Comprehensive Water Resources Management in Sri Lanka

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This article emphasizes the need for management of the water resources to achieve the objectives of sustainable use of the finite volume of water resources made available through precipitation of rainwater. It also summarizes some of the key issues identified in the areas of water resources management in terms of policy, legislation, information and institutional requirements and the approaches that have been initiated for comprehensive management of the water resources in Sri Lanka, through the implementation of two projects.

Water Resources Data

Sri Lanka has 103 river basins with the Mahaweli basin dominating in size (16 per cent of the island's total area or 10,327 sq.km). Seventeen river basins account for sizes more than 1,000 sq.km. Around 14 basins are of sizes ranging from 400-950 sq.km. while 45 river basins are of sizes less than 100 sq.km. Most of these small basins are confined within provincial boundaries and are located near the coastal belt. (Please see the map of Sri Lanka). The annual rainfall amounts to an average of 127 to 132 million cubic meters of water. In the wet zone, around 60 percent of the rainfall becomes run off while in the dry zone, it has varied from 35% - 40%.

Although Sri Lanka has an overall average precipitation of more than 2,000 mm per year, the monsoon climate and national geography create substantial variability in the amount of water that is available both locally and temporally.

The data on water resources in terms of quantity and quality relating to surface and ground water are scattered over several agencies and mostly such data are not available in the form of processed information on regular basis. In the case of water information there is a difficulty in ready accessibility as many agencies are held responsible for maintaining records or water resources data. The level of utilization of water resources information for management purposes has also been limited due to factors relating to reliability, regularity and timeliness etc. in the collection and processing of data. There is also no co-ordination mechanism in place for sharing of data and information on a regular basis. Hence a policy for management of the water resources information systems along with an institutional mechanism for sharing of data and access to information has become important.

Development of water resources

The development of water resources particularly to meet irrigation, hydro-power and domestic water supply needs has been carried out for long years in isolation thus creating a tremendous pressure on common water sources along the rivers, streams and tributaries. The successive governments while serving the economic and social development objectives of the country have paid minimum attention to a holistic view of the water resources management for sustainable use of the resource, both in terms of quantitative and qualitative aspects. As a result, sharing of the resource for different uses has been carried out on a first come first served basis. There is also no linkage that has been maintained to ensure a balanced development of upstream and downstream uses of the natural resources.

Lack of planning and development at river basin level

Planning for water resources development at river basin level has not been practiced and as a result the following problems has arisen:

- lack of a water allocation policy leading to severe competition, disparities in investment portfolios in the water sub-sectors as well as other economic entities,
- Lack of co-ordination among the developers/ state agencies responsible for provision of services in water resources, addressing management measures.
- Poor institutional arrangement for management of the water resources at national, provincial and basin level arising from policy gaps and overlapping of functions as well as lack of authority for agencies to manage the water resources at source level,
- Poor implementation of regulations pertaining to natural resource management, and
- Lack of awareness, consultation and involvement among all stakeholders in water issues in planning and management of the natural resources.

The possibilities of introducing water resources management measures at river basin level are being actively studied under the two projects namely the institutional strengthening for Comprehensive Water Resources Management and Water Law and Policy Advisory Programme while exploring different options for policies on river basin approaches for water resources management.

Issues relating to water supply sources and uses

The diverse climatic conditions, mainly rainfall patterns prevailing in the wet, intermediate and dry zones of the country has shown uncertainties in the availability of water in terms of quantity and quality for various uses at different times of need. The inherent nature of the terrain of the lands and soil structure, coupled with different types of land uses, degradation of lands in upper watersheds have resulted in high sedimentation rates threatening sustenance of the reservoirs. There are no national programmes for river bank protection and enrichment and most of the large and small water bodies are being affected due to the lack of a policy and regulatory framework for planning and management of land and water utilization.

There have been major development programmes of water sources for different uses at various locations along a given source such as river system. The results are sometimes detrimental and unfavourable to downstream water users, arising from frequent shortages and poor quality levels of the return flows. The ad hoc nature of development arising from poor co-ordination among developers has caused severe implications for existing water users who are dependent on the same source. The mix of uses have also created problems of availability at required times of the year as well as during the day. With urbanization the large reservoirs that have been exclusively developed for irrigated agricultural purposes are now being used for provision of domestic water supply to towns. The beneficiary farmers of these reservoirs have thus been deprived of their quota of water, while the water supply projects are compelled to move upstream adding costs that affect their viability.

Water allocation issues

The water resources management issues have been identified in the subject areas of water allocation arising from increased competition for water for the above uses, mainly for irrigation vs. hydropower vs. water supply for domestic and industrial uses. There is very little information available on specific allocation of water for other uses, such as inland fisheries, environmental and social needs. These uses have become increasingly important in the light of poor quality and quantity of water that is received downstream and towards the river mouth. In the absence of suitable criteria and appropriate methods for water allocation, there have been instances of conflicts among major water users and managers catering to multiple uses.

Issues relating to demand management

Demand management initiatives in the water sector have been considered as a tool for conservation of water resources while increasing the productivity of the water units by reducing the current level of water use for future consumption. The demand management policies are limited to tariffs in the domestic water supply sub-sector while other measures are hardly applied. The activities concerning demand management include charges for provision of water services, issue of licenses and permits for water use rights for different purposes, and regulatory conditions for extraction of surface and groundwater, beyond a certain limit along a river system or in an aquifer. Technology

development and transfer programmes have also been considered as important tools to reduce water consumption in the agricultural and other water consumption systems which are employed in industrial and domestic water sub-sectors.

In the absence of a proper right of access to water resources, in terms of a guaranteed quantity and quality worked out on the basis of availability of water in a given source area, people are reluctant to invest in the production of goods and services. Hence security of access for water need to be ensured by providing legal rights to water especially where there are water shortages and heavy competition. Introduction of pre-determined standards for different uses in terms of types of agricultural crops, domestic consumption, industry requirements, minimum flows for environmental conservation etc. during periods of scarcity would be essential if demand management parameters are to be practiced. An appropriate research agenda may be required for the above activities.

Management Objectives

Considering the above issues that need to be resolved, improvements to water use efficiency in terms of productivity of water use and effectiveness in achieving optimum benefits to the users on a sustainable basis has been considered imperative. These objectives are to be achieved through the introduction of management measures particularly in instances of both water deficit and surplus situation in order to meet following objectives:

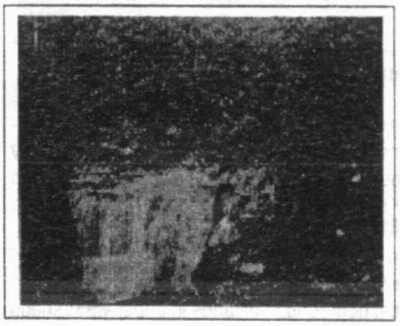
- maintain an equitable distribution of the water resource among the users,
- improve quality levels of the water for current and potential diverse uses,
- promote water sector investments both by public and private sectors in water infrastructure and service deliveries, including allocations for environmental concerns,
- justify long term investments in other productive sectors such as industry, agriculture, agro-processing, commercial/service sectors, aquaculture, etc.,
- develop and implement regional plans at river basin level that would enhance protection of water sources, other physical structures for social and economic functions, other natural resources while ensuring equitable sharing of water resources, and
- ensure sustainable use of both surface and groundwater resources.

Institutional Issues

Responsibility for management of the water resources is scattered over different agencies such as provincial/district/divisional administration, in case of rivers that flow entirely within provinces while rivers that flow across inter-provincial boundaries are the responsibility of the central government. There is no single agency that has been entrusted with the responsibility of managing the water resources including the river systems. Development and management of the reservoirs and some of the water bodies identified for specific purposes have been entrusted to the respective agencies, which are catering to different sub-sectors such as irrigation, hydropower, water supply and agriculture. Management of some of the major and medium sized irrigation reservoirs and minor tanks/anicut schemes have been entrusted to the Project Management Committees established with private and public sector participation, with shared responsibilities. Some of the large reservoirs serving multi-purpose objectives are also managed by the agencies such as the Ceylon Electricity Board, Irrigation Department, Water Supply and Drainage Board and the Mahaweli Authority of Sri Lanka.

It has been noted that the above institutions are also falling into the category of water users when they function as service delivery agencies, playing a dual role at the same time. There is no integrated approach to water resources management or a system of separation of authority for management of the resources from development and service delivery functions, leading to a lack of transparency. There is also no legally empowered authority or agency to allocate water for different water management bodies although; the Irrigation Department in certain critical situations currently undertakes such a responsibility. In addition, the above agencies have been empowered by their respective Acts to have access to waters in any water body to service the objectives of the state and the community, in generation of hydropower, irrigation facilities, to meet domestic and industry water supply needs.

The current arrangements that have been made for independent agencies to have access to water bodies including river systems have created problems of equitable distribution of water among different users, that has led to critical issues relating to allocation of water among the sub-sectoral users. The existing water related agencies are more or less involved in construction and management of water infrastructure to meet the needs of different users while some of the important aspects of water resources management functions are completely neglected. There is also no proper coordination mechanism established to resolve some of the competing issues among the major water agencies, which may require guiding principles to support rational decision making processes. The need for an independent agency to allocate water for different sub-sectoral uses, co-ordination of national water policy formulation and implementation activities, and promotion of water resources management functions is being considered under the two projects, which are being directed by the Water Resources Council.



Water in Plenty

Legislative Issues in the water sector

The legislative framework for management of surface water resources is at present scattered over several legal enactments. Some of the provisions have been made in land related legislation such as State Lands Ordinance. Although the majority of the water bodies are state owned, there are few privately owned inland water bodies located within private lands. The access for water for those living adjacent to rivers are provided under riparian rights but quantities are limited to individual consumption for domestic and other uses such as agricultural production for non-commercial purposes by taking water manually in buckets. In order to discharge their responsibilities in the development and management of water infrastructure, the National Water Supply and Drainage Board (NWS & DB), Ceylon Electricity Board (CEB), Irrigation Department (ID), Agrarian Services Department (ASD), Mahaweli Authority of Sri Lanka (MASL), Municipalities and Local Authorities have bee provided with access to surface water bodies under their respective Acts and Ordinances. There is no legislation for management of groundwater resources of the country.

Water uses for irrigation purposes are expressly exempted from permit requirements by the State Lands Ordinance. The NWS & DB and the CEB are not subject to license requirements, although they use water for producing the supplying drinking water and generating and distributing electricity, respectively. The Mahaweli reservoirs are catering to multiple uses such as generation of hydropower as well as for irrigation of command areas, while providing for water supply sub-sectoral needs. However, no consideration for requirements of inland fisheries and in-stream uses has been identified in the process of allocation. In addition, there is no provision in the MASL Act for long term planning for water resources uses, while it caters only for real time water allocations. In addition, there is no co-ordination between these institutions and the Central Environmental Authority (CEA), which is responsible for licensing wastewater discharges, so that in several cases, industries discharge waste into water bodies used for drinking and irrigation purposes.

The government has adopted a participatory management policy in managing the water in the irrigation reservoirs sharing responsibility for operation and maintenance with the major user groups such as Farmer Organizations established at field channel, distributory canals and project level. These policies are governed by the amendments that have been made recently to the Agrarian Service Act. There is provision in this Act, to transfer the management of the medium and large reservoirs to Project

Management Committees established at project level consisting of members selected from the public and private sectors. Legal provisions relating to Farmers' Organizations (Fos) are scattered in the Irrigation Ordinance, the changes brought about the Thirteenth Amendment to the Constitution with respect to the devolution of certain irrigation management functions to the Provincial Councils. Rights to water users in the form of groups or individuals to have access to water have not been granted under the Act.

The lack of will to enforce certain regulations relating to watershed management viz. Soil Conservation Act has created problems arising from severe soil erosion, leading to heavy siltation. Some of the minor tanks have become unusable to a great extent, due to poor maintenance affecting the agricultural production programmes. Private investors of thermal power plants have been uncertain about the agency that is responsible for extraction of surface water for cooling purposes. In the absence of a legal authority for allocation of water for different uses, the industrial development activities have been affected.

Any individual can have access to groundwater resources within the land for which he can claim ownership or on permits issued under the Land Development Ordinance irrespective of whether it can cause adverse impacts on the adjoining land or adjacent area. In most of the dry-zone and intermediate zone areas, government promotes construction of agro-wells for commercial agriculture without concern to environmental or social factors thus affecting the equitable consideration in the sharing of groundwater resources. The consolidation of water related legislation and the incorporation of new legislation required for the implementation of the national water policies would be a pre-requisite for comprehensive water resources management in the country.

Initiative for Comprehensive Water Resources Management

At present there is no comprehensive policy for management of surface and ground water in Sri Lanka. Water is managed as an input to a number of major national sub-sectors such as irrigation, hydropower production, inland fisheries, domestic and industrial water supply, but with little co-ordination among the sub-sectors. Further, water requirements for environmental management has not been recognised as an important element in the allocation policies. No mechanism exists to address common policy issues. There is therefore a need for a mechanism for joint planning among line agencies to address the competing demands and linkages within the water sector. Planning and policy development should be carried out in a manner, which is neutral and technically competent and in which recognises important national objectives.

Approaches for comprehensive management of the water resources have been considered through the implementation of the two projects with the assistance of the Asian Development Bank and the FAO/Netherlands. Some of the salient features of the main components of the projects include a national water policy, national water legislation, institutional development and information system development.

National Water Policy

A co-ordinated national water policy setting out a broad strategic direction will be the basis for legislative development and for a number of the other components of the project. It will be developed as a framework within which further additions and refinements can be made.

A review of current water and water-related policies had identified a number of broad "cross cutting" issues. The topics which will be addressed initially through in-depth analysis will be: Water allocation, demand management and water rights.

National Water Legislation

This component of the project is undertaken by the Netherlands/FAO funded project "Inter-regional Water Law and Policy Advisory Programme" supported by the WRS and the working group on water legislation. The objective is to consolidate existing water related legislation and to produce a water code that will allow government to perform water resources management functions effectively. Legislation will be introduced to address the implementation of new national policy measures.

Institutional Development

The following are some of the tentative institutional development issues that are expected to be addressed in this component of the ISCWRM project.

- Definition of water sector functions in terms of water resource management and service deliveries
- Permanent institutional mechanism to perform comprehensive water resource management functions
- Agency planning and performance criteria
- Data and information management in the water sector
- Human resource training and development

Organisational Arrangements

A Water Resources Council and a Water Resource Secretariat have been established to implement the two projects and for consultation purposes. The Council is responsible for the implementation of the projects, co-ordination of inter-sectoral and intra-sectoral issues relating to water resources management, and for providing direction and guidance. A permanent institutional arrangement with legal powers will be evolved through a consultative approach as a component of the Action Plan.

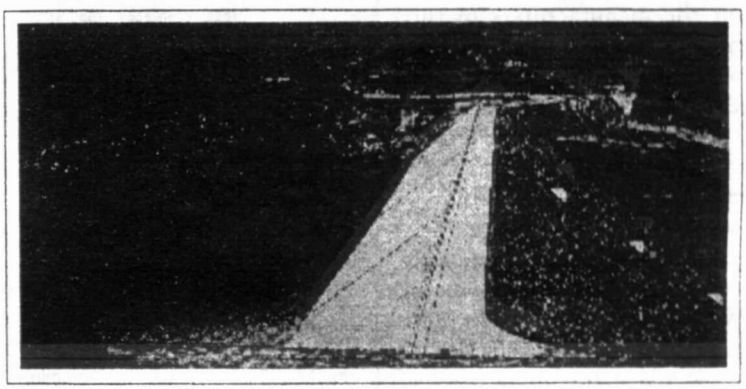
Water Resources Secretariat

A Water Resources Secretariat (WRS) has been established under the Ministry of Finance and Planning administratively attached to the National Planning Department to support the work of the WRC and to carry out day-to-day activities in the implementation of the Action Plan.

Expected Outputs from the Projects

The following outputs/achievements are envisaged from these two projects:

A national policy for comprehensive water resources management encompassing water allocation principles among sub sectors, water rights, demand management principles, and river basin planning approaches etc. recommendations for improved information systems for water sector encompassing public and private sector information needs and strategies for management and dissemination of information, focussing mainly on information needs for new policy development, planning and policy implementation: a water code encompassing introduction of new legislation through consolidation of existing water related legislation with provision for public awareness for effective management of the water resources; recommendations for improvements in the institutional mechanism for comprehensive water resources management, including a permanent institutional framework for co-ordination and management of water resources, and developed skills for comprehensive water resources management, through capacity building programs.



Kotmale Dam / Reservoir for power generation