

Participatory Management in Irrigation Development and Environmental Management in Sri Lanka

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Ancient irrigation systems were developed in Sri Lanka through construction of small village tanks, temporary river diversions, permanent river diversion and more sophisticated diversion-storage and water release systems. The management systems evolved together with the development. A cornerstone of the ancient management system was the active involvement of farmers in the management of irrigation systems. This management system was changed during the European colonization. Until the mid 1980s farmer participation in irrigation management was achieved through cultivation meetings held prior to the cultivation season. The deficiencies of this management arrangement resulted in the introduction of modern participatory management methodologies to irrigation in the mid 1980s. Initially, there was an attempt to recover a part of the cost of maintenance. However, this was not successful due to various reasons and the issue became a political one.

Participatory management in irrigated agriculture has achieved many positive results. Some irrigation systems have achieved better cropping intensities and higher water use efficiencies through better water management. There has been an improvement in the equity of water distribution, more transparent water allocation and better acceptance of the management strategies by the farmers. The closeness between the farmers and officers has also improved. A change in the investment patterns can also be observed, with less money being allocated to development of the infrastructure and more attention on management. However, participatory management in irrigated agriculture can not be described as a complete success. The reasons for failure include dependency of farmers on state help, inadequate change of attitudes, and inadequate finances and other resources. Therefore, despite the long-term objective of achieving self-management of irrigation systems by farmers, the current situation is that the farmer organizations are dependent on the state support.

Participatory approaches to environmental management are also of recent origin. The early attempts in this field carried out in 1990s are not considered sustainable, but have provided a few policy directions. The introduction of environmental policy and regulations has resulted in several procedures to be followed before implementing irrigation projects. The development institutions have undertaken planting new forests with the active participation of beneficiaries in the development projects. It can be seen that economic benefits to the community may serve as an incentive for the community to participate in the management of water resources and the environment. There is a need to adopt formal policies with regard to participatory management, as well.

Key words: agriculture, environmental management, irrigation, participatory management, Sri Lanka

Introduction

Modern participatory approaches to the management of water resources were first introduced to irrigated agriculture in Sri Lanka in the mid-1980s. The innovative officials of the Department of Irrigation attempted to resolve the many problems that arise from the complexity of water resource management through farmer participation. The Minipe and Kimbulwana Oya projects represent two of the better-known success stories; there may also have been many other successful efforts that were not

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Participatory approaches in environmental management are also of recent origin. The International Irrigation Management Institute (now the International Water Management Institute) implemented a project entitled "Shared Control of Natural Resources" with a focus on participatory management of natural resources. The results of the project were mixed; although substantial awareness of the importance of managing natural resources was created, the sustainability of the interventions was not satisfactory. Subsequent to the Asian tsunami of 2004, the relevance of community management of resources such as coral reefs became a prominent issue. Several interventions have been made since then to involve local communities in the management of the natural resources used by those communities.

The aim of this paper is to document the evolution of participatory management in water resources and environmental management in Sri Lanka and to identify some emerging issues related to the implementation of the related government policies.

Background to Community Participation in Water Resources Management Evolution of Irrigation Systems

Irrigation systems are believed to have been developed in Sri Lanka even prior to the establishment of the first Aryan settlements in the 5th century BC. Several competing theories attempt to explain the evolution of the island's irrigation systems. Despite any differences of opinion, it can be safely concluded that the development of small reservoirs at the village level preceded larger projects such as river diversions and the creation of large reservoirs.

Although the creation of large reservoirs required considerable state intervention, small-scale reservoirs (such as village tanks) created by smaller populations such as villages were not only managed by villagers, but were also constructed by them. These reservoirs were built along streams in the form of cascades, which provided drainage water from one tank located upstream and its command area to a tank located farther downstream. It is believed that state intervention came later, with the construction of larger reservoirs (Seneviratne,

2002).

Ancient Irrigation Management Systems

Sri Lanka's irrigation management systems coevolved with the development of social infrastructures (Imbulana and Neupane, 2005). A cornerstone of this management system was the active involvement of farmers in the management of the irrigation systems. There were strict rules and regulations for managing water in these systems. An effective and powerful bureaucracy appointed by the king imposed the necessary rules and regulations, and noncompliance resulted in deterrent punishments and heavy fines. The Kondavatuwana inscription (924 to 935 AD), found in the Gal Oya valley, ensured the rights of cultivators, but also clearly defined their obligations with regard to water use and their adherence to the cultivation calendar. The inscription dictates fines for violating the cultivation calendar and for overirrigation of fields.

In the ancient cascade systems, water from one tank that was used for irrigation was passed on to the next tank (farther downstream) through a drainage line. Considerable coordination was required because of the interdependence and intensive management of the various tanks in such a cascade system. The water management in these village irrigation systems was not strongly based on rules and regulations, but rather on customs, traditions, and rituals.

The traditions of a participatory nature include the following. *Kayiya* is a voluntary communal participation in all agricultural and social activities, and *attama* represents the voluntary offering of labor to many others to assist in their agricultural activities and in return, the volunteer receives the same kind of support. In a year with limited water resources in a village's tank, the villagers collectively decided to practice *bettma*, in which only a section of the fields close to the tank is cultivated to conserve water according to the shares. In the *tattumaruru* system, a plot is shared among a number of owners and each one, in turn, has an opportunity to farm the plot after a few seasons. In *kattimaru*, farmers receive an individual plot and rotate their farming between this plot and two or three other plots so that each farmer receives equal benefits from the soil and water resources. *Kanna* meetings

were held before each cultivation season, with collective, democratic decisions taken on the date when land preparation would begin, the first date when water would be issued, the type of crop or crops that would be grown, and when closure of the irrigation canals would occur.

The Decline of the Ancient Civilization and Subsequent European Colonization

The management systems of Sri Lanka's ancient civilization reached their zenith during the 13th century AD, and declined gradually thereafter. When the Portuguese, the first of the colonial powers, arrived in Sri Lanka in the early 16th century, few large-scale irrigation systems were functioning. The Portuguese were followed by the Dutch, and then Sri Lanka was ruled by the British empire. During the Dutch period, several canals were constructed for navigation and drainage in the western, eastern, and southwestern parts of the country. However, the development and management of water resources to support irrigated agriculture did not receive the desired level of attention from the Dutch nor from the Sinhalese kings. The once-fertile lands in dry zones, by and large, remained abandoned, and agriculture was confined to areas where small-scale irrigation and rain-fed cultivation were possible. This trend continued into the British period (Imbulana and Neupane, 2005).

Before the British period, the *rajakariya* system ensured community participation in irrigation management. This system provided the government with the right to obtain the services of the people in management projects for an area's water resources. Although there were deficiencies in this system, the British abolished the system without providing an alternative acceptable to the people. The subsequent neglect of irrigation and the dismantling of the self-reliant local governance system for the water resources led to many hardships for the local population (Perera, 1955).

This situation provided a pretext for social uprising and led to the rebellion of 1848. Although this uprising was crushed by the British rulers, the problems of the peasants started receiving better attention. It was soon understood that restoration of the irrigation facilities would address many economic problems in rural areas and would substantially decrease the population's discontent

(Imbulana and Neupane, 2005).

This understanding led to the establishment in 1900 of a government department exclusively devoted to irrigation development. The infrastructure development subsequently carried out by the Irrigation Department included the construction of reservoirs, diversion structures, and flood protection and salt-water-exclusion structures (Imbulana and Neupane, 2005).

Recent Developments and Application of Modern Principles

Until the mid-1980s, farmer participation in irrigation management was achieved through cultivation meetings that were held prior to each cultivation season. These meetings were chaired by the highest-ranking government officer in the area covered by an irrigation scheme, and all the relevant government officers and farmers participated. At the meeting, the extent of the proposed cultivation, the date of water issue, the date of water closure, the canals that would be maintained by farmers, and other relevant factors were chosen based on mutual consent. The decisions taken were applicable by the law.

The deficiency of this system was that a large number of farmers gathered just twice per year, and many voices were not heard. Other problems included the scarcity of water for some cultivators, especially those in the downstream areas of a given system, poor allocation of resources for maintenance, and deterioration of the irrigation infrastructure. The reforms of the mid-1980s were aimed to address the problems in this system and to involve the farmers more meaningfully in the management of their water resources.

Since 1978, a gradual change has been taking place in the management of major and medium-scale irrigation systems. This reflects a change from government management to a participatory irrigation system management. In 1978, irrigation officers enlisted the help of various interested persons to organize and motivate farmers to undertake the needed repairs to the Minipe irrigation system in Sri Lanka's Central Province. A key innovation was the creation of a joint project committee that consisted of Irrigation Department officers and representatives of the farmers. In 1981, the Agrarian Research and Training Institute

began organizing farmers so they would contribute labor to the rehabilitation project under the Gal Oya Left Bank System. This experience provided a proven process for organizing farmers, a model of how farmers should be organized, and strong evidence that organized farmers could solve many of their water distribution problems.

In 1984, the government introduced fee collection to pay for the operation and maintenance of irrigation projects (direct financing), which was started with promising results, but did not last more than 4 years. This approach was seen by farmers as an attempt to privatize the irrigation systems, and it became a contentious political issue, leading to failure of the new system. This failure demanded an alternative policy that would permit sustainable and efficient management of the irrigation infrastructure and water resources. In the late 1980s, the government introduced a participatory irrigation management policy in which management of these irrigation systems was shared between the farmers and a government agency. This strategy was designed to reduce costs and transfer power and rights to the groups that would use the irrigation system. The policy emphasized a change in the role of farmers from passive recipients of irrigation benefits to active partners in the management process who shared responsibility with government staff (Aheeyar, 2003).

Learning from these isolated experiences, coupled with increasing knowledge of the international experience (especially from the Philippines) led to the Gal Oya Irrigation Rehabilitation Project, funded by the U.S. Agency for International Development (USAID), which adopted a participatory approach to rehabilitation of the Gal Oya irrigation infrastructure. To support this approach, the government formed farmer organizations that were a prerequisite for the implementation of any infrastructure rehabilitation program (Samarasinghe, 2003).

Incorporation of this activity in the Gal Oya project helped to develop local competencies in institutional development. The Irrigation Management Division was formed in 1984 under the Ministry of Irrigation to formally adopt a participatory procedure for irrigation management in a selected number of major irrigation projects. The program was successfully launched, and since the late 1980s

the government has implemented a program to hand over the tertiary irrigation systems (distribution canals and field canals) used in major irrigation systems to farmer organizations under the USAID-funded Irrigation Systems Management Project implemented by the Irrigation Management Division. The same program was extended to cover major irrigation projects outside the Irrigation Systems Management Project during the same period. This program has received legal recognition since then and the irrigation ordinance was amended to strengthen this process in 1994. Although these changes have altered the institutional structure of the farming community, the state remains the dominant actor in the allocation of financial, land, and water resources. Such allocation mechanisms thus remain administratively driven by the central government, even though allocation decisions are based to some extent on local conditions (Samarasinghe, 2003).

In 1997 the National Development Council, chaired by Chandrika Kumaratunga, Her Excellency the President of Sri Lanka, proposed a program for delegating management of irrigation systems to the communities affected by these systems. Under this program, the government proposed to provide financial assistance to farmer organizations and to transfer state-owned assets to farmers, in addition to providing water rights and freehold titles to beneficiaries of these rights. This program underwent pilot testing in the Chandrikawewa and Ridi Bendi Ela schemes in the Mahaweli and non-Mahaweli areas, respectively. The positive results of this approach included the following.

- Administration of water resources, providing farming inputs and product purchases through formal arrangements with the private sector and with the participation of beneficiaries.
- Adoption of alternative crops in areas with high potential but where no cultivation was formerly undertaken due to a shortage of water, thereby increasing the cropping intensity, and the adoption of livestock production to increase farm incomes.
- Water allocation using a transparent mechanism that helped to save much water, thereby allowing increases in cropping intensity and crop productivity.
- Direct allocation of state financial resources

available for operation and maintenance of the systems so as to prevent the reallocation of funds at different stages due to purely political or administrative considerations, thereby ensuring proper utilization of the funds.

- Building the confidence of farmers, especially due to shortening of the administrative distance between farmers, water managers, and the providers of inputs and advisory services (Samarasinghe, 2003).

However, the project failed to provide title deeds for lands, water rights, and the transfer of state assets as had been envisaged by the original plan owing to the complexity of the issues and a lack of clarity in the policy (Samarasinghe, 2003).

Corresponding changes were also made in the legislation. In 1991, the Agrarian Services Act was amended to allow the Commissioner of Agrarian Services to grant legal recognition to farmer organizations, and particularly organizations involved in the management of water distribution channels. Second, in May 1994, the Irrigation Ordinance was amended to grant powers and responsibilities to legally recognized farmer organizations within major irrigation schemes. This amendment also provided for exempting farmer organizations from the payment of irrigation fees.

With the adoption of participatory management in irrigated agriculture, the investment pattern in water resources management changed. Imbulana and Neupane (2005) discuss the change in emphasis from the early 1980s to the 1990s policy of participatory management of both water and human resources. The primary mode of intervention adopted for water management in the 1980s was rehabilitation of irrigation infrastructure, and this was accompanied by software interventions such as irrigation scheduling, crop diversification, improvement of on-farm water use, and related factors. In parallel, the government provided substantial investment in the formation of farmer institutions. In 1984, the INMAS program introduced a formal structure for these farmer institutions, comprising different hierarchical levels and facilitating grass-roots representation to higher levels in the hierarchy.

The impact of these interventions has been mixed. On the positive side, the relationship between the government officers and farmers has im-

proved. There is more active participation by the farmers in decision-making processes related to water resources. This has resulted into a better understanding of the operation and maintenance activities and transparency in the utilization of funds has improved, although further improvements are possible (Imbulana and Neupane, 2005).

Impact of Participatory Management on Water Use for Agriculture

Some irrigation systems have achieved better cropping intensities and higher water-use efficiencies through better water management. Examples include the Kirindi Oya scheme, the Rajangane scheme, and the Kaltota scheme. Volumetric water allocations are practiced in the Mahaweli irrigation systems as well as in other areas, such as the Giritale scheme. Postproject evaluations of some irrigation rehabilitation projects, such as the NWP Water Resources Development Project, have revealed that rehabilitation helped to improve the equity of water distribution. Equitable water distribution, higher cropping intensities, and better yields have contributed to the alleviation of poverty in the areas covered by such schemes (Imbulana and Neupane, 2005).

Problems and Factors Influencing the Failure of Participatory Management

Since the implementation of modern participatory management, there has been considerable opposition to the new approach. Opposition appears to have been directed primarily at the transfer of power to farmers and the corresponding increased cost for farmers. Delegating irrigation management responsibilities to farmers means that government officers must also relinquish some of their powers. This transfer of powers can have an immediate effect; for example, some staff members could lose their jobs unless they were hired by the farmer organizations (Brewer, 1994). The low income from agriculture, the possible loss of agricultural subsidies, and the poor physical condition of the irrigation infrastructure are some of the other problems that prevent effective participation.

Policy Issues Related to Participatory Management in Irrigated Agriculture

The Government of Sri Lanka has invested a

large amount of resources at various stages during the evolution of the modern approach to participatory management to develop the required institutions and create an appropriate environment for participatory management. The major objectives of their policy were to increase agricultural productivity through efficient management of irrigation water and to decrease government costs for managing this resource. A case study was conducted in selected major irrigation schemes (the Rajangana and Mee-oya schemes), and observations were made in the Tabbowa, Kaudulla, Muruthawela, and Dewahuwa irrigation schemes from 1995 to 1996 (Aheeyar, 2003). The basic findings of the study were as follows:

- Allocation of resources for operation and maintenance by the government has been based on the decisions of a centralized financial agency (the Treasury Department) based on budgetary constraints rather than actual requirements. The government policy documents expect farmer participation in irrigation management to contribute 50 to 60% to government cost. However, only the allocation of funds for operation and maintenance decreased over 50% of its requirement.
- Creation of dependency: The delegation of power and responsibility to farmers leads to a necessity for self-financing of operation and maintenance below the DC level by farmer organizations. However, current policies have tended to create a situation in which farmer organizations are dependant on government financial support and catalytic actions.
- The existing investment pattern means that the investment of farmer organization money for the improvement of infrastructures or routine maintenance is not a major concern of any of the sample farmer organizations in the study.

Mobilization of Resources for Operation and Maintenance

There were four major methods of mobilizing resources by farmers in the study schemes to carry out the operation and maintenance tasks entrusted to these organizations: mobilization of labor for group work, mobilization of labor for individually allocated tasks, mobilization of time, and mobilization of money and materials. All these forms of

mobilization are essential for the sustainable maintenance of irrigation infrastructures (Aheeyar, 2003).

Bridging the gap created by the existing deficiency in resource mobilization is vital to maintain the sustainability of irrigation and to prevent premature deterioration of the infrastructure. During a recent study (Aheeyar, 2003), an attempt was made to learn how much paddy area farmers were willing to provide to their respective farmer organizations after each harvest in order to maintain the infrastructure in good condition. The farmers were willing to contribute more than the amount needed to bridge the gap in the current state funds for operation and maintenance, but this amount would not be sufficient if the government stopped or drastically reduced its operation and maintenance expenditures for the maintenance of secondary and tertiary canal systems (Aheeyar, 2003).

The accountability of an organization to the entire membership is one of the most crucial principles for long-term viability; otherwise, one cannot expect farmers to participate by providing their resources. Investigations conducted in various major irrigation schemes from 1995 to 1996, such as the Tabbowa, Dewahuwa, and Muruthawela schemes, revealed that several farmer organizations had collapsed due to an abuse of funds by their leaders. These studies revealed that a substantial number of farmers were not aware of the farmer organization's financial status and operating procedures and that not a single ordinary member was fully aware of the farmer organization's financial management practices (Aheeyar, 2003).

Participatory Approaches to Environmental Management

The Shared Control of Natural Resources in Watersheds (SCOR) project, which was implemented from 1993 to 1999, was a community-based participatory watershed management project aimed at developing, testing, and disseminating a holistic approach to the integration of environmental and conservation concerns with production goals. It was funded by USAID and was implemented by the International Irrigation Management Institute in collaboration with the Government of Sri Lanka.

The designers of SCOR hypothesized that the natural resources base, and particularly land and

water resources, could be conserved and that their productivity could be sustained if environmental and conservation concerns were incorporated in production processes. The SCOR design was built on the progress already made in Sri Lanka and elsewhere in participatory irrigation management and social forestry. The appropriateness of the approach was evaluated in two pilot watersheds in Sri Lanka (Huruluwewa, in the North Central Province, and Nilwala, in the Southern Province) that were chosen based on their different social, agricultural, and environmental characteristics.

The significant policy changes that were influenced by SCOR included:

- grants of usufructuary rights for using state reservations (such as irrigation reservations) on a pilot basis in Huruluwewa and Nilwala;
- the formation of farmer companies as a function of the Department of Agrarian Services;
- the decision to establish an agricultural settlement incorporating “encroachers” in upper watersheds;
- contributing to the legal recognition of watershed-based farmer organizations by the government;
- extending the mandate of the Irrigation Management Division to manage watersheds

However, the SCOR project was not considered a total success. Several community-based organizations such as farmer companies could not be sustained. An overly ambitious agenda, difficulties reaching individual farmers, and the short time frame of the project were cited as constraints that reduced the potential beneficial impacts of the project (ARD Inc., undated).

Environmental Management in Irrigation Projects

The expansion of irrigation sometimes results in environmental degradation. To minimize this risk, the government introduced environmental policies and regulations that specified several procedures that must be followed before implementing an irrigation project. For example, the construction of the Weli Oya Project in the Walawe River basin resulted in clearing some forests. In compensation for the loss of forest, the Irrigation Department undertook the planting of new forests with active participation by the beneficiaries of the project.

Conclusions

Community participation in the management of irrigation systems has been practiced in Sri Lanka since ancient times. Until European rule was established, a traditional system of managing irrigation infrastructure was used by most farm communities. However, changes to the administration system resulted in a breakdown of this form of management, particularly under colonial rule. Modern participatory management practices were not introduced until the 1980s, and there were many problems with the initial implementation.

Modern methods of participatory management of irrigation systems are increasingly being practiced in Sri Lanka. However, the results of this participatory management have been mixed. On the positive side, the new approach has increased transparency in the utilization of funds allocated for irrigated agriculture and has brought government officers and the farmers who benefit from management systems closer to each other. Irrigation efficiency has improved in some locations. However, state funds are still required for maintenance of the irrigation systems, and the sustainability of farmer-based institutions without state support is questionable. The adoption of formal government policies in the field of participatory management is also incomplete.

Similar issues exist for participatory management of Sri Lanka’s environmental systems. The economic benefits to a community can provide an incentive for them to participate in the management of ecosystems. However, the experiments in participatory irrigation management described in this paper show that the state still has an important role to play in the management of major irrigation systems, and the lessons learned in this domain will have important implications for participatory management of other aspects of Sri Lanka’s ecosystems.

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