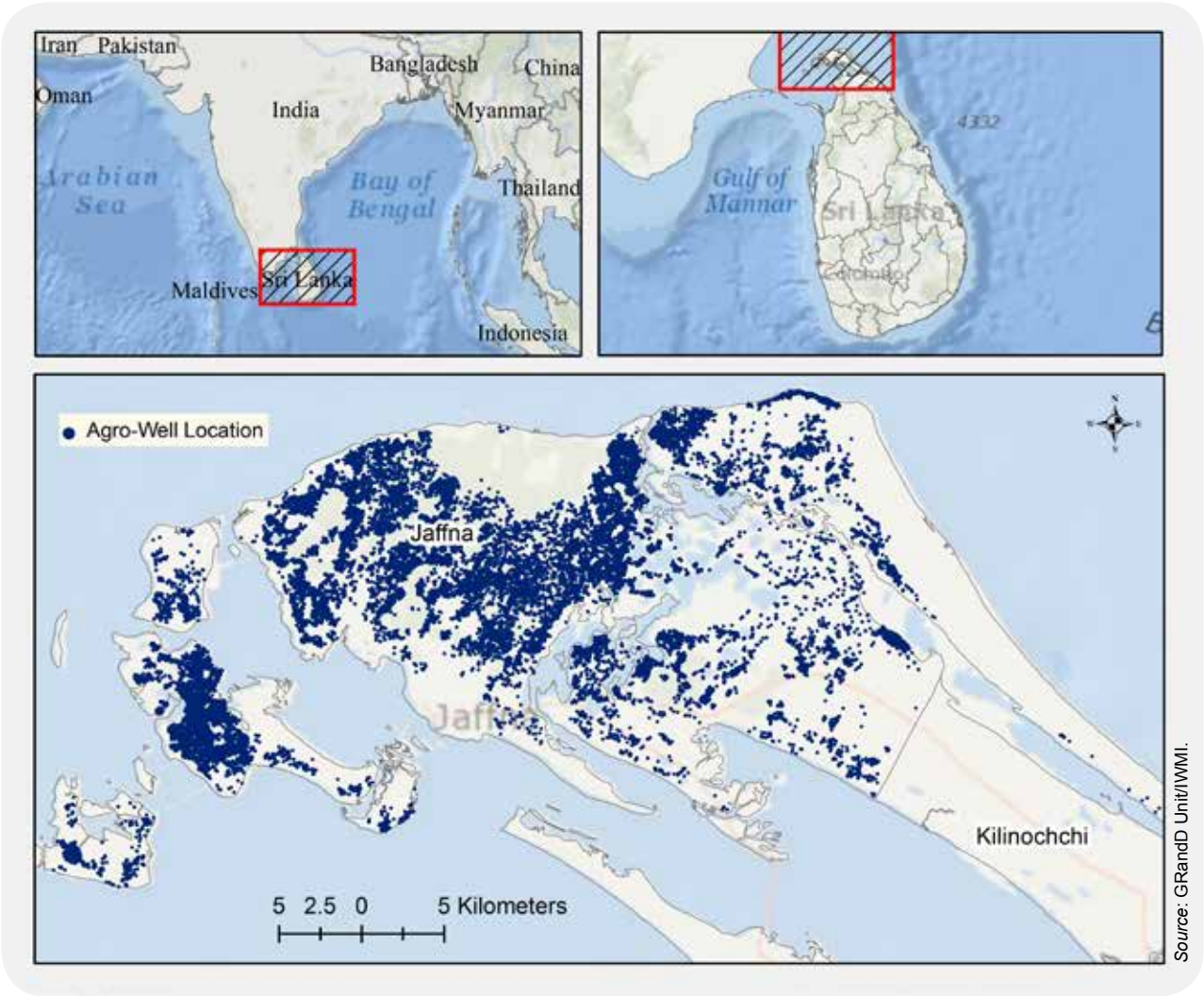
IWMI's GIS and remote sensing capabilities

in Sri Lanka



Source: GRandD Unit/IWMI.

International Water Management Institute

IWMI's GIS and remote sensing capabilities in Sri Lanka

The new research agenda of the International Water Management Institute (IWMI) for Sri Lanka places a high priority on the use of geospatial tools and techniques to support research. The capability of IWMI to analyze water resource issues with the aid of geographic information systems (GIS) and remote sensing has never been better, thanks to the experience of staff and improvements in technology.

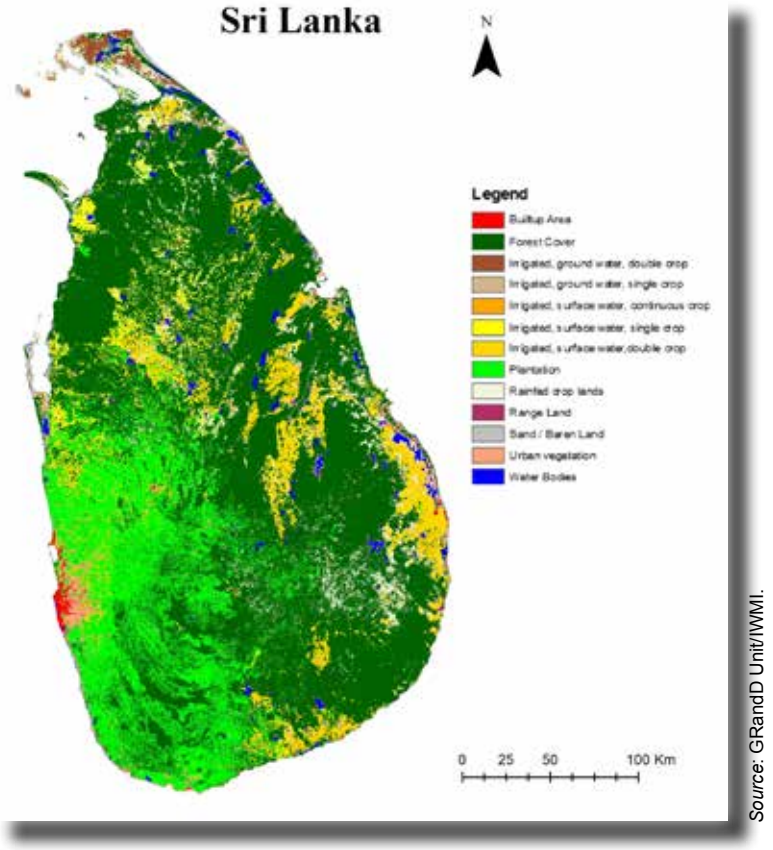
Photo credit: GRandD Unit/IWMI.

Since the launch of the first Landsat mapping satellite in the early 1970s, remote sensing aided by images from space has steadily advanced. Scientists are able to examine landscape data, such as irrigated land, vegetation and forest cover, in unprecedented detail over an extended period of time.

The biggest limiting factors to these snapshots from the sky are computer storage and processing power, which are becoming even cheaper and more accessible.

GIS is used to process, manage and classify information spatially. A GIS database, for example, might include well locations, areas prone to flooding, crop yields, and available canal/river networks and water flows. The data is often mapped to visualize and resolve an issue.

Sri Lanka Water Resources Information Portal



Source: GRandD Unit/IWMI.

The online Water Resources Information Portal for Sri Lanka is being prepared and will be launched by IWMI during 2013. It will include all of the Institute's water resources and project data plus shared information from various national water- and irrigation-related agencies. The portal will be located at http://slwa.iwmi.org/

The portal is designed to provide one-stop access to data and enable users to analyze changes over time. For example, IWMI's section of the portal will include maps, survey data, river flows and river basin data, and other project data, which are accessible for free. Access to some agency-owned data will require a username and password. Information supplied by Sri Lankan departments includes data on water supply, drainage and water infrastructure.

The goal is to encourage government agencies to share data, make the information available to the public, update the data on a regular basis, and use the information for analysis in forming or reforming public policy.

Many agencies already collect and store data. However, that data is not always in an easily accessible form, saved in a common place, or available after a project ends. Having the data shared in one place will save time, prevent erroneous data from being used, and will spread the information to a wider audience.

Flood mapping

IWMI plans to launch a flood mapping tool by the end of 2013. The datasets will be available on IWMI's online Water Resources Information Portal for Sri Lanka and the Water Data Portal (http://waterdata.iwmi.org). The satellite data will be processed through GIS.

Floods in Sri Lanka cause an enormous amount of destruction. The time-series maps will characterize flooding 'hot spots': agricultural and residential areas which are inundated or likely to be inundated during heavy rains. In addition to identifying flood-risk areas, damage assessments will also be provided.

The goal is to mitigate flood risk through better flood management planning, including improved early warning systems, and to take better advantage of opportunities such as floodwater harvesting/storage and floodwater farming.

Photo credit: Nonviolentpeaceforce.org on Flickr.

Irrigated area mapping

In 2006, IWMI developed its first Global Irrigated Area Mapping including Sri Lanka, based on decade-old satellite images with a coarse resolution of 10 kilometers. The Institute recently updated an irrigated area map for Sri Lanka, based on higher-resolution satellite images down to 56 meters and improved algorithms that make the product more accurate and precise.

Irrigated area mapping is an important tool to assess the distribution and intensity of water use, and the pressures on water resources as a result of urbanization, population growth and climate change. The updated map provides an estimate of Sri Lanka having just over 13,000 square kilometers (1.3 million hectares) of irrigated land. It also provides information on characteristics such as irrigated and rainfed areas, dominant crops, and whether cropping is done once a year, twice a year or continuously.

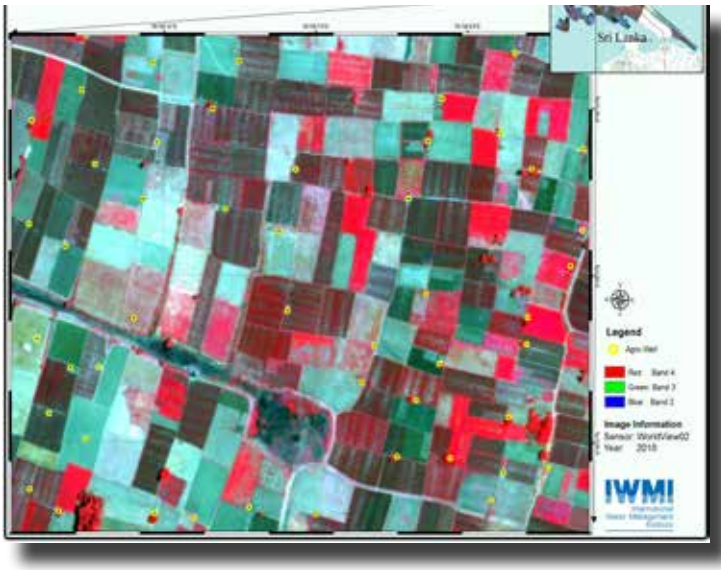
Agro-well mapping

IWMI has developed a methodology to identify agro-wells – the only source of water for irrigation in Sri Lanka's dry zone – by using high-resolution multispectral satellite imagery. The project was initially designed to assess the trends of groundwater use in agriculture in three different geographic areas in the dry zone: Jaffna, Kalpitiya and Medawachchiya.

Shallow wells have been hand-dug for a long time in the Jaffna and Kalpitiya coastal areas. Since the 1980s, government subsidies have prompted mechanically dug wells in central hard-rock regions such as Medawachchiya near Anuradhapura. The shallow well mapping project focused on 30 to 50 square kilometer blocks in each region.

The Jaffna Peninsula relies heavily on underground aquifers for all uses – agriculture, industry and domestic. Satellite images, validated by field surveys, showed that the number of wells increased by more than a third between 2003 and 2009 in Valikamam South District on the Jaffna Peninsula. Yet, the area used for farming only increased by 6%, which suggests an intensification in the use of a limited groundwater resource.

Field research showed that the groundwater in Jaffna has already become contaminated by the unrestricted use of fertilizers and pesticides, and parts of the peninsula are more saline. IWMI is supporting the government's plans to tackle the issue through a groundwater management plan.



Source: GRandD Unit/IWMI.

Salman Siddiqui, *Manager - GIS/RS/Data Management, IWMI Headquarters, Colombo, Sri Lanka*

Salman Siddiqui has nearly two decades of national and international experience in the field of geoinformatics. He has been the Manager of IWMI's GIS/RS and Data Management Unit since 2010. At IWMI, he has led the development of innovative approaches for gathering, storing, and processing data and information on water, food and environmental issues. Major projects have included the irrigated area mapping of Asia and Africa, and the management of global databases. Before joining IWMI, Salman worked as a Remote Sensing Specialist at the International Centre for Integrated Mountain Development (ICIMOD) in Nepal. He has also worked as a Senior Specialist at the Pakistan Poverty Alleviation Fund and as a GIS Analyst on United Nations Development Programme (UNDP) projects. He has a master's degree in forest engineering from the Pakistan Forest Institute, and a specialized master's degree from the National Institute for Geographic Information and Forestry in France.

"IWMI today is able to deliver an unprecedented quality of water resources data and maps thanks to advancements in GIS and remote sensing."

Herath Manthrithilake, *Head, Sri Lanka Development Initiative, IWMI Headquarters, Colombo, Sri Lanka*

Herath Manthrithilake first examined water-related issues as a civil engineering student in the early 1970s, and worked on water infrastructure construction sites in several former Soviet Republics. His postgraduate research focused on advanced hydrology and water resources management issues. Before joining IWMI in 2002, he had extensive experience as a Water Resources Engineer and as Director of the Environment and Forest Conservation Division and the Planning and Monitoring Unit of the Mahaweli Authority of Sri Lanka. He has also served as a lecturer at several postgraduate institutes in Sri Lanka.

"GIS and remote sensing provide the big picture of water-resource trends."

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