Food and Agriculture Organization of the United Nations

WaPOR

FAO's portal to monitor Water Productivity through Open-access of Remotely sensed derived data

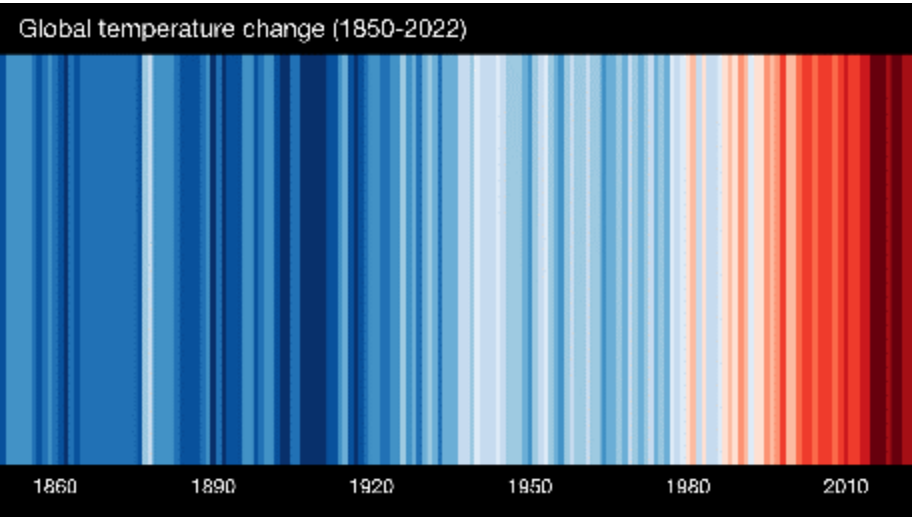
Monitoring land and water productivity by Remote Sensing (WaPOR phase 2)

FAO Land and Water, wapor@fao.org

Ministry of Foreign Affairs of the Netherlands

IWMI International Water Management Institute

UNESCO IHE DELFT



Water is central to food security and climate agenda

Over 700 million people suffer from hunger
(SOFI 2023)

Around 3.2 billion people live in agricultural areas with high to very high water shortages or scarcity
(SOFA 2020)

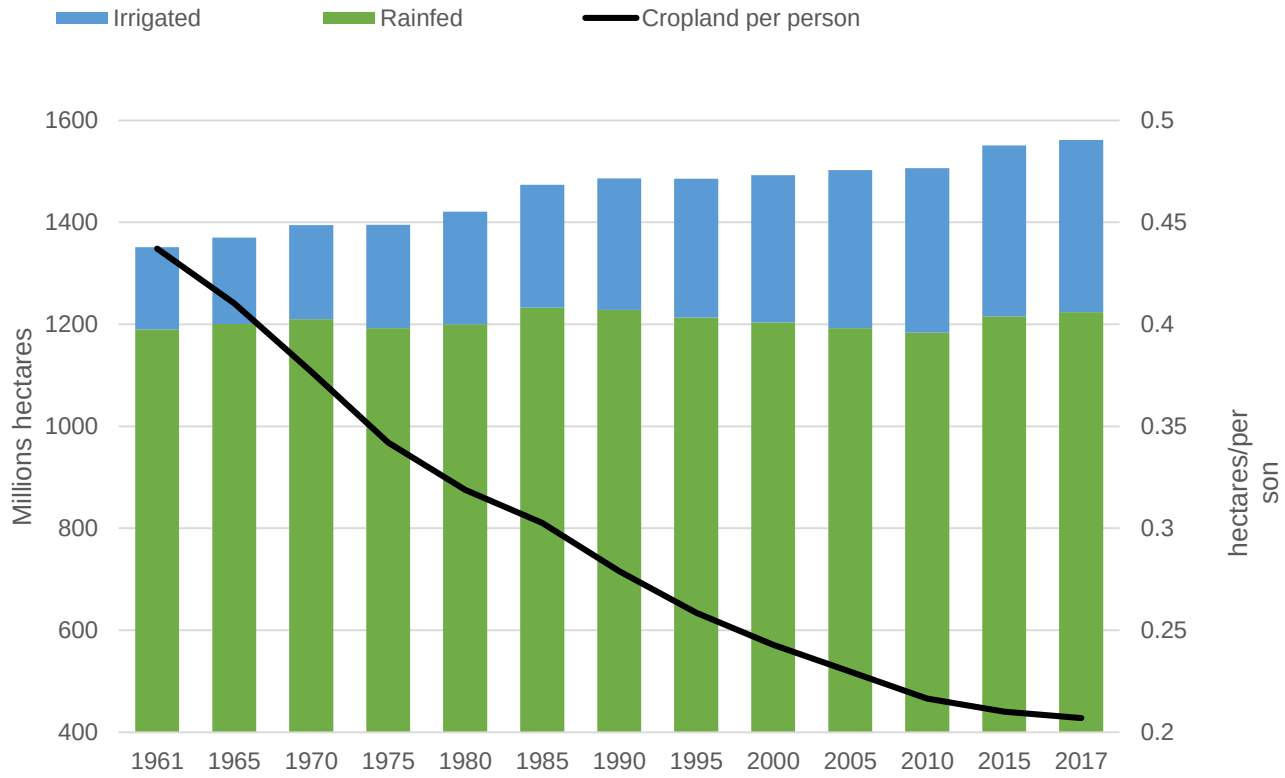
Water demand by agriculture is projected to increase by 20 - 30% by 2050, and

From 2000 – 2019 total cropland increased with 63 M ha, almost 85% of this increase is irrigated
(SOLAW 2022)

We need to produce more food with less water

Net increase in cultivated area over the last 60 years is attributable to a net increase in irrigated cropping

At the same time, agriculture is facing growing water scarcity



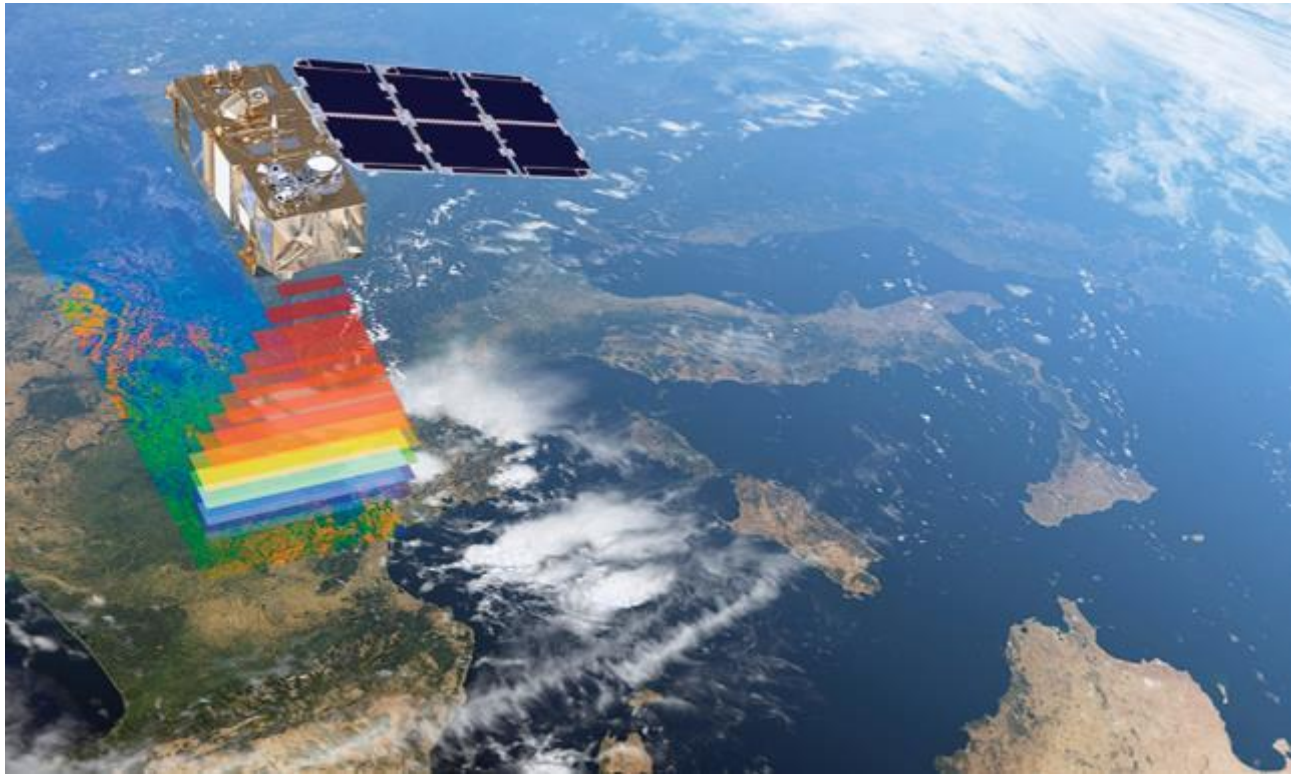
AQUASTAT

The FAO global information system on water resources and agricultural water management collects, analyses and provides free access to over 180 variables and indicators by country from 1960.

AQUASTAT data and information support SDG 6.4 indicators, for which FAO is custodian agency.

http://www.fao.org/aquastat/en/

Monitoring water use in agriculture in space and time

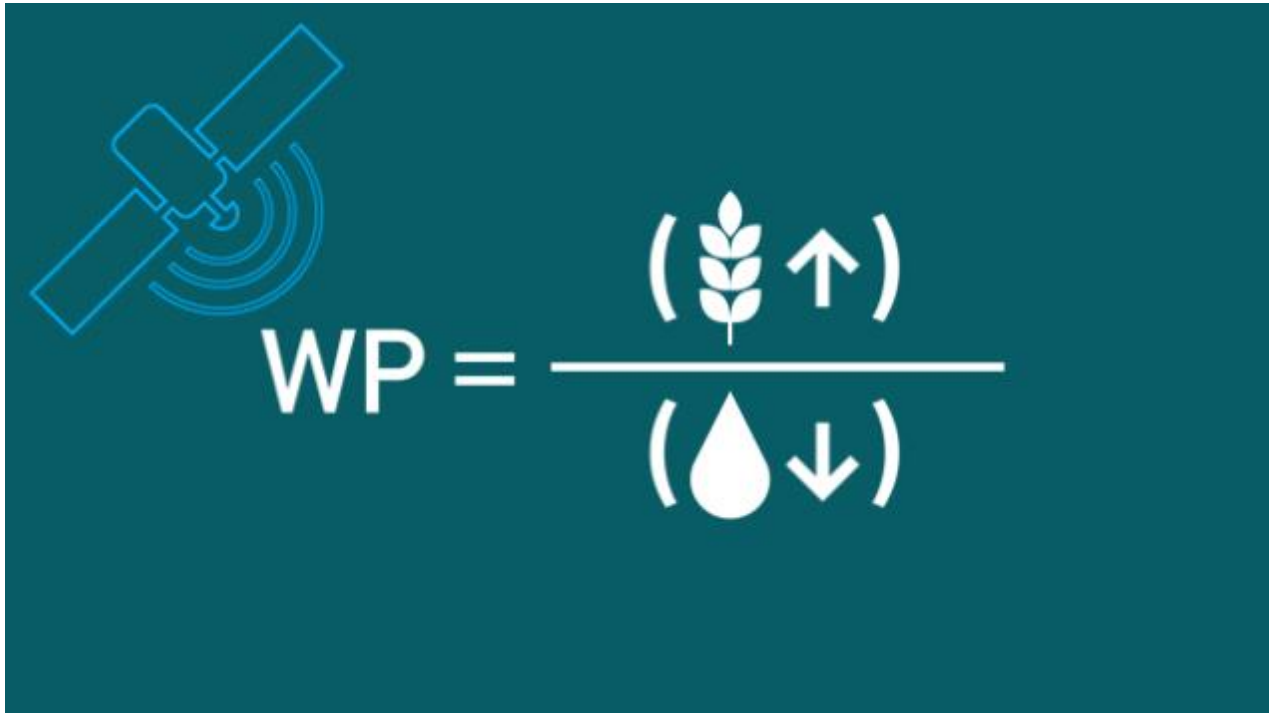


Remote sensing of water productivity

Water productivity in agriculture measures the output (kg/ha) per unit of water consumed (m^3/ha).

Satellites can help monitor water productivity in cost-effective ways.

Increasing water productivity is now a globally recognized target (SDG 6.4)



How WaPOR works

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eleaf SPACE FOR GROWTH

WaPOR Phase 2: demand driven applications

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Capacity Development

Training of stakeholders at different levels to enable use of the WaPOR database for practical applications to increase land and water productivity as well as for policy relevant applications to support sustainable water management, governance and agricultural policies.

Implementable solutions, tools and policy recommendations

Co-design and co-development of user-centered solutions and practical tools to improve land and water productivity, including to address specific policy requests

Database expansion

Continuation of WaPOR DB, expansion towards global coverage, open access, quality assessment and feedback process

2 main international partners, 3 components,
5+ years,13 countries

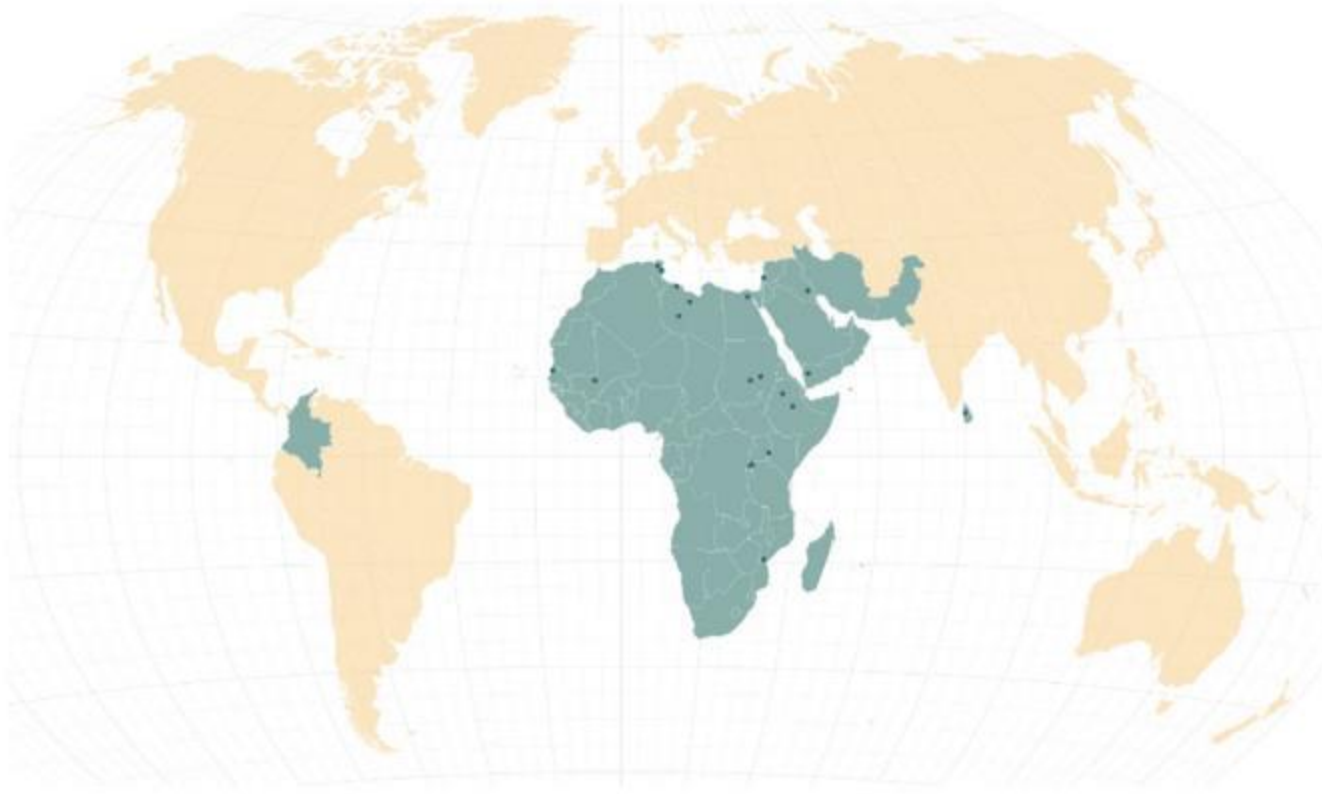
Data availability

- Water Productivity
- Actual Evapotranspiration (ETa)
- Reference Evapotranspiration
- Precipitation
- Relative root zone soil moisture
- Net Primary Production
- Quality layers

Daily (P, RET), dekadal, monthly, annual time steps

NRT update since 2018 (2009 on V2)

The three levels of WaPOR data are available for different areas



The global level (300m resolution) that covers the entire globe.

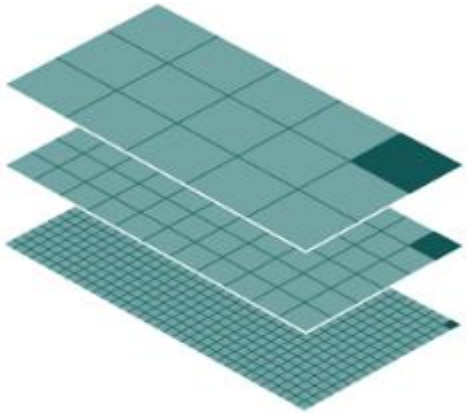
The national and sub-national / river basin level (100 m ground resolution) Northern and sub-Saharan Africa and the Near East (roughly a square of -30W, -40S, 65E, 40N)

The irrigation scheme and sub-basin (20 m ground resolution)

WaPOR provides actionable information

Near-real time (every 10 days) data on biomass development and water consumption (actual evapotranspiration), in addition to agro-climatic parameters on a daily time step (reference ET and precipitation).

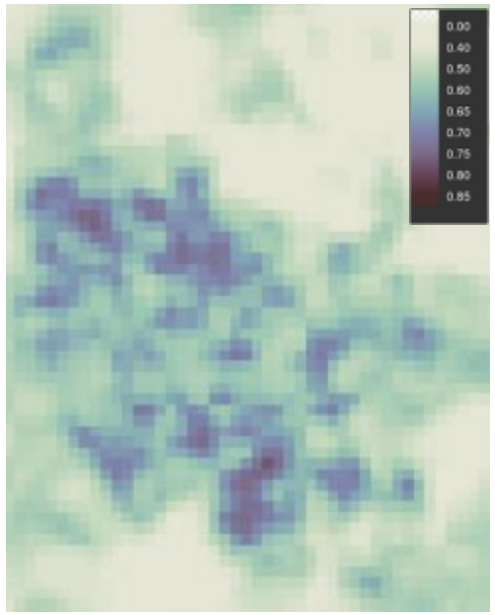
Spatial resolution ranges between 300 m and 20 m



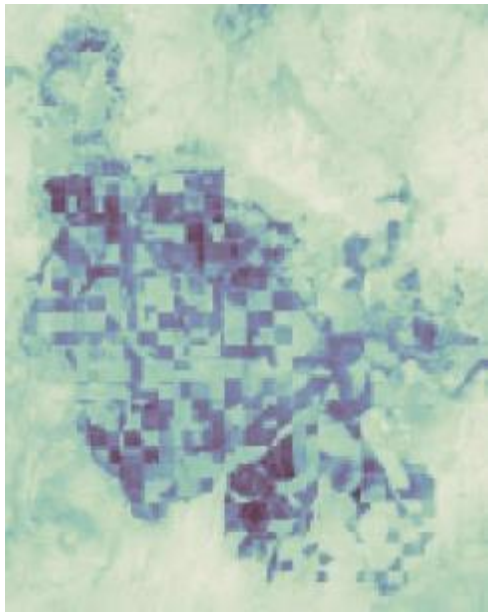
300m

100m

20m



Global data 300m



National data 100m, covering Africa and Near East

Sub-national areas 20m, >25 areas of ~100,000 ha

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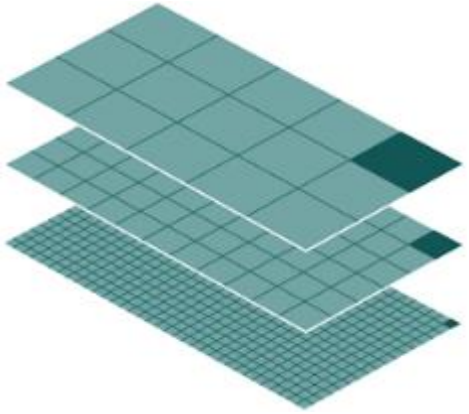
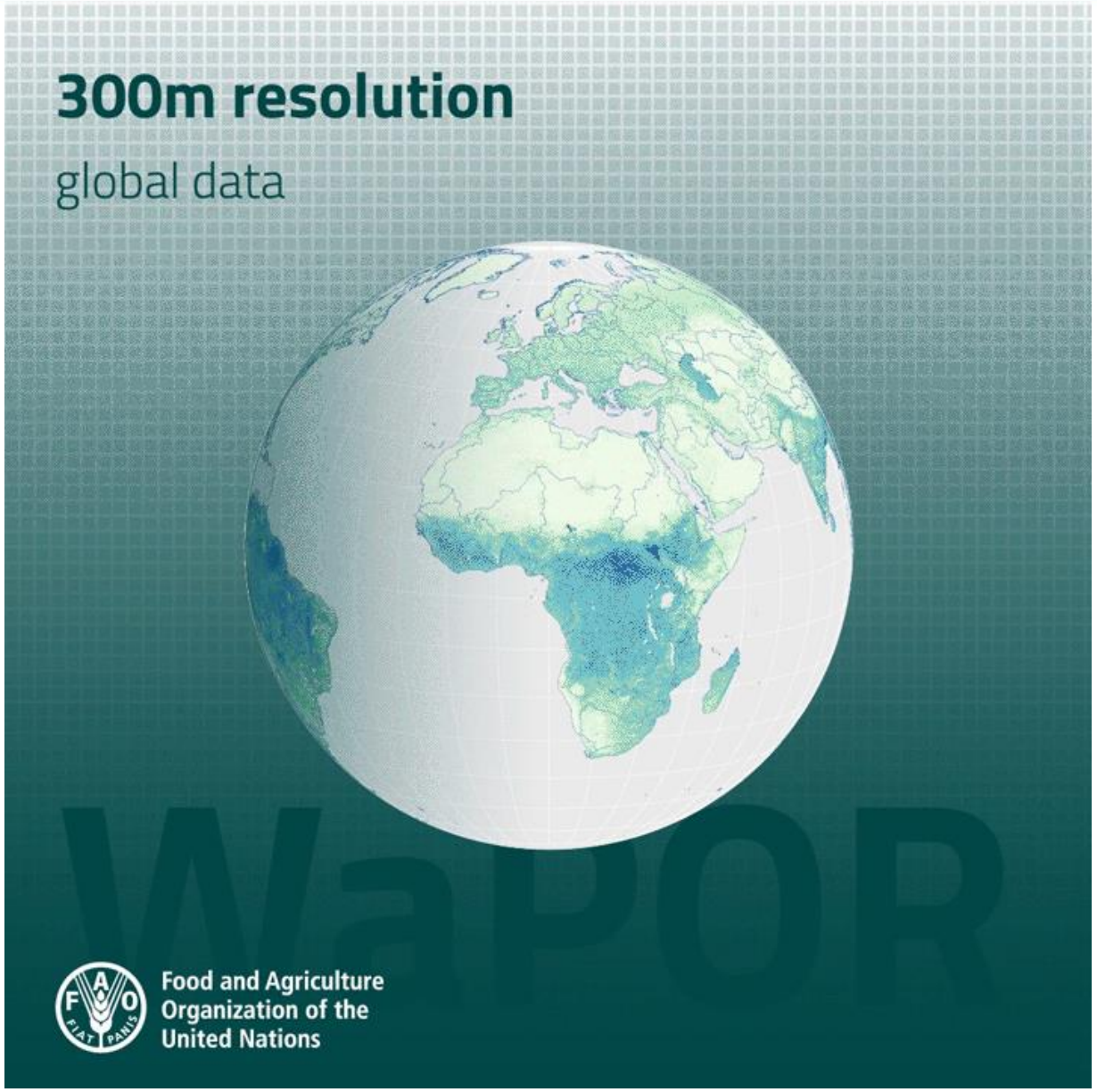
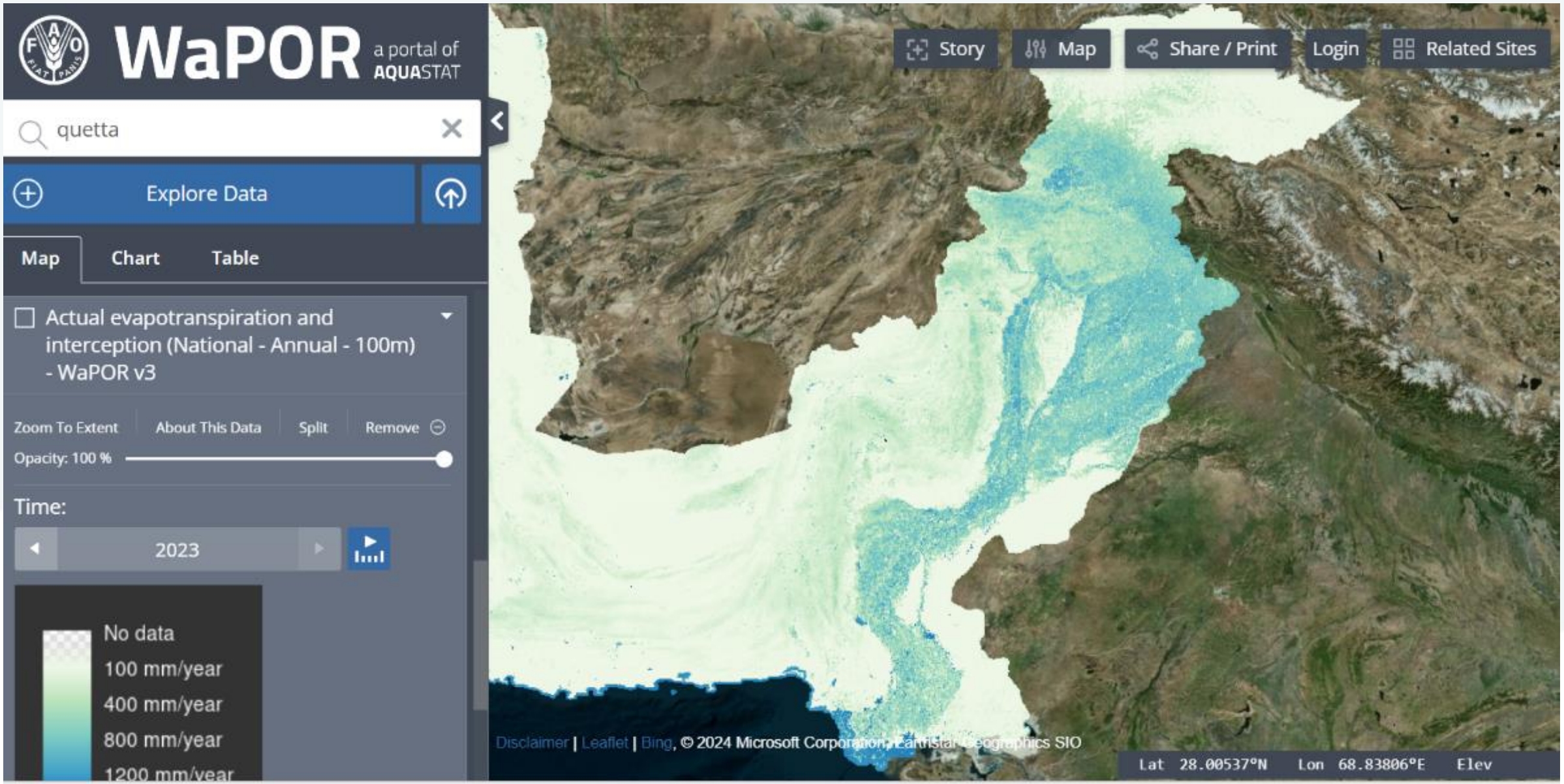


300m

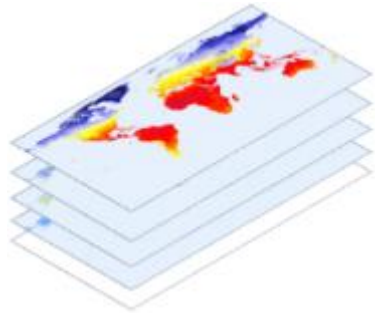
100m

20m




WaPOR a portal of AQUASTAT
quetta
Explore Data
Map
Chart
Table
Actual evapotranspiration and interception (National - Annual - 100m) - WaPOR v3
Zoom To Extent
About This Data
Split
Remove
Opacity: 100 %
Time:
2023
No data
100 mm/year
400 mm/year
800 mm/year
1200 mm/year
Story
Map
Share / Print
Login
Related Sites
Disclaimer | Leaflet | Bing, © 2024 Microsoft Corporation, Earthstar Geographics SIO
Lat 28.00537°N Lon 68.83806°E Elev

Knowledge sharing for sustainability



- Data distributed through ReST API for easier integration in ICT applications
- Open geospatial standards (wms, wcs, Cloud Optimized GeoTiff)
- Open codes and algorithms:

Wiki page for methodology
https://bitbucket.org/cioapps/wapor-et-look/wiki/Home

Bitbucket python

PyWaPOR https://www.fao.org/aquastat/py-wapor/index.html

- Online courses, tutorials, hackatons
- Catalog of WaPOR applications and uses

IHE DELFT Institute for Water Education under the auspices of UNESCO

Action-oriented data for different users

scale

Farmers and other end-users (app developers, agricultural entrepreneurs): advisory services

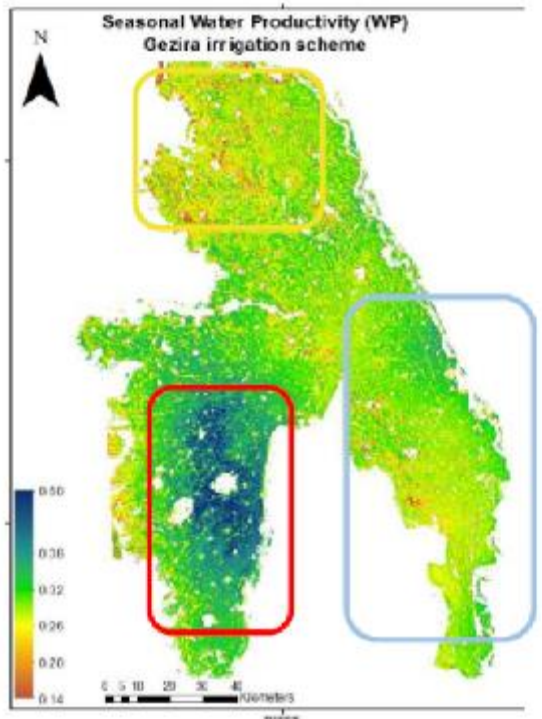
Irrigation scheme managers, WUAs, river basin authorities: monitoring water use and irrigation performance

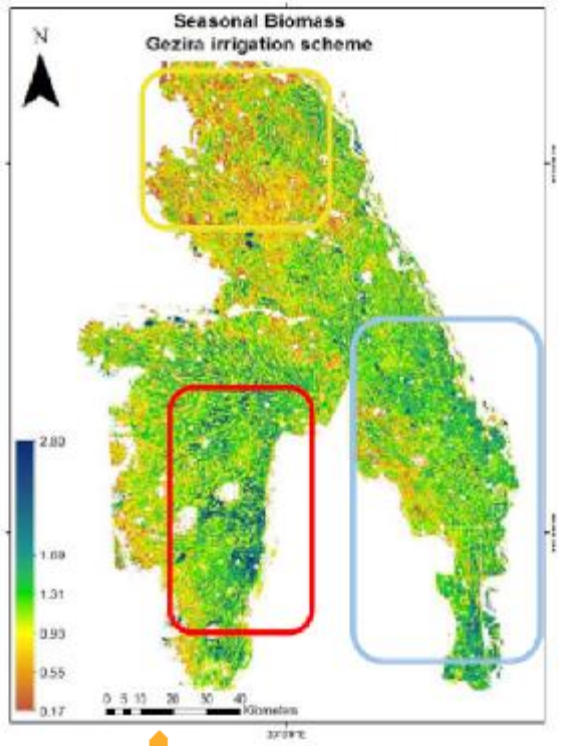
Policy makers: water allocation strategies, water productivity targets, SDGs

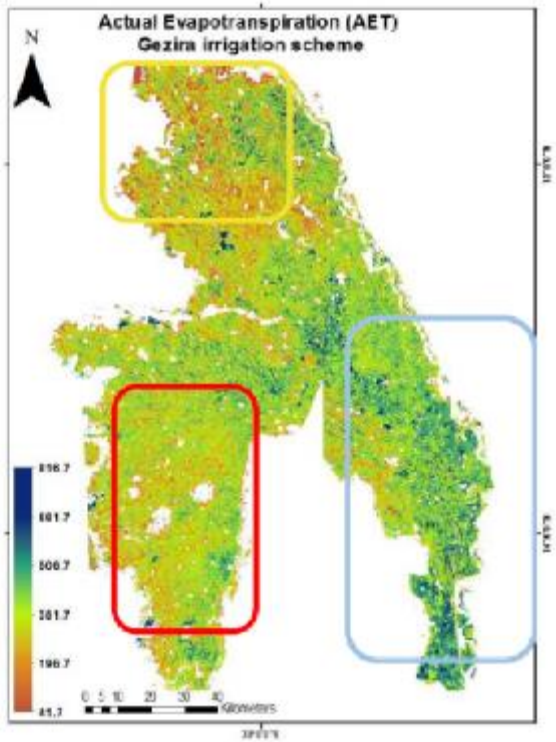
Applications:
Performance indicators to understand variability

In the Gezira irrigation scheme (Sudan) WaPOR data helps monitor how different zones are performing.

Water Productivity =







field production

water consumption

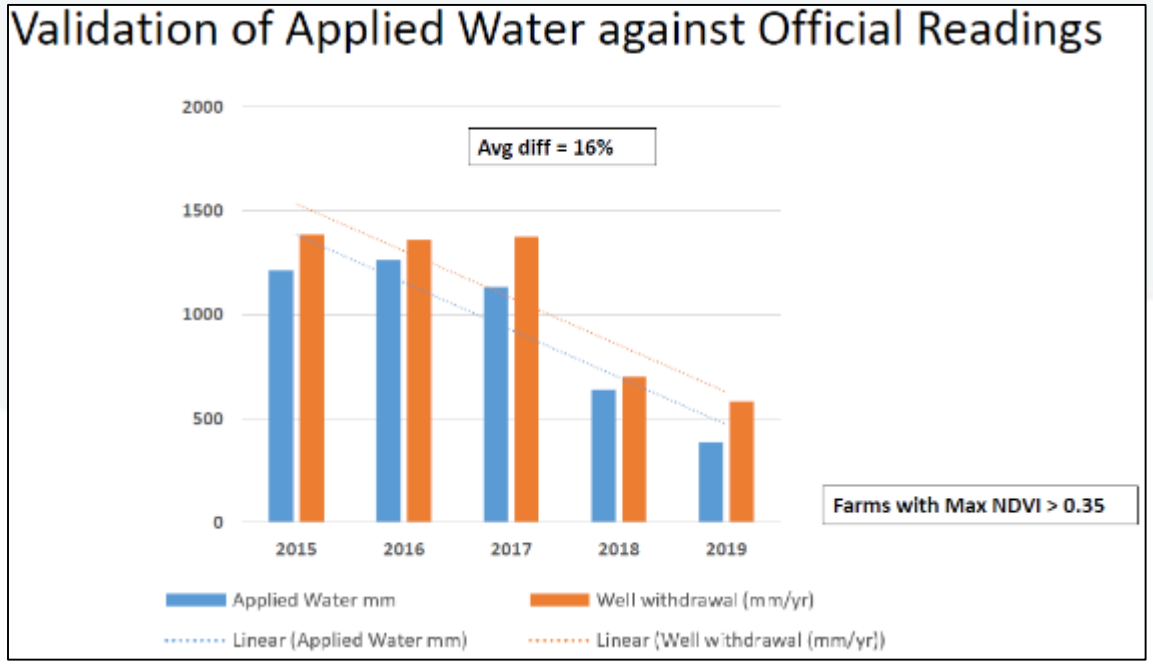
Struggling area needing intervention: **Low water productivity** with a low field production but also a low water consumption

Best performing area: **High water productivity fields** with a fairly high production and a low water consumption

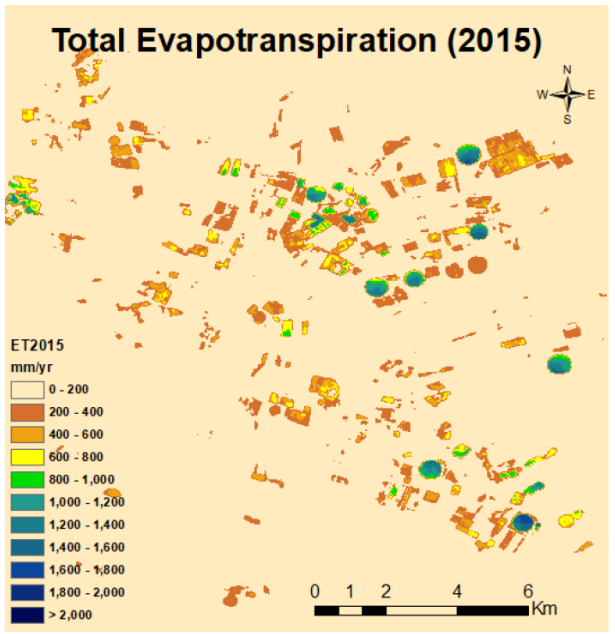
Mixed zones of high and low productivity

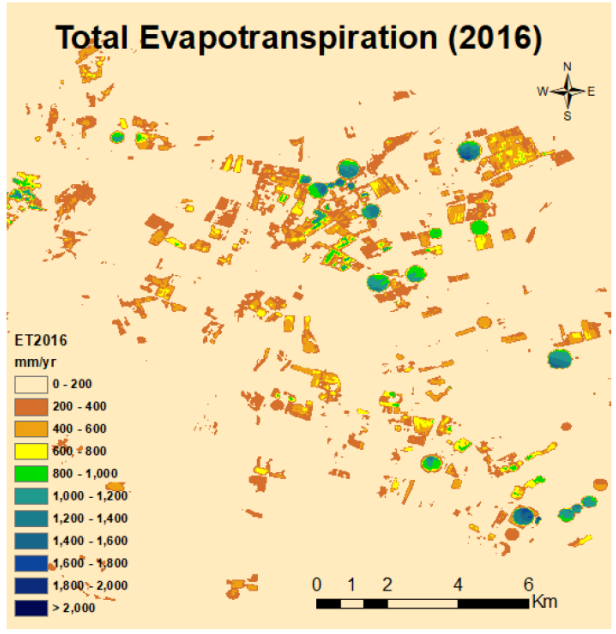
HRC SUDAN Hydraulics Research Center مركز البحوث الهيدروليكية

Applications in Jordan:
groundwater abstraction assessment in Azraq



PyWaPOR 30 m data - Azraq





Applications

There is a wide range of applications of WaPOR data that go beyond water productivity.

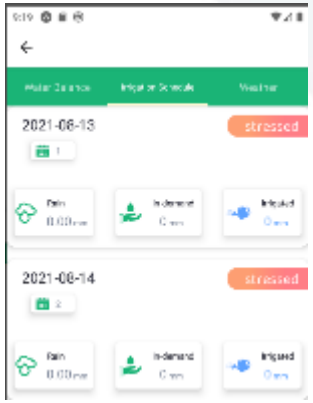
LARI-LEB PlantVillage Nuru IRWI

FAMEWS FAO DSP

ICT-based solution (app) for irrigation scheduling advice

IRWI (Egypt), LARI-LEB (Lebanon), IREY (Tunisia), WaFIRR (Jordan-under finalization) app help farmers know:

- how much water is required so that they can decide when and how much to irrigate and
- how healthy is the crop and predicted yield during the season.



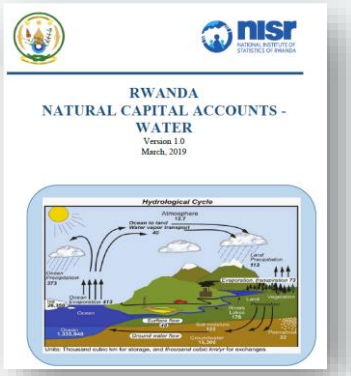
Apps can use WaPOR data in combination with user's inputs and other data sources

WaPOR

Informing national and global policies

League of Arab States guidelines on **Improved Water Allocation for Agriculture in the Arab Region**

Government of Rwanda using it for **Natural Capital Accounts**



Government of Egypt using it in the **Water Accounting Unit of MWRI**

Supporting data acquisition for **SDG monitoring and achieving targets** (SDG 6 in particular)

SUSTAINABLE DEVELOPMENT GOALS

Join us to build a water and food secure future where no one is left behind

wapor.apps.fao.org

wapor@fao.org

www.fao.org/in-action/remote-sensing-for-water-productivity