

LARGE-SCALE EXPLOITATION OF SATELLITE DATA IN SUPPORT OF INTERNATIONAL DEVELOPMENT

→ IRRIGATION PERFORMANCE SERVICE

Increased water scarcity -brought on by climate change, a growing population and food demand, and an increased competition of other sectors - calls for improving water productivity and achieving more crop per drop.

Traditionally, irrigation performance has been expressed in terms of efficiencies of observed flows, with a focus on the amount of irrigation water applied on the field. However, not all of the water applied will be consumed by the crop, and some of the losses in the irrigation system are actually re-used elsewhere downstream. Advanced energy balance algorithms together with satellite earth observation data are used to estimate actual evapotranspiration, i.e. the water consumed by the crop. Satellite derived data on water consumption and crop growth estimates irrigation performance at scales not achievable with conventional methods.

Irrigation performance can be expressed by a number of satellite derived indicators, providing spatial insight in water distribution both in the field and within an entire irrigation scheme. An insightful indicator of water distribution is the actual evapotranspiration, the quantity of water that is actually removed from the land surface through evaporation of water from the soil, plant canopies, and open water bodies plus transpiration by the plant (all together constituting the actual water consumption). The (biomass) water productivity is calculated by dividing the biomass production or the yield by the actual evapotranspiration, it shows biomass or crop production per unit of water. Another useful indicator is the crop water deficit, which can be expressed using the difference between potential and actual evapotranspiration, and shows where water stress occurs.

Satellite derived information on irrigation performance helps irrigation managers – both at farm and scheme level - to monitor their water management on a real-time basis but also to look at accumulated figures from an entire season and analyze spatial patterns from year to year. The consistent and objective measurement of progress, outcome and impact of agricultural water management provides opportunities to determine the reasons for success and failure of development activities, and how to use this understanding to improve future action.

DESCRIPTION

This service provides irrigation performance indicators to (1) assist in developing water management strategies responding to climate change and an increasing water demand; and (2) provide valuable input to monitoring and evaluation (M&E)

USE

- › Measure project and programme progress, outcome and impact of agricultural water management
- › Understand reasons for success and failure of development activities
- › Define water management strategies

INPUT PRODUCTS

- › Irrigated area
- › Actual evapotranspiration
- › Potential evapotranspiration
- › Transpiration deficit
- › Biomass production
- › (Biomass) water productivity

SPATIAL RESOLUTION AND COVERAGE

From local (field-level) up to regional scale (irrigation scheme level)

BENEFITS

More productive and sustainable agriculture by improving irrigation services (water distribution and timing of application) at both farm and scheme level

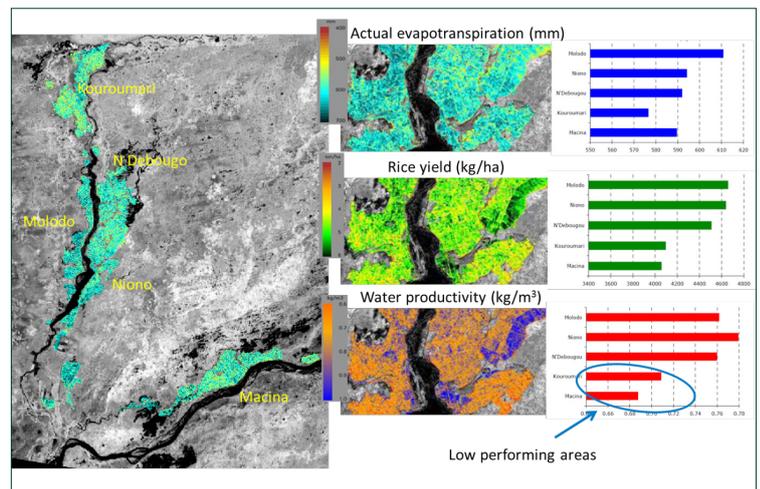
DELIVERY FORMAT

Depending on customer needs, e.g.:

- › Vector and raster formats
- › Through a web portal
- › Statistics in tables and/or (interactive) graphs

FREQUENCY

In-season (weekly) up to once a season (retrospective)



Actual evapotranspiration, yield and water productivity in the Office du Niger irrigation scheme (Mali)