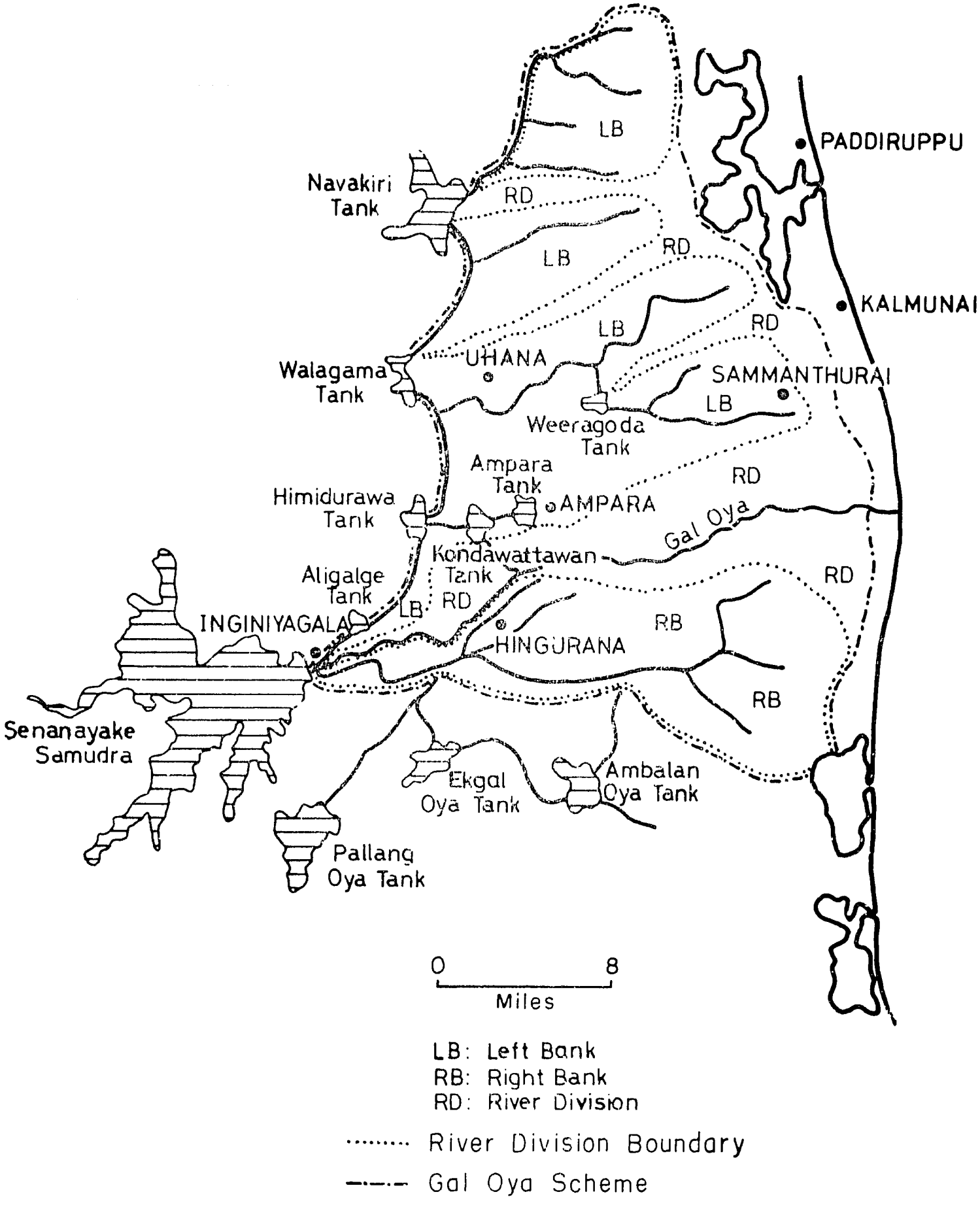

FIGURE 3: THE GAL OYA IRRIGATION SCHEME

purposes. Actually, this has not been a very complex task because irrigation needs take precedence, and the volume of water in the reservoir has rarely been sufficient to satisfy all purposes. There are operational rules that state that whenever the water in storage exceeds 500,000 acre-feet, releases can be made for either flood control or power generation independently of releases for irrigation (Irrigation Department and Sri Lanka Electricity Board, 1980).[1] If storage is less than 500,000 acre-feet, releases can only be made for irrigation needs or domestic water supply, although water will be routed through the turbines at the power station whenever feasible. Since 1972, storage has never exceeded 500,000 acre-feet (indeed, the reservoir has only reached full capacity twice in over thirty years) so it can be assumed that most releases are for irrigation and domestic use. In fact, in 1981, during the national power crisis, the Irrigation Department refused to allow special releases for power generation because there was barely enough water for standing crops.

For most of the year, domestic water requirements are covered by irrigation releases as long as each part of the scheme is at least partially irrigated. During the period between the end of the yala season and the onset of the maha rains, specific domestic releases sometimes have to be made, but this has only been of importance in the last few years. Before 1977, the de facto staggering of cultivation schedules meant that irrigation releases were made in almost every month of the year, except when there was sufficient rainfall to meet crop needs. After 1977, when the volume of water in the reservoir was reduced because of alterations in rainfall, domestic water issues began to present a serious problem.

The main allocation decision to be made is between crops. Gal Oya is the only major scheme in Sri Lanka where there is a substantial area devoted to a crop other than paddy. During the initial planning of the Gal Oya Scheme, it was anticipated that sugar cane would be cultivated in several different locations

throughout the area, but ultimately substantial areas were planted only on the Right Bank. At present there are about 10,000 acres of sugar cane plantations on the Right Bank, centered around the sugar factory at Hingurana.

The first planting of cane fields did not commence until the early 1960s, and the annual increase in acreage has not been great. There do not appear to have been any water problems on the Right Bank until the drought of 1973, when there was a severe water shortage toward the end of the yala season. Although good rains fell in late 1973 and replenished water supplies in Senanayake Samudra, the Sugar Corporation was sufficiently concerned about the future that a Cabinet decision was made to give priority to sugar production over paddy.[2] When the 1974-75 rainy season failed, the Sugar Corporation was assured by the Prime Minister that the 1974 decision would remain in effect. The Irrigation Department was instructed to ensure that sugar cane areas received their normal allocation of water before any allocations were made to other parts of the scheme for paddy production.

Analysis of Irrigation Department records indicates that, by and large, the sugar cane areas on the Right Bank have received most, if not all of their water allocation, even when there have been significant shortfalls in the amount of water available. Whenever water in storage was greater than 300,000 acre-feet at the beginning of April, the Right Bank areas have been given their normal allocation of 100,000 acre-feet for the yala season. If storage was below this level, water deliveries to the Right Bank would be reduced, but the percentage reduction has always been far less than that made for the River Division or the Left Bank portions of the scheme.

It should be stressed that the allocation patterns described here have been derived from our analysis of Irrigation Department records. There is no evidence of a formal set of operational rules for coping with water shortages. Rather, it

appears that the Irrigation Engineer in charge of the scheme slightly reduced deliveries to the Right Bank when water was in short supply while more drastically reducing deliveries to the other two divisions. Given that there have been several different engineers responsible for the scheme during the ten-year period analyzed, it is suprising how consistent the allocation patterns have been. These are discussed below.

Allocation of water among areas---Once the water allocation for sugar cane has been made, planners have to decide how to divide the remaining water among Right Bank, River Diversion, and Left Bank paddy areas. Again, there do not appear to be any strict guidelines or rules, but the Irrigation Department records show considerable consistency in allocations over the past ten years. The simplest task has been allocation of paddy for the Right Bank. The actual requirements for sugar cane are estimated to be 5 acre-feet/acre in the dry season, for a total of 50,000 acre-feet for sugar.[3] However, because the Sugar Corporation workers are government employees, they only work during daylight hours, and more water is needed than if continuous deliveries were made into the sugar fields. If the Irrigation Department issues double the minimum amount---e.g., 100,000 acre-feet---there will be sufficient water to irrigate the area planted in sugar plus about 10,000 acres of paddy cultivated in areas adjacent to the sugar estates. This has the advantage of allowing extensive reuse of drainage water from the sugar fields as well as drainage water from independent schemes upstream of the Right Bank main channel.

It is commonly stated that there is a policy of ensuring that water is delivered during the yala season to any area that was unable to grow a maha paddy crop. In almost all areas of the Gal Oya Scheme, it should be possible for farmers to obtain a maha crop, even in it is entirely rainfed. The exception to this are certain parts of the River Division, which suffer from flooding during the wet

season. These areas are all close to the coastal lagoon. In order to get water to these tail-end areas during yala, water has to flow through most of the River Division. As a result, most of the River Division gets two paddy crops a year. However it should be stated that the amount of water allocated to the River Division on a per-acre basis tends to be lower than for the rest of the scheme, partly because soils are less well drained and partly because there are considerable opportunities for reuse of water that drains into the River Division from both the Right and Left Bank areas.

The net result is that when water is in short supply, the main reductions in area are made in the Left Bank portion of the scheme. Irrigation Department records indicate that there have been greater fluctuations in both the total area authorized and the volume of water delivered to the Left Bank than to either the Right Bank or River Division areas. If water allocations to the Right Bank and River Division are subtracted from the total storage available, one finds a fairly predictable relationship between remaining volume in storage and total land authorized for cultivation in Left Bank areas over the past nine dry seasons (Figure 4). There is evidence that, regardless of how much water is available in storage for the Left Bank, it is not possible for the authorities to agree to authorize less than about 12,000 acres without coming into serious conflict with politicians acting on the behalf of farmers. In all years when the water in storage was well below normal, the Irrigation Department initially recommended authorization for less than 12,000 acres for the Left Bank, but, in every case, at the District Agricultural Committee meeting it was obliged to raise the authorized area to about 12,000 acres. If, on the other hand, stored water was at or above normal, the Irrigation Department could expect that its recommendations would be accepted as long as they exceeded 12,000 acres.

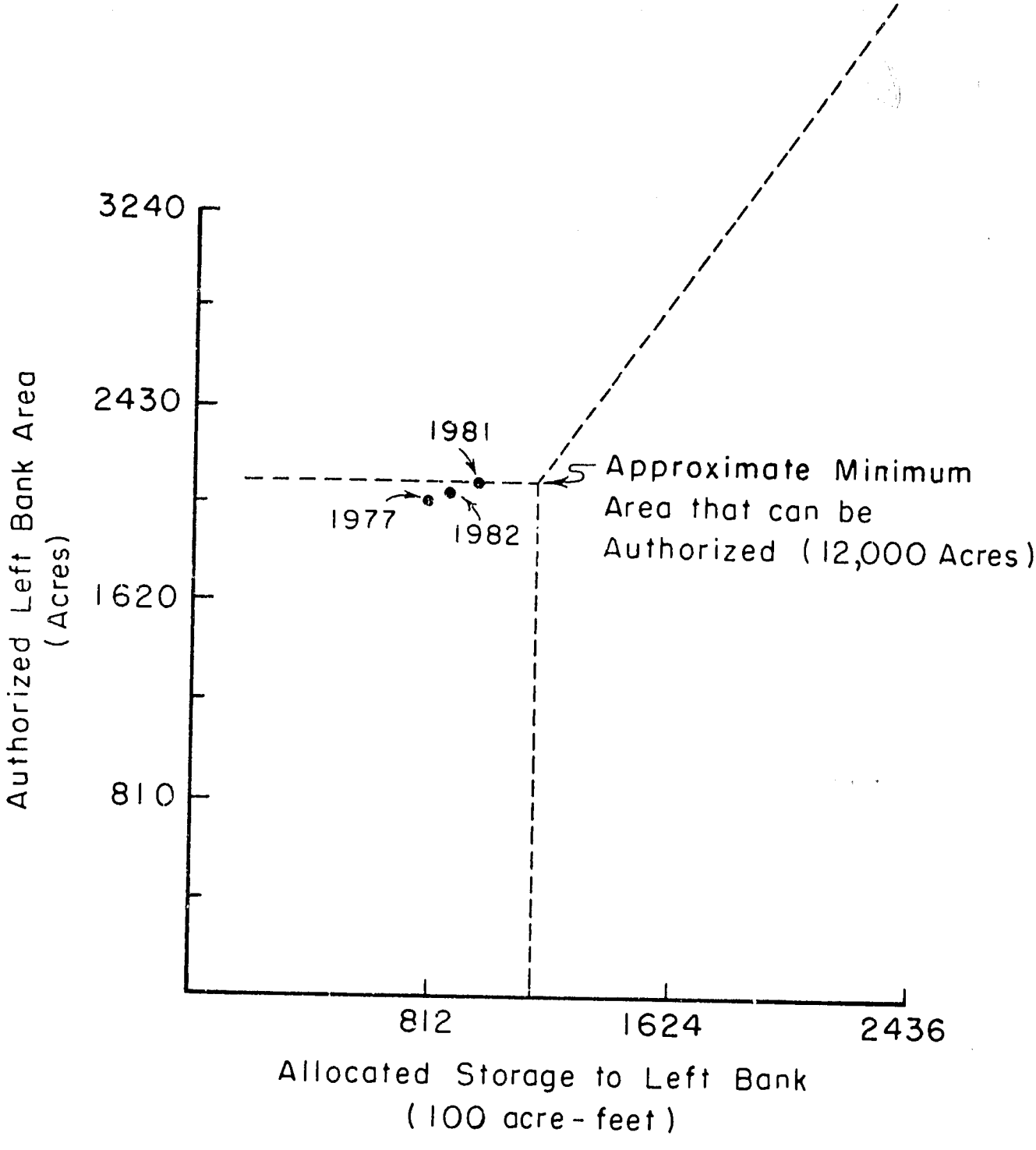

FIGURE 4: AREA AUTHORIZED FOR CULTIVATION ON THE LEFT BANK, GAL OYA RELATIVE TO WATER IN STORAGE, YALA SEASONS, 1977-1982

In addition to proposing a total area for cultivation for the Left Bank, the DAC also has to allocate this water among areas covered by different cultivation meetings. For hydrologic and managerial reasons, land authorization has almost invariably started at the head of the Left Bank and proceeded downstream until the total area authorized has been allocated. Head-end cultivation meeting units can therefore always expect to receive authorization for full cultivation, middle areas have a reasonable expectation of at least some authorization, while tail-end areas have little or no prospect of getting an irrigated yala crop since water supplies are never sufficient. It is always likely that there will be problems for officers who have to attend cultivation meetings in the middle part of the scheme in those years when only the minimum area is to be authorized. In some tail areas, meetings are never held.

Coordination of Cultivation Meeting decisions—Because the water flowing to each division of the Gal Oya Scheme is ultimately controlled by that division's sluice gate at the main reservoir, it is necessary for decision makers at the scheme level to ensure that the decisions arrived at for all of the cultivation meetings within each division are compatible. The easiest way to achieve this is by agreeing at the District Agricultural Committee meeting on a basic set of decisions for presentation to each cultivation meeting. Of particular concern is coordination of the irrigation calendar for all areas. When operational plans are discussed at cultivation meetings, it is desirable to be able to propose and agree on the same rotational calendar for all areas within a single division of the scheme.

As indicated in Chapter I, soliciting agreement on these two issues—the calendar for cultivation and the schedule for rotational issues—provides much of the original purpose for cultivation meetings. Yet, the physical layout of the Gal Oya Scheme largely prohibits farmer input on these matters. It is therefore not suprising that farmers view the meetings largely as mechanisms to inform them of

decisions that have already been made at a higher level, rather than as a forum for farmer inputs into the decision making process. It is in this context that the comparison of Gal Oya and Kaudulla is of interest. Although there is only one cultivation meeting for the entire Kaudulla area, it still largely serves as a vehicle for ratifying decisions already made at the DAC level.

The fit between hydrologic and administrative boundaries—The Gal Oya Scheme is unique within Sri Lanka in terms of the complexity of its boundaries. In addition to being subdivided into eight separate cultivation meeting areas, the Left Bank Division is also split among three Irrigation Engineers and between two districts (Figure 5). Because two DAC meetings are involved, coordination is difficult. There is also the matter of transfer of responsibilities between different officers at administrative boundaries. Under the best of circumstances, this would represent a serious problem, but in Gal Oya it is made worse because there is frequently a lack of fit between hydrologic and administrative boundaries.

This is most severely felt along the boundary between Ampara and Batticaloa Districts. Each district has its own Government Agent, its own DAC, different Irrigation Engineers and field staff and yet, in no case, is there any structure along the channels where they cross from one district to another to monitor water flows. Downstream officers have no way of controlling the timing or volume of water issues coming into their units, which are under the authority of a completely separate set of officers upstream. This has resulted in conflicts between officers from the two districts, a situation aggravated by the coincidence of the district's boundary with the general division between ethnic Sinhala and Tamil areas.

Even where there are control structures present at the lower end of a cultivation meeting unit, the downstream officers remain dependent on the action of upstream officers to deliver water to them. In theory, the presence of small reservoirs at the head end of a unit should allow field officers to regulate flows

into their units. In practice, however, this is not generally feasible since the storage capacity of three of these reservoirs (Aligalge, Walagama, and Weeragoda Tanks) is very small in proportion to the flow passing through the reservoir. Substantial modifications of incoming discharges can only be made at Himidurawa and Navakiri Tanks, where storage capacity is sufficient to make releases independently of short-term inflow. Indeed, Navakiri Tank is large enough to enable the Irrigation Department to treat its river division and the parts of the Left Bank Main Canal command area lying below it as a separate irrigation system independent of Senanayake Samudra. Only in periods of heavy rain during the maha season are efforts made to augment the volume of water in storage in Navakiri Tank by sending releases to it through the Left Bank main.

2.2 Water Availability for the 1981 Yala Season

The initial stages of the planning process in Gal Oya for a yala season normally take place in early February, toward the end of the maha season. At this time of year, it is usually possible to estimate the availability of water in Senanayake Samudra for the coming yala season. This allows enough lead time for government departments and agencies to make agricultural inputs available to farmers before cultivation commences in April. It has been traditional for the yala cultivation to commence immediately after the Sinhala and Tamil New Year, which falls on April 12 and 13.

Because 1981 was an unusual yala season due to a shortage of water in the main reservoir, it illustrates some of the weaknesses in the existing structure and operation of the irrigation system. By late January 1981, it was clear that the water situation in Gal Oya was extremely unpromising. Total volume in storage at Senanayaka Samudra was only 135,000 acre-feet, the lowest recorded level in any January since the reservoir was completed in 1952. This was completely

unexpected as the reservoir had been by no means empty at the end of the 1980 yala season. On 31 October 1980, there were over 100,000 acre-feet in Senanyake Samudra, the highest level for that date for over ten years. However, the maha rains were very poor, with only 11.9 inches of rainfall recorded in Ampara during December and January, compared to an average of 26.4 inches.

The decreased rainfall had two major effects. First, inflow into Senanayake Samudra was well below normal during the two months when most inflow occurs, and second, there were significantly increased demands for the delivery of supplemental irrigation water for maha crops. The general feeling among District-level officers in January was that no areas should be authorized for yala cultivation in Left Bank areas, as storage was barely sufficient to meet sugar requirements on the Right Bank and to provide domestic water supplies throughout the scheme until the next rains came the following September or October.

The situation below Navakiri Tank was not as serious. By the end of January 1981, there were 27,000 acre-feet in storage in the tank (56 percent of total capacity). It was expected there would be sufficient water for at least partial cultivation of both River Division and Left Bank areas served by Navakiri Tank. Although no decisions had been made regarding total acreage to be authorized in these areas, it was proposed that cultivation meetings be held in late February in the Batticaloa District portions of the scheme.

The water situation changed dramatically in early February. Between February 4 and February 8, a total of 8.8 inches of rain fell at Ampara and considerably more in the catchment area of Senanayake Samudra. This rainfall not only halted the demand for supplemental irrigation of the maha crop, but also led to a significant increase in storage in all reservoirs. By mid-February, Senanayake Samudra had 195,000 acre-feet in storage while Navakiri Tank rose to 39,500 acre-feet, or 80 percent of total capacity. Because of public pronouncements made by

district-level officials in January that the yala season was in jeopardy unless rainfall occurred, these officers were now placed in a position where some land had to be authorized on the Left Bank, even though storage levels remained well below average. In the previous eleven years, there had only twice been lower storage at the beginning of March (in 1975 and 1977), and in all other years there had been at least 335,000 acre-feet.

District-level officials were faced with a difficult set of conditions. On one hand, Navakiri Tank was nearly full, and a normal area could safely be authorized below it. On the other hand, Senanayake Samudra stood well below average, and only a very restricted area could be contemplated. Nevertheless, because both areas were part of the Left Bank, officers felt they had to try to reach some degree of equity in land allocations. February 1981 was marked by a series of meetings at the district level to plan the strategies to be adopted and presented to farmers for their approval at cultivation meetings.

2.3 Cultivation Meetings, Gal Oya Left Bank, Yala 1981

The cultivation meetings held prior to the 1981 yala season for the Gal Oya Left Bank can be divided into two loci: those areas served by Navakiri Tank and essentially independent of the Left Bank system (some of Area 5, most of Area 6, and all of Area 7 in Figure 5), form the first group while those areas entirely dependent on deliveries from the main reservoir (Areas 1, 2, 3, 4, most of 5, part of 6, and all of 8 shown in Figure 5) are the second. This division reflects not only the different administrative and water supply conditions already discussed (most but not all of the first group lies in Batticaloa District), but also the timing of the meetings themselves. It has been common for cultivation meetings in the Batticaloa District to be held earlier than those in Ampara District because of the imperative need to begin the cultivation cycle in those areas that did not get a

maha crop due to flooding during the peak rains. These areas cultivate a late maha (Meda) crop starting in February or March, which differs from the traditional April starting date for most areas. To provide a sequential frame of reference, main events in the pre-yala season decision making process on the Left Bank are listed in Table 2.

Areas below Navakiri Tank—The Left Bank areas below Navakiri Tank are served by two cultivation meetings. The larger area, falling entirely within Batticaloa District, covers nearly 9,500 acres and has its cultivation meeting at Paliyatewatte. The upper part of the area, served by Navakiri and totalling about 1,500 acres, is in Ampara District and is covered by the Warankatagoda cultivation meeting, which covers areas lying in Batticaloa District. Some of the problems in decision making and coordination discussed below stem from this fact.

The Government Agent (Batticaloa) initially scheduled the Paliyatewatte meeting for February 24, 1981. In late January, this meeting was moved up to February 5 at the request of the Assistant Government Agent (Vellaveli) so as to bring it closer to the River Division cultivation meeting dates governing schedules for a meda crop. This change of date proved to be significant because heavy rains began on February 4. Despite this, all actions taken at the February 5 meeting were based on the pre-rainfall storage level of 27,000 acre-feet since there was no way of knowing how much if any increase there would be in storage as a result of the rains.

The Paliyatewatte cultivation meeting was conducted in a normal manner as if no water shortage existed. Attendance by farmers was very low, totalling only a few dozen, though farmer representatives from each colony unit were present.[4] Indeed, only three farmers from Colony 35 attended the meeting, even though the meeting was physically located in that colony. By contrast, there were over sixty government officers, reflecting the need to have adequate representation from

Table 2: Events Preceding the Start of the 1981 Yala Season, Left Bank Gal Oya.

Date	Events
January	Water situation ominous; 135,000 acre-feet in storage in Senanayake Samudra; prospect that no water would be available for Left Bank cultivation during yala season; 27,000 acre-feet in Navakiri Tank (56 percent of capacity) so some cultivation in its command area probable; cultivation meetings for Batticaloa District cultivation meetings (CMs)—Paliyawatte and Warankatagoda—scheduled to be held late February.
February 4-8	Heavy rains in Ampare and Senanayake Samudra (SS) catchment area; raising level in SS to 195,000 acre-feet (about 60 percent of "normal"); level in Navakiri Tank up to 39,500 acre-feet (80 percent of capacity).
February 5	Paliyawatte CM held (originally scheduled for February 24); Warankatagoda CM not held (in fact, put off until March).
February 23	District Agriculture Committee (DAC) meeting to consider adjustments in schedule for areas served by SS since water still short; suggestion made to move up start of season to mid-March, instead of mid-April as was usual, and to authorize only 4,000 acres in Left Bank area.
March 2	Proposal announced to shift some of Left Bank area from paddy into auxiliary crops requiring less water.
March 3	Announcement of March 14 and 16 as dates for Uhana and Warankatagoda CMs.
March 12	DAC meeting to finalize proposal for these CMs; no agreement.
March 13	Postponement of Uhana CM and that part of Warankatagoda CM dealing with area served from SS.
March 14	Warankatagoda CM for area served by Navakiri Tank (Units 34 and 36).

Table 2 (continued):

Date	Events
March 24	Inauguration of Gal Oya Water Management Project by Minister.
March 28	Special meeting of DAC; agreement to raise area authorized in Left Bank to 12,530 (4,000 acre authorization never formally announced) with some cultivation of auxiliary crops instead of paddy.
April 5	Cultivation meetings at Uhana, Warankatagoda (area served by SS), and Weeragoda; decision that cultivation season would start April 15.
April 12	Domestic deliveries for New Year; SS level only 180,000 acre-feet (no rain since February 9).
April 14	First deliveries for land preparation for yala season.

both districts. The meeting was chaired by the Assistant Government Agent (Vellaveli) acting on behalf of the Government Agent (Batticaloa). District-level officials from each district representing the Irrigation Department, Department of Agrarian Services, Department of Agriculture, and the Land Commissioner's Office were present, together with field-level staff from all these departments.

The meeting was held in the public library, the largest room in the village, but there was still not enough room for all attendants. Once all the officials had been seated, some farmers were left outside and had to stand in the rain, which at times was very heavy. This in itself is indicative of the relationship between farmers and officials, which is made more tenuous by genuine language difficulties. The meeting was conducted in a mixture of Tamil and English because, while all Batticaloa officers and all farmers present were fluent in Tamil, Ampara District officials can only speak Sinhala and English. The result was that most discussion among officers was in English, with translation only provided once a decision was to be presented to farmers. This is not to imply that discussions were deliberately withheld, but to stress that it was difficult for farmers to be participants in most of the business conducted.

The proposals presented to the meeting are summarized in Table 3. There was almost no comment from farmers on these proposals. One farmer requested that all of Colony 35 be irrigated, rather than only authorizing land down to V12 channel, but he was informed that this was not possible as the reservoir was not full. However, officials did say that if more water became available as a result of the rains, it would be possible to permit an increase in the authorized area. (Despite this statement, no effort was made to increase the authorized area even though the volume of water available increased by over 40 percent as a result of the February rains. It was tacitly understood that there would be no objection if additional areas were cultivated without authorization should rainfall occur.) The

Table 3: Decisions Approved at the Paliyatewatte Cultivation Meeting, February 5, 1981.

Decisions Approved

1. A total of 2,424 acres are authorized for cultivation, to be allocated in the following manner:

Colony Unit	Acres	
D2	300	
Middle Class	300	
35	384	(up to V12 Channel)
37	360	(up to V13 Channel)
38	330	
39	450	
13	150	
25	150	

2. No cultivation authorized on Colony Units D2 or E, or below V14 Channel along Vallaveli Distributary.

3. Rice varieties to be three, or three and one-half months duration.

4. First water delivery schedules for March 15, followed by two weeks of continuous flow for land preparation. No rotational schedule to be proposed, instead farmers should inform government officers when water is needed.

5. Last water delivery to be June 30.

6. In addition, 150 acres of chilies authorized in Unit 40 for Thumpankerni Youth Scheme.

net result was that, with minimal discussion, the proposals were adopted by the cultivation meeting. Both farmers and officials appeared to be happy with the results of the meeting.

Some observations should be made regarding the proposals drawn up in advance of the meeting. Although the nominal command area of the Paliyatewatte meeting is 9,500 acres, only 2,424 acres were to be authorized. This is because the bulk of the area never receives yala irrigation water due to insufficient storage capacity in Navakiri Tank.[5] Farmers in tail-end areas have become resigned to this state of affairs (many migrate to the coast during the yala season), so that authorization of only 27 percent of the nominal command area was seen as being about average.

A second point of interest is that the meeting has jurisdiction over some Colony Units served directly from Senanayake Samudra, including Colony Units 13 and 25, which are served by Uhana/Mandur Channel, and the so-called Middle Class Block served by Gonagolla Distributary. Land was authorized for cultivation in these areas, even though no decisions had yet been made as to the total extent, if any, to be authorized in Ampara District, upstream of the areas in question.

Finally, the meeting adopted a starting date for its season, though no decisions had yet been made in Ampara on the starting dates for the upstream Colony Units along the Left Bank Main Canal. This was to cause problems later on.

The Warankatagoda cultivation meeting was held on March 14. Normally, the meeting is divided into two parts. One meeting covers Colony Units 34 and 36 and the two units below Navakiri Tank that lie in Ampara District. The second covers Colony Units 27 through 33, which are served directly from Senanayake Samudra. Because both areas are served by the same officials, it is administratively expedient to hold the two meetings consecutively, although it inevitably reduces the number of farmers from Units 34 and 36 who attend, since Warankatagoda village is five miles from the nearest part of Unit 34.

That part of the cultivation meeting dealing with land authorization and water schedules for Units 27 through 33 was postponed at the last moment for reasons discussed below. Only 30 farmers in all attended the meeting, and some of these were from Units 27 through 33, who were not aware that their part of the meeting had been postponed. There were eighteen government officers present, the most senior being the Assistant Government Agent (Ulkana), who chaired the meeting. The meeting was held in the local school, and there was plenty of space available. All proceedings were conducted in Sinhala so that language problems were eliminated. The decisions made at the first part of the Warankatagoda meeting are summarized in Table 4.

Unlike the Paliyatewatte meeting, and although the full area was being authorized, there was considerable discussion on a number of points. Several farmers expressed dissatisfaction with the overall performance of government officers in the area. In particular, they complained that water issues in several maha seasons had been excessive, thereby reducing water availability in subsequent yala seasons. Requests had been made for gates on distributary channel offtakes along the Left Bank Main to replace those missing or broken, but no action had been taken. It was also reported that there had been no effort to prosecute farmers who started cultivation before or after prescribed dates. While there is some justification for these statements, it is not clear how much action farmers really expected from officers present at the meeting. As far as can be determined, Units 34 and 36 have always been able to cultivate two crops a year, and their complaints can be seen more as an expression of wider grievances.

More significant was a lengthy discussion relating to the operation of the sluice gates at Navakiri Tank. It had been recognized in official circles that there was a genuine problem of communication between the Irrigation Department engineers in Ampara and Paddiruppu concerning the whole question of water

Table 4: Decisions Approved at the Warankatagoda Cultivation Meeting (Part I), March 14, 1981.

Decisions Approved
1. All legal lands in Colony Units 34 and 36 are to be authorized for cultivation.*
2. Rice varieties are to be three to three and one-half months duration.
3. First water delivery is to be on March 20, followed by one month of continuous issues for land preparation. Thereafter, rotational deliveries will be given.
4. Last date of water delivery is to be July 20.
5. Fines will be levied for failure to clean channels, nonadherence to the above dates, and for failure to remove cattle from paddy areas.

*No actual acreage was ever discussed. The total extent of land is not clearly defined, and estimates range from 1,000 to 1,800 acres. The Irrigation Department uses an estimate of 1,500 acres of legal lands in the two units.

management below Navakiri Tank. When areas under the authority of the Irrigation Engineer (Paddiruppu) required water, his staff had to contact him so that he could make the arrangements with the Irrigation Engineer (Ampara), who in turn had to instruct the Technical Assistant (Gonagolla) to take the required actions. To overcome the inevitable delays involved, it was proposed that operational responsibility for the sluices at Navakiri and the regulators at Vellaveli and Sillikodi Bifurcations be handed over to the Irrigation Engineer (Paddiruppu), thus enabling him to give orders directly to the gate keeper at Navakiri Tank. Farmers from Units 34 and 36 expressed concern that this change could potentially deny them access to water as control would be passing from Sinhala to Tamil officers. Hydrologically, this is an unlikely scenario because all Sinhala farmers are located in the upper portion of the scheme. It would be impossible to send water through that area to Tamil areas without the upstream farmers receiving at least their fair share of water. The transfer of responsibility did not take place until May and was viewed in some circles as a primary cause of ethnic disturbances that broke out in the area a couple of months later.

Despite this discussion, which at least provided farmers with the opportunity to voice their feelings, the meeting adopted the proposals without any changes being made. It is worth noting that a number of the decisions were at variance with those adopted by the Paliyatewatte meeting. The cultivation meeting at Warankatagoda agreed to start water deliveries on March 20 while the earlier meeting had agreed to March 15. The later date was adopted because not all upstream farmers expected to be ready for land preparation. After all, farmers could hardly be expected to be ready for land preparation on the day following a cultivation meeting. Upstream areas had been promised a full month of continuous issues for land prepartion, in contrast to only two weeks given in Paliyatewatte.

The final date of water issues was set for July 20, a full month after that set for downstream areas at the earlier meeting.

No effort was made to rectify these discrepancies, even though several officers had been present at both meetings. The result was that two meetings serving a contiguous area with no effective intermediate control structures fixed cultivation calendars that were in conflict. In reality, this does not appear to have created any undue concern among farmers in the Paliyatewatte area, but it is indicative of the lack of coordination among officers. Such discrepancies might have been understandable had they resulted from farmer suggestions made at the second cultivation meeting, but it is clear that they represented decisions made by officials before the cultivation meetings.

The cultivation meetings in the areas below Navakiri Tank appear to have been typical of yala seasons when there were no serious water shortages. There were no restrictions placed on farmers who normally expected to get a yala crop. This was in complete contrast to the cultivation meetings held in the remainder of the Left Bank area.

Areas below Senanayake Samudra—It was mentioned above that the part of the cultivation meeting for Units 27 through 33 scheduled to be held at Warankatogoda on March 14 was postponed at the last minute, as was the cultivation meeting set for Uhana to be held two days later. The reasons for these postponements provide an important insight into the whole decision making process.

Following the February rains and the realization that some paddy cultivation would have to be permitted in Left Bank areas not served by Navakiri Tank, the Government Agent (Ampara) convened a meeting of the District Agricultural Committee for February 23. The Irrigation Department was expected to provide its estimate of the total area that should be authorized given prevailing water

conditions. Irrigation Department officers are fully aware of their difficult position when water is in short supply. If they suggest too low an area, they are open to criticism, while overauthorization can lead to crop failure and severe political repercussions. The normal tactic the Irrigation Department adopts is to initially suggest a very low figure and then subsequently to agree to increases that will be forced upon them as a result of political pressures by farmers on district-level officials. It was no great surprise, therefore, that the figure presented to the February 23 meeting was only 4,000 acres, substantially lower than the total authorized in any previous dry year. The 4,000 acres was to be confined to distributary channels that had direct offtakes along the Left Bank Main Channel between Senanayake Samudra and Navakiri Tank, with no irrigation being proposed along Uhana/Mandur or Gonagolla Distributaries.

The logic behind such a plan was twofold. First, none of the offtakes had gates that the farmers could operate. As long as there was water in the Left Bank Main Channel, these channels would inevitably get water. The only structures that remained firmly under Irrigation Department control were at Himidurawa and Uhana Bifurcation. It was also hoped that construction work scheduled to take place in conjunction with the Gal Oya Water Management Project would commence along Uhana Branch Channel during the yala season. By not authorizing land along this channel, there would be less interruption of construction activities during water deliveries (although no construction took place there for several months due to other factors).

The conservatism of the Irrigation Department's estimate of only 4,000 acres of paddy for the Left Bank can be demonstrated by an analysis of the probable water allocations between the three divisions of the scheme. On the basis of previous practice, one could predict that the 190,000 acre-feet available would be allocated as follows: Right Bank areas would receive 70,000 acre-feet (70 percent

of normal); the River Division would receive 30,000 acre-feet; and the Left Bank would receive about 10,000 acre-feet. These total more than actual storage, but some inflow can always be anticipated into Senanayake Samudra du g the first part of the yala season. Inflow in excess of 10,000 acre-feet could be seen as a reserve for domestic supplies after the yala season and for any unexpected demand. If only 4,000 acres were planted on the Left Bank, then no water shortages would be likely. This water allocation allows nearly 25 feet of water per acre, more than three times the Irrigation Department guidelines of seven and one-half feet per season.

At the February 23 discussion no decision on the total area to be authorized for paddy cultivation was reached. Instead, it was decided to postpone a final decision in hopes that there would be additional rainfall before the end of March. Since the start of the yala season was still several weeks away, it was not unreasonable to postpone the decision. However, when the decision was made, it was suggested that the yala season be moved forward to start between March 15 and March 20, a month earlier than normal. The logic for such a suggestion was that evaporation and seepage losses from Senanayake Samudra would be reduced if the yala season commenced as soon as possible after the maha harvest. There was no discussion of whether farmers could be ready for land preparation by mid-March, and the meeting agreed to try to implement the new calendar. A further factor in the postponement of a final decision could have been the forthcoming District Development Council elections, whose date had just been announced. The elections were to be held in early June, and it was clear that denying water to wide areas in the Left Bank could have repercussions at election time. If rainfall occurred, the authorized areas could be extended and electoral unpopularity might be avoided.

Following the February 23 DAC meeting, the lobbying of district-level officials by farmers commenced in earnest. This lobbying took two forms. First, farmers along Uhana/Mandur Distributary Channel, who had become aware of the initial Irrigation Department proposals, sent a series of representatives to meet the Government Agent and the District Minister. These farmers had never faced the prospect of not having any water for a yala crop, and this undoubtedly increased their bargaining position. The previous year they had been successful in getting water allocations raised (even though there was no real water shortage in 1980), and there was every reason to expect that the District Minister would react favorably to their proposals.

The second lobbying came from within government circles. In 1980, when there had been a water shortage in the North Central Region of the country, there were widespread efforts to persuade farmers to grow chilies and other subsidiary crops that require less water than paddy. This resulted in a majority of the farmers receiving a small income rather than only a few being able to grow paddy. The experiment was relatively successful, but only because the Mahaweli Development Board set a guaranteed price for chilies and agreed to buy the entire crop.[6] It was proposed that the same scheme be tried in Gal Oya. However, there was never any attempt to provide similar price guarantees, nor were the technical aspects of changing from rice to other crops seriously considered; how seeds and fertilizer would be gotten to Gal Oya in sufficient quantities, how extension advice on new crops would be provided, or how the delivery plan for irrigation water would be changed. Nevertheless, the idea caught on and in a speech made on March 2 the District Minister expressed his desire that large areas of subsidiary crops be grown on the Gal Oya Left Bank (Ceylon Daily News, 1981).

By March 3, it was clear to the Government Agent that some action would have to be taken, particularly if the new cultivation calendar were to be brought

into effect. He announced that cultivation meetings would be held at Warankatagoda on March 14 and at Uhana on March 16. (No mention was made of any meeting at Weeragoda. Even though Weeragoda had been the site of intense lobbying during the past ten days, no provision had been made to deliver water to it during the coming season.) A second District Agricultural Committee meeting was planned for March 12 to finalize the arrangements.

This meeting proved as inconclusive as the first, with no decision made on the extent to be authorized. It appears that the lobbying efforts, particularly from Weeragoda area, were strong enough to prevent the original plan—that is, only authorizing area along the Left Bank Main—from being adopted, but no compromise was worked out. An additional complication was the finalization of March 24 as the official inauguration of the Gal Oya Water Management Project at which the principal speaker would be the Minister of Lands, Land Development, and Mahaweli Development. It was considered politically embarrassing to have the inauguration of a project that promised to improve irrigation service occurring immediately after cultivation meetings that would severely restrict irrigated area. The result was that the cultivation meetings for Uhana and the part of Warankatagoda served by the Left Bank Main Canal were postponed, and no new dates were set. Although this decision was made public on March 13, not all farmers in Units 27 through 33 were aware of the postponement and, as mentioned, some attended the meeting at Warankatagoda that dealt only with Units 34 and 36.

The Assistant Government Agent (Uhana), who chaired the part of the March 14 Warankatagoda meeting dealing with Units 34 and 36, reiterated the official position that only 4,000 acres would be authorized on the Left Bank, although he did not say where the water would be sent. He did say that should the expected rains occur, then there would be enough water for everyone to have a full crop. Naturally, the reaction of those farmers present was hostile, and for the first time

the matter of reallocating water from the Right to the Left Bank was raised. The Assistant Government Agent took the position that this was not possible because it was official government policy to ensure that the sugar estates got priority for water, a position that was unlikely to be popular with farmers who depended on paddy for a livelihood.

The effect of these statements was to increase the lobbying directed towards the Government Agent and the District Minister. At the inauguration of the Gal Oya Water Management Project on March 24, the District Minister again stated that should the rains occur there would be water for everyone. On the day following the inauguration, new dates for cultivation meetings were announced. Meetings at Uhana, Warankatagoda, and Weeragoda were to be held on April 5. A special meeting of the District Agricultural Committee to finalize the areas to be authorized for cultivation was arranged for March 28.

The March 28 meeting resulted in some concrete proposals. The Irrigation Department officers, while still claiming that there was only enough water for 4,000 acres, agreed to increase the total area authorized to 12,530 acres if two conditions were imposed on farmers. First, there should be a mixture of paddy and subsidiary crops grown, thereby reducing total water demand. Second, the cultivation should be declared to be "at farmers' risk," meaning that the Irrigation Department disclaimed all responsibility for guaranteeing that the crop would be successful. Under this provision, farmers would not be able to claim crop insurance (a nominal sum anyway), and the Irrigation Department would not expect criticism from government officers or politicians should things go badly. It was also agreed that the season should commence on the normal date, April 15, with a twenty-five day period of continuous flow for land preparation followed by rotational issues. The last issue would be made on August 10.

The 12,530 acres were to be divided as follows: 5,398 acres in Uhana Unit, the full legal acreage; 4,962 acres in Warankatagoda, a figure that included almost all land that could expect to receive water in a normal yala season; and 2,170 acres in Weeragoda. The last figure is of interest for two reasons. In contrast to the allocations to Uhana and Warakatagoda that covered almost the entire cultivable areas, the authorized area for Weeragoda was only slightly over half, and it was to be allocated on a channel-by-channel basis. The Irrigation Department drew up a complex plan for Weeragoda, with each channel allocated land up to a point where there was a structure that could be used to prevent water from flowing downstream. The result of this plan was that, in terms of area allocated, there was considerable inequity between adjacent distributary channels. Some were to receive a high proportion of the total area, others very little, and in two cases none at all. The feasibility of implementing such a plan was never discussed.

Before describing the April 5 cultivation meetings, it should be stressed that at no time did the Government Agent consider the option of announcing the decisions by proclamation. It was clear that the cultivation meetings could be volatile and that he, and other officers, might face considerable opposition. It is to his credit that he was prepared to carry through with normal procedures and allow farmers an opportunity to publicly present their views.

Uhana cultivation meeting was the first of the three meetings to be held on April 5. In contrast to previous years, attendance was staggering, with over one thousand farmers present. It appeared that over half of all eligible farmers had come to the meeting, in contrast to the usual 5 to 10 percent. This was probably because of the various postponements and the circulation of rumors.

The Government Agent started the proceedings by stressing the gravity of the water situation and appealing to farmers to conserve water throughout the season. The Irrigation Engineer of Ampara, repeated these warnings and reiterated

the official position that there was only sufficient water for 4,000 acres of paddy on the Left Bank. He then read out the proposals for Uhana Unit, which included the 5,398 acre allocation (Table 5). Before farmers were invited to reply, the Assistant Director of Agriculture explained that the authorization of the full acreage had been based on the assumption that farmers would grow subsidiary crops on one acre of their four acre holdings. He pointed out that if farmers tried to grow paddy on their entire holdings, the crop would surely fail.

The main reaction of the farmers was that the subsidiary crop plan was unworkable because it was impossible to grow crops having different water needs in adjacent paddies. Some soils were totally unsuited for crops other than paddy, and it was unfair to expect farmers to try to grow other crops in these areas. It was also pointed out that many of the four-acre holdings had been subdivided (although this is illegal), and the proposal to devote exactly one quarter of each holding to subsidiary crops was unrealistic. Some commented that water wastage was largely the result of bad management on behalf of Irrigation Department officials. If they did their job properly, then there would be sufficient water for everyone to grow paddy.

There is merit in all of these comments, and the Government Agent responded that all government officials would be expected to work hard without favoritism to ensure that water problems did not arise. He also stressed that farmers had to cooperate with officials in what would undoubtedly be a difficult season. However, he was not prepared to alter the decisions and said that they would have to stand without modification. He emphasized that the farmers had to realize that the alternative was to restrict the total area to be authorized, and he was sure that this would be a less acceptable alternative.

With relatively few dissenting voices, the proposals were accepted by the meeting. Farmers had been assured that they could cultivate all of their land, and

Table 5: Decisions Approved at the Uhana Cultivation Meeting, April 5, 1981.

Decisions Approved
1. All legal land to be authorized for cultivation, a total of 5,398 acres, of which one-fourth to be devoted to subsidiary crops.
2. Paddy varieties to be three to three and one-half months duration.
3. First water delivery to be on April 15. There will be twenty-five days of continuous deliveries for land preparation.
4. Land preparation to be completed by May 10. Thereafter, rotational deliveries will be made.
5. Last date of water delivery to be August 10.
6. Channel clearing to be completed by April 10. A fine of Rs. 50/=m to be levied for every six feet not cleaned by that date.
7. Fines of Rs. 50/=m to be levied for cattle not removed from paddy lands by May 10.

it was unlikely that the subsidiary crop proviso could be enforced. As all land had been authorized, it would have been difficult for farmers to have gained many further concessions. There was no discussion concerning the calendar of activities. Having obtained approval of the proposals, all the officers then proceeded to the second meeting of the morning.

The Warankatagoda cultivation meeting (Units 27 through 33) was held later in the morning of April 5. Although only about 200 farmers were present, attendance was still much higher than in normal years. The format of the meeting was almost identical to the Uhana meeting, with presentations by the Government Agent, the Irrigation Engineer (Ampara) and the Assistant Director of Agriculture. The only significant difference in the proposals made at this meeting was that one-third of the total area alloted was to be planted to subsidiary crops. This is a reflection of the fact that the Warankatagoda area was divided into three-acre holdings in contrast to four-acre holdings in Uhana.

The reaction of farmers to the proposals was similar to that of the Uhana farmers, but discussions were somewhat more heated. The first proposal made by farmers was to increase the irrigated area by 250 acres to include lands along distributary channels G16 to G21. These lands are farmed by Tamils who claimed that if they were not given land, they would appeal to the Government Agent (Batticaloa) for his support. The proposal was readily accepted by the Government Agent (Ampara), who did not wish to be seen as discriminating against Tamils.

There was considerable discussion on the matter of subsidiary crops. Many farmers claimed that their soils were unsuited for anything but paddy, and, after a long debate, it was agreed that if the Extension Agent and Cultivation Officers agreed, certain farmers could grow paddy on their full three-acre holding. However, the Government Agent said that any farmer who cultivated only paddy without having express permission would be prosecuted and might even face

eviction from his land. It is not clear whether the Government Agent had the authority to make such threats, and in any case it would have been very hard to enforce such decisions.

Discussion then moved on to criticism of the Technical Assistant of the Irrigation Department, the official responsible for the area. It was alleged that he was insensitive to farmer problems and had authorized special water releases to Navakiri Tank, thereby creating the water problems now being faced by farmers. He was also accused of failing to replace broken gates and of showing favoritism to certain groups of farmers. The Technical Assistant (Gonagolla) was called on by the Government Agent to respond to these allegations, but he was unable to give a good account of the problems. It was left up to his Maintenance Oveseer to explain some of the difficulties that the field staff of the Irrigation Department were facing.[7] The Government Agent said that all gates would be replaced as part of the Gal Oya Water Management Project, and if farmers were to show good cooperation with field-level staff, there should not be any water problems during the season.

There was also discussion of the calendar of activities. One group of farmers said that as a result of the water problems, they did not have adequate supplies of drinking water. They requested a special domestic water delivery be made for the forthcoming New Year festivities. The Government Agent refused to sanction this, as he said there was not enough water. A counter proposal by the farmers was then made. They suggested that a twenty-five day long issue for land preparation was excessive. If the releases were split into two periods of ten days each, with a five-day break, there would still be sufficient water for land preparation. The water saved could then be used for a New Year domestic issue. After some discussion among the officers present, it was agreed that this was a sensible suggestion and that it should be adopted.

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This proposal indicates that farmers could make useful suggestions and that they have a good understanding of their water requirements. There is no doubt that large volumes of water are wasted by continuous issues during the land preparation period because supplies greatly exceed demand in head-end areas. As it turned out, the proposal was never adopted because officials had already agreed to provide Uhana farmers with twenty-five days of continuous issue. As their land is upstream of Warankatagoda, it would have been difficult to implement both calendars simultaneously. Had the Warankatagoda meeting been held first, the proposal could well have been adopted throughout the scheme. However, because the Warankatagoda farmers had been promised a water delivery for the New Year, this was implemented, and all parts of the Left Bank were given drinking water from April 12 to April 15.

The only reference made to the nature of the rotations to be adopted was a suggestion by the Government Agent that tail-end farmers along channels be given water first during a rotational issue. There was no discussion of the length of rotational issues along the main channel system, or of the discharges to be expected.

When the final plan was presented to the meeting, the majority agreed to accept it. Table 6 summarizes the decisions made. Because of the length of the two meetings it was now past lunch time, and all the officers proceeded to Ampara for a break before going on to the third meeting.

The Weeragoda cultivation meeting commenced in mid-afternoon and turned out to be a very different affair. There were about 600 farmers present, many of whom had waited for hours for the officers to arrive. Like the other two meetings, the local school was used so that there was room for everyone. Similarly, all discussions were in Sinhala (except when some officers conferred privately in English).

The meeting started in the same manner as the previous two. The Government Agent made his introductory remarks and then asked the Irrigation Engineer to read out the proposals for land authorization. For each distributary channel the Irrigation Engineer announced the proposed acreage and identified the last channel to which water deliveries would be made.

Even before he had finished presenting the proposals, however, the farmers started protesting vigorously, and the remainder of the meeting was conducted in a very hostile atmosphere. Almost all discussions were between farmers and the Government Agent, with other officers keeping quiet.

The main gist of the farmer objections was that it was unfair to restrict their acreage while the other two cultivation meetings had been given their full allocation (some Weeragoda farmers had attended the Uhana meeting to find out what was going to happen in other areas). They argued that if restrictions had to be made, then they should have been divided equally among the three areas. They also said that the gross inequalities between adjacent channels would lead to friction and a more equitable solution should be sought. Some farmers said that it would be easy to break any structures that the Irrigation Department intended to use to prevent water from reaching tail-end portions of the channel system. The Government Agent immediately responded by threatening to prosecute anyone tampering with structures. Farmers then claimed that the Irrigation Department did not know how to operate the scheme properly. They cited the events of 1980 as exemplary. At that time only 2,000 acres had been authorized, but there had been sufficient water for growing paddy on the full area of nearly 6,000 acres (including encroached lands). They asked how they were expected to believe the seriousness of the present situation when the same story had been used the previous year. By this stage, several farmers were making statements simultaneously, and it was clear that the meeting was getting out of hand.

Table 6: Decisions Approved at the Warankatagoda Cultivation Meeting (Part II), April 5, 1981.

Decisions Approved
1. Total land authorization to be 5,212 acres, including all land along the Left Bank Main Channel to Navakiri and on Gonagolla Distributary as far as G21 Channel. One-third of all land to be subsidiary crops.
2. Paddy varieties to be three to three and one-half months duration.
3. Domestic water delivery to be made from April 12 to April 15 for New Year.
4. First water delivery to be April 15 for land preparation. This delivery to last ten days, from April 26 to April 30. Second delivery for land preparation from May 1 to May 10. Thereafter, rotational deliveries will be given.
5. Last water delivery to be on August 10.
6. Fines to be levied for failure to clear channels (Rs. 50/= per six feet of channel length not cleared by April 10) or for failure to remove cattle from paddy lands by May 10.

When a farmer from MII Channel commented that it was ridiculous to approve only twenty-two acres out of a total of 334 acres, the Government Agent suggested it would be easier to delete those acres as well. A proposal by a vel vidane to permit each farmer to cultivate two acres each was turned down because it was said there was insufficient water.[8] Another farmer commented that if water was reallocated from the Right Bank to the Left Bank, there would not be a shortage. He accused government officials of showing favoritism toward large landowners on the Right Bank. The Government Agent responded to this by appealing for cooperation from the farmers. There was not enough water for everyone, and he could not see why the farmers could not accept the proposals. An immediate uproar followed with many farmers losing their tempers and creating disturbances. The Government Agent in turn became angry and and said that, if farmers wanted, he could release all the water from Senanayake Samudra in one large issue. Then everyone could do as they wished, but it would be their responsibility when there was no water left in the middle of the season. He said he could not listen to any more discussion about diverting water from the Right Bank because that was a Cabinet decision. Further, he said that it was ridiculous to make accusations that he was favoring one group, and he would not tolerate any further allegations against other ethnic groups. There did not seem to be any basis for further discussion.

In an attempt to calm things down, several farmers proposed alternative schemes to divide up the limited acreage. However, at no time was there any consensus of opinion among the farmers, and nothing was resolved. Ultimately, the Government Agent called the meeting to a halt and said that the original proposals would stand. The meeting was adjourned without formal acceptance of the proposals. The unapproved proposals are listed in Table 7.

Table 7: Proposals Presented to the Weeragoda Cultivation Meeting, April 5, 1981.

Proposed Decisions

1. 2,170 Acres authorized, one-quarter of which is to be devoted to subsidiary crops. Land to be allocated as follows:

Channel	Authorized Area	(Total Area)*
M1	102	(102)
M2	10	(10)
M3	142	(142)
M4	0	(78)
M5	807	(2,649)
M6	122	(599)
M7	43	(43)
M8	279	(729)
M9	96	(96)
M10	122	(122)
M11	22	(334)
M12	0	(573)
M13	56	(56)
M14	52	(52)
M15	28	(28)
M16	269	(672)
M17	20	(20)
Total	2,170	(6,305)

2. First water delivery to be April 15 to April 25.

3. Second water delivery to be May 1 to May 10.

4. Last water delivery to be August 10.

*The total area includes encroached land and private lands as well as legal allotments. No reliable figures for legal allotments exist, but they are estimated to total about 4,000 acres. In allocating land, the Irrigation Department was using total area figures, not legal lands only.

It is obvious that the meeting failed completely to achieve any of the goals stated in Chapter 1. It merely served to worsen relationships between government officers and farmers, and this was to develop into a serious crisis later in the season.

2.4 Water Issues During the 1981 Yala Season

Prognostications to the contrary, no rainfall of any significance fell during the period February 9 to April 10. When the first water deliveries were made to the Left Bank on April 12, storage in Senanayake Samudra had fallen to just over 180,000 acre-feet. The water deliveries for the season can be divided into four distinct groups, as shown in Figure 6.

Releases for land preparation commenced as planned on April 15 following three days of limited deliveries for domestic use during the New Year holidays. Although it had been agreed at Warankatagoda and proposed at Weeragoda that the deliveries should be split into two periods of ten days each to save water, deliveries were made continuously from April 15 through May 10, with the exception of two days (April 14 and April 19) when gates were closed following rainfall. The discharge rate from Senanayake Samudra was not significantly different from previous years when storage was above normal. The total volume issued to the Left Bank areas above Navakiri for land preparation was 33,750 acre-feet. This amounted to over 2.6 acre-feet per acre for the authorized area, twice the rather generous estimate specified by the Irrigation Department in its "Technical Notes" (1.3 acre-feet/acre). This enabled farmers to prepare land for paddy without difficulty throughout the authorized area. There were no significant efforts to implement the plan to plant one-quarter or one-third of the authorized area in subsidiary crops. Further, because of the availability of considerable water downstream of the authorized areas and by reuse of water flowing in the drains, a

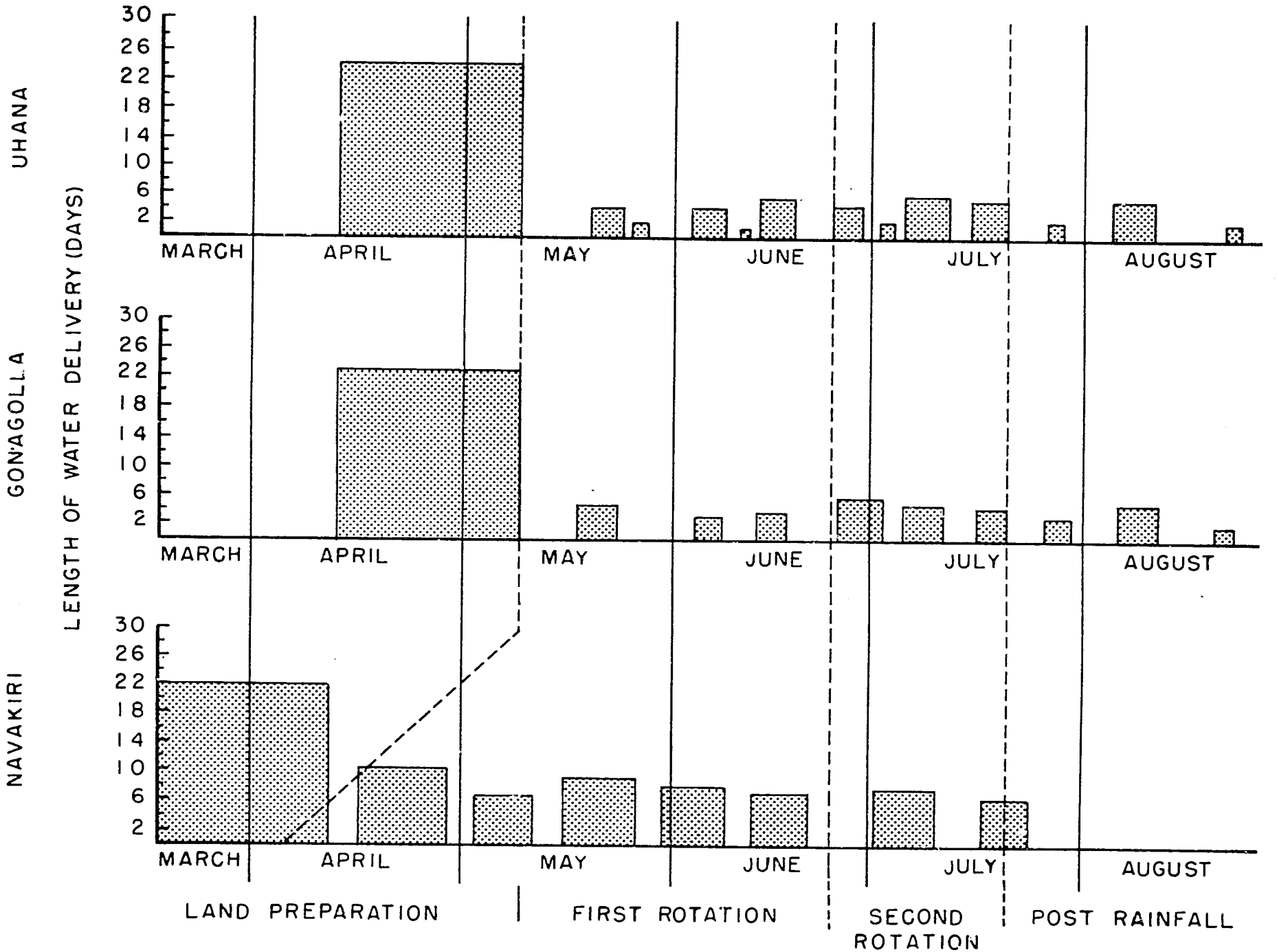

FIGURE 6: WATER ISSUES, GAL OYA LEFT BANK, YALA 1981

far greater area of land was prepared for paddy cultivation than had been authorized. By mid-May, it was estimated that in Left Bank areas above Navakiri a total of 16,650 acres were planted to paddy. Of 12,780 authorized acres, 3,629 acres were supposed to have been planted to subsidiary crops. Thus, the total area under paddy was more than 80 percent more than the area originally authorized (see Table 8). Therefore, total water demand for the season was at least 50 percent greater than originally planned, and nearly 35 percent of the planned water supply had been used up for land preparation.

By the end of the land preparation period, farmers had little confidence that the Irrigation Department would follow the plan. Despite warnings of water shortages and appeals for conservation directed toward farmers, there was no evidence that any significant efforts were being made by the Irrigation Department to save water. At the same time, it was clear to the Irrigation Department that difficulties lay ahead. By May 20 when rotational deliveries commenced, there was only about 160,000 acre-feet of storage in Senanayake Samudra.

The situation below Navakiri Tank was somewhat different. Deliveries for land preparation commenced on March 20 as scheduled, but in an effort to conserve water, discharges were kept below normal. Because there was inadequate water for land preparation, the area that could be cultivated in the tail-end parts of the scheme was limited. Although 3,624 acres had been authorized for cultivation, only 3,400 acres were actually cultivated. Farmers who had been authorized to cultivate but did not receive water were naturally very angry. However, they were unable to convince the Irrigation Department, either directly or through political channels, to increase discharges. As all the farmers who faced this situation were Tamil, considerable resentment built up against head-end Sinhala farmers who were getting full deliveries and the Sinhala staff of the Irrigation Department. Several efforts were made to open the sluices at Navakiri Tank

Table 8: Allocated and Actual Acreages, Gal Oya Left Bank, Yala 1981.

Cultivation Meeting Area	Allocated Area (Acres)		Actual Area[A] Cultivated (Acres of Paddy)	Area of Paddy[A] That Died
	Paddy	Other Crops		
Uhana	4,048	1,350[B]	6,950	0
Warankatagoda (Units 27-33)	3,475	1,737[C]	5,500	425
Weeragoda	1,628	542[B]	4,200	550
Unit 26[D]	0	0	350	n/a
Warankatagoda (Units 34 & 36)	1,200	0	1,500	0
Paliyatewatte	2,424	0	2,000	550
Total	12,775	3,629	20,500	1,525

[A]Actual acreages are approximate.

[B]Based on the condition that one-quarter of holdings be planted in subsidiary crops.

[C]Based on the condition that one-third of holdings be planted in subsidiary crops.

[D]No cultivation meeting held, but about 350 acres were cultivated using domestic water deliveries from Weeragoda Tank.

illegally, but these were unsuccessful. The situation did not change when responsibility for the operation of Navakiri Tank was handed over to Batticaloa District on May 1.

The first rotational deliveries into the Left Bank above Navakiri commenced as planned on May 20. It is normal practice for rotational deliveries to be based on a ten-day cycle——that is, five days of water to Uhana Branch Channel, four to Warankatagoda, and one day without a delivery. The level of discharges would normally be close to the maximum carrying capacity of the channels. In 1981, however, a new rotational pattern was adopted, with a twelve-day cycle with simultaneous deliveries of about five days to both Uhana and Warankatagoda. Discharges to each area were considerably lower than maximum discharge, followed by seven days of no delivery.

It is important to note that no announcement was ever made of exactly what schedule was to be followed. Farmers had assumed that rotational deliveries would be similar to previous years (five days on, five days off) and were greatly perturbed when they were confronted with a new, even more unpredictable delivery pattern. The Irrigation Department did provide a delivery calendar to Technical Assistants in each of the three cultivation meeting areas, but the TAs could not be sure how reliable the calendar would be. Moreover, they were told not to give details to farmers in case changes had to be made.

By June 22, most of the Left Bank was in serious trouble. In the previous forty-four days, only 20,220 acre-feet were issued to the 16,650 cultivated acres above Navakiri. This represented a daily water delivery of 0.33 inches per acre, in contrast to water issues averaging 0.83 inches per acre during the land preparation period. The result was that large areas of paddy experienced severe plant stress, and all tail-end areas began to suffer crop losses. In Weeragoda Unit and along Gonagolla Distributary, a total of 975 acres of paddy (10 percent of the planted

area) were lost, and several thousand acres were stressed to the point where yields were severely reduced.

A similar pattern was also observed below Navakiri Tank. Deliveries for land preparation averaged 0.61 inches per acre per day, but the first five rotational issues only provided an average of 0.46 inches per day. A total of 550 acres out of the 3,500 acres planted (16 percent of the planted area) suffered crop losses, and all crop losses were in Tamil areas.

District-level officers were not oblivious to the situation, but they were now trapped. Water in the main reservoirs was clearly inadequate to meet all the demands, but they could not continue to let crops die, even if they were on unauthorized land. The Irrigation Department was asked to determine the extent of the expected water deficits, and a meeting was arranged for June 23 to discuss the situation.

At the June 23 meeting, the Irrigation Department estimated that there was a shortfall of 25,000 acre-feet, of which 5,000 was for areas below Navakiri Tank. After a long discussion, the Government Agent decided that the only course of action was to restrict deliveries to sugar cane areas on the Right Bank and release additional water to the Left Bank. This decision would guarantee the paddy crop throughout the scheme, but would leave the Sugar Corporation without assured water supplies in September or October. The Irrigation Department was instructed to make an immediate release of 5,000 acre-feet of water to Navakiri Tank because the situation there was particularly serious. The head of water in the reservoir was so low that it was almost impossible to get water into all cultivated areas.

The second rotational deliveries commenced on June 24. In contrast to the previous six weeks, discharges were high, and suddenly there was more than sufficient water for everyone. Understandably, there was considerable anger

among tail-end farmers who had already lost their crops. They unhappily watched large volumes of water flowing into fields covered with dead rice plants. Although the additional 5,000 acre-feet started to reach Navakiri Tank on June 26, the engineers did not make immediate releases. They waited until the water level in the tank rose a few feet so as to provide an adequate head of water. When water was finally issued on July 1, there was a free-for-all to get as much as possible. However, the rate of discharge was still very low (only 120 cusecs), and tail-end farmers still had great difficulty getting water. They perceived this as yet another attempt by Sinhala head-end farmers to deprive Tamils of water, and on July 4 communal riots broke out along Sillikodi Distributary Channel. Within hours the disturbances spread all along the Sinhala-Tamil boundary and resulted in three deaths and the destruction of scores of homes.[9]

Politicians were left with no option but to quell the riots in any way possible, and the Irrigation Department was instructed to deliver water in large quantities to all parts of the scheme. This issue continued until July 11, when rain fell throughout the area. With abundant water flowing, some of the discontent spurring the rioting was removed. Unfortunately, communal disorders were to start again in early August (although the cause this time was not related to water).[10] By July 15, storage in Senanayake Samudra had fallen below 64,000 acre-feet, and it was hard to see how the sugar cane crop could be saved.

Fortune now intervened. Two major rainstorms were experienced during the second half of July, both enabling the Irrigation Department to halt deliveries in progress and, for the first time on record, leading to an increase in storage in all reservoirs in the area. By July 31, there was a total of 81,450 acre-feet in Senanayake Samudra, more than enough to complete the irrigation of both the paddy and sugar cane crops.

2.5 Subsequent Events in Gal Oya: Yala 1982 and Maha 1982/83

It is clear from the description of the 1981 yala season that had it not been for the unprecedented rains of July, the season would have been one of the least successful in the history of the scheme. The dual effect of overauthorization of land in relation to water supplies and the overgenerous releases of water at the start of the season led to a very severe crisis immediately prior to the rainfall. Had there been no rainfall, there would likely have been considerable recrimination as far as Irrigation Department officers were concerned, as well as for officers of other government departments. Instead, there was an air of complacency, and a few individuals went as far as expressing reasonable satisfaction with the season as a whole. Their position was that, while there had been some crop losses, farmers had succeeded in harvesting a paddy crop on over 90 percent of the cultivated area. This was even more significant because planted and irrigated area had considerably exceeded that initially planned and authorized. This attitude not only ignored the connection between the riots and the water shortages, but also did not take the level of production into consideration. ARTI data indicate that on the Left Bank as a whole, average yields fell from around 60 bushels per acre to close to 50 bushels per acre, and tail-end areas averaged below 40 bushels per acre.

The long-term records of the Irrigation Department show that there have never been two poor years in a row. Every water-short year has been followed by a year with at least average rainfall. Thus, senior officers, who are frequently rotated in their postings, seldom experience more than one difficult season. By misfortune, however, the maha rains of 1981/82 were also below average, and the water conditions in early 1982 were very similar to those of the previous year. With the same personnel involved in both planning and operation, it might be expected that at least some of the lessons of 1981 would be incorporated into planning and operating activities for the 1982 yala season. However, this was not the case.

When the District Agricultural Committee met in February 1982, the level of water in Senanayake Samudra was almost identical to that of 1981. The Irrigation Department again proposed that only 4,000 acres should be authorized for cultivation on the Left Bank. After a bargaining process, a total of about 12,000 acres was finally agreed upon, with a distribution similar to that of the previous year. There was, however, one very significant difference that merits some attention.

One of the components of the Gal Oya Water Management Project has been the organization of farmers into water user groups that have operation and maintenance responsibility at the field channel and eventually at the distributary channel level. Farmer representation in some form was also planned at various levels to provide farmer input into planning activities. Although the organizational program was still in its initial stages, three farmer-representatives were invited (after a meeting between nearly 100 representatives of field-channel groups and the Government Agent in early February to discuss the allocation of only 4,000 acres) to come to District Agricultural Committee meetings, the first such participation in the country.

In the course of the various meetings to resolve the water problems, the Government Agent decided that the basis for allocating water to the Right Bank should be modified. Because water was in short supply and all areas of the scheme would have to make sacrifices, he proposed that Sugar Corporation employees should irrigate the cane fields around-the-clock instead of just twelve hours a day. The water saved could be given to the Left Bank for paddy cultivation. In spite of protest from the Sugar Corporation, this plan was agreed upon. The Government Agent was now able to call cultivation meetings on the Left Bank and present proposals that were likely to meet with general favor.[11]

Farmer reactions at the cultivation meetings were extremely positive. Although they were being offered proposals similar to those of the previous year, the announcement that they were to get more area authorized than initially rumored was enough to keep all discussions amicable, and the proposals were accepted without modification or dissent. It should be noted, however, that there was really no additional water. Analysis of the 1982 water releases indicates that the proportion of water issued to the Left Bank as well as to the other two divisions of the scheme was essentially the same as that in any other water deficit season. Perhaps because officials presented the proposals in a concessionary manner, the cultivation meetings proceeded smoothly.

There were also some operational changes in 1982. Because farmers were generally satisfied with the proposals put to them at the cultivation meetings, there was no post-meeting period of lobbying to change the decisions. As a result, it was possible to start the 1982 yala season in March and to reduce conveyance losses from Senanayake Samudra. However, there were still some problems encountered during the season that necessitated large releases of water. By the end of the paddy harvest in late July, water in storage was at a very low level, and it was necessary both to cut back issues to the Right Bank and to reduce domestic issues. Despite these conservation measures, Senanayake Samudra was essentially empty by early September. On September 7, there was only 5,000 acre-feet in storage, and during the next month great hardships were experienced throughout the scheme as there could be no releases for domestic water. Once again, shortcomings in the planning and operational activities had led to a crisis, but this time there were no outbreaks of violence.

Fortunately, the maha rains of 1982 were well above average, and by December 1982, there was nearly 350,000 acre-feet of water in Senanayake Samudra. Despite the now abundant water supply, problems were still encountered

throughout the remainder of the maha season. In October 1982, the District Agricultural Committee met to decide on arrangements for the maha season. On the basis that rainfall plus supplemental deliveries of irrigation water would be sufficient for a full rice crop, all areas were authorized for cultivation. The DAC also set the first date of water deliveries to begin late in the maha season.

As indicated, irrigation in the maha season is intended to be supplemental. As long as rainfall is sufficient to meet crop and soil water needs, there is no need to release water. In Gal Oya and elsewhere in Sri Lanka, the maha rains tend to diminish in January or February, and it is generally necessary to make releases during the latter part of the season. Over the years it has become traditional to schedule the first irrigation water delivery for mid-January, in the same way that the first issue for the yala season is made on April 15. However, the timing and amount of maha rainfall are unpredictable. In some years the rains extend to March, in others they finish in December. As there is no way of predicting the end of the rains, any decision on when to begin water deliveries should relate to actual rainfall conditions. In practice, what has tended to happen is that water deliveries are started on January 15 regardless of rainfall conditons. Head-end farmers, in particular, have come to rely on this issue. Many delay their land preparation knowing that there will be ample water deliveries late in the season, which make ploughing their fields easier than with rainfall only.

In the 1982/83 maha season, despite the early rainfall, little came after December 20. By the first of January, several parts of the scheme were experiencing water shortages, and demands were being made on the Irrigation Department to make water deliveries as soon as possible. The Irrigation Department, with the backing of the Government Agent, responded that no deliveries could made because the cultivation meetings had agreed that the first water issue would be January 15. Eventually farmer pressure built up to the point where a

hastily convened meeting of the District Agricultural Committee agreed to bring forward the first date of delivery to January 5.

This episode further illustrates the futility of using the cultivation meeting process to set dates several months ahead for activities that are dependent on short-term water conditions. Although the Gal Oya Water Management Project had been in progress for two and a half years at the time of this most recent crisis, there had been no significant change in the process of allocating water and authorizing cultivation, or in scheduling operational activities so as to promote more effective management of the scheme as a whole.

NOTES

[1]Operational rules are required because while the Irrigation Department is responsible for volume and timing of releases, the gates are operated by employees of the Sri Lanka Electricity Board.

[2]The decision to favor sugar production over rice may have been influenced by conditions set for an Asian Development Bank loan being negotiated by the Government to support the sugar industry.

[3]The Irrigation Department uses standardized estimates for water use in planning for each season. Maha paddy crops are assumed to need 4 to 6 acre-feet/acre of irrigation water and yala paddy crops 5 to 7 acre-feet/acre. These estimates are applied to all Dry Zone schemes irrespective of location or soils.

[4]Tamil areas appear to have been more willing than Sinhala areas to work through the elected role of farmer-representatives provided for in the Agrarian Services Act of 1978. These farmer-representatives are informally referred to as vel vidanes, the traditional title for the village "water headman." The position, however, is not directly comparable with the traditional vel vidane role, which was abolished in 1958 when elected Cultivation Committees were established by law.

[5]Navakiri Tank has an exceptionally low ratio of storage capacity to irrigable area. It was assumed in the initial planning of the Gal Oya Scheme that there would be sufficient water in Senanayake Samudra to irrigate areas upstream of Navakiri and to augment Navakiri using surplus water throughout the year. Because inflow into Senanayake Samudra has rarely been as large as anticipated, augmentation of Navakiri Tank has not been possible except briefly during heavy rains.

[6]The following year the Mahaweli Development Board withdrew its guaranteed price for chilies, and most farmers reverted to growing paddy.

[7]We should note that relations with this TA improved after farmer water management organizations were set up in the area through Institutional-Organizers fielded by ARTI under the Gal Oya Water Management Project. When Sinhala-Tamil ethnic disturbances broke out in July, including violence against Tamil residents of Gonagolla Town, (Sinhala) farmer-representatives from the organizations undertook to guard the home of the (Tamil) TA and the Maintenance Overseer to ensure their safety.

NOTES (continued)

[8]Since there are about 1,500 farmers in Weeragoda, this would have meant authorizing about 3,000 acres for cultivation.

[9]There had been serious communal riots in Jaffna during June associated with the District Development Council elections. Although these disturbances were confined to the northern part of the island, tensions remained at a high level, and these probably contributed to the outbreaks in Gal Oya.

[10]The August riots in Ampara sparked off similar disturbances in several other parts of the country. There had been ethnic quarrels between schoolboys in Batticaloa, and these triggered larger disturbances the next day in Ampara, where Tamils bore the brunt of the attacks. Several Irrigation Department officers in Ampara were attacked and had to flee the area. Operation of the scheme was left to a skeleton staff.

[11]It is not clear if farmer representatives proposed this reallocation or if the GA would have done so whether or not there were farmer representatives present at the DAC meetings.

CHAPTER 3: THE KAUDULLA CASE STUDY

3.1 Managing the Kaudulla Scheme

There are various factors that give Kaudulla farmers good access to irrigation water and make the scheme relatively easy to manage (see Table 1). Some of these include a homogeneous and egalitarian farming population, water-retentive soils, favorable topography, and moderate size. The area officially allocated for irrigated paddy cultivation is currently just over 10,500 acres, of which about 4,600 acres are commanded by the low-level main canal (see Figure 7), although encroachments make the total slightly larger. This area constitutes Stage 1, the focus of our field study.

In the long run, another 30,000 acres of land, designated as Area D of the Mahaweli Program, will be developed on the Left Bank of the Kaudulla Scheme. Since 1976, Kaudulla Tank has been able to receive Mahaweli water via the nearby Minneriya Tank. The high ratio of tank storage capacity to area irrigated places Kaudulla in a very favorable position.[1] At Kaudulla and the adjacent Minneriya and Parakrama Samudra Schemes (all in Polonnaruwa District), one finds the most generously and reliably irrigated area on the island, as well as the highest Dry Zone paddy yields.

As in most other schemes in Sri Lanka, management tools at the Kaudulla Scheme are very limited. There are no written procedural guidelines, and records of volumetric measurements of water stocks and flows are not kept. None of the Irrigation Department staff, from the Irrigation Engineer down to the field laborers and the sluice-keepers, have any written guidelines as to how they should undertake

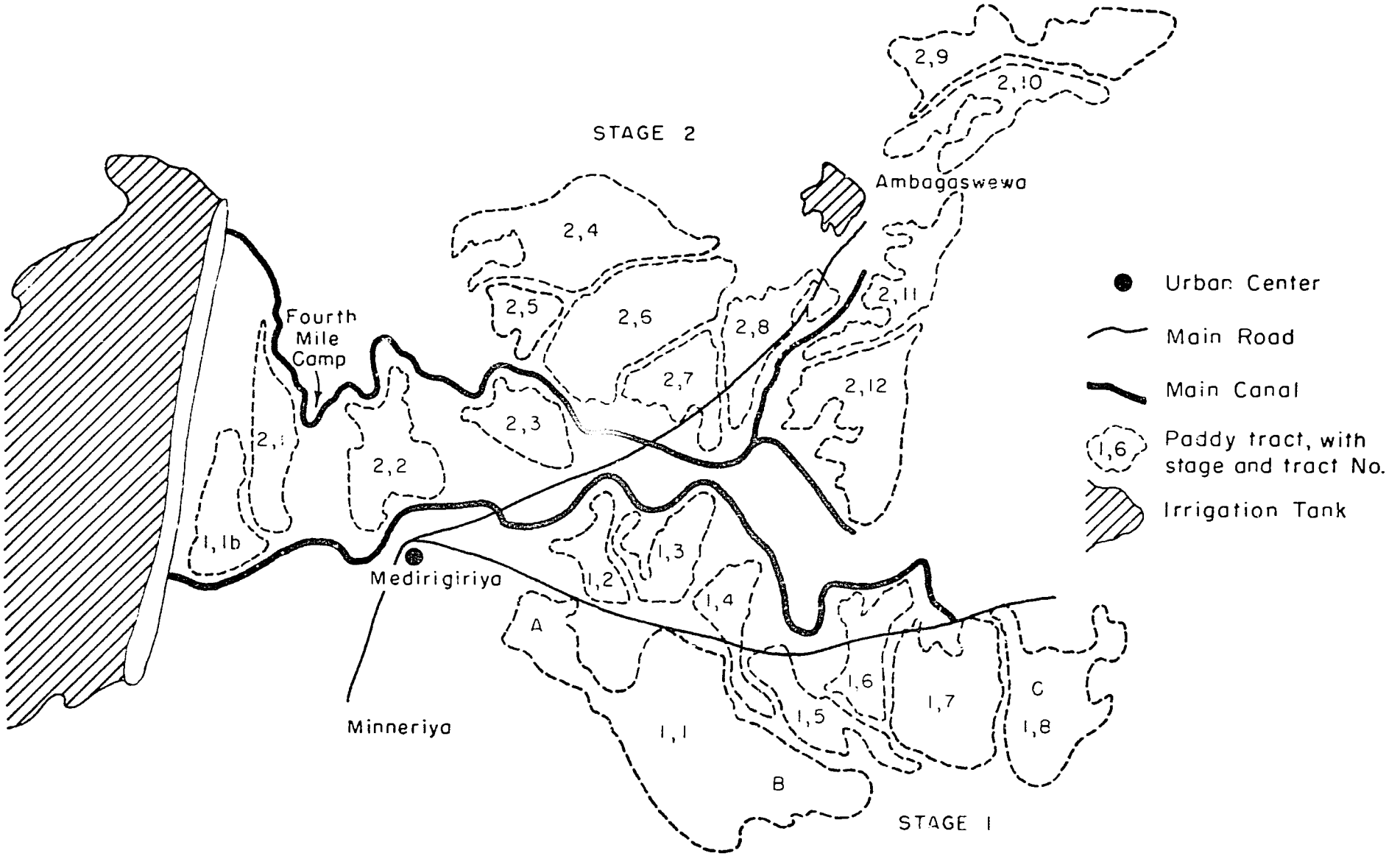

FIGURE 7: KAUDULLA IRRIGATION SCHEME

the water management aspects of their jobs. Tank levels and sluice gate openings are regularly recorded, but for various reasons these measurements are either not used or are not useable as guides in carrying out water management tasks. Although the Irrigation office staff use formulae to convert these measures into estimates of tank storage volumes and tank water issues, the results are simply sent to Colombo without being locally analyzed or cumulated. Also, recent detailed hydrological research on the Kaudulla Scheme casts considerable doubt on the accuracy of the information on water flows that is available.[2] Finally, data on cropped area, generated by the Department of Agriculture, are collected on the basis of residential localities (administrative units) rather than by paddy tracts (hydraulic units). Thus, agricultural statistics are not easily related to water use statistics.

This is not to say that Kaudulla water is managed on an ad hoc or arbitrary basis. Several well-established practices help things to run smoothly. For instance, sluice-keepers—those who control the issue of water from the main sluices and have living quarters nearby—automatically close the sluices after heavy rain without awaiting explicit orders from Works Supervisors. All other changes in sluice openings must await specific instructions. This is a fairly useful water-saving practice, although crude and potentially damaging if, as often happens, rain that falls at the head-end does not reach tail-end areas.[3]

Another well-established practice is the rotation of issues among groups of distributary channels that lead off the main canal. For example, on the lower main canal in the course of a week, water will normally be issued to the top end (Tracts 1 through 5) for three days, to the tail-end (Tracts 6 through 8) for three days, and closed off entirely for a day. Since, in actual practice, the structures do not allow the water to be so efficiently controlled and, in addition, abnormal situations arise, there are frequent modifications in the system. Thus, since there is no adequate

control structure on the main canal between the off-takes to Tracts 5 and 6, water flow can never be entirely shut off. Similarly, the gates to the distributary channels serving Tracts 1 through 5 often cannot be closed. Vociferous demands for more water are met where possible, and the system is often never closed at all for the one day a week. Instead, this day's delivery may be directed, insofar as is physically possible, to the areas apparently most in need of water. As we shall see, it is only by amending officially-determined schedules that the system can be made to work satisfactorily.

In Kaudulla, more than in many other schemes, amendment is carried out by the middle-level field staff. By this, we refer primarily to the Works Supervisors (otherwise known as 'Guardians,' 'Maintenance Overseers,' etc.) who live in and are responsible for water management tasks in Stage I, Stage II, and Ambagaswewa at the end of Stage II, respectively (see Figure 7). All are experienced men who have served for several years on the scheme and are well integrated into the local society and economy. Farmers with water-related problems rarely bother to approach the Irrigation Department field laborers, but instead go directly to the Works Supervisor. The Works Supervisors in turn only pass on especially difficult problems to the senior Technical Assistants.

Although the three Technical Assistants supervising operations and maintenance have living quarters at Fourth Mile Camp on the scheme (see Figure 7), typically, they are not especially involved in local society. Most are transferred after a year or two, almost as quickly as is the Irrigation Engineer for the scheme. The Kaudulla Irrigation Office, along with the living quarters of the Engineer and his office staff, is located, rather unusually, several miles outside the scheme beyond the town of Hingurakgoda. Since Kaudulla is at the end of a paved road and almost surrounded by jungle, there is no through traffic, and public transport is limited. The Irrigation Engineer and his office staff necessarily see less of the

scheme than they would if they were located within it. The local staff, especially the Works Supervisors and similar officers from other departments, thus have considerable autonomy. The senior staff are, and are perceived to be, rather temporary and inexperienced visitors.

3.2 Water Availability for the 1980 Yala Season

Kaudulla farmers showed a high degree of interest in the planning and implementation of water use in the yala 1980 season because of the recent introduction of Mahaweli water and the subsequent increase in area able to grow a successful paddy crop. According to the official statistics, during the past two yala seasons (1978 and 1979), almost the entire (official) irrigated area had borne a paddy crop.[4] However, the survival of the 1979 yala paddy crop had been close. The entire acreage under the scheme had been irrigated on the understanding that Mahaweli water would be delivered to the tank during the months of June to August. In fact, this water did not begin to arrive before mid-July, which was just in time to avert a major water crisis, the outbreak of conflict over water, and the disintegration of the established rotation schedule due to urgent demands (Murray-Rust and Cramer, 1979:7-9).

Another factor that helped to arouse farmers before the 1980 yala season was their belief that the Irrigation Department had been negligent in not repairing a long-standing leak in the sluice serving Stage I. (There was a log jamming the sluice.) Although the spill gates had been opened during the previous maha season, by early April the tank water level appeared barely adequate for a yala crop. Many farmers were eager to blame the Irrigation Department for the low water level.

However, whether or not there was adequate water for a full yala paddy crop was a disputed issue. According to the Irrigation Engineer, a recently arrived but keen young man, the tank held only about 55,000 acre-feet in early April. He

estimated that at least 75,000 acre-feet would be necessary to meet the needs of an irrigated paddy crop throughout the scheme, domestic water deliveries, and the small lift irrigation scheme on the low-level main canal. (Note that the start of the yala season in Kaudulla had become rather late, with consequent high losses of stored irrigation water through evaporation and evapotranspiration during the hot, dry months of May through August.)

Note should be made that because the maha and yala seasons were very extended, covering almost the entire calendar year, there was scarcely any interseasonal interruption in water deliveries. During the previous years, water had been delivered during the maha season from early October until sometime in March, and during the yala season from early April until the end of September (Holmes et al., 1980: Figures 19-22).

The Engineer explained that during the previous yala season, there was about 58,000 acre-feet of water in the tank with an additional 25,000 acre-feet received from the Mahaweli Project. This was considerably more water than was currently available. Many farmers were unwilling to accept that the paddy acreage should be limited, and some of them suggested that this young and inexperienced Engineer was playing safe to save himself later potential trouble and embarrassment. It was probably rational for farmers to press hard for paddy to be allowed on all lands because once the paddy was planted, there was a good chance that the Mahaweli authorities would feel obliged to deliver some water to Kaudulla if that was the only way of saving a standing crop threatened with drought. It is, however, difficult to judge whether this was in farmers' minds.

3.3 Kaudulla Cultivation Meetings

The First Cultivation Meeting on April 4—The meeting was held in the school at Medirigiriya, at the top end of the scheme.[5] The attendance of about 400

to 500 farmers was considered good but by no means exceptional. Only about 10 percent of the 4,873 legal allotees were present.

Most of the farmers managed to crowd into the school hall. Standing or seated on the low schoolroom walls and the ground outside, they were faced by a semi-circle of officials on chairs, including the Government Agent (henceforth GA) who presided, the Assistant Government Agent for Medirigiriya, the Irrigation Engineer, some Technical Assistants, the Agricultural Instructor, the Deputy Commissioner for Agrarian Services, the local bank manager, and a visiting expatriate researcher. At the front of the farmers' ranks, and also seated on the floor, were a number of more junior officers, including the Works Supervisors. These officers were physically and symbolically separated from the group of seated higher officials.

The meeting was dominated by the GA, a man of evident status and character, who handled matters firmly and politely. He summed up the water situation, concluded that there was not enough water for a full paddy crop, and suggested a bethma cultivation whereby every farmer on the scheme would be allocated an acre on Stage I.[6] This would have involved cultivation of the full area of Stage I. It should be noted that the sluice that serves Stage I (the low-level main canal) is five feet lower than the sluice serving Stage II. When the tank is low, water can be delivered at greater head (pressure) through the Low Level Sluice, and, at a certain point, it is only possible to deliver water through the Low Level Sluice. Thus, the suggestion to limit cultivation to Stage I was technically sensible.

The discussion that followed veered back and forth between a number of matters. Some farmers blamed the Irrigation Department for excessive water use in the last maha season and for failure to mend the continuing leak in the Low Level Sluice. One group was successful in publicly embarrassing the Engineer, who

had no answer to their charge that he had persistently ignored requests to come and look at a particular irrigation problem. The GA became involved in a discussion of the maintenance and management of channels and structures and gave details of forthcoming institutional reforms. Other farmers focused on the central question of what was to be done with the limited water available. There was some opposition expressed to adopting the bethma system, mainly on the grounds that it was impractical for farmers to travel miles from Stage II to Stage I. The GA sympathized with these farmers. Finally, a Stage II farmer suggested that water be issued only for non-paddy crops throughout the scheme. This, however, raised a host of questions and problems. As with paddy production, unirrigated crops require ready cash for land preparation and seed. Since most farmers did not have the money, could the banks deliver adequate credit quickly? Where would the vast amount of seed needed come from? What about farmers whose plots were low-lying and thus insufficiently drained to grow non-paddy crops?

At one point it appeared that the officials were about to fall into disarray in the face of contradictory suggestions and the magnitude of the problems of providing credit and seed for a large acreage of non-paddy crops. They were saved by the Agricultural Instructor, who with the aid of the back of an envelope and a hurried whispered conversation with the other officers, managed to draw up a program to be put to the meeting. It is significant that he was the only locally-resident man on the platform.

After further open discussion, the following program was formally proposed and seconded by two farmers and accepted by the meeting:

- No paddy is to be grown this season, only unirrigated crops.
- Water will be issued on April 20 for seven days for land preparation. Thereafter the sluices will be alternately open for three days and closed for three days. On September 30 deliveries will cease.
- Those requiring seed should apply to the Agrarian Services Department before April 10. The seed will be supplied between April 20 and 25.

- Applications for credit should be made before April 20, and the issuing of loans will begin on April 30. Credit should be repaid by October 15.
- Channels should be cleared by April 15. If this is not done, the Cultivation Officers should do the work before April 25 and charge the farmer responsible Rs. 15 for every two yards.
- Fencing is to be completed by May 30.
- Land preparation and sowing to be completed by May 30 for cowpea, red onions, and miscellaneous vegetables; and May 15 for bombay onions, groundnuts, and blackgram.
- Animals and tractors are not allowed into the fields to prepare the land for the maha season before October 20.

On paper this looked like an excellent program. The Kaudulla farmers, who had little experience in growing non-paddy crops, agreed to abstain from paddy and to grow water-sparing, high-yielding subsidiary crops, thus meeting a long-standing national policy objective. However, the program raised a whole host of associated problems.

First, the technical and economic viability of non-paddy crops was in question. It was already too late to sow chilies, the most lucrative subsidiary crop. Second, the Agrarian Services Department and the bank had ambitiously agreed to supply seed and credit. Finally, did the market for non-paddy crops exist?

The other set of doubts concerned the commitment of the farmers to the program. One had the impression that once the GA had strongly committed himself to the suggestion that everyone must grow non-paddy crops, few farmers were willing to openly disagree. Large numbers of farmers drifted away from the meeting once it became clear that this would be the decision. Considerably fewer than 500 farmers formally assented to the decision As the meeting was drawing to a close, a few spots of rain began to fall. The GA, having just obtained agreement on a non-paddy crop, chose that moment to announce that there had been heavy rains the previous day in the catchment area of the Mahaweli River, and that

perhaps they would receive Mahaweli water and be able to grow some paddy after all!

The Second Cultivation Meeting on April 26—A second meeting was held three weeks later at which the GA explained that, although the previous meeting had agreed on non-paddy crops only, some influential farmers from Stage I (they were from the top-end) had been dissatisfied. They had approached the local Member of Parliament (MP), who had requested that the decision be reconsidered. One might add that the possibility of getting Mahaweli water had made this reconsideration opportune and convenient. This time the MP attended the water meeting and the number of farmers was probably in excess of 1,500.

At the time of the meeting, the only relatively firm prospect for Mahaweli water was 10,000 acre-feet reckoned to be in excess of the requirements of the adjacent Minneriya Tank. The MP had requested that this be transferred to Kaudulla. The Irrigation Engineer suggested that this be used to cultivate about 3,700 acres of paddy on the upper part (Tracts 1 through 6) of Stage I. The meeting, however, floundered on the refusal of Stage 2 farmers to agree to this proposal. A minority were willing to come to Stage I to do a bethma paddy cultivation, but the majority disagreed. They wanted at least half an acre of paddy each on Stage 2. Some Stage I farmers, presumably from the very top end, were willing to see the paddy acreage on Stage I reduced in order to permit some paddy to be grown on Stage 2, but that too failed to win general agreement.

The absence of consensus, however, was not yet a problem because there was still no final word from the ultimate arbiter, the Mahaweli Board, on the amount of water that could be made available to Kaudulla from the Mahaweli system. The GA announced that a decision would be made either through another meeting or by the officials, after the meeting of the Mahaweli Board on April 30.

Interim Arrangements—Since no decisions had been reached at the second water meeting, there was no plan for the disbursement of water issues. Owing to the fact that water really did seem short, farmers on Stage 2 had gone ahead with non-paddy crops. Water deliveries to them, adequate for non-paddy crops, had already begun in the form of a small but steady flow of water from the lower main canal. As explained, the Low Level Sluice could not be completely closed. This was later supplemented by substantial rainfall in late April. Many Stage 1 farmers began to prepare their land for paddy, although most at the bottom end abstained because they had little confidence in receiving irrigation water later in the season. No paddy seed was available from the Agrarian Services Department because there had been no decision to grow paddy. From May 6 the Low Level Sluice was closed completely for a week for the long-demanded repairs. Those farmers who were in the process of preparing or irrigating their land with the water that had been escaping [illegible]gh the leak complained that they had not been informed in advance. The repaired sluice was reopened on May 14 and kept open for seventeen days, thus allowing paddy land preparation on Stage 1 to be completed.

The Third Cultivation Meeting on May 16—Most of the officers attended this meeting, although the MP was absent. Farmer attendance was only about 400. Presumably, the majority of farmers had heard that there was no prospect for additional Mahaweli water. The business of the meeting was to decide on an equitable division of the limited water supply.

The final decision was similar to that suggested by the Irrigation Engineer at the second meeting. It was agreed that Stage 2 farmers could only have water for non-paddy crops. Paddy could be grown on Stage 1, but only on the basis of one acre per allottee. There were 1,982 allottees, and 1,859 acres of land were demarcated for cultivation. The area to be served under each distributary channel was specified, but the precise location of the land that was to receive water was

not demarcated, beyond the decision not to deliver water to the tail-end, Tracts 6 through 8. Allottees there were asked to do bethma cultivation in upper tracts and to contact the Colonization Officer at Diyasenapura if they experienced any problems. Farmers in Tracts 7 and 8 did not resist since scarcely any had begun cultivation. Some on Tract 6, however, had already begun preparations and adamantly refused to be moved, demanding water instead.

Finally, the GA asked the Colonization Officer to prepare a list of all farmers on Tracts 6 through 8 who wished to cultivate elsewhere on the bethma system. He said that after receiving this list and discussing the situation with the MP and other officers, he would announce the final decision on May 19. One might note that by removing the arena of decision making from the cultivation meeting to consultations between officers and the MP, the problem of the refusal of some Tract 6 farmers to abandon their prepared paddy was sidestepped. Instead, local officers were left with the physical reality of the paddy area in Tract 6.

3.4 The Allocation of Irrigated Acreage

The allocation of irrigated land for bethma cultivation is, in practice, very complicated and far less equitable than the ideal scheme suggests. There appears to be an inconsistency between the magnitude of the allocation process and the absence of any detailed discussion of procedures either in the cultivation meeting or in the official record of the decision (Table 9). According to the "Announcement of Revised Cultivation Decisions" (Table 9), the government had no intention of allocating individual bethma rights. Rather, the allocation process was expected to be carried out by the farmers themselves on the basis of individual relationships and initiatives. The government machinery—in this case the Colonization Officer concerned with land rights—was only required to record the arrangements and to intervene in the case of complaints. Otherwise, the allocation process is arranged

Table 9: Accouncement of Revised Cultivation Decisions, Kaudulla Irrigation Scheme, Yala 1980.

The following amendments were made to the water meeting decisions (water meeting held on April 4, 1980) at the meeting held at the Polonnaruwa Kachcheri attended by the Medirigiriya M.P., G.A. (Polonnaruwa), I.E., and the other relevant officers.

Water deliveries to the Stage II area will remain the same as decided at the water meeting on April 4, 1980. Stage II will get water only for the subsidiary crops. Stage I farmers will be issued water only for one acre under the bethma system. The areas and acreages of water deliveries will be according to the following table:

Tract/Channel Area	Acreage	Tract/Channel Area	Acreage
Tract 1-13	316	D-4 Channel	54
D-1 Channel	312	D-5 Channel	180
RB-Channel	335	D-6 Channel	09
D-2 Channel	159	D-7 Channel	12
D-3 Channel	30	D-8 Channel	178
21-Short Channel	14	D-5, LB1 Channel	18
D-0 Channel	212	Urukotuwa	30

Farmers in the Stage I, Tracts 1 through 5 area must be prepared to share (or divide) their lands with the non-water issuing area farmers in Tracts 6 to 8. Those who already had cultivated more than one acre must share their expenses with the land-receiving farmers as decided at the water meeting held on May 16, 1980. All these land sharing actions should be peaceful and cordial. All these land-sharing arrangements should be communicated to the Colonization Officer, Mr. Jayasundera, at Diyasenapura. If farmers have any problems, they should complain to Mr. Jayasundera. There will be no water deliveries at all to Tracts 6, 7 and 8.

Dates of water deliveries for paddy cultivation will be issued later.

Sgd. A.G.A. Medirigiriya,
(for the G.A. Polonnaruwa).

cc: 1. M.P. Medirigiriya
2. G.A., Polonnarawa,
3. I.E. Kaudulla
(for necessary action)
4. Colonization Officers
(Diyasenapura and Wijayapura) (for necessary action).

by the farmers themselves on an individual basis, not via the mediation of any farmer organizations.

The question that springs to mind is how, in practice, does this process work. Unfortunately, the available information is very fragmentary, although it is clear that the outcomes are the result of a great deal of maneuvering at the personal level, and thus are reflective of the unequal social, economic, and political stature of different individuals. Fragments of information from Kaudulla and elsewhere suggest that bethma land is not equally shared. Those who have to abandon their own land and seek land elsewhere frequently receive little or no compensatory land. For the yala 1980 season at Kaudulla, we have two sets of quantitative data (Tables 10 and 11) that clearly support this conclusion.

The information in Table 10 comes from a large sample of farmers who were interviewed on an informal basis by resident investigators. It only includes farmers whose own land was not to receive irrigation water. The interviews were conducted in the midst of the land allocation process, and it was not possible to replicate them once the process was complete. The trend, however, is very clear. The majority of those allocated land elsewhere were unlikely to cultivate it themselves, although most would receive some kind of cash compensation from the actual cultivator. Table 11, presenting data from a different sample of farmers, also clearly confirms that in the majority of cases, those allocated land other than their own plots did not actually cultivate it.

Whether or not bethma results in an equitable distribution of water is a question beyond the scope of this study. Clearly, benefits are distributed less equally in practice than in principle. One might, however, argue that there is at least some transfer of income from richer top-end cultivators to poorer tail-enders through compensation payments for cultivation rights foregone. Our interest in the bethma system arises from a different perspective. The case material illustrates

Table 10: Land Use Arrangements Made by 122 Recipients of Bethma Land at Kaudulla, May 1980.

Types of Arrangement Reached	Recipients Number	Recipients Percent
Land was solely cultivated by the permanent allottee in return for some compensation to the bethma allottee*	36	30
Land was cultivated by a farmer other than the permanent allottee in return for some compensation to the bethma allottee	14	11
No final arrangement was made because of dispute or uncertainties**	47	39
No plot of land was allocated	3	2
Bethma allottee actually worked the plot allotted to him	22	18
Total	122	100

*The most common compensation arrangement was for the actual cultivator to pay the bethma allottee a fixed rent in kind at a lower rate than that levied under the prevalent local tenancy arrangement (vee poronduwa).

**In eighteen cases, there were doubts or disputes about access to irrigation water. In eight cases, the bethma allottee had been asked to pay the permanent allottee a cash compensation for the land preparation work already completed. In six cases, the permanent allottee had allegedly allowed the bethma allottee less land than his entitlement, and in five cases, had not allowed him any land at all. Other problems arose in ten cases.

Table 11: Amount of Paddy Land Actually Cultivated by Sampled Farmers at Kaudulla According to the Location of Their Allotted Holdings, Yala 1980*

Location	Location Symbol on Figure 7	Number of Farmers in Sample	Average Extent of Paddy Cultivated per Farmer**
Tract 1 Top-end	A	19	1.61 Acres
Tract 2 Tail-end	B	19	0.51 Acres
Tract 8	C	19	0.16 Acres***

*This information relates to the farmers interviewed regularly during the 1979-80 agricultural year in the course of the Farm Power Project.

**All the paddy was irrigated in the Scheme.

***Only three of the nineteen farmers cultivated any paddy at an average of one acre each.

how the important process of allocating actual access to irrigation water takes place in large part outside the purview of the cultivation meeting. Although broad strategic decisions concerning alternative principles of allocation are discussed at the cultivation meeting, final decisions are frequently ambiguous. As recorded above, the third cultivation meeting closed with officials asserting that no water would be issued beyond Tract 5 and a group of farmers on Tract 6 vehemently asserting that they would not abandon the land they had already prepared. In the long run, the local irrigation staff found it impossible to deny water to Tract 6, and some water was delivered one day each week throughout the season. This was mainly to serve nineteen farmers who had begun the cultivation of non-paddy crops. Also, several Tract 6 farmers took advantage of the water to grow paddy.

What was the actual outcome of the 1980 season in terms of cropped area? The answer is muddled by the wide variation between the two sets of estimates of cropped area reported in the last column of Table 12. Since, however, the alternative estimates are widely divergent only in the case of non-paddy crops in Stage 2, the present argument is not much affected. Perhaps the most significant conclusion is that in the gathering of statistics as in other matters, the government machinery on irrigation schemes is very much attuned to paddy cropping.

A further comment on the statistics in Table 12 is that as previously pointed out, they are collected by the staff of the Agriculture Department, not Irrigation and according to residential, not hydraulic units (i.e., tracts). The actual paddy acreage in Stage 1, variously estimated as 1,994 and 1,882 acres, was more or less the same as the aggregate target of 1,859 acres. It has been demonstrated above, however, that the distribution of water and land among farmers was significantly different from the plan. Whether this was also true of the allocation of cultivated acreage between different tracts, one cannot say because of the way in which the cropping figures were collected.

Table 12: Allocated and Actual Cropped Acreages, Kaudulla, Yala 1980.

		Area Allocated	Area Cropped*
Stage I	Paddy	1,859	1,994 / 1,882
	Non-paddy crops	0	77 / 0
Stage II	Paddy	0	810 / 950
	Non-paddy crops	As much as desired**	847 / 3,522

*The two alternative sets of figures were obtained from the Medirigiriya Agricultural Office by different agencies at slightly different times.

**There are officially 5,935 acres of irrigated allotted land in Stage II. Given the lack of credit and seed compared to paddy, one would not expect the entire acreage to be cultivated with non-paddy crops.

It is clear that in Stage 2 there was a large cultivated area of officially illegal paddy. This was usually around the top ends of canals, where farmers could easily appropriate water. The official crop statistics, although questionable, show a marked decrease in the ratio of paddy to non-paddy crops as one moves from the head of Stage 2 to its tail. Many if not all of those Stage 2 farmers who refused to agree to a bethma cultivation on Stage 1 must have felt pleased with themselves, even though, as one would expect, average paddy yields on Stage 2 were rather low.[7]

3.5 Managing the Water

To make judgments about the degree of success of the water management practices adopted in the 1980 yala season, one would need to make quantitative calculations such as irrigation efficiencies and water use rates per unit of agricultural output. However, the requisite data are either not available or, if available, of doubtful accuracy.[8] A less rigorous, and more applied approach to evaluation suggests that perhaps the season should be counted a modest success. Major conflicts were avoided; water was available until the end of the season; no crops failed due to lack of water; if the most generous figures for cropped area are to be believed, the area cultivated was about 60 percent of that cultivated in the previous 1979 yala, with only about 40 percent as much tank water issued, and 55 percent as much water received in total, including rainfall (Holmes et al., 1980; and Holmes, personal communication); paddy yields on Stage 1 were relatively high; and the cropping pattern envisaged at the beginning of the season was in large part achieved—the main exception being the substantial area of "illegal" paddy on Stage 2. One should, of course, note that non-paddy crops require less water than paddy and can tolerate longer intervals between water applications.

The day-to-day water management decisions were thus made in a context where water was scarce but never acutely so. Note that rainfall amounted to about three-quarters of the long-term local average (Holmes et al., 1980; and Holmes, personal communication). One might conclude that approximately the correct decision had been made concerning the extent of cropped area. The water still in the tank at the end of the season was insurance against the substantial chance that rainfall would be below the long-term average (Holmes et al., 1980: Table 4). Predictably, many farmers preferred to attribute the fact that water was left at the end of the season to the inexperience of the Irrigation Engineer.

Discussion of water management practices can best be structured around the information laid out in Figure 8, which focuses on the major decisions that are made by the Works Supervisors—that is, the timing, duration, and size of main sluice gate openings. Although there was no specific mention of these matters in the final official decision on the season's program (see Table 9), a three-days-open, four-days-closed pattern of deliveries from the main sluices had been mentioned at the first water meeting, and was almost automatic on Stage I. The normal practice was a three-day delivery to Tracts 1 through 5 followed by a three-day delivery to Tracts 6 through 8. Given that no water was to be delivered beyond Tract 5, the three-day delivery per week seemed natural. Note that there was scarcely any discussion of these matters at the water meetings. This was considered to be detail rather than strategy.

Before looking in more detail at Figure 8, two general comments should be made about the process of allocating water during the season. The first is that rotational deliveries between channels were made in a few cases only and for limited periods when water was beginning to be very scarce. On Stage I, there were no rotations between the nine distributary channels taking off from the Right Bank Main Channel. However, during June and July, rotations were enforced

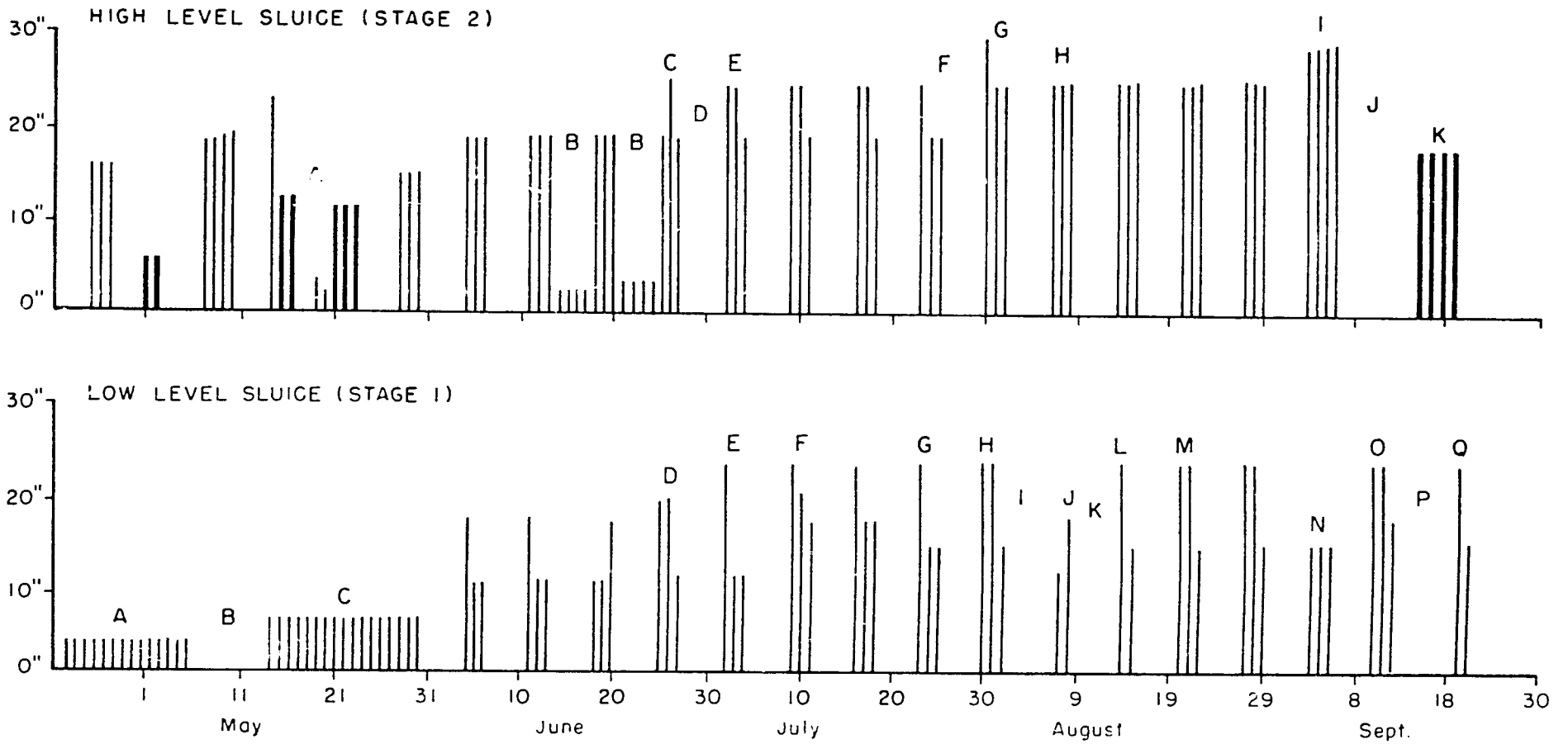

FIGURE 8: SLUICE GATE OPENINGS, KAUDULLA SCHEME, YALA 1980

Notes: 1. There is only a single gate on the Low Level Sluice. There are three gates on the High Level Sluice, but only two were ever open at any one time. When two were open, a thick line was used.

2. The size of gate openings does not in itself indicate the volume of water issued. This also depends on tank water level. The Low and High Level Sluices both have different size apertures and are situated at different levels.

Notes to Figure 8: Kaudulla Irrigation Scheme.

	Date	LOW LEVEL SLUICE (One Sluice Gate)
A.	April 21 - May 5	The sluice gate was continually open at three inches because it was jammed by a log. Some cultivators used the flow to prepared paddy lands (see text).
B.	May 6-13	The sluice was closed for repairs.
C.	May 14-30	A relatively small continuous delivery was made for the completion of land preparation that had been begun with leaks and rain water. (Note that no such continuous delivery was made to Stage II, as paddy was not supposed to be grown there.)
D.	June 25-27	The regular water delivery was augmented so that some water could be directed to the uncropped tail-end Tracts 7 and 8 for domestic purposes.
E.	June 2	The sluice was opened wider than usual on the first day of delivery to increase "head" in the channels and allow more water to be directed to the tail-ends.
F.	June 9-11	The receding tank level made it necessary to open the sluice wider to compensate for the reduced head of water and still issue the same quantities as before.
G.	July 24-25	The sluice opening was reduced on the second and third days of delivery in an attempt to save water. Water was beginning to become scarce.
H.	July 30-31	The sluice opening was increased to compensate for the further head loss because of falling tank water levels.
I.	August 6-7	Normal delivery was suspended on the sixth and kept at a low level on the seventh because of heavy rain.
J.	August 8	The sluice was opened more on the previous day to permit a water delivery to Tracts 7 and 8 for domestic purposes.
K.	August 13	The normal daily delivery was postponed because of construction work on a bridge across the main channel.
L.	August 14	A relatively big delivery was made to compensate for the lack of one on the previous day.
M.	August 20-21	A relatively big delivery was made because of complaints about water scarcities in Tract 1-B.

Notes to Figure 8 (continued)

	Date	LOW LEVEL SLUICE (One Sluice Gate)
N.	September 3-5	Sluice opening was reduced because most crops were close to harvest.
O.	September 10-12	The sluice opening was increased again because of complaints about water scarcity.
P.	September 13-19	No deliveries were made because it seemed that no more water was required.
Q.	September 20-22	A few farmers asked for water, and a final delivery was made.

	Date	HIGH LEVEL SLUICE (Three Sluice Gates)
A.	May 19-20	A small delivery was made for domestic purposes.
B.	June 14-17 and 21-24	A small continuous delivery was made so that the channels would not dry up and the main three-day issue would travel more rapidly toward the tail-ends of channels.
C.	June 26	An especially big delivery was made because of complaints about water shortages beyond Tract 8.
D.	June 28 - July 1	The practice of continuous deliveries was terminated because water was becoming scarce.
E.	July 2-4	The normal sluice opening was increased to compensate for reduced tank water levels (see F above).
F.	July 23-25	The normal delivey was reduced on the second day to save water.
G.	July 30 - August 1	The normal delivery was increased because of complaints about water scarcities at the tail-ends.
H.	August 6	A slightly reduced delivery was made on the first day because of rain at the tail-end.
I.	September 3-6	An especially big delivery was made because the main channel was closed for construction work.
J.	September 7-14	The system was closed for eight days because of construction work.
K.	September 15-18	An especially big delivery was made to compensate for the previous closure.

between field channels taking off from two of the distributary channels. The three-day period of water delivery was divided so that the top-end field channels received water for one and a half days and the tail-end channels for one and a half days. These rotations were made in response to problems at the ends of these two distributary channels. They were informally evolved by the Irrigation Department field staff and the vel vidanes (farmer representatives for water management) elected for the first time early in the season.

On Stage 2, the problem of getting water to tail-ends was, as always, more serious. The fact that the High Level Sluice serving Stage 2 is higher than the Low Level Sluice (see above) meant that there was less head of water down the Stage 2 channel system. In early July, a rotation schedule between distributary channels was introduced. During the three-day delivery period, Tracts 1 through 4 received water for one and a half days and Tracts 5 through 12 for the remaining one and a half days. One might note that this represented a de facto acceptance of the cultivation of a large paddy acreage toward the top of Tract 2. These top-end tracts were given more than twice as much water per total acre (i.e., cropped or non-cropped) as the tail-end tracts.[9] Once again, the decision to introduce rotations and to allocate water in these proportions was made by the local irrigation staff in response to immediate exigencies.

A second general point is that the allocation of water among farmers was, as in all schemes in all seasons, accompanied by a continuous ferment of actions and responses on the part of individual farmers and field staff. Farmers continually blocked channels to augment their own water supply while their dams were removed by other farmers, vel vidanes, and irrigation staff. Because water was scarce, many farmers were especially dependent on field-to-field flow rather than direct supply from field channels. They attempted to increase their supply from other fields, either in cooperation with the other cultivators or unilaterally.

Farmers cultivating under bethma on part of another's allotment often complained that the permanent allottee would not give them their fair share of water. The Works Supervisors listened to a continuous flow of complaints and requests.

3.6 Managing the Main Sluices

The relevant empirical information about the operation of the main sluices has been given in Figure 8 and the accompanying chronological commentary. Listed below are the main points of interest:

(1) The precision of sluice gate openings depends on the personal predilections of the individual Works Supervisors. In most cases, the first day of the three-day delivery was marked by an especially large issue designed to quickly build up a reasonable level of water in the channels. This increased the chances that at least some water would reach the tail ends. Yet this practice was not consistently followed, especially on Stage 2.

(2) The High Level Sluice has three gates. When attempting to deliver a given flow of water, a choice must be made as to whether to use more than one gate or to open one wider. In the early part of the season, the practice on Stage 2 varied. Given the lack of any volumetric flow measurements, only a very experienced Works Supervisor could make accurate judgments about the consequences of alternative decisions.

(3) Sluices were closed after heavy rain.

(4) Exigencies, such as construction work, require occasional and sometimes quite substantial changes in delivery schedules.

(5) Barring exigencies, the basic three-days-on, four-days-off delivery schedule was closely adhered to. This reflects a perceptible "tightening up" in recent years of irrigation management at Kaudulla, perhaps partly in response to detailed hydrological research that has been in progress there since 1978 (Holmes et al., 1980).

(6) Even when the delivery schedule was closely adhered to, the supply of water towards the tail end of even main canals was markedly more variable than the supply at the top end. This conclusion is not derived from the data is Figure 3, but from a separate measuring exercise.[10] This is quite normal and predictable for a surface irrigation scheme in which it is not possible to prevent top-end farmers from helping themselves to water. It helps to demonstrate that deviations from a fixed supply schedule are especially harmful to tail-end cultivators.

(7) Most important, the information in Figure 8 illustrates that decisions to change sluice gate openings are made on an ad hoc basis and in response to immediate pressures, especially farmer complaints. This was especially evident during the months of July and August, when water began to be scarce.

Whether or not the decisions concerning sluice gate openings were good or bad from a technical (i.e., irrigation and agronomy) point of view is a question that cannot be answered with the information that is currently available. From the political and administrative points of view it may be that the field level Irrigation Department staff manage water at Kaudulla in the best ways possible. For example, the strong tendency to respond to reasonable complaints about water shortages, even at the cost of a continual oscillation between conservation and delivery of water, may be justifiable because it is the only way to prevent a major buildup of farmer resentment, which ultimately leads to political disturbances or to damage to physical structures. The main conclusion of this discussion, however, is that the actual water management process at Kaudulla is carried out largely independently of the cultivation meetings. Rather, it is the outcome of local decisions, personalities, and social and political relationships.

NOTES

[1]The Kaudulla tank has the capacity to store 8.1 acre-feet of water per acre commanded, the highest figure for any of Sri Lanka's large schemes. This compares with an average of 5.6 acre-feet for the fourteen schemes that have a command area greater than 7,500 acre-feet (data in Farrington et al., 1980:7). The adequacy of water supply, of course, also depends on water yields from the catchment area and elsewhere. Since, however, Kaudulla and several other schemes are now able to receive water from the Mahaweli system, direct comparisons between schemes regarding potential water availability are not meaningful.

[2]This is based on private communication from the staff of the Hydraulics Research Station, Wallingford, UK.

[3]The research conducted at Kaudulla reveals extremely high variability in the spatial distribution of rainfall over the scheme area, a product of the shower pattern of the monsoons. For additional information see Holmes et al., 1980: Tables 1 and 2.

[4]According to these statistics, paddy covered 95 percent of the officially irrigable area in the yala 1978 season and 97 percent in 1979.

[5]There was no suitable alternative venue, but the choice of Medirigirya made it certain that top-end farmers would be better represented than tail-enders.

[6]Under the bethma system, rights to water (and, attendantly, land) are temporarily reallocated among cultivators for the season. All within the larger area are given some land to cultivate within a smaller area at the head of the system that can easily be irrigated with available water.

[7]This conclusion is inferred from a comparison of two sets of yield data. The official figures from the Statistics Department's Crop Cutting Survey, based almost entirely on crop cuts made in Stage 2, suggested an average yield of thirty-eight bushels per acre. By contrast, the sample used by the Farm Power Project, located mainly in Tract 1 of Stage 1, suggested an average yield of fifty-six bushels per acre.

NOTES (continued)

[8]One might note in addition that recent investigations have raised doubts about the actual size and shape of the sluice outlet to Stage 2 of Kaudulla Scheme, and thus threw into question the accuracy of estimated sluice discharges (D.W. Holmes, personal communication).

[9]Tracts 1 through 4 accounted for exactly one-third of the legally allotted acreage under Stage 2. Even had farmers been unable to tap water intended for Tracts 5 through 12——which is almost impossible to stop——the upper tracts would have received twice as much water per total acre as the lower tracts.

[10]Throughout the yala 1980 season, measures of water levels were taken at three day intervals at two fixed points: the offtake from D1 channel to the RB1 channel at the head of Tract 1, and the offtake from the main channel into D9, serving Tract 5, the lowest point to which water was officially delivered. The water level at the head of D9 exhibited much more variability than at the head of RB1. This variability was measured by coefficients of variation of the water level, which were 52 percent and 39 percent respectively.

CHAPTER 4: CONCLUSION

4.1 The Performance of the Cultivation Meeting System

One possible interpretation of the case study material presented above is that cultivation meetings serve no useful purpose. This viewpoint would likely arise from a very narrow understanding of the function of cultivation meetings, that is, that their purpose is to make democratic and authoritative decisions (i.e., enforceable and enforced) about the use of water and the cultivation calendar. On large-scale schemes, it is evident that the cultivation meeting system does not work in this way. It is, at best, an extremely limited, arbitrary, and disorganized kind of democracy. The decisions made at the meetings are, in large part, nominal. Yet the fact that cultivation meetings do not live up to certain ideals does not mean that they serve no positive purpose. Indeed, our case material suggests that they perform at least four positive functions:

(1) They provide distinct, even if limited, possibilities for farmers to embarrass government officers publicly before the Government Agent. In this sense, they are a residual check on a blatantly poor job performance or immoral behavior on the part of officers.

(2) By obliging senior representatives of different government departments to publicly agree on a set schedule for the supply of agricultural inputs, the chances that seed, credit, and water will be provided at more or less the appropriate time are increased.

(3) The meetings provide the farmers with broad indications of how the irrigation staff intend to deliver water in the forthcoming season. Although agreed

schedules are often considerably amended, some information is better than none at all from the point of view of the farmers' planning for the next season.

(It is important to bear in mind that farmers do not just wait for water. If there is to be a season, they need to prepare by repairing ploughs, securing credit, arranging for labor, fertilizer, or tractors. If they are unlikely to cultivate, they may wish to prepare for the alternatives: seeking a job on a public works scheme; undertaking some small trading enterprise; gathering materials to rebuild their homes, etc.)

(4) Most importantly, especially on conflict-prone schemes such as Gal Oya, the cultivation meetings permit the officers to "take the farmers' temperature" —to assess, from the size of attendance and the tone of farmers' language, the extent to which they will cooperate with certain suggestions or, conversely, the extent to which certain ideas may be pursued without provoking the intervention of politicians or open conflict. Relations between irrigation staff and farmers are often antagonistic and cultivation meetings help prevent this antagonism from boiling over. (To be sure, if the meetings are badly handled by officials, they may actually keep dissatisfaction simmering. At Weeragoda, antagonisms increased as a result of the meeting.)

That said, it is clear that cultivation meetings play only a small role in the preparation and implementation of water management schedules. Further, the system is characterized by a number of apparently pathological features: the arbitrariness with which meetings are sometimes arranged; the lack of official preparation for the meeting; (failure to provide up-to-date information or to investigate recent records for lessons and guidance); low farmer attendance; belief on the part of both officers and farmers that meetings are a waste of time; ill-tempered discussion; timing of meetings too late to prepare for non-paddy

crops; rushed decisions that command little support; lack of effective means of reaching consensus when different groups firmly hold radically opposed views; waste of valuable meeting time on apparently petty individual problems and grievances; the tendency of officers and farmers to form opposing hostile blocks; decisions made in the expectation of acute water scarcity at meetings held just before the onset of heavy rain; promises of increases in authorized areas if expected rainfall arrives; and, above all, the fact that decisions are widely ignored or flouted.

The fundamental problems associated with the cultivation meeting system can be grouped under three related headings:

(1) The once-per-season meeting is not a satisfactory means of engaging in an effective dialogue with several thousand farmers. It is physically impossible for more than a tiny fraction of farmers to have their voices heard and there is no way to weight the representativeness of each voice. A speaker who is respected in his locality, who is the chairman of the local branch of the ruling political party, and who is voicing the general opinions of his neighbors deserves serious consideration.

(2) The decisions produced by the present system are so impractical that neither officials, politicians, nor farmers feel much obligation to adhere to them, though they nominally have the force of law.

(3) The planning and implementation of water delivery schedules should be an ongoing process. Plans for water delivery should be continually revised up to the end of the season in light of rainfall, changes in the physical capacity of the delivery system due to damage or repairs, and political pressures generated by inadequate water deliveries. The present system is based on the fiction that planning is undertaken at the cultivation meetings in an open, democratic, and accountable manner, and mere implementation is left to the

Irrigation Department field staff. The result, as we have seen, is that nearly all real decisions—i.e., decisions that make a difference as to who receives water and when—are made by the Irrigation Department staff in situations where there is no democracy, no openness, and little accountability. Instead, decisions are made in response to urgent pressures from many areas.

The result is the kind of oscillation in water management practice detailed in the case of sluice openings at Kaudulla. One cannot judge whether there is any substance to farmers' claims that Irrigation Department staff exploit their decision making power for personal ends. In Gal Oya, we know that TA's seldom know water delivery schedules in advance so that their capability to benefit from bribery is severely limited (though it exists!). However, such charges are almost inevitable when the formal public decision making procedure is widely ignored.

There are particular reasons why the cultivation meeting system is especially problematic at Gal Oya and Kaudulla. At Gal Oya, part of the problem lies in the large size of the scheme and the consequent need to divide into several meeting areas. At Kaudulla, the problem arises from planning in the absence of information on how much water will be delivered from the Mahaweli System. Yet it is not the circumstances peculiar to these schemes alone that leads to a critical evaluation of the cultivation meeting system. The problems set out above can be serious, even on small, self-contained schemes where only one meeting is held, and the tank is the sole source of water.

4.2 Options for Improving Water Management

(1) New Decision-Making Organizations—At least two possible means of improving the cultivation meeting system emerge from the analysis above. The first is that meetings should cease to be open to all farmers and instead be restricted to (presumably elected) farmer-representatives, each chosen to

represent a hydraulic unit (e.g., one or a number of distributary channel areas. Such an arrangement offers the prospect of orderly discussion, of representation of the interests of farmers on all parts of schemes, and of assigning responsibility to representatives for the ideas they promote. A second, and equally important step would be to incorporate farmer representatives, along with some officials, into a permanent standing committee, which would meet frequently and regularly, perhaps once every two or three weeks during each season. One would thus be dispensing with the fiction that a season's irrigation schedule can be planned on a once-and-for-all basis before the season begins, before rainfall is known, and without allowing for other exigencies.

Such suggestions are not novel. Similar ideas are sometimes expressed by officials concerned with irrigation management, and an experiment of this type has been conducted in the five tanks in the North Central Province, which fall under the Tank Irrigation Modernization Project (Parker, 1978). It is, however, not clear what success the experiment is having.

Doubts about the effectiveness or acceptability of a standing committee include:

(a) To set up such a committee is relatively easy. To ensure that it becomes an effective decision making arena, and that officials genuinely share information and authority with farmers, is more difficult.

(b) Such a committee would, to a certain extent, become a political arena, both in the broad sense that representatives from different areas would be competing with one another for water, and in the narrower sense that party affiliations intrude. However, the allocation of water is already a very political matter. MPs tend not to have an overall picture of the issues involved in water management at the local level nor do they feel responsible for the consequences of changes that they attempt to impose. This is

because frequently their only contact with the allocation of water is through the complaints of their constituents. The inclusion of MPs in the committees and the acceptance that water allocation decisions are invariably political might lead to a less arbitrary and more constructive set of relationships among farmers, politicians, and officials.

(c) Removing decision making from the public cultivation meeting to a small committee would raise questions concerning the relationship of the representatives to the mass of the farmers. It might be argued that there would be a continuing need for some kind of forum for ordinary farmers to express views and complaints and for decisions to be explained to farmers so that they could express their views and obtain information on planned cultivation schedules. One possibility would be to continue to hold cultivation meetings, but on a consultative basis only. A second would be to depend on a federated structure of farmers' water user associations, with the lowest-level (field channel) group linking with a federated structure at, say, the distributary channel, the latter actually sending representatives to the scheme committee. Just such a structure was planned for the Tank Irrigation Modernization Project (Parker, 1978), and is currently beginning to evolve at Gal Oya through the Institutional Organizer Program organized by the Agrarian Research and Training Institute. In any event, there would be a need, as indeed there is at present, for a public notice-board system through which intended irrigation water issues would be publicized and continually updated.

(d) A standing committee system would require resolution of a difficult question, that is, the role of the Government Agent and his assistants in irrigation planning. The chairing of water meetings by the GA/AGA has its origins in very different historical conditions (see Chapter 1.3), but is currently

justified by the fact that only the GA/AGA has the authority to coordinate decisions concerning programs of the separate government agencies involved: the Irrigation, Agriculture, Agrarian Services and Land Commissioner's Departments, and the banks. Yet the GA/AGA could probably not be expected to preside over a meeting held every few weeks, except in a few very large schemes like Gal Oya. Elsewhere, would the role of the GA/AGA in water management come to an end? If so, the next most senior official is the Irrigation Engineer. There may be questions as to whether he has the status and authority to coordinate all of the separate agencies involved.

We would note that a circular prepared jointly by the Ministries of Lands and Agriculture in 1980 attempted to coordinate cultivation meeting decisions throughout the country (including synchronization of all starting and finishing dates), a step that further removes decision making from the local area (Ministry of Lands and Ministry of Agriculture, 1980). It would not be wise to be too optimistic about the effectiveness of such a new water management committee, and certainly not wise to expect any rapid results if the government's expectation is to centralize rather than decentralize planning and operation. Experience in Gal Oya during 1982, when farmers were consulted in the pre-cultivation meeting decision making process and farmer-representatives were subsequently invited to sit on the District Agriculture Committee, suggests that there is considerable potential as yet untapped. It is premature to fully assess the implications of this experiment, but there is no doubt that the psychological impact has been tremendous. If it results in better relations between farmers and officials, then substantive progress will have been achieved.

(2) Matching Planning and Operation—A recurrent feature of water management in Gal Oya is that there is little attempt to coordinate the planning decisions, including those of cultivation meetings, with shorter-term

operations during the season. This situation appears to be prevalent throughout Sri Lanka, although there are varying degrees of uncertainty. In Gal Oya, it is difficult to predict both discharge and timing of deliveries, while the Kaudulla data indicate that the timing of deliveries is more reliable than the amounts of water discharged.

Two related questions arise. Are the releases of water into the scheme by the Irrigation Department consistent with overall water availability during the season? And is the delivery of irrigation water to specified locations at which farmers assume managerial control done in a reliable manner? There is evidence to suggest that more care has to be taken in releasing water from the reservoir so as to avoid creating unnecessary deficits during the latter part of the season. This may appear to be purely a technical matter, but this is not true. To be sure, the Irrigation Engineer in charge of a scheme is faced with a difficult, if not impossible task. He has to accept that, despite his technical advice, cultivation is likely to be authorized for a larger area than he is certain can be served (and the area actually cultivated is likely to be even larger). He can, with considerable justification, blame political processes for this divergence. With relatively little incentive (financially or in terms of promotion), he is expected to accommodate all political pressures brought to bear on the operating plan. If he tries to restrict issues during land preparation so as to limit total land irrigated, he will face immediate political pressure from farmers and their representatives to increase issues. This will result in increased demand for water throughout the season. Since their political standing is generally low, it is easy to sympathize with Irrigation Engineers who bow to one or other of these pressures.

At the same time, it must be recognized that no effort is made to monitor performance either during or after a season. If records were maintained that indicated the proportion of available storage released on a weekly basis, the

Irrigation Department would be able to demonstrate the likely effects of responding to increased demand for water. This would eliminate some crises that arise during the season, especially toward the end. It should be stressed, however, that this requires cooperation from higher administrators and from politicians during the season, as well as before it. A common complaint of Irrigation Engineers, and one that is frequently justified, is that they receive some measure of political support before a season, but when cultivation commences, the politicians invariably take the side of farmers, even if the lands under cultivation that are in need of water were not authorized to be planted.

Conventional wisdom has it that most water management problems originate at the field level because of farmer mismanagement. Analysis of thirteen years of records from Gal Oya indicates that the unreliability of water deliveries starts higher up the channel system, and that even in years with high storage, it is not possible for farmers to predict either volume or timing of successive deliveries on the basis of what they have been told by the ID (Murray-Rust, 1983). One cause of this lies in the relatively low ratio of available supply-to-anticipated demand that results when there are political pressures to extend the authorized area. The Irrigation Department is then forced to respond to rainfall in an attempt to conserve water in storage. The effect of this is disruption of delivery schedules. Attempts were made in both 1980 and 1981 to implement monthly delivery schedules, but information was only given to Technical Assistants, who were expressly told not to inform farmers. These schedules could not be maintained for the entire month.

A second cause is the continued failure to clearly define those locations within the conveyance system where responsibility for control of water passes from the Irrigation Department to farmers. The Irrigation Department controls the distribution of water throughout the system, down to the level of individual field

channels, though it does not have the capacity for such control. Indeed, the latest thinking (now being implemented in theory in Mahaweli "H" Block) is that rotations should be planned and controlled down to the end of adjacent pairs of farmers along a field channel, with the Irrigation Department operating every structure from the reservoir to the field channel turnout. This places the Department's management capability under tremendous strain, particularly as staffing levels are being cut back and funding reduced.

For farmer-based management to be effective, it is necessary for water to be reliably delivered. Discharge and timing should be relatively predictable, and changes should be passed on to farmers in advance. There is little doubt, based on experiments tried in some schemes, that farmers have considerable managerial potential that can extend above their field channels. At Gal Oya, it has been proposed that farmers take on managerial responsibility for distributary channels that encompass several field channel turnouts. If the Irrigation Department were to schedule irrigation deliveries to the head of each distributary rather than to each field channel, they would substantially reduce their managerial requirements. Moreover, this would allow farmers to adopt management strategies that were suited to local conditions and would probably reduce conflict between farmers and the government. In the longer term, it would be possible to assess actual water requirements for each hydrological unit rather than operate according to gross estimates of overall water requirements. (It appears at present that the ID is willing to devolve O&M responsibility from the distributary gate on down to farmer organizations in the Uhana area of Gal Oya beginning with the 1983 yala season. This would be quite a departure from past policy.)

Present practice is to assume a general water requirement and then to calculate the area that can be served by the volume of water in storage. More appropriate as a long-term strategy is to volumetrically deliver water to given

areas and to allow farmers to make the decisions regarding how the water would be best distributed in relation to land. For example, it does not seem appropriate for the Irrigation Department to make decisions about the distribution of water and cultivated area within small command areas because there are several alternatives for farmers, including bethma and changes in cropping patterns. The present arrangements almost inevitably lead to conflict among farmers and with the Irrigation Department, particularly if adjacent units are treated differently. If volumetric deliveries were adopted, it would be easier to spread water shortages over much wider areas and let farmers make the necessary managerial adjustments.

Admittedly, Sri Lanka is a long way from such a system. Few schemes keep records of discharges other than tank releases, and it would involve the Irrigation Department in much more energetic main system management than is currently practiced. It also has to be stressed that closer monitoring of discharges opens the Irrigation Department up to greater public scrutiny, and this is only desirable if public accountability is applied equally to other government officers and to farmers alike. If present efforts to organize farmers at field and distributary channels demonstrate that they can indeed accept responsibility for water management, then the first step toward more efficient and harmonious water management will have been taken.

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