

Water Matters

News of IWMI Research in Sri Lanka

Issue 4, October 2009

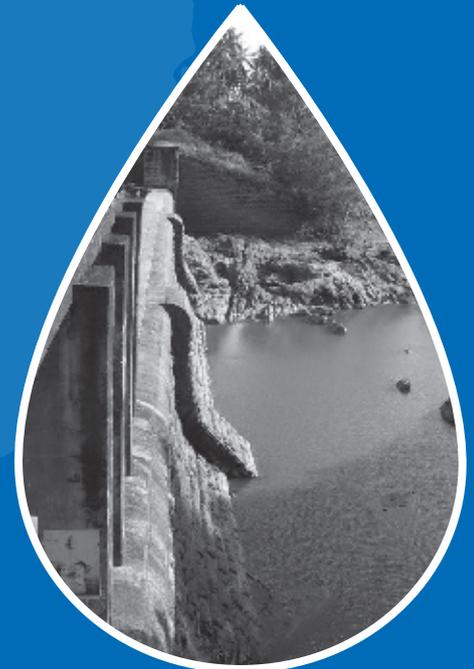


CONTENTS

Editorial—National “Water for Food Conference” 2009 (p.2) / Key Focus Areas of the Sri Lanka “Water for Food Conference” (p.3-5) The Way Forward: Beyond the “Water for Food Conference” (p.6) / Partnerships in Action (p.7) / List of Papers Presented at “Water for Food Conference” (p.8)



The Sri Lanka “Water for Food Conference” held in June brought together a wide range of academics, scientists and practitioners to discuss key issues relating to food security, climate change and water management in Sri Lanka and helped shape a new research agenda for IWMI and its partners in this country.



National “Water for Food Conference” 2009

Food for Thought on Sri Lanka’s Water, Food and Environmental Future

A national “Water for Food Conference” was held by the International Water Management Institute (IWMI), the Irrigation Department, the Department of Agriculture and the Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) from June 9-11, 2009 at the Bandaranaike Memorial International Conference Hall (BMICH) in Colombo. The conference brought together about 150 people including policymakers, researchers and practitioners to discuss issues relating to water, food security and environmental change in Sri Lanka, and to foster collaboration between them. It focused on three very topical areas: irrigation for food security; water quality, environment and climate change; and policies, institutions and information needs for water resources management.

The Prime Minister of Sri Lanka, Hon. Ratnasiri Wickramanayake graced the occasion as the Chief Guest. The Prime Minister observed that the conference focused on a topic that was very important for Sri Lanka and was very timely. He noted that Sri Lanka is not immune to the effects of climate change and urged the scientific community to work out pragmatic approaches to mitigate and adapt to it, especially for small farm communities. The keynote address was delivered by Professor M. S. Swaminathan, an Agriculture Scientist of international repute and a member of the Rajya Sabha (Upper House of the Parliament in India). He stressed the urgent need to set up a national consortium for water and food.

A key recommendation of the conference was that IWMI should facilitate the establishment of a “Sri Lankan Operational Research and Capacity Building Center” that could bring together staff from IWMI, and the Departments of Irrigation, Agriculture, Agrarian Services and Environment, to develop innovative options for improving Sri Lankan agriculture, particularly in the north of the country. There was general agreement that all agencies should contribute to the government’s efforts at post-conflict rehabilitation in the Northern and Eastern Provinces. Some opportunities that were identified included restoration of village irrigation systems; conjunctive use of surface water and groundwater, resulting from the availability of low-cost pumps and efficient micro-irrigation technologies; and improving the performance of major irrigation schemes, which are operating below potential. Advantage should also be taken of new technologies, and new cultivars and crops, and effective irrigation management reforms are also required. The importance of information management systems for water resources development was discussed. IWMI has been developing a national water resources data and information system, which was demonstrated at the water conference.

Overall, the conference was a successful event that generated useful suggestions for ensuring Sri Lanka’s national water and food security.

Dr. Madar Samad
Regional Director – South Asia



The Prime Minister, Hon. Ratnasiri Wickramanayake, who was the Chief Guest, addresses participants at the “Water for Food Conference” held in Colombo, June 2009 at the Bandaranaike Memorial International Conference Hall (BMICH).



Prof. M. S. Swaminathan, member of the Rajya Sabha (Upper House of the Parliament in India) was the Guest of Honor at the conference.

Key Focus Areas of the Sri Lanka “Water for Food Conference”

Alexandra Evans

Irrigation for Food Security

Irrigation has been practiced in Sri Lanka for centuries; the traditional tank system contributed to livelihoods and food security not only by supplying water for irrigation but also by recharging groundwater and providing water for domestic and other purposes. More recently, large-scale irrigation systems have been developed either in place of, or to complement, the tank cascade systems. This rich history and existing mix of irrigation systems provides many opportunities for food production both for commercial purposes and household consumption. However, there was a general consensus among the participants that more should be done to ensure sustained production and to avoid food insecurity while also protecting the resource-base. Many suggestions were raised and discussed at length.

There was a unanimous feeling that there was still much to understand about the tank systems and that in some places they should be revived, especially in the North and East where many have been neglected or damaged. There is a large and detailed body of knowledge on these systems, which must be carefully reviewed and learned from while at the same time gaining a greater understanding of current practices, markets and new methods.

Some of the newer methods discussed included, ‘zero tillage technologies’, ‘system of rice intensification’ (SRI) and the use of agro-wells. Some strong feelings were expressed about these options, both for and against, but what emerged was a consensus that where options have been tested and appear promising, they should be developed with farmers so that they are appropriate and feasible for implementation, without incurring excessive costs.

Although the focus was on increasing food security through irrigation, the overwhelming feeling was that water resources management and food security went beyond agriculture. First, water resources need to be managed at different scales and water productivity needs to be improved at the basin, scheme and household level. Second, food security requires holistic approaches including fisheries, livestock, fruit and vegetable cultivation, water management and agroforestry. This will improve sustainability and build resilience at the household, community and national level, to withstand events such as droughts, floods and epidemics.



Photo Credit: Karen Conniff

A rural farmer carrying grain. Food security requires a holistic approach to improve sustainability and build resilience at household, community and national level.

Water Quality, Environment and Climate Change

This session explored a wide range of issues associated with water quality, environment and climate change, and the linkages between them. The papers and discussions included multifunctional agricultural systems, multiple use water systems and ecosystem services, and the economic benefits that they provide. It was strongly felt that environmental water requirements need to be understood and taken into account at all stages in the planning, development and management of irrigation schemes. Critically, environmental flows require high and low flows, rather than steady discharge, to mimic natural conditions. The negative implications of irrigation development on the environment were stressed but the need for irrigation in crop production is also clear. Trade-offs between the two are therefore required; although farmers clearly understand the need for water for the environment they do not necessarily want to lose part of their livelihoods to support it. Finding solutions to this complex problem is one of the most pressing challenges facing the sector.

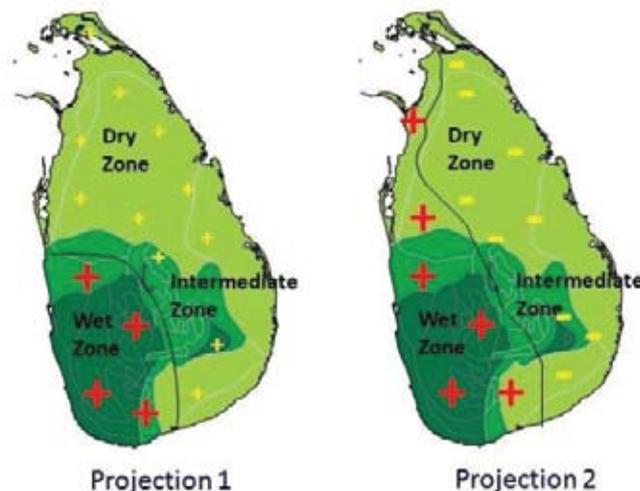
Alternative sources of water also need to be explored including groundwater, rainwater and even wastewater. All of these have associated pros and cons and need to be carefully reviewed and their use planned for. Groundwater, for example, has good potential in some areas but there are issues around pollution, especially in shallow aquifers. Therefore, groundwater needs to be monitored and the cause-effect relationship of pollution understood. Rainwater has become a preferred source of drinking water in some rural areas but there are quality concerns where operation and maintenance recommendations are not followed. The challenge is how to overcome this.

Copious quantities of wastewater are produced by cities and could be available for use in agriculture, to provide both water and nutrients, but there are obvious health and environmental risks where wastewater is not treated or managed properly. More research is needed on how to manage wastewater and how to work with farmers to balance the nutrients supplied in wastewater with plant nutrient needs.

Wastewater is not the only cause of water pollution problems; astounding quantities of sediment also enter rivers due to poor land management. There are many technical solutions and good laws, but there is inadequate implementation and enforcement. The heavy use of pesticides also results in considerable environmental pollution but chemical analysis is not always feasible. Therefore, it is necessary to review farmers' practices but questions remain on how to control these practices and how to fund this.

Common factors that spanned the water quality discussions and which need to be taken into consideration in future research and interventions are: institutional challenges such as legislation and sustainability of projects; funding challenges; the need for long-term

Spatial patterns of rainfall projections for Sri Lanka for 2050



Plus signs indicate an increase in rainfall and minus signs indicate a decrease. The relative size of the change is indicated by the size of the sign. Sources: Projection 1 (Basnayake et al. 2004); Projection 2 (De Silva 2006).

monitoring; and the need for guidelines on water quality for various uses.

Climate change was the third key issue discussed. The major observation is that predictions of climate change vary widely and are even contradictory, with estimates for both temperature rise and changes in rainfall being uncertain. Variations in rainfall have already been identified, such as, a 7% decline in mean annual rainfall during 1961-1990 compared to that of 1931-1960, which implies that climate change is already affecting Sri Lanka. The number of consecutive wet (rainfall) days has also declined and there have been shifts in seasonality, observed as delays in seasonal rainfall. Warming trends have also been identified. These changes have implications for agriculture, especially in small tank systems where farmers are more dependent on rainfall. Farmers will need to adopt innovative adaptation strategies but this alone may be inadequate and policy support is required.

A comprehensive national study on vulnerability of water resources is necessary to understand the existing changes and to prepare for the future.

References

- De Silva, C. S. 2006. Impacts of Climate Change on Water Resources in Sri Lanka. Paper presented at the 32nd WEDC International Conference, November 13-17, 2006, Colombo, Sri Lanka.
- Basnayake, B. R. S. B.; Rathnasiri, J.; Vithanage, J. C. 2004. Rainfall and Temperature Scenarios for Sri Lanka Under the Anticipated Climate Change. Paper presented at 2nd AIACC Regional Workshop for Asia and the Pacific, Manila, Philippines, 2004.

Policies and Institutions for Water Management

The discussions around governance and participatory irrigation management concluded that there are few opportunities remaining in Sri Lanka to develop large-scale irrigation infrastructure. Therefore, water management will need to focus on improved governance of existing systems, crop diversification and intensification, new technologies and conjunctive water use.

In terms of the existing governance structure, a multitude of sectoral policies were identified but they are fragmented and sometimes contradictory. There have been attempts to create a holistic policy but these have failed, primarily due to the process, the language and lack of transparency. There are reasonably comprehensive policies for drinking water, especially urban water, but there are still six policies that cover drinking water. Some of the policies are not complete or are not backed by legislation. No bulk water allocation policy exists and there are no established principles for this; nor is there a groundwater policy. The consensus was that a holistic and overarching water policy, which all stakeholders can understand and identify with, needs to be developed.

Participatory Irrigation Management (PIM) was central to the discussions and it was felt that adequate operation and maintenance of irrigation systems is not possible at the current level of resource allocation without PIM. It is essential to reestablish the earlier PIM monitoring, evaluation and feedback system known as the Central Coordination Committee for Irrigation Management (CCCIM).

Irrigated agriculture should not, however, be looked at in isolation, rather, it should be part of a broader framework of innovative income generation options that includes crop diversification and intensification, through improved irrigation efficiency from the current level of approximately 35%. Options include the promotion of conjunctive use of

water, the potential for reuse and recycling, and the promotion of cheap and innovative technologies.

All these actions require a careful assessment of existing stocks and trends of water resources. Currently, insufficient data are gathered, processed and shared. IWMI is establishing an online National Water Resources Data and Information System which is currently under development.

Feedback on the Conference

A wide variety of participants attended the conference including government agency staff (47%), university staff and students (20%), as well as NGOs, research organizations, United Nations (UN) agencies and donors. They brought a variety of disciplines such as agriculture, geography, economics, and irrigation engineering.

Of the 25% of participants who completed feedback forms, 88% found the opening session to be excellent or good. They particularly liked the presentations, which were very informative, and the fact that a number of well-respected people made presentations. With regard to the technical sessions, some respondents would have preferred it if they had not run in parallel as they had to miss some but felt that the number of papers was just right (78%). Generally, they felt that the topics covered were good but some people felt slightly restricted and would have liked to see links with domestic water. The majority (95%) found the discussions in the technical sessions to be useful.

The success of the conference was borne out by more than three-quarters of the respondents wanting it to be repeated regularly - every one or two years.



A Distributory Canal 7 (D.7) farmer organization meeting in the Uda Walawe Right Bank System.

Photo Credit: B. R. Ariyaratne

The Way Forward: Beyond the “Water for Food Conference”

K. Jinapala

IWMI researchers held meetings with key stakeholders, including the Ministry of Irrigation and Water Resources Management, the Ministry of Agriculture and Agrarian Development, the Department of Agriculture (DoA), various UN agencies, and the National Water Supply and Drainage Board (NWSDB), immediately after the conference. Priority areas were identified for research-led development to improve land and water productivity in Sri Lanka.

Irrigation Tanks and Groundwater

Village settlements in the North and East (except the Jaffna Peninsula) depend on small irrigation tanks, which harvest and store rainwater for multiple uses, including the irrigation of about 26,000 hectares under minor systems. The restoration, rehabilitation and improvement of these tanks will make significant contributions to the economic and social recovery of communities affected by the conflict.

There are also opportunities to develop groundwater systems in Sri Lanka for supplementary irrigation, especially in the North and East, where this should be implemented as part of a larger agriculture and water management program.

Traditionally, in the development of tank systems and groundwater, the emphasis has been on technological interventions. However, for these to succeed they must be supported by adequate social capital. This has diminished in the conflict-affected areas. Similarly, institutional support systems are essential but these too have broken down. These are two main areas in which IWMI could effectively contribute by bringing international experience and expertise from other countries in the region.

Livelihoods Diversification

Going beyond conventional cropping patterns will be one strong development intervention needed throughout the country. This will improve food security and build the resilience discussed in the conference.

There are a large number of families who are currently displaced as a result of the conflict. There are also many who do not possess irrigated agricultural lands, who are landless or lack tenure security, and the war has increased the number of female-headed households and disabled people. Providing such groups with immediate support and working to rebuild their livelihoods are among the most urgent interventions required. IWMI has been discussing with the World Food Programme (WFP) and the DoA, the feasibility of implementing innovative homestead gardening for displaced families and for those with very small plots of land (please see the report on this on page 7).

IWMI has also become a member of a group established by the Food and Agriculture Organization (FAO) to implement projects to help internally displaced persons (IDPs) to reestablish their livelihoods in the conflict-affected areas. IWMI has become an active participant in the agriculture cluster meetings and is contributing to the development plan that FAO is coordinating. A concept note has been submitted that focuses on improving livelihoods of farmers under small tank irrigation in the North and East of Sri Lanka.

Enhancing Land and Water Productivity

Research to enhance land and water productivity in Hambantota and Monaragala was discussed. Improving the productivity of irrigation systems and rainfed agriculture are some of the proposed interventions for which IWMI can provide support through research and capacity building.

Consequently, IWMI is developing ideas for water resources development in the Hambantota and Monaragala Districts, at the request of the Secretary of the Ministry of Irrigation. These projects will be undertaken in close collaboration with national partners including the Irrigation Department, HARTI and leading NGOs in the water sector.

Information Management Systems

Recently, IWMI initiated the development of a prototype system for managing national water resources data and information to provide online access. Following the conference, this system was presented to various stakeholders including several ministries, the Irrigation Department and the NWSDB. The Ministry of Water Resources had also initiated a project to establish a water resources management unit and they found that the prototype matches well with components of this project. Discussions are underway as to how to bring these initiatives together.



Small irrigation tanks harvest and store rainwater for multiple purposes. The restoration and rehabilitation of these tanks can contribute to the well-being of rural communities.

Partnerships in Action

Establishing Movable and Vertical Vegetable Gardens for Internally Displaced Persons in the North

A Report by K. Jinapala and B. R. Ariyaratne

Nearly 300,000 people in the Northern Province became Internally Displaced Persons (IDPs) in the aftermath of the war; many of these were farmers. The WFP and the government are providing dry rations to the IDPs but they are rarely able to provide vegetables. The DoA has tried to fill this gap by promoting vegetable cultivation in the camp areas to address nutritional needs. This campaign has been very successful but its extent is limited by land and water constraints, and consequently, the volume of vegetables produced in the vicinity of IDP camps remains inadequate.

In this context IWMI discussed with the DoA the idea of introducing “vertical vegetable gardens” and “movable vegetable gardens”. These are options that have several advantages over planting in the ground. The smaller, movable gardens would be more appropriate for immediate implementation within the IDP camps and the vertical gardens for resettled households, as can be seen from their advantages (Box 1).

IWMI’s Expertise in Vertical Vegetable Gardening

IWMI has implemented vertical vegetable gardening projects in various countries. In Sri Lanka, implementation was under the Resource Centres on Urban Agriculture and Food (RUAF) program, in partnership with the Western Province DoA.

In the Vavuniya project, IWMI and the Western Province DoA are continuing to work together, along with the Vavuniya DoA and WFP, to introduce vegetable cultivation to the IDPs. With permission from the Governor of the North, the team started the training in October 2009. Movable and vertical vegetable gardening technologies were demonstrated to 25 agriculture extension staff from Vavuniya, as well as to some farmers and schoolchildren. The team explained the theoretical aspects of the proposed technology and set up demonstrations. The intention is that staff from the Vavuniya DoA will train farmers in the IDP camps, and support them to establish movable gardens immediately and to understand how to create permanent cultivation towers when they return home. As the current intention is for IDPs to be resettled as soon as possible training on the permanent cultivation towns will be increasingly important, as will training of trainers within the DoA in the Northern and Eastern Provinces. These activities will link well with the other livelihoods research projects planned by IWMI.

Positive Outcomes

Mrs. Jeganathen, the Deputy Director, Vavuniya DoA, is committed to implementing the project with IDPs and has



IWMI and the Western Province Department of Agriculture held a demonstration for agricultural extension officers in Vavuniya on how to set up and maintain vertical vegetable gardens to ensure a regular supply of vegetables.

(Box 1) Advantages of Movable and Vertical Vegetable Gardens

- Both can be constructed very quickly, with limited materials, including recycled poly-sacks and plastic bottles. Soil and compost are needed, which may be more difficult to obtain but compost production can be part of a longer-term plan when households are resettled.
- Both can be established on small plots of land and a number of vegetables can be grown in a small area.
- Both can reduce water requirements because water is trickled through a central irrigation tube (either a pipe or an old plastic bottle). Kitchen wastewater can be used which saves more water.
- Labor for maintaining the plants is minimal in both cases compared to other traditional methods of growing vegetables.
- Semi-movable, vertical gardens can be used to plant larger quantities of vegetables and, therefore, can be managed on a commercial scale in environments where land and water resources are constraints for agriculture. These are more appropriate when households are settled.

already selected 200 interested farmers. The Vavuniya office of the WFP will support the DoA and will provide empty poly-sacks. IWMI will fund implementation of this by providing seeds and compost but it is hoped that uptake will be spontaneous as most of the materials are relatively easy to obtain. Another trip will be made in November to monitor the progress.

Contact Person

Dr. Madar Samad

Regional Director – South Asia
m.samad@cgjar.org

Postal Address

P O Box 2075
Colombo
Sri Lanka

Location

127, Sunil Mawatha
Pelawatta
Battaramulla
Sri Lanka

Telephone

+94-11-2880000

Fax

+94-11-2786854

E-mail

iwmi@cgjar.org

Website

www.iwmi.org



List of Papers Presented at “Water for Food Conference”

Irrigation for Food Security

- Agriculture, environment and food security
- Natural rhythm (rainfed agriculture), cultural rhythm and food security in the North Central Province of Sri Lanka
- Participatory approach to minimize flood and drainage impacts on agricultural lands – Case study of Walawe Basin
- Holistic approach to ensure food security through cascade system development in the dry zone of Sri Lanka – A practice from Plan Sri Lanka
- Instability of paddy production and regional food insecurity in Sri Lanka
- Food security and rural irrigation rehabilitation experiences from rural irrigation rehabilitation in Ratnapura District of Sri Lanka
- Utilization of aquatic plants: A method to enhance the productivity of water in seasonal tanks in Anuradhapura District
- Sustainable land use patterns of the traditional village tank cascade system in the dry zone of Sri Lanka: Case study of the Paranahalmillewa Cascade at Medawachchiya Division
- Water shortage in the Lower Deduru Oya Basin
- System of rice intensification (SRI) and food security among the poor: Opportunities and constraints
- Impact of water saving irrigation systems on water use, growth and yield of irrigated lowland rice
- Ancient irrigation technology and water management techniques in Sri Lanka – Appropriate theories and practices for application
- Potential for zero tillage technique in rice and other field crop cultivation in rice-based cropping systems in dry and intermediate zones of Sri Lanka
- Integrating agroforestry characteristics in to agro-well-based agriculture
- Importance of seasonal planning on irrigation water productivity: Ingimitiya experience
- Temporal variation of agroclimatological zones in Sri Lanka
- Improved paddy production by optimizing use of water in major irrigation systems

Water Quality, Environment and Climate Change

- Wetlands and agriculture – a case for IWRM in Sri Lanka
- Improving biodiversity and productivity in dry zone home gardens through rainwater harvesting
- Environmental flow assessment and valuation – Recent examples from Sri Lanka
- How to minimize the negative impacts on Bundala National Park (Ramsar Wetland) by irrigation development of Kirindi Oya River Basin in the southern part of Sri Lanka
- Non-user benefits emanating from enhanced water flow to Yala Protected Area Complex
- Treatment and non-treatment options to improve the quality of irrigation water contaminated with wastewater: Example from Kurunegala, Sri Lanka
- Consumer acceptability and household water security through stored rainwater: A case study in Anuradhapura District
- Potential to increase the area under paddy cultivation with domestic and municipal wastewater irrigation in Kurunegala District

- Availability and spatial variability of plant nutrients in paddy fields of Wilgoda irrigation scheme in Kurunegala
- Cost-effective approach to assess water pollution potential by fungicide residues using three agricultural environments in up-country of Sri Lanka
- The impact of inappropriate soil management on river water quality
- Distribution of fluoride in groundwater in some selected areas of Anuradhapura District
- Preliminary groundwater assessment and water quality study in the shallow aquifer system in Attanagalu Oya Basin
- Vulnerability to climate change in Sri Lanka: Adaptation strategies and layers of resilience
- Climate change, local institutions and adaptation experience: The village tank farming community in the dry zone of Sri Lanka
- Identify the impact of tide level for river basin flooding
- Rainfall fluctuation and changing pattern of agriculture practices
- Climate change and rainfed agriculture in the dry zone of Sri Lanka
- How prepared are water resources and agricultural sectors in Sri Lanka for climate change? A review

Policies, Institutions and Data Needs for Water Management

- Sri Lanka's water policy: Themes and issues
- Enhancement of capacity of farmer organizations for sustainable irrigation systems in Anuradhapura and Kurunegala Districts
- Multiplier impacts of irrigation Investments
- Interventions necessary in capacity building in existing water organizations to improve productivity and access to water
- Contribution of food markets and their behavior for food security: A comparative study on marketing arrangements in different irrigation systems
- Local governance for effective and productive water management process
- Sri Lanka's water future to 2025-2050 - scenarios and issues
- Economic valuation of irrigation water under a major irrigation scheme (Gal Oya) in eastern Sri Lanka
- Sand barriers and access to water – community pressure and policy interventions in river sand mining in Sri Lanka
- Irrigation infrastructure management by public funds - How it can be made justifiable?
- Managing irrigation with farmers - history, present status and future review of participatory irrigation management in Sri Lanka
- Policy alternatives of the management of minor and medium irrigation schemes to develop groundwater systems in restricted catchments for the improvement in food productivity in the dry zone of Sri Lanka
- Irrigation development, food security and poverty alleviation in Sri Lanka: past trends and future directions
- Development of a water resources assessment and audit framework for Sri Lanka
- Green accounting system for Sri Lanka
- Effects of land use/land cover on the water source vulnerability: The case study on intermediate zone of Matale District
- Data and information management for water management
- Surface runoff estimation over heterogeneous canal commands applying medium resolution remote sensing data with SCS-CN method
- Benchmark basin research in Walawe River Basin