IWMI International Water Management Institute
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Putting Research Knowledge into Action

# 1 Sri Lanka: Issues and opportunities for investment

## The need for improved water management in Sri Lanka

The country has an annual rainfall between 750 and 6,000 millimeters (mm), with large spatial and temporal variation. The availability of clean drinking water is a national imperative, but agriculture consumes the bulk of available water resources. Economic development, population pressure and rising demands from different sectors are placing increasing pressure on available water resources. Climate change could aggravate this situation in Sri Lanka. There is a danger that the demand for water will outstrip supply, particularly in the Dry Zone of Sri Lanka where most irrigation schemes are located.

## Key messages

- There is ample room for improving productivity in all irrigation systems.
- Groundwater management requires more attention.
- Coastal freshwater sources are faced with serious threats.
- The "Tank Country" (Dry Zone) requires a new approach.
- Important watersheds in the hill country are degrading rapidly.
- A paradigm shift in *policies, legislations, institutions and approaches to capacity building* is essential.

Investments in *hard* and *soft* water infrastructure must take into account likely changes driven by population, urbanization and climate change, adopting "*no regret*" options.

## Key water issues

### Revitalizing irrigation

There are over 600,000 hectares (ha) of irrigated farmland in Sri Lanka. Cultivation takes place during the two seasons with an average cropping intensity of 1.65. The main irrigated crop in the country is paddy (94% of irrigated area), with an average yield of 4.3 tonnes (t)/ha, and a surplus is being produced at the moment. While the current productivity ranges between 0.2-0.5 kilograms (kg)/cubic meter ($m^3$), the irrigation efficiency at systems level is about 35-45%. There is a growing need for substantial investment in the rehabilitation of existing irrigation facilities and overall improvements in productivity. Therefore, future investment in the irrigation sector needs to be more focused on increasing productivity of expensive irrigated water through increased yields and multiple use.

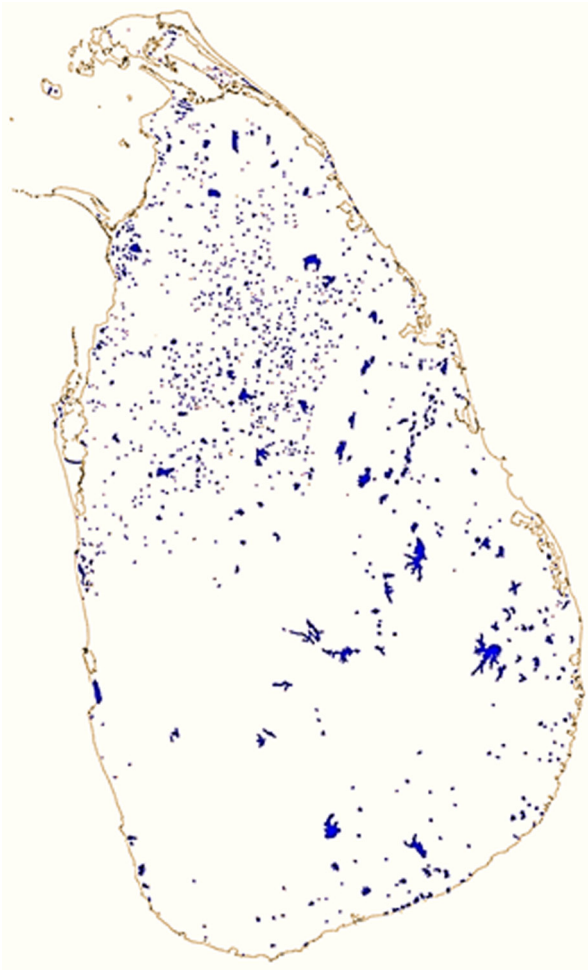
### Managing groundwater use

As is happening elsewhere in Asia, farmers are increasingly turning to groundwater. Private investment in agro-wells and irrigation pumps is expanding rapidly because of the high rates of return on investment. Wells and pumps allow multiple-cropping of high-value upland crops, give farmers more discretion over water use, promote diversification of crops and livestock, and increase farmers' incomes. Most of the new wells are running dry or producing low quality water due to site selection errors. However, indiscriminate withdrawal of groundwater from aquifers is a serious threat to the sustainable use of groundwater.

Moreover, nearly 30% of the population live in coastal areas and depend on the shallow lens of freshwater saddled on saline waters for livelihoods and for the tourism industry. These precious and limited water resources are threatened by overextraction, pollution, saltwater intrusion and sea level rise due to climate change. No doubt, the sustainable utilization of this limited resource is important. A systematic research program is urgently needed to guide the policy, legislations and institutions that include adaptation to climate change.

## Agriculture in the dry zone

The dry zone forms 70% of the land area of Sri Lanka. Most of the rain falls during the three months of the monsoon season in the form of heavy downpours.



Sri Lanka's small tank distribution (*Source*: IWMI).

Therefore, the traditional practice was to capture and store this rainwater in small- and medium-size surface reservoirs. There are an estimated 18,000[1] constructed ponds or tanks in the dry zone, but approximately half of them are classified as 'abandoned' or badly in need of repair. Some of these structures in this area can be traced back to the fifth century BC. Though these tanks served multiple purposes, irrigation has always played a major role in the economy. These small tanks are the ideal storage option for mitigating drought and floods, a function they have performed on a local scale for several centuries. These tanks are interlinked and interdependent through a cascade system. The rehabilitation of these tanks is of great interest to everybody. Past experiences show the failure of the single tank rehabilitation approach. Therefore, in rehabilitation efforts, one should look at the whole cascade system including the watershed area and not only on an individual tank.

Large areas of land in the Dry Zone are under rainfed conditions. The productivity of rainfed areas could be increased by supplemental irrigation at crucial times for the crops using groundwater. This type of conjunctive use of water can help to improve the livelihoods of a vast amount of people, whose livelihoods are vulnerable to frequent droughts and floods.

## Watershed degradation in the hill country and the impact on water resources and agriculture

Population pressure on lands in the hilly region is leading to the cultivation of marginal slopes. Forest cover is declining dramatically. This conversion of natural forest into agricultural and other land uses has decreased annual total water yield, increased storm runoff and reduced baseflows. About 31% of the electricity used in the country is generated from rivers flowing from the hills, and most irrigated lowlands depend on water from the hills.

Poor land management practices and rapid runoff are responsible for high soil erosion, loss of land productivity, more frequent flash floods, and silting of canals and other water bodies. About 46% of the total land area in the hill country is estimated to be seriously affected by erosion.

[1] Panabokke, C.R. 2009. *Small Village Tank Systems of Sri Lanka*.

## Policies and institutions for water management

The Government of Sri Lanka has identified the need for a comprehensive policy revision in the water sector and is attempting to develop a new set of policies. Policymakers are working to facilitate new investments, promote data and information sharing, and move towards Integrated Water Resources Management in recognition of the key role that water will play in the growth of the economy. In the face of new developments, it is obvious that the approach to water management over the past 100 years cannot continue into the future. It needs a paradigm shift towards high productivity and sustainability of the resource.

## IWMI research in Sri Lanka

Since its establishment in Sri Lanka in 1984, the International Irrigation Management Institute (IIMI) (as it was known then) and IWMI (as it is known now) continue to research on agricultural water management issues in the country. Over a thousand publications are available on such research activities, which cover areas such as irrigation, participatory irrigation management, basin planning, benchmarking, ecological sustainability of irrigation systems, watershed management, wetlands, irrigation and malaria, climate change, water quality, groundwater management, rainfed agriculture and small tank systems, to name a few. Some of the work has profound implications on the policies of the country; a classic example is the Irrigation Management Policy Support Activity (IMPSA). The Sri Lankan Government has amended the Agrarian Services Act and the Irrigation Ordinance in order to legally recognize the farmer organizations and to accommodate those organizations in the management of all major irrigation schemes, as a result of the IMPSA.

IWMI continues to work on major agricultural water management issues in Sri Lanka, with the view of helping all stakeholders in the post-war development efforts.

## Future investment needs

IWMI is hoping to rekindle its collaboration with partner institutes in the country with the joint development of research-backed solutions for sustainable, equitable and productive interventions on water management. The Institute is also seeking to establish links with major donors to continue the work. Given the context of population growth, urbanization, industrialization and climate change, investments are needed in the following areas:

## Revitalizing irrigation

- Revitalizing existing irrigation systems for better output, combined with modern asset management systems to sustain high productivity levels.
- Integrating management of surface water and groundwater for multiple use.

## Rainfed agriculture and irrigation in the dry zone

- Improving irrigation efficiency and water storage options in the dry zone.
- Managing the use of groundwater to avoid overexploitation and pollution.
- Developing coping strategies to mitigate the negative impacts of extreme events such as droughts and floods that occur as a result of climate change.
- Rehabilitation of cascade systems including the catchment areas.

## Watersheds in the hill country

- Managing critical watersheds to avoid land degradation.
- Improving water quality and the environment.
- Soil and water conservation.
- Sustainable river basin management.

## Policies and institutions for water management

- Developing a comprehensive approach with policies, legislations and institutions for the management of water resources.
- Developing/capacity building of state officials and user groups to effectively involve them in water resources management providing sufficient resources.
- Advocating new policies and institutional mechanisms for river basin management.

## Source

This Water Issue Brief is based on the following:

*Proceedings of the National Conference on Water, Food Security and Climate Change in Sri Lanka, BMICH, Colombo, Sri Lanka, June 9-11, 2009*, eds., Evans, A.; Jinapala, K. Colombo, Sri Lanka: International Water Management Institute.

## Related IWMI publications

**Open access (electronic version freely accessible via the internet)**

Dissanayake, P.; Smakhtin, V. 2007. *Environmental and social values of river water: examples from the Menik Ganga, Sri Lanka*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 15p. (IWMI Working Paper 121)

Eriyagama, N.; Smakhtin, V.; Chandrapala, L.; Fernando, K. 2010. *Impacts of climate change on water resources and agriculture in Sri Lanka: a review and preliminary vulnerability mapping*. Colombo, Sri Lanka: International Water Management Institute (IWMI) 43p. (IWMI Research Report 135)

Molle, F.; Renwick, M. 2005. *Economics and politics of water resources development: Uda Walawe Irrigation Project, Sri Lanka*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 74p. (IWMI Research Report 087)

Panabokke, C. R.; Ariyaratne, B. R.; Seneviratne, A.; Wijekoon, D.; Molle, F. 2007. *Characterization and monitoring of the regolith aquifer within four selected cascades (sub-watersheds) of the Malala Oya Basin [Sri Lanka]*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 38p. (IWMI Working Paper 122)

Saleth, R. M.; Dinar, A.; Neubert, S.; Kamaiah, B.; Manoharan, S.; Abayawardana, S.; Ariyaratne, B. R.; de Silva, S. 2007. *Institutions, impact synergies and food security: a methodology with results from the Kala Oya Basin, Sri Lanka*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 46p. (IWMI Research Report 124)

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