



## **KnoWat:** Knowing water better

Towards a more equitable and sustainable access  
to natural resources to achieve food security

# Water accounting and auditing

Sri Lanka is an island country in the Indian Ocean with a land area of 65 610 km<sup>2</sup> and a population of 21.6 million. It has a network of approximately 103 principal rivers and tributaries, most of which originate in the central and southern parts of the country.

There are three climatic zones in Sri Lanka: the dry zone (annual rainfall less than 1 750 mm), the intermediate zone (annual rainfall 1 750–2 500 mm) and the wet zone (annual rainfall 2 500–4 500 mm). The only source of water is direct rainfall. The biggest user of water is agriculture.

Agriculture contributed around eight percent to national GDP in 2020. Rice is the most important crop, producing 4.1 million tonnes in 2019–2020, enough to feed the entire population of the country. Paddy is grown all over the country, mainly during two monsoon seasons, the Maha season from September to March and the Yala season from April to September. Rice contributes to 1.8 percent of country's GDP and 1.8 million families are engaged in its production. About 983 550 hectares are under paddy, 43 percent of all agriculture lands.

According to the Climate Risk Index 2021, Sri Lanka is the thirtieth most climate-vulnerable country in the world. The country is highly susceptible to extreme weather events such as prolonged droughts.

Due to population growth, economic growth and industry-led deterioration of water quality, the competition for water and water scarcity have increased in recent years.



© FAO/Thushara Ranasinghe



© FAO/Thushara Ranasinghe

## Project area

The Malwathu Oya river basin is the second largest in the country, with a catchment area of 3 291 km<sup>2</sup>. The Malwathu Oya's southern catchment is home to around 200 000 inhabitants, most of whom engage in farming.

The cultivation of rice has been practiced for thousands of years in this dry part of northern Sri Lanka where ancient civilizations flourished, partly due to the irrigation systems. Today, there are a large number of ancient and modern tanks and reservoirs in the basin that have been built for irrigation and domestic water supply.

Due to the effects of climate change, such as prolonged droughts and floods, farmers in the southern catchment are experiencing challenges with the water supply. To improve water resource management, especially in times of water scarcity, the KnoWat project set out to conduct a water accounting and auditing (WA&A) assessment in the Malwathu Oya southern catchment.

## Water accounting and auditing assessment in Sri Lanka

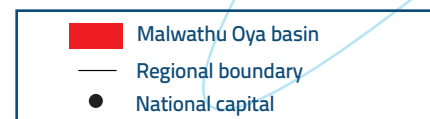
Water accounting and auditing are an essential aspect of managing water resources. **Water accounting** is the systematic examination of status and trends in the availability, demand, accessibility and usage of water. **Water auditing** puts trends in water supply, demand, accessibility, and usage into a broader framework of governance, institutions, public and private expenditure, law and the political economy of water. When combined, water accounting and auditing facilitate policy development and decision-making.

In addition to the water accounting and auditing assessments, the KnoWat project carried out a water productivity study in an area found to have low water productivity.

The water accounting study focused on ten subwatersheds of the Malwathu Oya catchment over four seasons. In each case, water balances were calculated with inputs from the WaPOR database, based on the Soil and Water Assessment Tool (SWOT), which is commonly used for hydrological studies by the Irrigation Department of Sri Lanka. These water balances were compared with observed hydrological data. The study showed that the flows based on the SWOT and WaPOR data were between 4 and 13 percent higher than the observed flows. It concluded that the model replicates the situation on the ground quite well and can be used in future water balance studies.

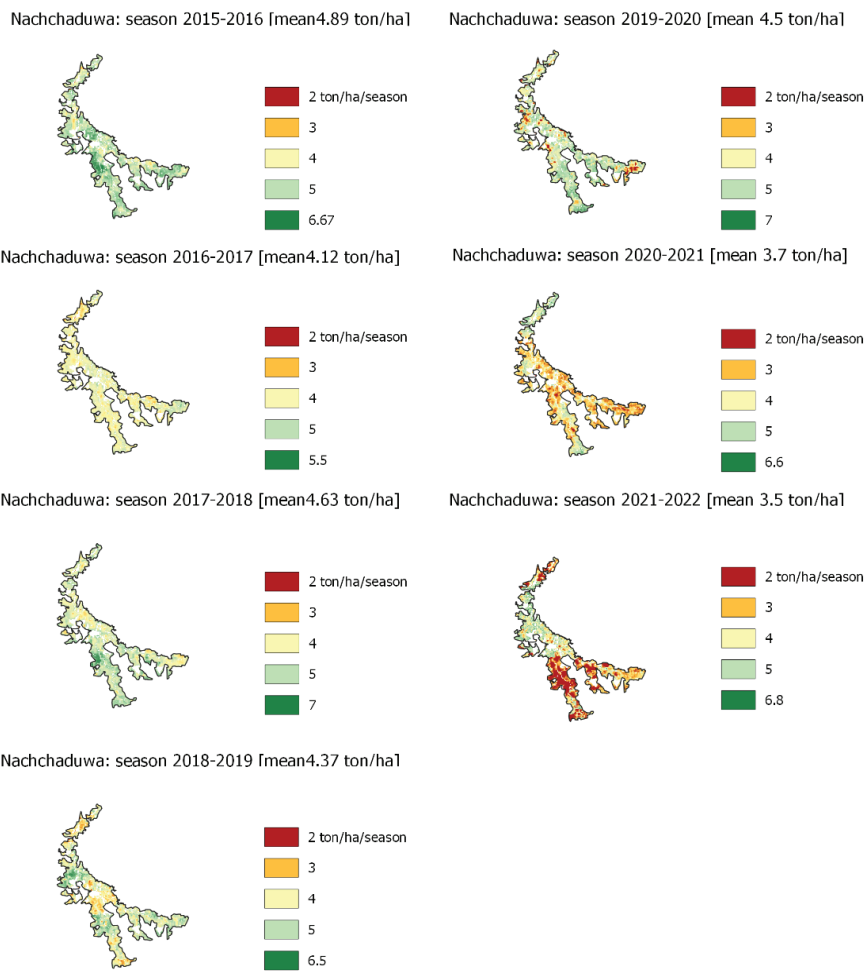
The water auditing study focused on three case studies in areas where there is an issue with water management:

1. **Water sharing between agricultural and domestic uses and the issues of unavailability of water from a tank in Thuruwila.** The auditing study discovered that enhancing collaboration between area officials and the farmers could help solve issues related to water sharing by drawing on the practical knowledge of the farmers.



Source: United Nations Geospatial. 2020. Map geodata [shapefiles]. New York, USA, United Nations, modified by the author. Lakes and rivers data from Natural Earth Data and catchment data from Hydrosheds.

### Nachchaduwa irrigation scheme: Paddy rice yield, Maha season, 2015-2022



Source: FAO. 2022. Water Productivity through Open-access of Remotely sensed derived data (WaPOR). In: FAO. Cited 16 December 2022. [https://wapor.apps.fao.org/home/WAPOR\\_2/](https://wapor.apps.fao.org/home/WAPOR_2/)

2. The Nuwara Wewa feeder canal and the issue of illegal use of water. In this case, irrigation officials believe that the illegally-irrigated lands should be legalized because siphoning is difficult to control.

3. Water management in areas of low water productivity in the Nachchaduwa irrigation scheme. The water productivity analysis (see below) revealed inadequate maintenance and cleaning of the canal, which caused flooding and, as a result, low water productivity. In addition to improving the canal system, the establishment of better facilities for accessing and using the infrastructure should be considered.

The results of the water accounting and auditing studies were validated with stakeholders at local and national levels. The information can underpin better decisions on water management in the future.

### Further information

Use the QR code to learn more about all the activities implemented in Sri Lanka.



[www.fao.org/in-action/knowat](http://www.fao.org/in-action/knowat)

### Capacity building

In cooperation with the International Water Management Institute (IWMI), the KnoWat project trained 30 experts from the Irrigation Department and other partners in water accounting and auditing methodologies through a hybrid on-site and remote training programme. Furthermore, 23 experts were trained in the application of the WaPOR data to assess agricultural water use and productivity at basin and irrigation scheme levels. In cooperation with the University of Peradinya, students and university staff received training in WaPOR-based water accounting and productivity assessments, and WaPOR-based assessments are now incorporated in the curriculum of hydrology and agronomy students.

Based on the results and capacities built of the KnoWat project, partners are currently studying the application of WaPOR in the System for Environmental Economic Accounting for Water (SEEA-W), as well as the monitoring of Sustainable Development Goal indicator 6.4.2 on water stress.

# KnoWat: Knowing water better

Towards fairer and more sustainable access to natural resources for greater food security

Rwanda, Senegal and Sri Lanka (2019–2022)

All around the world, countries are struggling to adapt their agricultural and food systems to conditions of climate change and to extreme weather events such as long periods of drought or heavy rains. Water scarcity is expected to increase as is competition for water resources among users. Smallholder farmers are particularly vulnerable to changes in water access and availability: a sudden lack of water due to drought can mean lost income and food, threatening their lives and those of their families. For these reasons, major efforts are needed to address the links between water scarcity, food security and livelihoods in our changing climate.

The KnoWat project takes an integrated approach to water resources management that includes water accounting, water productivity, water governance and water tenure assessments. **Water accounting** is the systematic study of current status and future trends in water supply and demand in a given spatial domain. **Water productivity in agriculture** signifies the ratio between yield and the water consumed by a crop. To support water accounting and productivity assessments, the KnoWat project built the capacities of key partners to apply FAO's Water Productivity Open-access Portal (WaPOR). This tool assesses water consumption in agriculture and the water productivity of agricultural production using remote sensing.

**Water governance assessment** looks at the broad framework of institutions, finance and the political economy. To better understand water governance processes, the project developed and tested a **new methodology to assess water tenure**, the formal and informal arrangements used to access water. The assessment of water tenure aims to understand the different relationships between people and water resources.

Enriching our knowledge around water through accounting, productivity, governance and tenure assessments helps policy and decision-makers to plan and implement **better policies**, with the ultimate goal of ensuring equitable water allocation for **better livelihoods, food security and healthy ecosystems**, even under conditions of growing water scarcity.



© FAO/Ishara Kodikara



This project is supported by the **Federal Government of Germany** and implemented by the **Food and Agriculture Organization of the United Nations (FAO)**.

In Sri Lanka, the project is implemented in collaboration with the **Department of Irrigation**. The country activities were implemented in collaboration with the **International Water Management Institute (IWMI)**, the **Post Graduate Institute of Agriculture of the University of Peradeniya** and **E-leaf**.



## For further information, contact:

Benjamin Kiersch  
Project Coordinator  
Land and Water Division  
Land-Water@fao.org

Joseph Bizima  
National Coordinator Rwanda  
FAO Representation  
in Rwanda  
FAO-RW@fao.org

Lamine Samaké  
National Coordinator Senegal  
FAO Representation  
in Senegal  
FAO-SN@fao.org

Thushara Ranasinghe  
National Coordinator Sri Lanka  
FAO Representation  
in Sri Lanka  
FAO-LK@fao.org

<https://www.fao.org/in-action/knowat>

The boundaries and names shown and the designations used on this/these map(s) do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.



Some rights reserved. This work is available under a CC BY-NC-SA 3.0 IGO licence