

Institutional Framework for the Development and Management of Large-Scale Irrigated Agriculture in the Dry Zone of Sri Lanka: Mahaweli as an Example

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ABSTRACT

Colonial interventions disturbed the traditional institutions of water and land use, which led to the creation of state-sponsored colonization schemes. Further, the system-by-system development paid less attention to the settler community. With the introduction of the participatory irrigation management, self-management at the tertiary canal level and joint-management at the system level evolved in each system. The commercialization process paved the way for the private sector and farmer associations to participate in system development. Transfer of functions of authorities narrowed-down the traditional scope and led to a new concept of river-basin management.

HISTORICAL BACKGROUND

The British colonial policy based on neoclassical economics had a lasting impact on agrarian conditions in Sri Lanka. The main aspect of colonialism was to make use of natural resources, namely land and water, to suit the colonial policy. The Colebrook-Cameron reforms of 1832 abolished the traditional institutions of *rajakariya* (compulsory labor) and hereditary headmanship. In 1840, the Crown Lands (Encroachment) Ordinance converted, at a stroke, nearly 90 percent of the land in this country to Crown property. These lands were sold not only to the British developers but also to Sri Lankan entrepreneurs for planting tea, rubber, and coconut. The expansion of rubber plantations might have caused the greatest hardship to peasants because these plantations were established in the most densely populated southwestern part of the island. Irrigation was one of the main sectors affected by the reforms. Meantime, colonial officers introduced the Paddy Lands Irrigation Ordinance of 1856 and entrusted the responsibility of irrigation development to the Government Agents (GAs). In 1900, with the establishment of the Irrigation Department (ID), the functions handled by the GA were transferred to the Director of Irrigation. The government mechanism introduced to implement irrigation programs disturbed the ancient customs, traditions, and practices in the paddy sector. The Land Development Ordinance (LDO) of 1935 was enacted for the creation of a landowning peasantry class in the dry zone areas. In this zone, large areas of land were available without water and the colonial authorities decided to establish a state department (e.g., the ID) and entrusted it with the task of providing a gravity water supply to the selected

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irrigation schemes there. The manner of using water and operating the canal system was prescribed in the Irrigation Ordinance of 1946 and the responsibility for implementing this ordinance was vested in the ID. With this state intervention in allocating water to the drylands, the value of such land increased. In other words, two natural resources were brought into use for rice production through peasant farmers.

From the 1850s to the 1940s, the British rulers concentrated on the restoration of ancient irrigation works. The Gal Oya multipurpose river basin development project combining irrigation, agriculture, power, and industries was begun in 1949 and the Gal Oya Board was formed as the implementing agency of the new project. This was influenced by the American experience and the model of the Tennessee Valley Authority. With this experience began the construction of large-scale new irrigation schemes in Sri Lanka.

In the 1930s, state-sponsored colonization schemes were started with a heavy incentive package to shift the wet-zone population to the malaria-infested and uncultivated jungles in the dry zone. Even at present, the government is spending large amounts of money to continue the same 'colonization model' with strong government agency intervention. As a result, the settlers depend on agency staff mainly for the supply of irrigation water, agricultural inputs, distribution of outputs, and other day-to-day needs. The planners paid more emphasis on construction and settlement and not much thought was given to the long-term maintenance of the canal system. Accordingly, requests for foreign capital assistance for rehabilitation, every 10 years, have become a normal practice in major irrigation schemes.

In the Mahaweli Development Project, human settlement schemes were started not only in the downstream areas but also in the upper catchment of the Mahaweli, namely, Kotmale, Victoria, Randenigala, and Rantambe. This paper will focus attention on Systems B, C, H, and Walawe regions under the Mahaweli systems.

TENURE SYSTEM AND EXPECTED DEVELOPMENT

Although state lands were sold at a nominal price to the developers under the Crown Lands Ordinance, a rigid state-sponsored tenure system was designed to protect the peasants and prevent large landholders from gaining access to large tracts of land under the LDO. After Sri Lanka gained independence, population pressure on cultivable land rapidly increased and state control of land alienation was also very high. As a result, the Paddy Lands Act (1958) and the Land Reform Law No. 1 (1972) were introduced to ensure security of tenure to tenant cultivators and to fix a ceiling on private ownership of agricultural lands, respectively.

Land permits were given to the settlers on a provisional basis and their permits were to be cancelled if violations such as nondevelopment of land, nonresidence, nonowner cultivator, and nonadherence to water management rules were detected. Further, the ownership could be transferred to the spouse or to the eldest son. According to the land grants (e.g., *Swarna Bhoomi* and *Jaya Bhoomi*), the tenure system is very close to a freehold title. However, the grantees can sell the *Jaya Bhoomi* land only to another peasant farmer and this is to prevent

changing the landownership from the peasant class to another class of people in the rural areas or in the urban centers. It is no secret that unauthorized subletting, mortgaging, leasing, sharecropping, and extensive fragmentation take place in all settlements. Those who engage in these aspects of settlement tenure, both in policy and practice, are not entitled to a) rights to water, b) agricultural credit from commercial banks, and c) requisite services from agency staff. Although settlement planners had proposed 'family farming' in the Mahaweli systems, at present, this aspect of farming is not practiced.

FEATURES OF THE MAHAWELI WATERSHED

Sri Lanka has a total land area of about 6.5 million hectares of which about 1.6 million hectares have been cultivated permanently. Shifting cultivation is practiced on about 1.1 million hectares. Tree crops account for about 900,000 hectares and paddy for about 600,000 hectares. About 80 percent of the paddy lands is under the command of irrigation systems. To date, 302,035 hectares of irrigated land are served by 197 major schemes including 85,700 hectares under Mahaweli systems (table 1). The multipurpose Mahaweli Development Programme was the government's single largest investment scheme during the late 1970s and in the 1980s. In its peak year (1984), 30 percent of the total public capital investments and 92 percent of all investment were made in the irrigation sector.

The basic feature of the Mahaweli Master Plan (UNDP/FAO-1969) was that the project area was divided into 13 engineering, irrigation, land use, and settlement systems, and a new network of canals providing gravity irrigation water for each system. This type of system-by-system planning and implementing approach is not considered as river-basin development and it is focused on the network of major reservoirs and the trans-basin diversion canal system. In other words, these newly developed Mahaweli land areas can be identified as created watersheds in selected river basins.

In the dry zone, for the undulating terrain, a traditional irrigation network has been designed with the provision of village tanks and a cascade system but this approach was not taken into consideration in the Mahaweli systems. The irrigation system in the Mahaweli Project originated from the experience gained in very large rice-growing areas abroad such as the Thailand central plain, which is extensive and is generally a flat terrain. In the Mahaweli systems, the land surface is not flat but is undulating with average slopes of 3 percent. As a result, the canal system was located on the highly permeable upper ridges of the valleys, and the water loss from this soil type is very high. For example, in the Walawe Chandrika Wewa Block the conveyance loss was 35 percent of the total issues.

The settlement planners recommended a three-tier management hierarchy namely Unit (250 farm-families), Block (2,000 farm-families), and Project/System (15,000 farm-families). The settlement layout provided for rural road networks with individual entry to each homestead as well as to each paddy land. Therefore, social harmony did not advance among the settlers and they always considered themselves only as individual family units although, at

Table 1. Irrigation systems in Sri Lanka.

No.	Implementing agency	Scale of irrigation system	Total command area (ha)	%	Average command area (ha)	No. of projects/ systems	Annual average yield per ha
1	IMD	Major (1)	157,134	29	4,762	33 (3)	4.1
2	MASL	Major	85,700	16	21,425 ha/scheme	4 (4)	4.3
3	ID (5)	Major	59,201	11	370 ha/scheme	160	—
4	DAS						
4.1	Fulfillment of legal requirement	Minor (2)	87,074	16	8.8 ha/scheme	95 (anicut)	1-9
4.2	Custodian		149,589	28	16.1/ha scheme	294 (tanks)	1-9

Sources: Director, IMD; Commissioner, DAS; ID; and IIMI.

1. Major - More than 80 ha.
2. Minor - Less than 79 ha.
3. Total no. of projects 37. Active no. of projects 33.
4. Systems B, C, H, and Walawe.
5. Main activities are: rehabilitation and construction. Field-level implementation is done through the DCs in consultation with PSs.

DAS - Department of Agrarian Services.

MASL - Mahaweli Authority of Sri Lanka.

ID - Irrigation Department.

DS - Divisional Secretary.

PC - Provincial Council.

the initial stages, the management of a Unit was planned for 250 families and that of a Block for 2,000 families. Although much development work would be involved at the early settlement stages, with the passage of time, when the workload of unit and block managers lessened, it was possible to amalgamate the units and the blocks to accommodate approximately 1,000 and 5,000 families, respectively.

The Mahaweli Authority of Sri Lanka (MASL) was created with a highly centralized management system to manage massive construction and settlement programs. The settlers were from different backgrounds, such as landless poor families selected on an electoral basis, evacuees from the Mahaweli construction sites and second-generation families from early settlement schemes. Due to these cosmopolitan features of the Mahaweli settlers, they could not act as a group or even as an irrigation society in the early stages of the Mahaweli Project. As a result, in 1972, the SOGREAH/MDB Report recommended a Community Development (CD) program to promote social cohesion among the settlers. In the dry zone, the small tank system and the tank cascade system were very efficient for the community management of water allocation and for the maximum use of water from the upper to the lowest level in the

valley. In other words, farmer participation in water and the operation and maintenance (O&M) was not considered in the CD program. On the other hand, in the early 1990s, there were different divisions in the MASL, to manage various types of activities within (each system) each watershed (table 2).

Table 2. *Present status of WUAs.*

System	Irrigable area	No. of FCGs	No. of WUAs
B	19,200	1,673	144
C	20,800	1,921	192
H	31,500	2,516	246
Walawe	14,200	1,386	169
Total	85,700	7,496	751

FCG=Field-channel group.

WUA=Water user association.

Source: MASL/IDU Statistical Book 1997.

WATER AND INSTITUTIONAL FRAMEWORK

A complex canal system has been designed to supply irrigation water to thousands of farm-families to meet their individual requirements. This type of water delivery system will operate successfully only if each farmer cooperates with the water agency. In the early stages of Mahaweli (1970s), turnout groups or FCGs were formed as informal organizations at the field-channel (FC) level with 15-20 farm families. These FCGs, arranged on the basis of hydrological boundaries, strongly bind these farmers with a common cause. Leaders form higher-level organizations for management of the irrigation system and to combine them through their representation at grass-roots level. As they are concentrated at the FC level, some farmers diverted the maximum possible water into their farms at the upper level (distributary-channel level) of the canal system. Therefore, in the early 1990s, Mahaweli Water User Associations (WUAs) were established as nongovernmental organizations (NGOs) within the hydrological limits, based on the distributary channel. The centralized management was changed and farmer-level and hydrological level NGOs were introduced, which became the turning point in the MASL activities.

As pointed out earlier, the centralized management system of the MASL and the physical layout of the irrigation network failed to develop farmer cooperation and hydrological level farmer participation. Hence, resource mobilization was not effective. Because of these reasons, it has been decided to introduce participatory irrigation management (PIM) in all major irrigation systems under the MASL. Such participation is effected through a sharing of responsibilities between the agency and the WUA on a mutually acceptable basis.

The work involved in implementing the above activities is being executed through the Institutional Development Unit (IDU) in the Mahaweli Economic Agency. In early 1992, the

staff for this Unit was drawn from the existing staff of the MASL. The IDUs were established in the Head Office, in respect of each Project Office and each Block of each Project. Organizing of farmers requires a carefully planned program and the fielding of change agents directed by experienced ID staff. To perform the role of change agent in the transformation to PIM, educated youth from amongst the settlers' second generation have been selected and they are designated Institutional Organizer Volunteers (IOVs). These volunteers are paid an allowance for incidental expenses and given a bicycle for official transport. The catalyst program was terminated with effect from December 1997.

SELF-MANAGEMENT AT TERTIARY LEVEL

The turnover of distributary and field channels to the WUAs for O&M is being considered as the PIM package. The main components of the PIM are a) the establishment and development of sustainable WUAs capable of participating in the management of the system, b) coordination of all activities of the agency and the WUAs through the coordination committees, and c) the O&M of the distributary and field channels (tertiary irrigation canals) by the WUAs and the O&M of the main and branch canals by the agency.

In the first phase, the WUAs take over management responsibilities with technical and financial support from the agency. When the agency and the WUAs agree that both parties are ready for 'joint-operation,' a Memorandum of Understanding is signed under which the roles and responsibilities of both parties are clearly defined in respect of O&M.

The second phase is reached when the WUAs are able to self-finance O&M through funds generated and resources mobilized by themselves, but with continued technical assistance from the agencies. Through this process, 'self-management' was introduced at the tertiary level of the canal system. During this phase, all government funds allocated for the maintenance of the system could be diverted for better O&M of the main and branch canals.

JOINT-MANAGEMENT AT SYSTEM LEVEL

A WUA area covers only a small part of the irrigation system but it can also be as large as 15,000 hectares. Further, the activities within the WUA directly affect the performance of the main and branch canals, which are interdependent. If the system is to be well-managed, there should be an organized interconnection among all WUAs, mainly for water management and O&M of the whole system. These committees operate at three management levels namely, Unit, Block, and Project, with the WUA representatives in each committee being in a majority. This committee system was empowered to decide on such questions as water distribution, cropping pattern, and prioritization of canal maintenance and improvement works, and to participate in monitoring and evaluation of project activities. The regular meetings of these committees help a) promote better understanding between the agency staff and the farmers and b) the agency staff to identify and resolve problems in a systematic manner, and it be-

comes possible to progressively increase the participation of WUAs in the overall management of the system.

The most significant benefit derived from participation in the coordination committees is the development and strengthening of a WUA. The effectiveness of the committees would necessarily improve as the WUA representatives would mature through the participation in these committees. The success of the committee system will largely depend on the capabilities of the farmers and their degree of participation in the deliberations at the meetings. Therefore, it is important to regularly monitor the progress of effective participation of the agency staff and the WUA representatives at these meetings. In 1992, the Irrigation Ordinance was amended and legal status was provided for the Project Management Committee. Further, through these latter committees ‘joint-management’ was introduced at Unit, Block, and Project/System levels in all Mahaweli areas.

COMMERCIALIZATION OF SMALL FARM AGRICULTURE

The number of farmers at the field-channel level is far too small to sustain a viable WUA. At the main and branch level, it would be difficult to form and develop an institution with such a number of farmers and it would not serve the needs of water distribution or canal maintenance. At the distributary-channel level, the average area would be 150-200 hectares of irrigable land and an equal number of farm families. The total irrigable area and the number of FCGs and WUAs in the respective systems are shown in table 2.

Following the New Agricultural Policy of the Ministry of Agriculture and Lands, action has already been taken to set the necessary institutional changes by organizing WUAs in the line of Farmer Companies registered under the provision of the Companies Act No. 17 of 1982. The present contribution of agriculture to the Gross National Product (GNP) and the contribution of paddy production to the GNP decreased from 1982 to 1996 (table 3).

Table 3. Agriculture and paddy production: Contribution to GNP (in %).

Description	1982	1992	1996
Contribution of agriculture to GNP	26	21	18
Contribution of paddy production to GNP	5.7	4.2	3.0

Source: Department of Census and Statistics and Annual Report. Central Bank 1982, 1992, and 1996.

Therefore, it is important to take remedial action to improve productivity and ensure a reasonable price to the farmers. Measures such as increasing productivity, reducing cost of production, reducing post-harvest losses, value-addition and diversification, and development of local and foreign markets are some of the responsibilities of these new Farmer Companies.

In other words, the main objective of these companies is commercialization of small farm agriculture. The farmers and the WUAs become shareholders of the company. The appropriate area of authority of the company should not be more than 3,000 hectares and therefore, the Block Manager's area is the most suitable area to form these companies.

In early 1997, the National Development Council (NDC) prepared and submitted a policy paper on a pilot project for implementation in the irrigated agricultural areas. Consequent to a decision by the NDC, two pilot projects were undertaken, one at Ridi Bendi Ela (a non-Mahaweli area) and the other at Chandrika Wewa (Mahaweli area) to pilot-test different objectives of the policy paper. These objectives are:

- starting commercial activities
- handing over O&M activities
- undertaking agricultural extension and research
- developing the company's assets base
- pilot-testing of water rights policy
- pilot-testing of land titles for granting freehold

In early 1998, Chandrika Wewa (Janatha) Farmer Company was registered and the above activities were started.

TRANSFER OF FUNCTIONS

At present, one of the main tasks of the MASL is to transfer essential functions of educational, health, and postal services, and of main roads and drinking water supply to the government and local institutions while transferring the functions of rural roads and town administration to the local institutions, namely, Provincial Councils and Pradeshiya Sabhas.

The above-mentioned transferring of functions is not limited to the government sector; the commercial sector is involved in it, with handing over of commercial allotments to the private traders and provision of sites for state banks and private banks. The cultivation in Mahaweli systems is not limited to small farmers; the private sector investment is also encouraged. In System C, Informatics Agrotech (Pvt) Ltd. is cultivating highland crops on 500 hectares and they have planned to invest nearly Rs 100 million in 1999.

RIVER BASIN MANAGEMENT APPROACH

With the implementation of the Mahaweli Master Plan, construction of tunnels introduced trans-basin water transfers. This is a paradigm shift from a single basin approach to an inter-basin integrated area development approach. The MASL Act No. 23 of 1979 was introduced for quick implementation of the carefully selected sections of the Mahaweli Master Plan. According to the MASL Act, special areas of authority can be developed with the water

resources of the Mahaweli River. Any major river can also be declared as a special area. Therefore, the MASL Act is geared for river basin development and management. At present, the strategy is to reduce direct government expenditure on delivery services. Therefore, the Project/System-level development and management will be handled by the framers' institutions (e.g., WUAs and Farmer Companies) with private-sector involvement through a participatory mode with the MASL. The integrated approach of river basin planning and implementation will be the main focus of the MASL. It is important to introduce a massive awareness program for a) the MASL staff to change from the system mode to the river-basin mode and b) the settlers to change their attitudes from distributary-channel level self-management to project-level joint-management.

CONCLUSIONS

The above processes cannot be ascribed to one specific institutional framework but they have evolved during the past several decades. In future, the MASL will act as a facilitator to achieve future goals and objectives. With the downsizing of the MASL, self-management at tertiary level, joint-management at system level and commercialization of small farm agriculture will be the key roles for the existing and new institutions in the Mahaweli areas.

Due to the magnitude of the Mahaweli watersheds, the water-user demand has increased not only for surface irrigation water but also for domestic, industrial, power, fisheries, environmental, and recreational purposes, within their own areas as well as in the adjacent areas of these watersheds. Increasing the use of pesticides and the provision of irrigation facilities for the dry-zone areas create environmental and vector-borne health hazards, respectively. Under these circumstances, an effective institutional framework is needed for the productive and efficient water use among different water users. Further, the small- and large-scale water users are scattered throughout the river basins. Therefore, managing water resources in Mahaweli areas should not be limited only to the watershed and it is necessary to introduce an integrated approach of 'river basin management.' In the Mahaweli areas, there are large river basins namely, Mahaweli Ganga, Kala Oya, and Walawe Ganga. In these basins, there are several stakeholders whose rights have to be safeguarded. Therefore, it is necessary to identify water control areas in those river basins, appoint water managers to plan future strategies of water allocation, issue concession titles, and allocate water rights for different water users. The above institutional framework has to be professionally introduced to the water users as well as to the provincial authorities within the river basin.

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