

# IWMI Research in Sri Lanka



- Integrated Water Resources Management
- Impacts of Irrigation on Poverty Alleviation
- Drought Monitoring
- Impacts of Agriculture on Wetlands and Biodiversity
- Malaria Risk Mapping
- Impacts of Wastewater on Health and Environment



## About IWMI

IWMI is an international non-profit scientific organization supported by the Consultative Group on International Agricultural Research (CGIAR). IWMI works in developing countries and has offices in both Africa and Asia with headquarters in Sri Lanka.

## Mission:

To improve the management of land and water resources for food, livelihoods and the environment.

## Research Themes:

1. Water Availability and Access
2. Productive Water Use
3. Water Quality, Health and Environment
4. Water and Society

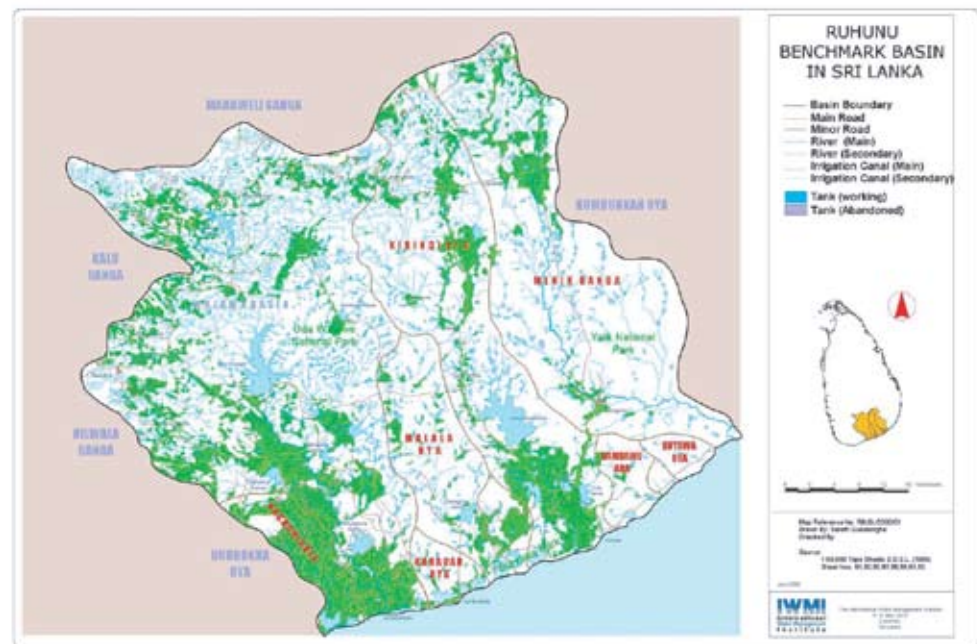
*The Sri Lanka Program office is located at IWMI Headquarters. The Sri Lanka Program works with national and international partners in consultation, research and capacity building activities.*

## Overview of Projects and Activities

IWMI's research program in Sri Lanka is centered around two types of research: studies that generate generic solutions to land and water management which are of global importance; and research that is of national importance, with visibility and impact within the country. IWMI's work in Sri Lanka has been ongoing since the mid-1980s and the Institute maintains a mutually beneficial relationship with its host country. IWMI has contributed to the development of institutions and practices to improve the management of water resources and irrigated agriculture in Sri Lanka. Through lasting partnerships with government agencies, national researchers, universities and other organizations, the Institute continues to strengthen research capacity and the linkages between researchers and end users such as policymakers, water managers and community organizations. IWMI's portfolio in Sri Lanka includes a range of research, capacity building and knowledge sharing activities. IWMI works mainly in its designated benchmark basin in the Ruhuna, but also in other areas.

Key projects/activities carried out over the last few years include: studies on irrigation infrastructure development and its impacts on poverty alleviation, environmental impacts of agriculture on wetlands and inland fisheries, malaria risk mapping, drought monitoring, livelihoods and environmental impact assessment in the aftermath of the December 2004 tsunami, wastewater agriculture and sanitation for poverty alleviation (WASPA). In addition, a synthesis of the Uda Walawe Basin was carried out under the Comprehensive Assessment of Water Management in Agriculture.

## The Ruhuna Benchmark Basin-Critical Issues



The Ruhuna Benchmark Basin covers an area of 5,500 km<sup>2</sup>, and has a range of agroecological zones and geographic landscapes. It encompasses three main river basins: the Walawe Ganga, Kirindi Oya and Menik Ganga. Water is the most critical natural resource in the basin. Water scarcity and competition between different users is an issue. Irrigation under different management systems, large-scale irrigation expansion, the southern development program, and other conflicting users such as power generation provide interesting areas for study. Poorly managed agricultural activities in the upper catchments result in soil erosion and lead to land and environmental degradation in the region. The basin provides an environment for partner and stakeholder interactions and for strengthening links with development agencies working here on a long term basis. IWMI is also establishing a knowledge base and facilities to make the basin more attractive to researchers and to facilitate further research. Capacity building comes within the Institute's mandate for knowledge sharing which extends beyond basin boundary partners to include other global basin projects and organizations at national level, to scale-up and scale-out impacts which would ultimately have far-reaching benefits for the country.

[http://www.iwmi.cgiar.org/Research\\_Impacts/Benchmark\\_Basins/Ruhuna.aspx](http://www.iwmi.cgiar.org/Research_Impacts/Benchmark_Basins/Ruhuna.aspx)

**IWMI Benchmark Basins and Challenge Program Water and Food Benchmark Basins**

The Ruhuna Basin is one of four benchmark basins where IWMI works. The other basins are the Olifants basin in South Africa, The Syr Darya Basin in Central Asia and the Krishna Basin in India, while some others are currently being developed as Benchmark Basins. IWMI also works with partners in the Challenge Program Water and Food (CPWF) Benchmark Basins which are the Andes and Sao Francisco basins in South America, the Karkeh basin in Iran, the Nile, Volta and Limpopo basins in Africa, the Yellow River basin in China and the Mekong basin in Southeast Asia.

**Partnerships and Capacity Building**

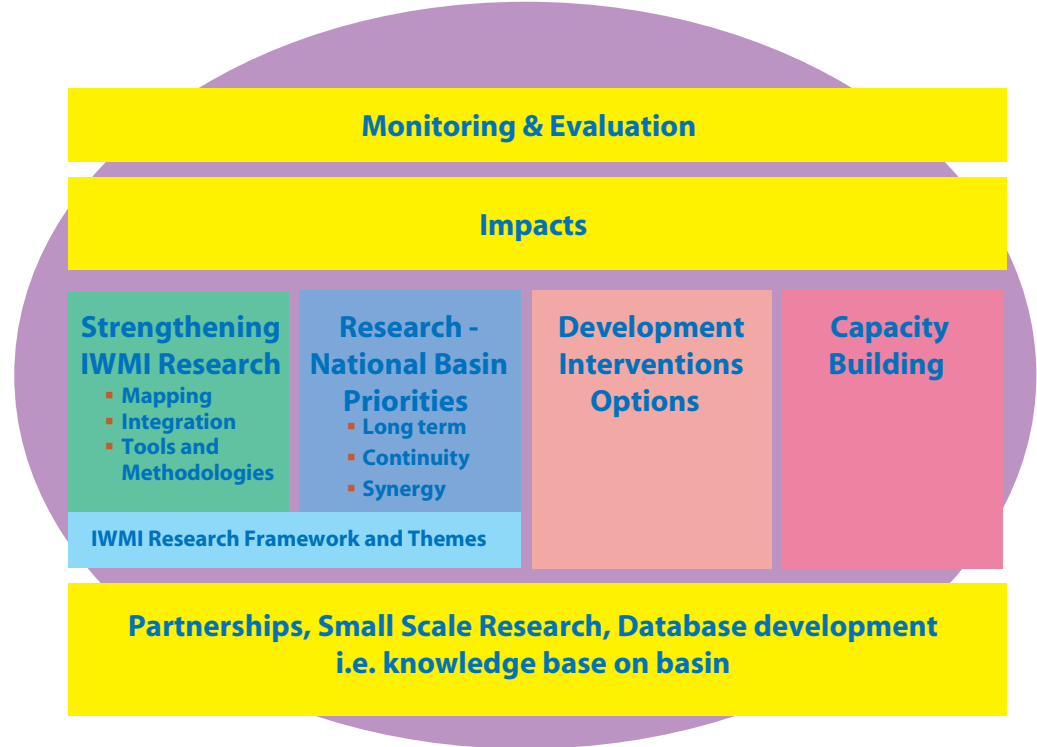
It is IWMI's policy to work in partnerships with international research systems (ARS), national research systems (NARS), government agencies, universities, NGOs and other local stakeholders as necessary. This approach strengthens the research team, improves facilities for data access and makes it cost effective. More importantly, it enables IWMI's mandate of acting as a knowledge sharer and enables transfer of knowledge between the developed and developing world research systems, facilitating capacity development in a big way.

Capacity building is mainly through these partnerships in projects. In addition, IWMI organizes numerous conferences, working meetings, on-the-job training and training courses. Formal academic training occurs through support for post-graduate fellowship and internship programs. IWMI also works closely with universities, one example being its interaction with the Postgraduate Institute of Agriculture, University of Peradeniya, in developing and supporting a Masters course in Integrated Water Resources Management.

**Benchmark Basins**

Benchmark basins are like "field laboratories" where research is facilitated through long term partnerships with the opportunity to test out some of the findings, and to monitor impacts well beyond the life cycle of projects, as conditions change and evolve within the basin. In addition, benchmark basins provide new knowledge through a deeper understanding of the interactions between water, food and environment in the basins, as well as the impacts of interventions on the livelihoods and health of rural communities.

**Benchmark Basin Concept**



**Sri Lanka Consultative Committee**

The key instrument for interacting with policy makers in Sri Lanka is the Consultative Committee. Ministry secretaries and heads of departments and key academics form its membership. Consultative Committee meetings are generally held twice a year to present IWMI activities and seek input regarding priority research needs in Sri Lanka.



A Sri Lanka Consultative Committee Meeting in session at IWMI headquarters.

**Some Key Projects:**

**Analyzing the Dynamics of Temporal and Spatial Variability of Poverty**

A joint initiative between IWMI, FAO, UNEP and the CGIAR, this project looked at developing a geo-referenced information base to understand the spatial dynamics of poverty and food insecurity in Sri Lanka. The key research question in this project was to understand the significance of access to water and land and its impacts on the livelihoods of basin inhabitants, as well as the links between the extent of differential access to reliable water and the variations in poverty and food insecurity. This helps when recommending and implementing suitable pro-poor interventions.

## IWMI's Partners and Collaborators in Sri Lanka

- Ministry of Agriculture, Environment, Irrigation and Mahaweli Development
- Department of Irrigation (DOI)
- Mahaweli Authority of Sri Lanka (MASL)
- Department of Agriculture (DOA)
- Department of Agriculture Production & Development (Agrarian Services Dept) (DAPS)
- Department of Public Administration (Government Agents) (DOPA)
- Ceylon Electricity Board (CEB)
- Department of Wild life Conservation (DOWC)
- Department of Forests (DOF)
- International Union for Conservation of Nature (IUCN)
- Sugar Research Institute of Sri Lanka (SRI)
- University of Peradeniya (UOP)
- University of Sabaragamuwa (UOS)
- University of Ruhuna (UOR)
- University of Kelaniya (UOK)
- Industrial Technology Institute (ITI)
- Hector Kobbekaduwa Agrarian Research & Training Institute (HARTI)
- Department of Census (DOC)
- Department of Survey (DOS)
- Anti Malaria Campaign (AMC)
- Department of Health (DOH)
- Department of Fishery (DOF)
- Department of Costal Conservation (DCC)
- National Water Supply & Drainage Board (NWSDB)
- Water Resources Board (WRB)
- National Building Research Organization (NBRO)
- Urban Development Authority (UDA)
- Nippon Koei Co., Ltd
- Sevanagala Sugar Industries Ltd.
- CARE international
- Sri Lanka National Water Partnership (Lanka Jalani)

## Impact Assessment of Irrigation Infrastructure Development on Poverty Alleviation

This study investigated the poverty-reducing effects of irrigation infrastructure development. Irrigation systems in Sri Lanka and Pakistan were selected as study areas and the Japan Bank of International Development (JBIC) funded their development and rehabilitation. Study results showed strong evidence that irrigation does help in poverty reduction, particularly chronic poverty. Findings suggested that the incidence, and severity of poverty was highest in areas without irrigation infrastructure and the lowest in areas where there was access to established irrigation infrastructure, with adequate water supplies. IWMI's research has demonstrated that the benefits of irrigation infrastructure development and rehabilitation can be enhanced for rural communities through complimentary interventions such as the development of small tanks and technologies that use raw material and local labor during construction. Other recommendations were making land titles legally transferable, crop diversification opportunities and by generating new avenues of income for non-farm employment.

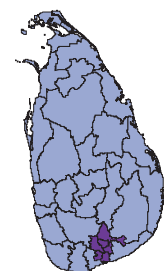
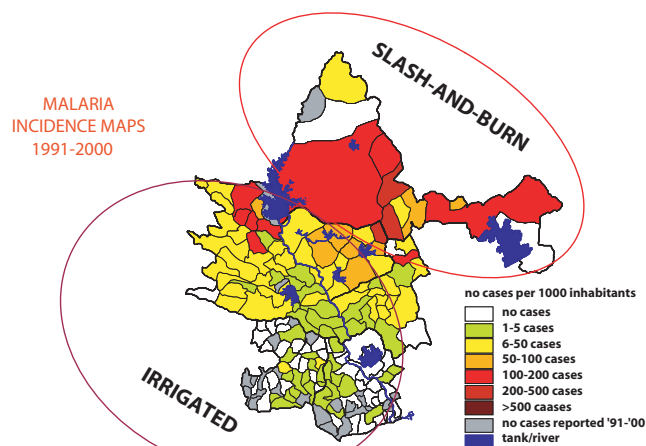


The benefits of irrigation infrastructure development can be enhanced through interventions such as small tanks and technologies.

## Malaria Risk Mapping in the Uda Walawe

Changes in agricultural water management have critical impacts on the breeding of mosquito vectors, the need for agro-chemical applications and the availability of drinking water. IWMI together with partners introduced a project to integrate priority public health issues into overall water management in the Uda Walawe Basin. The project helped to identify and understand the linkages between water, agriculture, the environment and human health in agro-ecosystems. IWMI's research hypothesis was that the operation of irrigation systems can be changed to achieve positive health impacts with minimum impact on agricultural performance. Malaria risk mapping using GIS remote sensing technology makes it possible to target priority high risk areas with interventions to control the spread of vectors.

## Malaria Risk Map



Risk mapping can also be used as part of an early warning system for impending epidemics.

(Based on Klinkenberg et al, 2002)

### Membership

1. Secretary, Ministry of Agriculture, Environment, Irrigation and Mahaweli Development
2. Secretary, Ministry of Irrigation
3. Secretary, Ministry of Agricultural Development
4. Director General, Department of Irrigation
5. Director General, Mahaweli Authority of Sri Lanka (MASL)
6. Director General, Department of Agriculture
7. Director General, IWMI
8. Commissioner General, Department of Agrarian Development
9. Chairman, Central Environmental Authority (CEA)
10. Chairman, Water Resources Board
11. Chairman, National Science Foundation (NSF)
12. Chairman, GWP South Asia
13. Chairman, Lanka Jalani
14. Country Representative, The World Conservation Union - IUCN
15. Executive Director, Sri Lanka Council for Agricultural Research Policy (CARP)
16. Director/WRD, Ministry of Agriculture, Environment, Irrigation and Mahaweli Development
17. Director, Irrigation Management Division (IMD)
18. Director, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)
19. Dean, Faculty of Agriculture, University of Ruhuna
20. Head, Postgraduate Institute of Agriculture (PGIA)
21. Director Research, IWMI
22. Director, Global Research Division, IWMI
23. Coordinator, IWMI-GWP Resource Center, IWMI
24. Head, Sri Lanka Program, IWMI
25. Dr. C. R. Panabokke, Consultant, IWMI

## Assessing Human Impacts and the Status of Water Quality in the Bundala RAMSAR Wetland Lagoon System

The Bundala National Park is Sri Lanka's first RAMSAR site and is located downstream of the Kirindi Oya irrigation system in the South. This wetland area hosts a vast population of wildlife, marine life and migratory birds. However, since the implementation of the Kirindi Oya Irrigation Settlement Project (KOISP) the Bundala National Park is receiving more fresh water, leading to declining salinity levels in the lagoons. In addition, the nutrient and pesticide load in irrigation drainage affects the park. Environmental research at IWMI is examining the interaction between wetlands and seeks to solve how water resources can best be managed to serve the needs of different users.



Testing water quality in the Bundala National Park, Sri Lanka's first Ramsar site.

## Wastewater Agriculture - Maximizing the Benefits and Minimizing the Risks

The extent of wastewater use in agriculture is much larger than is recognized and authorities tend to discourage its use because of the health risks. However, for poor farmers in urban and peri-urban areas, it is a reality. Authorities need to recognize and address this issue. IWMI is looking at the alternative options available to reduce the health risks of wastewater agriculture without losing the benefits from its use. The Wastewater Agriculture and Sanitation for Poverty Alleviation in Asia (WASPA-Asia) aims to achieve this through "Learning Alliances", bringing together different stakeholders and developing and testing solutions for sanitation and de-centralized wastewater management, as well as for mitigation of health risks from wastewater use.

## Rehabilitation and Irrigation Management Studies in the Walawe and Kirindi Oya Basins

This Asian Development Bank (ADB) supported project diagnosed water management problems and recommended potential solutions for improving water management in rehabilitated irrigation schemes and initiating crop diversification. The project was implemented in two Phases. Phase 1 was implemented from 1986 to 1990 and was further extended by three years under Phase 2. Within this period, significant impact was made on crop diversification in the Uda Walawe and Kirindi Oya basins. Research influenced government policy on crop diversification in other irrigation schemes of the country and contributed to improve the Uda Walawe and Kirindi Oya irrigation projects.



Passion fruit cultivation is more profitable for this farmer who switched to this crop from banana cultivation which he was previously engaged in.

## Drought Preparedness using Remote Sensing (RS) data and GIS technology

Poor communities living in Sri Lanka's dry zone are especially vulnerable to drought which has negative impacts on food security and livelihoods. IWMI is creating systems that monitor drought effects and vulnerability issues on a near real time basis. This will enable proactive measures to help minimize the adverse impacts of drought. A database was developed with three key components: a Drought Monitoring System (DMS), Crop Monitoring System (CMS Lanka) and Baseline Conditions (BC Lanka). IWMI is fusing these systems with a wide range of resource data fed in, to develop a comprehensive baseline database on natural resources. This project will also link with IWMI's drought mitigation research in South Asia, providing valuable lessons for the region.

## Key Publications

- Bandaragoda, D. J. 2000. A framework for institutional analysis for water resources management in a river basin context. Colombo, Sri Lanka: IWMI, 46p. (IWMI working paper 5)
- Jayatilaka, C. J.; Sakthivadivel, R.; Shinogi, Y.; Makin, I. W.; Witharana, P. 2001. Predicting water availability in irrigation tank cascade systems: The cascade water balance model. Colombo, Sri Lanka: IWMI (IWMI research report 48)
- Renwick, M. E. 2001. Valuing water in irrigated agriculture and reservoir fisheries: A multiple-use irrigation system in Sri Lanka. Colombo, Sri Lanka: IWMI. (IWMI research report 51)
- Sakthivadivel, R.; Loeve, R.; Amarasinghe Upali; Hemakumara, M. 2001. Water scarcity and managing seasonal water crisis: Lessons from the Kirindi Oya Project in Sri Lanka. Colombo, Sri Lanka: IWMI. (IWMI research report 55)
- van der Hoek, W.; Konradsen, F. 2002. Pesticide poisoning: A major health problem in Sri Lanka. In Smit, L. A. M. (Ed.), Pesticides: Health impacts and alternatives. Proceedings of a workshop held in Colombo, 24 January 2002. Colombo, Sri Lanka: IWMI.
- Kikuchi, M.; Barker, R.; Weligamage, P.; Samad, M. 2002. Irrigation sector in Sri Lanka: Recent investment trends and the development path ahead. Colombo, Sri Lanka: IWMI. (IWMI research report 62)
- Kikuchi, M.; Weligamage, P.; Barker, R.; Samad, M.; Kono, H.; Somaratne, H. M. 2003. Agro-well and pump diffusion in the dry zone of Sri Lanka: Past trends, present status and future prospects. Colombo, Sri Lanka: IWMI. (IWMI research report 66)
- Klinkenberg, E.; van der Hoek, W.; Amerasinghe, F. P.; Jayasinghe, G.; Mutuwatte, L.; Gunawardena, D. M. 2003. Malaria and land use: A spatial and temporal risk analysis in Southern Sri Lanka. Colombo, Sri Lanka: IWMI. (IWMI research report 68)
- Smakhtin, Vladimir U.; Piyankarage, Sujeewa C.; Stanzel, P.; Boelee, Eline. 2004. Simulating the hydrology of small coastal ecosystems in conditions of limited data. Colombo, Sri Lanka: IWMI, 28p. (IWMI research report 77)
- Somaratne, P. G.; Jinapala, K.; Perera, L. R.; Ariyaratna, B. R.; Bandaragoda, D. J.; Makin, I. 2003. Developing effective institutions for water resources management: A case study in the Deduru Oya Basin, Sri Lanka. Colombo, Sri Lanka: IWMI. (IWMI working paper 58)
- Molle, Francois; Renwick, M. 2005. Economics and politics of water resources development: Uda Walawe Irrigation Project, Sri Lanka. Colombo, Sri Lanka: IWMI, 68p. (IWMI research report 87)
- Molle, François; Jayakody, Priyantha; Ariyaratne, Ranjith; Somatilake, H. S. 2004. Balancing irrigation and hydropower: Case study from Southern Sri Lanka. Colombo, Sri Lanka: IWMI, 38p. (IWMI research report 94)
- Amarasinghe, Upali; Samad, Madar; Anputhas, Markandu. 2005. Locating the poor: Spatially disaggregated poverty maps for Sri Lanka. Colombo, Sri Lanka: IWMI. (IWMI research report 96)
- Somaratne, Pallewatte G.; Jayakody, Priyantha; Molle Francois; Jinapala, Kiribandage. 2005. Small tank cascade systems in the Walawe River Basin. Colombo, Sri Lanka: IWMI, 43p. (IWMI working paper 92)
- Smakhtin, Vladimir; Weragala, Neelanga. 2005. An assessment of hydrology and environmental flows in the Walawe River Basin, Sri Lanka. Colombo, Sri Lanka: IWMI, 13p. (IWMI working paper 103)

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