ICSBE2016-19

INSTITUTIONAL REFORMS IN MINOR (VILLAGE TANK) IRRIGATION SECTOR OF SRI LANKA TOWARDS SUSTAINABLE DEVELOPMENT

W.M.S.M. Wijekoon[1]*, E.R.N. Gunawardena[2] and M.M.M. Aheeyar[3]

[1]*Postgraduate Institute of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka*
[2]*University of Peradeniya, Peradeniya, Sri Lanka*
[3]*International Water Management Institute, Colombo, Sri Lanka*
**E-Mail: shyam.madu@gmail.com, TP: +94773256711*

Abstract: This paper reviews the institutional reforms taken place in minor irrigation systems in Sri Lanka by contrasting those observed during pre-colonial and colonial periods with those after the independence. Formal or informal institutions have governed the operation and performance of the minor irrigation systems with continuous change of authority. While the earlier reforms focused on the irrigation sector with quicker benefits and lower political risks, recent reforms have covered macro institutions, where the benefits are gradual with high political risks. In ancient irrigation system management, decision making and implementation were taken by communities themselves under the feudal system of "*Rajakariya*" ensuring sustainability and maintaining village ecosystem. With the abolishing of "*Rajakariya*" system after the arrival of British rulers, the authority was shifted from the community to the government along with the trend of irrigation system management towards centralization and bureaucracy. After independence, though the minor irrigation system management was the responsibility of beneficiary farmers, the authority of the systems was continuously changed between different government agencies. Now, minor irrigation systems are governed by the Department of Agrarian Development and/ or Provincial councils towards sustainability goals while emphasizing the different stakeholder involvement through enforcement of formal and informal rules and procedures. The government continues the commitment to reform because it provides evidence for the political and economic stability, tactical benefits, timely consideration of stakeholders' perception and information towards the required change.

Keywords: Authority; Institutional reforms; Minor irrigation systems; Stakeholders; Sustainability

1. Introduction

Sri Lanka has rich freshwater endowment with surface and ground water resources. Access to water and irrigation plays a major role and considered as the backbone of the Sri Lankan rural economy. About 25% of cultivable land and two million farmer families (65% of rural households) are engaged in paddy farming as their main occupation [1]. Irrigation systems in Sri Lanka are classified according to the size of their command area as major (>600ha), medium (600ha-80ha) and minor (<80ha) irrigation systems [2]. Minor irrigation system (MIS) or village tank has historically been primarily built to fulfil food security needs of successive generations under water scarcity conditions [3].

The rapport between water resource and agriculture will not survive without irrigation [4]. According to policy makers, irrigation is one of the most important strategic factors in the development of the rural sector and it is playing a central role in poverty alleviation [5]. Investment in water resources development, especially in irrigation, has been a major development strategy of successive governments of Sri Lanka since independence [6]. Not only the government involved in the construction of hydraulic works, but also in the setting up of institutional arrangements that enabled to fulfil a variety of important water management functions [3].

The local demand and competition for water for agriculture, industry, and households have been increased over the years. Therefore, governance of available

water resources becomes a challenging task to achieve water security at the local, regional, and global level. According to the GWP, the 'water crisis is often a crisis of governance', and identified making water governance effective as one of the highest priorities for action [7]. Therefore, the solution to the growing water crisis lies in the appropriate institutional reform of existing social systems [8]. Policy reform can encourage farmers to use irrigation and drainage resources efficiently by motivating improvements of water management practices [1].

This paper reviews the institutional reforms taken place in minor irrigation systems (MISs) in Sri Lanka throughout the history. It attempts to explain the nature, direction, and depth of institutional reforms of MISs in Sri Lanka on the basis of institutional changes. The paper is organized as follows. First, there is an overview of MISs of Sri Lanka and its significance, followed by institutional evolution in MIS beginning from pre-colonial era to the colonial period and post-colonial period. Then the paper discusses how the institutional changes effect sustainability of schemes and conclude the paper with present institutional structure in MIS.

2. Key features and significance of MISs

Sri Lanka amazed the ancient world with their in- depth scientific knowledge and wisdom in building intensive irrigation systems with thousands of small tanks and water diversion structures and the social system to become a focal point of the village as "one tank one village system" [9]. According to one estimate, the total number of both functioning and abandoned minor tanks is over 18000 [10] and village tanks concentrate in the dry zone of Sri Lanka mainly in North Western Province and North Central Province [11].

Ensuring the sustainability of MIS through proper operation and maintenance (O&M) is vitally important considering its ecological, economic and social roles. According to Department of Census and Statistics, out of total extent of 772,626ha of paddy cultivated in 2014/15 *Maha* season, 203,836 ha (26%)were under village tank systems. During 2015 *Yala* season, out of total 480,662 ha land cultivated, 123,375ha (25%) were sown under village tanks. Average paddy yield under minor tanks was 4235 kg/ha in *Maha* season 2014/15 and 3967 kg/ha in *Yala season* in the year 2015. The total Paddy land harvested under MISs in *Maha* 2014/15 was 195,768 ha, with an estimated production of 829,077 MT, which represents 28% of 2014/15 total *Maha* season production. The extent of Paddy land harvested under minor irrigation schemes in 2015 *Yala* season was 121,802 ha with a calculated production of 483,188 MT, which is 24% of total *Yala* paddy production [12].

It is also worthwhile to note that, *Yala* cultivation almost relies on irrigation water stored in tanks. It is, therefore, possible to affirm that proper O&M of village tanks is crucial to ensure the present levels of production because 1/4 of Sri Lankan paddy land and paddy production depend on minor irrigation schemes.

The tank is the most important asset to the agrarian society because it provides many services other than supplying water for irrigation. MIS helps to recharge groundwater and offer water for livestock, domestic needs such as drinking, washing, and bathing and even for recreation. In addition, it has been the source of fish, other food types (lotus root, seeds, stems, *kekatiya* and other edible aquatic plants), flowers for ornamental and religious/cultural use, etc. Therefore, the tank was considered as a treasure to the village.

3. The institutional evolution

Institutions are the rules of the game in a society or formally, are the humanly devised constraints that shape human interaction. They are made up of formal constraints (e.g., rules, laws, and constitutions), informal constraints (e.g., norms of behaviour, conventions and self-imposed codes of conduct) and their enforcement characteristics [13]. The institutional setting of the MISs in Sri Lanka

covers both the general "institutional environment" as defined by the constitutional, political and economic arrangements and the specific "institutional structure" as defined by water-related laws, regulations and organizations. While the institutional environment influences the evolution of the institutional structure, it may be formal or informal; it governs the operation and performance of the MIS. As society and its priorities change, institutions (conventions, codes of conduct, and norms of behaviour, laws, and contracts) seem to evolve and continually alter the choices available to the individual.

3.1 From Pre-colonial era

Sri Lanka operated a village tank-based agrarian culture in the ancient food production system [14]. The traditional food production system was not targeted food production only; it targeted an integrated system in which culture and the society were integral components with the concept of "village-tank-field-temple". Due to this culture, none of these components operated independently and all the components worked together for the sustainability.

From earliest times, the smallest administrative unit was a village or "*gama*" and small village tanks and canals were constructed in the village and maintained by villagers themselves on a voluntary basis [3].

The tanks were owned by the king, the temples, village institutions or individuals. "*Brahmi*" rock inscriptions as well as "*Thimbiriwewa*" and "*Kahabiliyawa*" rock inscription noted that there were individuals with the ownership of private tanks known as "*Vapihamika*" [14]. "*Samanthapasadika*" an ancient text of Sri Lanka, have described the rules and regulations in managing large and small tanks and also tanks owned by the private individuals [3].

In the traditional agrarian system, for every tank, there was a management system and management officials appointed by the king, regional ruler or the society. This is a paid position and more than the payment, it is a social status. In *Brahmi* inscriptions, two words of "*Ananika*" and "*Adikaya*" may be referring to an irrigation engineer and an officer-in- charge of canals, respectively. Another rock inscription by the King Sena II (853 - 887 A.D.) described a supervising officer of tanks as "*Vevajeruma*" and authorized organization to take care of tanks as "*Dolosmahavethena*" [14].

The village temple was one of the primary institutions connected to the tank based irrigation systems. The village agricultural activities and Buddhist temple had a strong linkage where Buddhist monks gave the leadership and provided blessed time for all agricultural activities [15]. The collective decisions were made at *Kanna* meeting (seasonal cultivation meeting) held in the temple. The major decisions made at these meetings were date of the first issue of water, last date of the water issue, method of the water issue, cleaning of channels, bunds and sluices, date of harvesting and threshing of paddy at communal threshing-floor [15].

Irrigation water was not offered free of charge for agricultural purposes. Therefore, when water was obtained from a tank, a fee was levied. Until the 6th century, this payment was known as "*Dakapathi*". During the latter part of the Anuradhapura and Polonnaruwa era, it was known as "*Diyabedum*" and "*Diyadada*" respectively [14]. Because of the payment have to be made for the water, traditional farmers realized the value of water, and they treated it as precious [14].

The people achieved the specific irrigation development system in the ancient times through the feudal system of "*Rajakariya*", literally known as work performed by the people to the king, since all the resources were owned by the king [11]. Under the "*Rajakariya*" system, minor irrigations were operated and managed (construction, repair, and maintenance) by the community themselves. The authority of management of village irrigation was given to the "*Mahagamarala*" (village headman) by the king, who was the common official under

the "*Gamsabawa*" (village council) system based on the concept of the equitable right to water [15]. *Gamarala* was responsible for implementation of *Gamsabhawa* decisions on regulating the main sluice and ensuring the equitable distribution of irrigation water. The *Gamarala* was paid in kind by the village tank farmers for his services. Every individual in the village had to follow a set of rules and regulations imposed on tanks by *Gamsabawa*. Anybody who violated such rules was penalized with heavy penalties despite his social status. The bans imposed on tanks by the G*amarala* were called "*anabolbedeema*" [14]. The well- established and prosperous tank-village socio-economic and cultural systems were maintained by *Rajakariya* system in ancient Sri Lanka [15].

3.2 During the colonial period

British rulers established their colonial administration in the coastal areas of Sri Lanka in 1815. It was the first time that brought the western scientific knowledge into the field of water-related development activities in Sri Lanka [16]. They paid attention on top down written rules and regulations in the Government legislations than the regulations based on the customs, norms and the tradition of Sri Lanka.

The British rulers in 1832 abolished the well-established communal method of *Rajakariya* system and since then nobody was officially responsible for the maintenance of village irrigation works. Lack of responsibility and authority led to the degradation and decline of many minor irrigation systems, especially in the more remote parts of the dry zone [11];[15]. No alternative system was introduced by the rulers of the country to ensure the routine maintenance and repair of tanks. With this policy changes, the function of *Gamsabawa* and *Gamarala* became inactive and customary rules and regulations malfunctioned.

There were attempts by the colonial masters in the latter part of 19th century to re-establish irrigation discipline and improve the effectiveness of local community organizations by introducing various ordinances. The first attempt was that the British Colonial Government introduced the "*Paddy land irrigation ordinance No.9 of 1856*". This was an attempt to reintroduce the ancient system of village committees (*Gamsabawa*) that enforced the customary rules in relation to the construction and maintenance of irrigation structures and the distribution of water [11].

This document was remarkable for its recognition and support of traditional customs and institutions, including the *Gamsabawa* as "indispensable preliminaries to any attempt at improvement". Accordingly, the *Gamsabawa* were revived particularly under the chairmanship of the "*Korala*" and empowered to enforce decisions through assemblage. The provision was made to give "grants-in-aid" for half the estimated village irrigation work if the villagers themselves contributed the other half in money or in kind [17].

The Government renewed the Ordinance in 1861 and made it more flexible. Each Irrigation Division, (i.e. Village Cultivation Officer's division) was now allowed to select for either the *Gamsabhava* or the *Village Headman* or for a combination of both. Under the Village Headman, there were several "*Velvidane*" (Irrigation Headman) to manage irrigation works. Each of whom was elected by the entire village community under the supervision of the *Ratemahatmaya* (native chieftain) [17]. The *Velvidane* enjoyed local authority and he was accountable to the Village Cultivation Officer (VCO). Any breaches of irrigation regulations, to be reported to the VCO who would, in turn, take it to the *Gamsabava* [17]. *Gamsabawa* received the sole authority to handle water disputes. The main functions of *Velvidane* were, securely keeping the items such as sluices, spills, etc. in good order, passing information from government officials to farmers, undertaking earthworks and other such activities involving farmers correctly and properly, preparation of shareholder lists and observe all instructions with regard to cultivation [15].

The shift of authority from the community to the government came when all irrigation works came to be divided into two major groups defined as major and minor works by *Irrigation ordinance no. 02 of 1887* [18]. In 1887, Provincial Irrigation Boards were initiated, and Government Agents (GAs) were assigned with the responsibility of implementing both major and minor irrigation works in their administrative areas [11]. These Provincial Irrigation Boards were subsequently abolished in 1900. The establishment of the Irrigation Department in 1900 is the turning point which shifted the trend of irrigation system management towards centralization and bureaucracy once again [11]. Under the new institutional setup, Irrigation Department and the GAs were responsible for the maintenance of irrigation schemes in their areas with the help of communal labours. "*Gamsabawa*" has remained as the central rural institution, handling of water disputes as of civil courts [11];[15].

During the nineteenth century, under British colonial administration, the restoration of some of the major ancient irrigation works as well as rehabilitation and improvement of indigenous small village tank irrigation systems were carried out. This gave a significant impetus to the improvement and stabilization of the small tank irrigated agriculture, especially in the NCP and NWP [11].

A new irrigation regulation was introduced in 1932 by the ministry of Agriculture and Lands, in which construction, improvement and maintenance of irrigation schemes became the responsibility of the Irrigation Department from 1932-1948 [15]. In 1935 with the introduction of the Crown land policy, crown lands under the village tanks were sold in four-acre blocks for paddy cultivation and they were commonly known as "*akkaraldam*" (acre-land). Unfortunately, only the rich villagers could afford to buy these lands [17].

3.3 After the Independence

Following independence in 1948, the responsibility of minor irrigation schemes was transferred to the Ministry of Agriculture due to the heavy involvement of the Irrigation Department on major irrigation development projects [15]. With the introduction of the *Paddy Lands Act of 1958*, the Department of Agrarian Service (DAS) was assigned with the responsibility for investigation and construction as well as the maintenance of all small tank irrigation systems [11];[15]. But the efforts of the DAS were mainly diverted to the implementation of the *Paddy Lands Act*, and less to the maintenance of minor irrigation works [11].

Cultivation Committees (CCs) were formed under *Paddy Lands Act* in order to resume again providing incentives and recognition of farmer participation in improving paddy cultivation instead of a traditional institution of the "*Velvidane*" at village level [11]. CCs were mainly responsible for enforcing tenancy reforms and to promote the development of paddy cultivation. In accordance with the latter, CCs were to develop and maintain minor irrigation works by setting up "*irrigation committees*" within the framework of the CC system. Village representatives (known as Irrigation Agents) were to be elected to CCs, and made responsible for all irrigation-related affairs in respect of the villages they represented [17].

Although the act had the provision for forming irrigation rules by CCs, no legal authority was given to this provision. The committee framed only draft rules. As the committee could not implement sanctions against rule breakers for their failure to contribute communal labour for maintenance of tanks bunds and distributary systems, they fell into disrepair. Finally, an amendment was made to the irrigation ordinance in 1967, which provided the necessary power to CCs [17].

Agricultural productivity committees (APCs) at each divisional level and newly constituted CCs were established in each village council under *Agricultural Productivity Law No. 2 of 1972*. The Minister of Agriculture selected the farmer representatives for these committees. The

committees came to be packed with political loyalist and not with genuine farmers [18]. This was the major limitation with this and reduced the real farmer representation, thus APCs were less accountable to farmers [15]. These committees brought about a new dimension to agriculture development mainly because of the concept of Agricultural Service Centres. Five hundred Agricultural Service centres were established under divisional level [18].

In 1972 a radical change was implemented affecting to the Irrigation Department. With the *Agricultural Productivity Law No. 2 of 1972*, the responsibility of minor tanks and related infrastructure was handed over to the Territorial Civil Engineering Organization (TCEO) that was considered to be a decentralized system with a high degree of engineering orientation. The TCEO operation little over 5 years, neither this organization nor the minor irrigation works could adjust comfortably to benefit each other [11]. This organization was dissolved and the irrigation works were transferred to the Irrigation Department with the new government which came to power in 1977 [18].

The passing of *Agrarian Services Act No. 58 of 1979* revived the DAS, and once again the maintenance of minor irrigation works was vested with the DAS. It also ensured provisions for water administration and management, which covered the main functions of, holding of *Kanna* meetings on time, efficient maintenance of irrigation systems, enforcement of such established customs affecting wastage and proper timing of agricultural operations, proper timing of paddy cultivation and joint measures for conservation of soil [11].

After the transformation of minor irrigation schemes to DAS, parliament appointed "cultivation officer" at the village level for irrigation management in cultivation committee area. Farmers should elect "*Yaya*" (track) representatives and six of them elected to Agrarian Service Committees (ASCs) at the divisional level instead of APCs. ASCs couldn't function independently and these committees were not felt by farmers in their own institutions and majority was for the officials (Agrarian Services Act, No. 58 of 1979).

The *Agrarian Service Act No. 58 of 1979* was amended in 1991, which allowed the DAS to legally register the Farmer Organizations (FOs) which were established by DAS and legally registered in the department. The main purpose of the amendment was to give the legal recognition and to provide maintenance contracts to FOs [9]. The act recognizes farmer organization as a formal institution and stipulates the responsibilities including the levying of water fees and confers the authority of the Department of Agrarian Services to support the activities of FOs.

However, the establishment of FOs based on administrative boundaries (village basis) acted as the major hindrance in farmer participation, which was otherwise centred on the hydrological boundary. Under these circumstances, some schemes have to be maintained by more than one FOs. Meanwhile, some "*Grama Niladhari*" (GN) divisions were bisected by several irrigation schemes. Therefore, the creation of FOs based on administrative boundaries has caused problems in sharing of water, operation and maintenance and implementation of effective sanctions against defaulting farmers [9];[15].

3.4 After 13th amendment to the constitution of 1987

With the enactment of 13th amendment to the constitution of Sri Lanka, functions and authority of minor irrigation schemes were transferred to provincial councils [6] and it became the responsibility of the respective Provincial Irrigation Departments (PIDs). But, owing to the inadequate technical capacity in most PIDs, the Development of Agrarian service continues to manage the MISs [6].

In the year of 2000, under a special gazette notification, the responsibility of minor irrigation was reverted back to the Irrigation Department. In the same year again minor irrigation responsibility was transferred to

the DAS with the enactment of the *Agrarian Service Act No. 46 of 2000* [9]. The name of DAS was changed as "Department of Agrarian Development (DAD)" by the same act. The department was mainly focused on "protection of rights of tenant cultivators of paddy lands" and "Renovation of small scale (village) irrigation schemes". Farmer Organizations were re-registered under the new act. Present minor irrigation schemes are governed according to the amendment of this act No. 46 of 2011 under DAD and focuses on the Sustainable development of farming community and all agricultural lands of Sri Lanka, where efficient management of minor irrigation works and irrigation water through FOs and protection of all waterways has a significant role.

DAD is headed by the Commissioner General and consist a workforce of nearly 12000 carders working all over the country attached to 25 district offices and 557 Agrarian Development Centres located at the divisional level. About 9600 of village level animators are working with Farmer Organizations as facilitators to the agricultural community. Nearly 13,000 FOs are registered in the DAD to implement the community based activities and governmental programme at ground level [19].

Management of minor irrigation is a devolved subject under the 13th amendment to the constitution. Therefore, the responsibility of minor irrigation system management comes under the Provincial Department of Irrigation. In many place, minor irrigation management is still under the DAD due to lack of capacity of PID. However, there are conflict of interests between the central government agency of DAD and the provincial administration on minor irrigation rehabilitation, maintenance and water management were reported in some places [20].

Among the nine provincial councils, the North-Western Provincial council introduced its own North Western Province Irrigation Statute No.02 of 2014. The Statute has facilitated the council to establish North Western Provincial Department of Irrigation, North Western Provincial Irrigation committee, and irrigation system management and development committee. These institutional arrangement provides to undertake planning, designing, implementation, supervision, maintenance and rehabilitation of all irrigation works, reservoirs, anicuts, canals and streams, water fountains, irrigation reservations and feeding areas within the province other than irrigation schemes running through more than one province and for the demarcation of boundaries of irrigation works [6].

4. Discussion and Conclusion

In ancient hydraulic culture and the agrarian civilization occurred around the irrigation systems are unique to Sri Lanka and it cannot match with any other ancient technology or agrarian civilization prevailed in the rest of the world. The ancient irrigation management system was sustainable with the bottom-up development approach enriched with the active community participation. This traditional community management system was transferred to central government authorities with the centralized bureaucratic administrative system during the colonial period. Although, top-down management system was initiated by the centralized agencies, but the system was not succeeded due to limited community participation in the decision-making process and the hindrances in the implementation of top-down decisions. So, the irrigation authorities had to re-launch decentralized management system through the establishment of legally empowered FOs. With the change of the political setup in the country, institutional procedures, rules and regulations governing the management of minor irrigation had to undergo contnious over the years with the change of political leadership and government policies. It is unfortunate to note that the responsibility of minor irrigation development and management and the governance arrangements have been changing between departments without the scantiest regard to

the large peasant population and their livelihood under village irrigation systems.

The latest dilemma is a conflicting arrangement made in minor irrigation management between the central government and provincial councils with the devolution of power under the 13th amendment to the constitution of Sri Lanka. The Provincial Irrigation Department (PID) is mainly responsible for the management of minor irrigation systems within the province.

FOs is legally registered in the centralized DAD under the *Agrarian Development Act No. 46 of 2000*. DAD is the central government agency responsible for the management of agrarian society through the facilitating input supply and output marketing and strengthening the horizontal and vertical linkages of the farming community and other stakeholders. Under that, small farmer groups, farmers' organizations, Agrarian Development councils, provincial and National federations established and strengthened with the formal legal backup. DAD is not only responsible for the minor irrigation schemes, but also the management of all paddy lands and protection of tenure rights. Provincial councils have not yet taken any arrangements to provide legal recognition to the farmer organizations.

The above two institutions are working separately, which may lead to duplication and overlapping of their activities. Therefore, interventions are required to integrate and coordinate the functions of these two separate and independent entities. Therefore, it is important to introduce clear coordinated working arrangement to link these to separate institutions. Other than that, there are numbers of institutions engage in the management of ecosystem and livelihoods in minor irrigation schemes. Therefore, an institutional reform is needed to formulate a better arrangement to integrate all the relevant institutions with required legal arrangement for the management of minor irrigation works for long term sustainability.

Acknowledgement

This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada. Their financial support is greatly appreciated.

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