International Water Management Institute

WaPOR

Tool Series

Irrigation Performance: Mozambique

The challenge

Mozambique's Lower Limpopo irrigation schemes face challenges related to inefficient water use, lack of real-time performance monitoring and limited data-driven decision-making. Farmers and water managers need insights into crop water use, irrigation efficiency and productivity to optimize water allocation. The absence of a systematic assessment framework has made it difficult to improve performance at multiple levels.

The solution

The Irrigation Performance Assessment Tool (IPAT) uses Water Productivity through Open access of Remotely sensed derived data (WaPOR) to enable users to monitor seasonal crop water use and detect underperforming areas (Figure 1). Water managers can assess whether irrigation meets crop requirements, while farmers can identify opportunities for water saving. The tool's automated processing and visualization capabilities ensure regular updates and easy access to essential performance indicators.

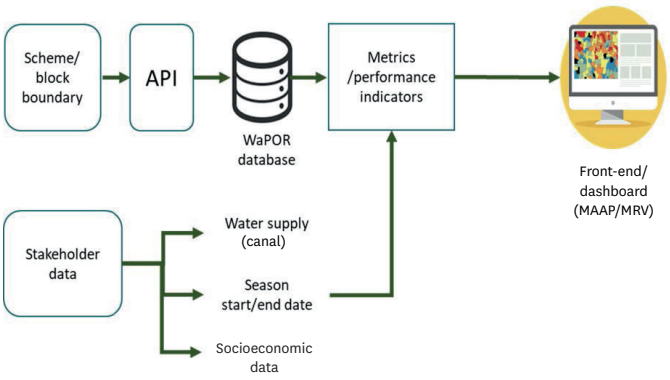

Figure 1: Schematic overview of the framework of the Irrigation Performance Assessment Tool (IPAT) for Mozambique.

Notes: API - application programming interface
MAAP/MRV - Ministry of Agriculture, Environment and Fisheries – Unit for Monitoring, Reporting and Verification

Key technical features

IPAT integrates Level 3 WaPOR-derived data at 20 m spatial resolution – including evapotranspiration and interception (AETI), transpiration (Tr), precipitation (P) and net primary production (NPP) – with Geographic Information System (GIS)-based analytics to generate irrigation performance indicators at scheme, sector and block level. The output is available in tabular, vector and raster GIS formats for spatial analysis, enabling users to track changes over time. The tool is accessible in English and Portuguese.

Current use and main users

The tool is currently under development. Its main users are the National Institute of Irrigation (*Instituto Nacional de Irrigação*, INIR) and Chokwé Hydraulics Public Company (*Hidráulica de Chókwè Empresa Pública*, HICEP). The tool will be hosted by INIR.

Key stakeholders and beneficiaries

The key stakeholders are INIR and HICEP. The main beneficiaries are government agencies involved in irrigation management.

The co-creation process

The tool was co-created through stakeholder consultations and iterative feedback loops. During an inception workshop, initial requirements were collected, identifying INIR and HICEP as the primary stakeholders and tool users. They contributed to tool development by sharing data and validating results. In 2024, performance indicators were presented to technical stakeholders from various organizations for feedback and improvement. This process was complemented by capacity building efforts, including technical training workshops with INIR, HICEP and other stakeholders, as well as an in-person co-development and validation workshop.

Key outcomes and impacts

The tool enhances irrigation efficiency by identifying underperforming areas and optimizing water allocation, leading to improved water productivity. By enabling data-driven decision-making, it supports more effective irrigation scheme management. The tool also strengthens local stakeholder capacity with skills to use geospatial data. Additionally, IPAT has the potential to impact policy by supporting irrigation planning and government decision-making.

Sustainability and continuous updating

Training and capacity building were organized to equip stakeholders with the skills to derive irrigation performance indicators using Quantum GIS (QGIS), a free and open-source geographic information system application. Stakeholders can now download and process WaPOR data to generate these indicators, ensuring the portal continues to be updated over the long term.

Scaling potential

The tool can be expanded to other irrigation schemes in Mozambique. While the Lower Limpopo irrigation systems are the largest in the country, data constraints have limited IPAT's application to the Chokwé Irrigation Scheme. If geospatial data are available, there is significant potential to scale the tool to at least 10 other large schemes in the region. Additionally, INIR is interested in applying IPAT to rice mono-cropping schemes.

The WaPOR portal

The publicly accessible Water Productivity through Open access of Remotely sensed derived data (WaPOR) portal of the Food and Agriculture Organization of the United Nations (FAO) supports agricultural water productivity monitoring at continental, national and basin scales. With new information produced every 10 days, the portal helps users make informed policy and investment decisions.

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International Water Management Institute

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