



Food and Agriculture Organization
of the United Nations

Monitoring Water Use in Agriculture by remote sensing

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Food and Agriculture
Organization



Monitoring Water Use in agriculture

Context: donor perspectives

- Water productivity in development programmes funded by The Netherlands should increase by 25%
- The Netherlands had good experiences in Yemen with monitoring water use through Remote Sensing.





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Monitoring Water Use in agriculture

Context: FAO and the SDG's

- The 2030 Agenda for Sustainable Development includes 17 SDG's with 169 Targets and 230 Indicators;
 - Of 17 SDG's FAO is 'custodian' UN agency for 21 SDG indicators, across 6 SDGs;
 - FAO information systems (FAOSTAT and AQUASTAT) are important instruments to monitor progress towards the SDG's.
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Using Remote Sensing in support of solutions to reduce agricultural water productivity gaps

Rationale

“To assist the member countries of FAO in:

- **monitoring** land and water productivity;
 - **identifying** land and water productivity gaps;
 - **proposing** solutions to reduce these gaps;
 - **contributing** to a sustainable increase of agricultural production;
- while taking into account ecosystems and the equitable use of water resources, which eventually should lead to an overall reduction of water stress.”



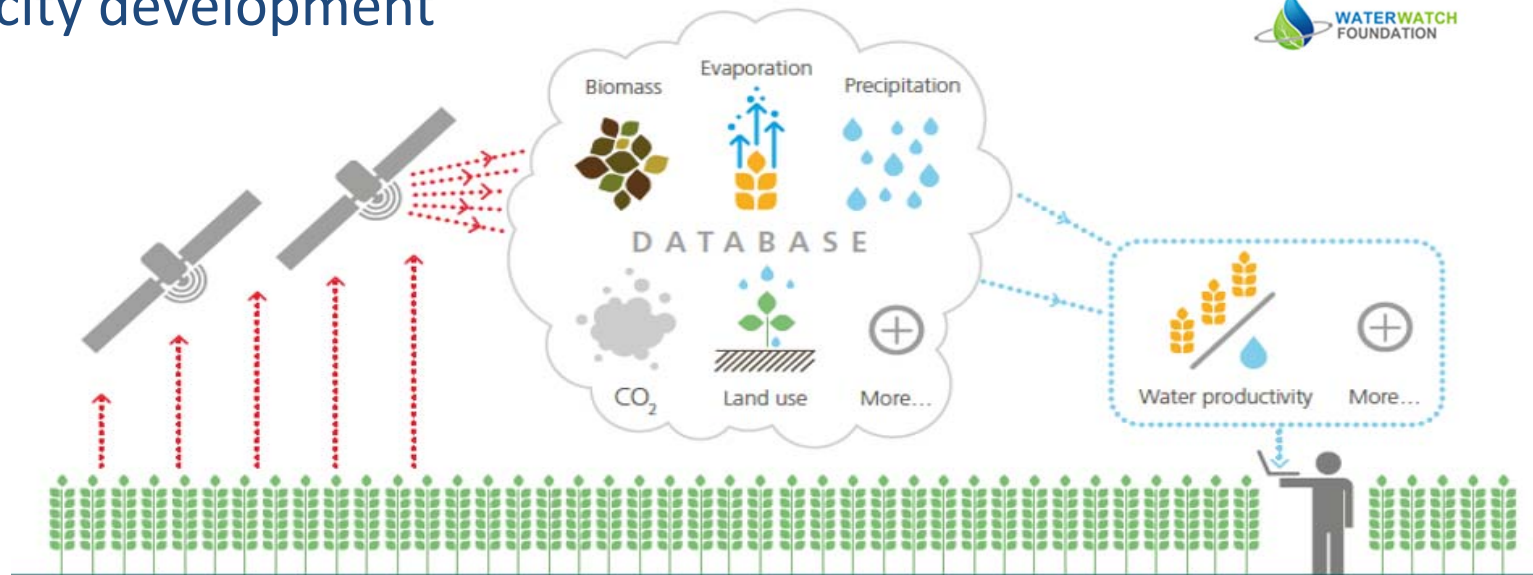


Using Remote Sensing in support of solutions to reduce agricultural water productivity gaps

Project components:

1. Database
2. Water and land productivity assessment
3. Water accounting
4. Capacity development

Consortium:

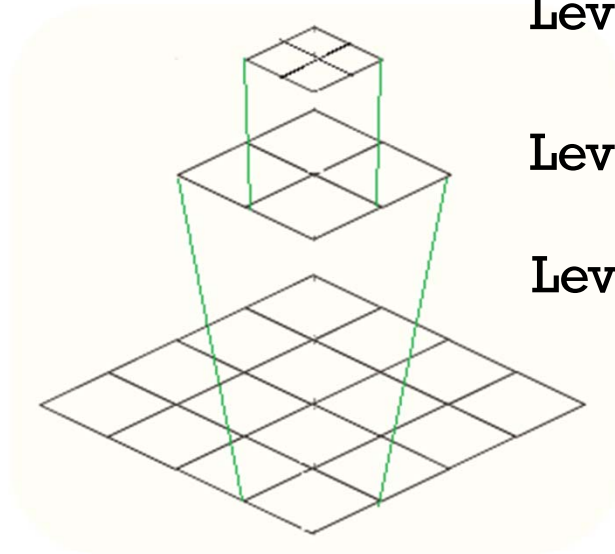




Using Remote Sensing in support of solutions to reduce agricultural water productivity gaps

Project components:

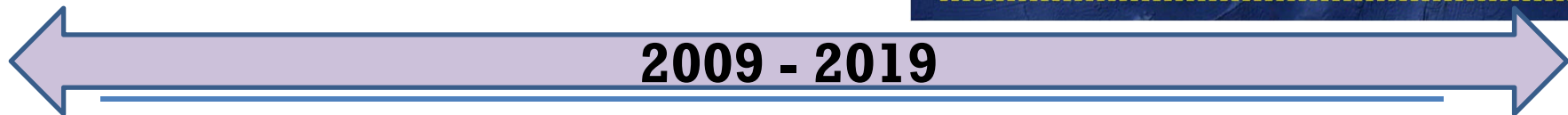
Database



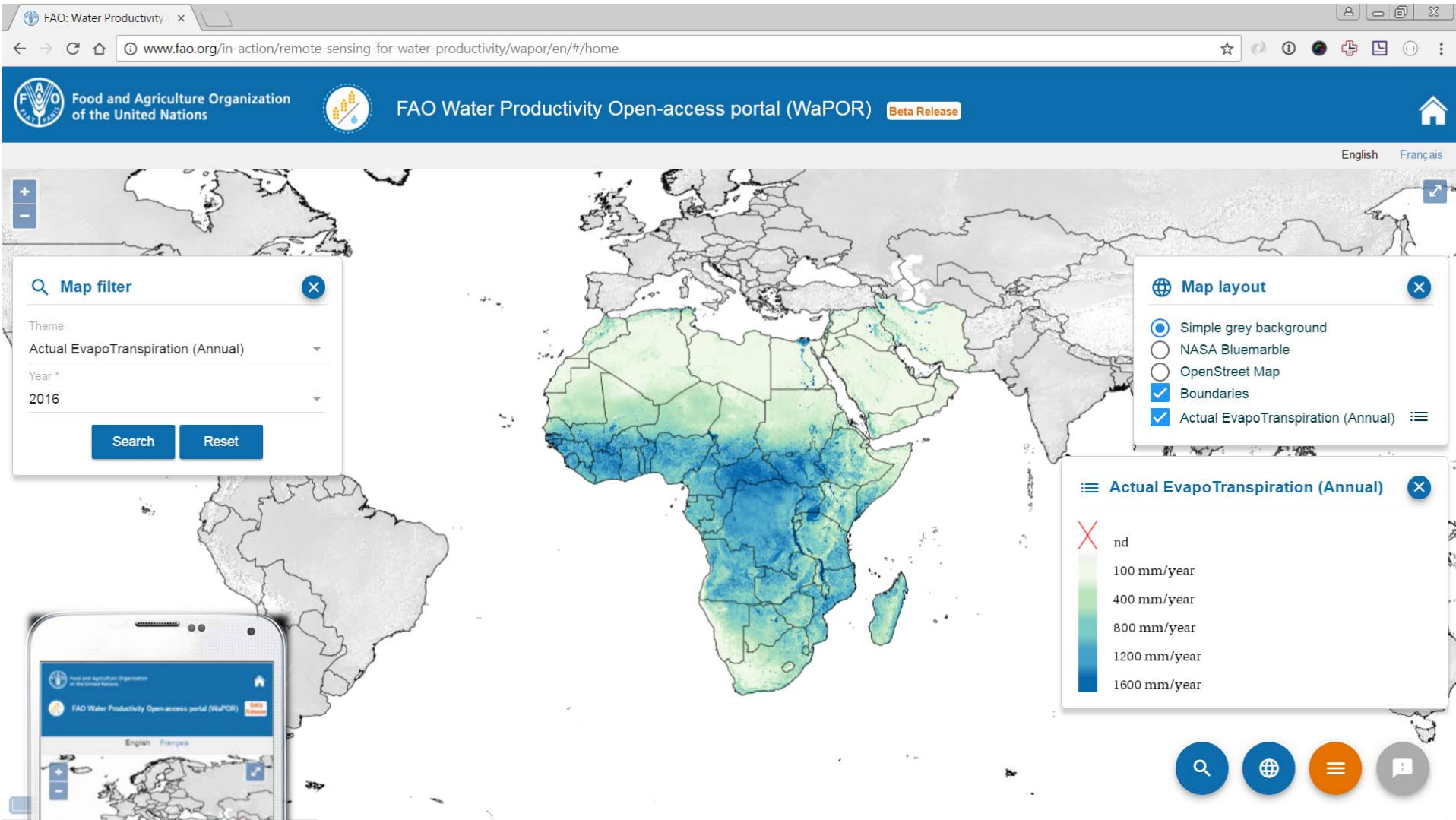
Level 3 – 30 m →

Level 2 – 100 m →

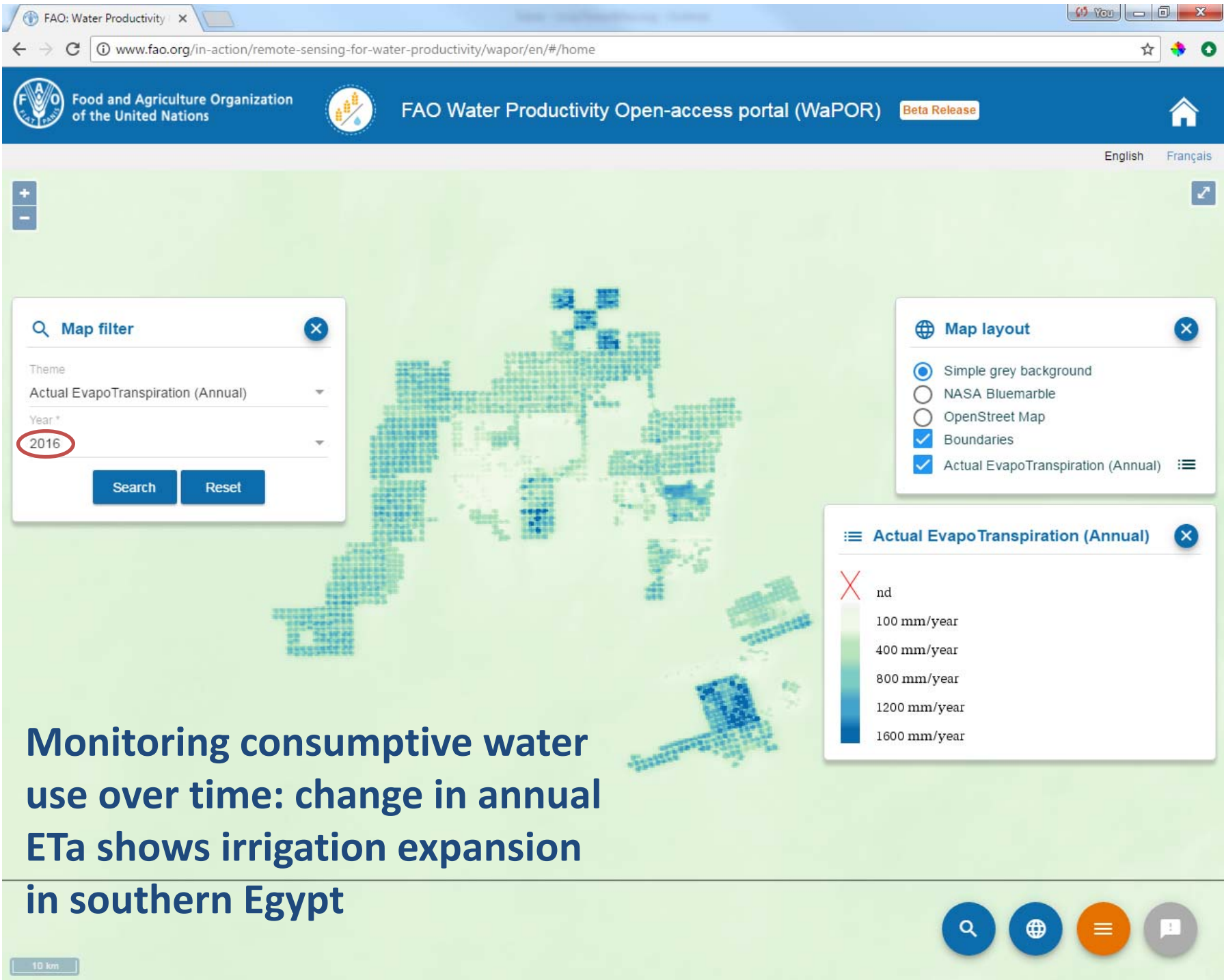
Level 1 – 250 m →



2009 - 2019



WAPOR BETA PORTAL NOW ONLINE



Monitoring consumptive water use over time: change in annual ETa shows irrigation expansion in southern Egypt

Level 1 Level 2

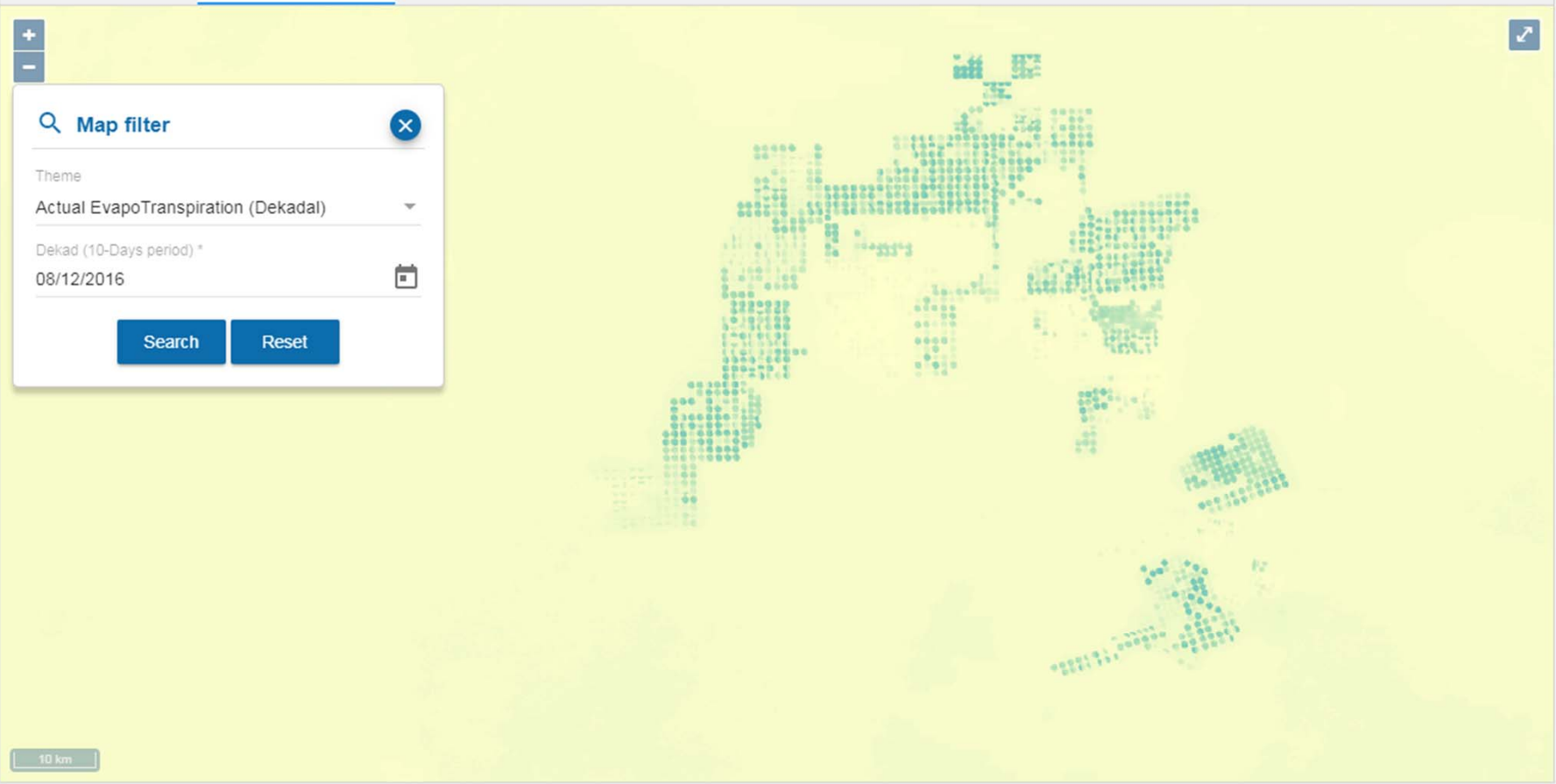


Map filter

Theme
Actual EvapoTranspiration (Dekadal)

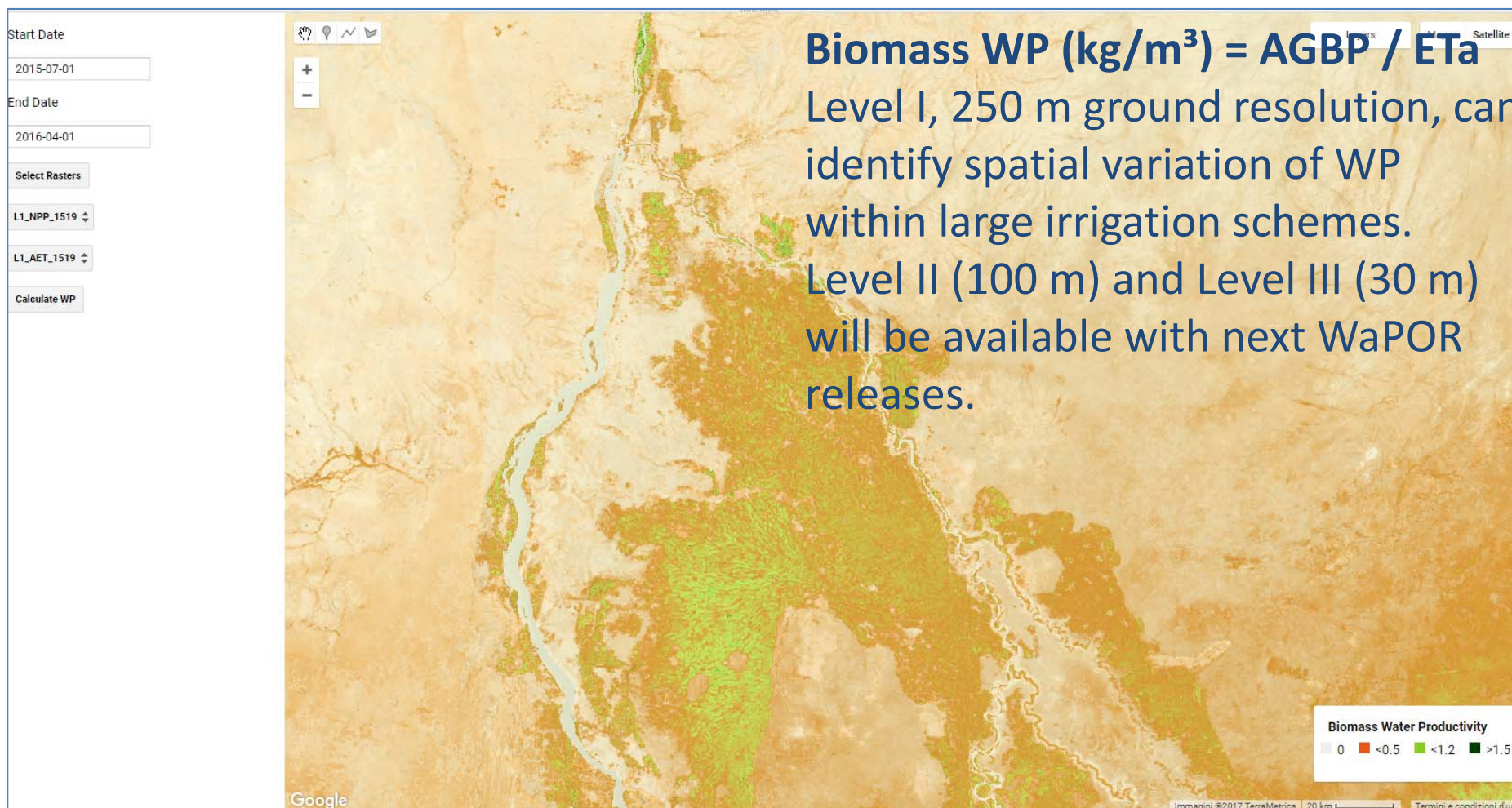
Dekad (10-Days period) *
08/12/2016

Search Reset

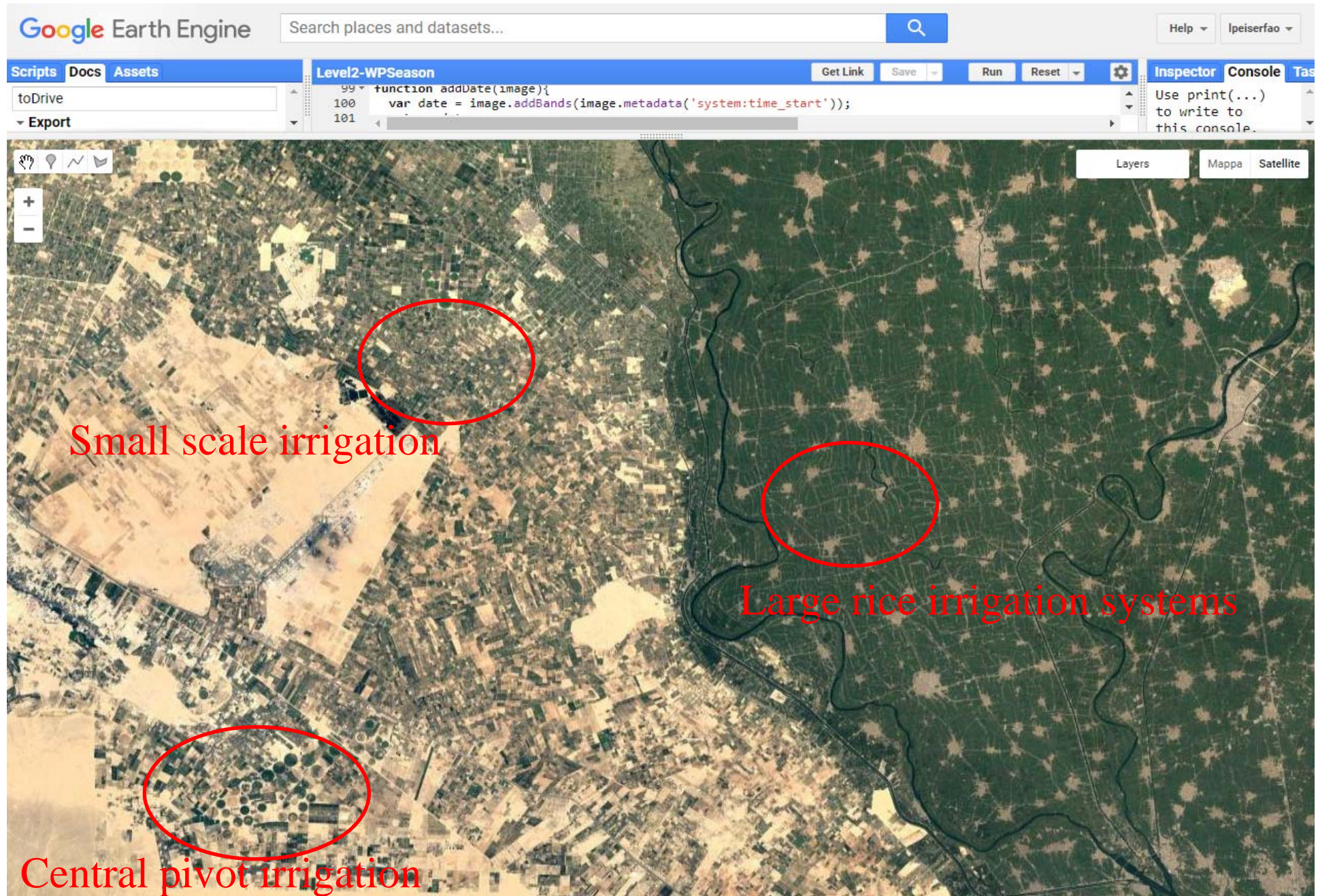




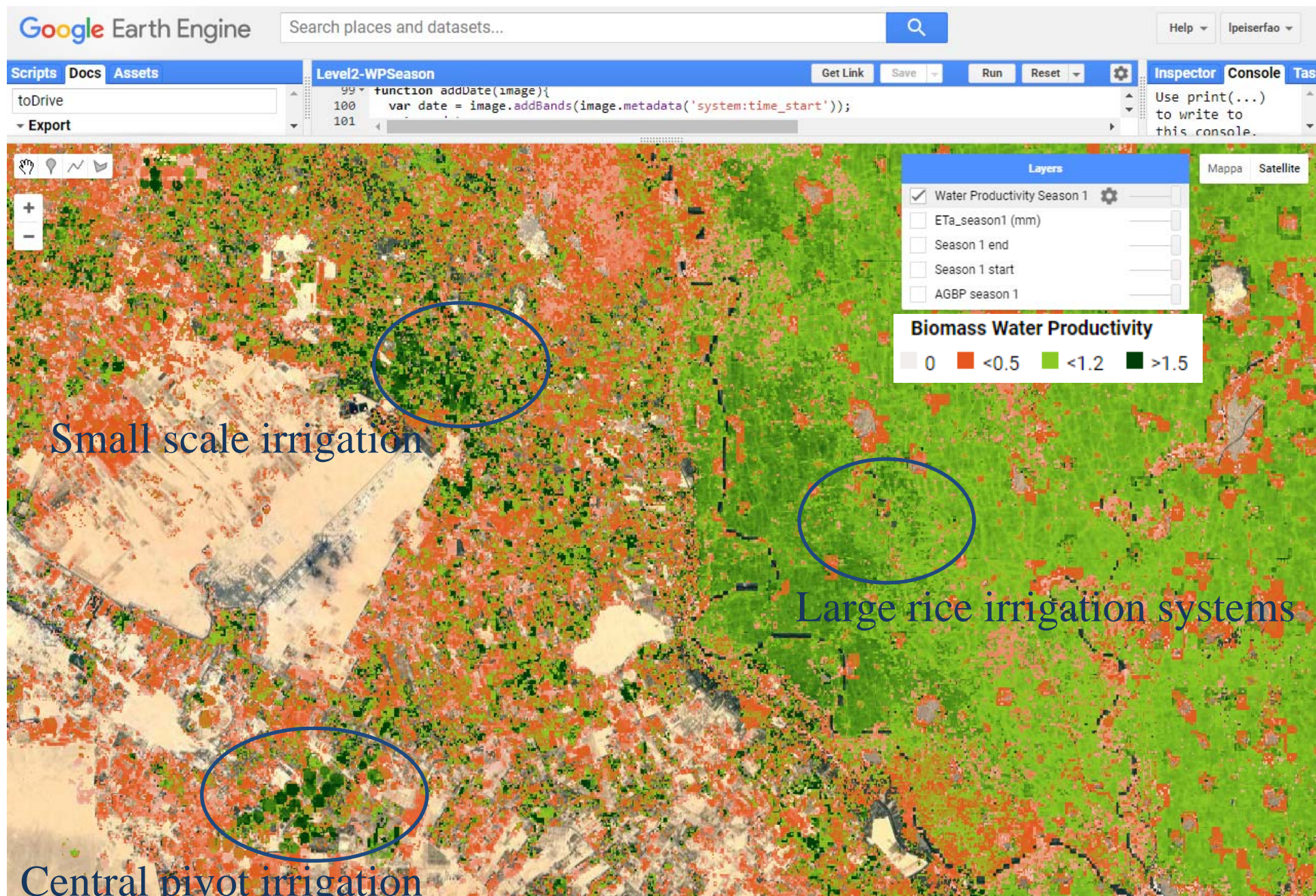
Screenshot Biomass water productivity, 2015-2016



Water productivity in the Nile Delta, Season 1, 2015



Water productivity in the Nile Delta, Season 1, 2015





Example of time series analysis in WaPOR

The screenshot displays the WaPOR interface. At the top, the FAO logo and name are on the left, and the portal title "FAO Water Productivity Open-access portal (WaPOR) Beta Release" is in the center. On the right, there are language options for "English" and "Français", and a home icon. The main area features a satellite-style map of a region in Southeast Asia, overlaid with a green color scale representing Net Primary Production. A "Map filter" popup is open on the left, showing the theme "Net Primary Production" and a date selection of "21/12/2016" for a "Dekad (10-Days period)". A "Time series" popup is open on the right, displaying the following data:

Net Primary Production	
SELECTED VALUES	
Dekad	2016-12 from 21 to 31
Value	2.76
Unit	gC/m ² /day
Location	
Latitude	11.462
Longitude	41.514

At the bottom of the interface, there are navigation icons for search, globe, menu, and chat, along with the text "powered by Google Earth Engine". A scale bar for "100 km" is visible in the bottom left corner of the map area.



Map filter

Theme

Net Primary Production

Dekad (10-Days period) *

21/12/2016

Search

Reset

Net Primary Production

Time series

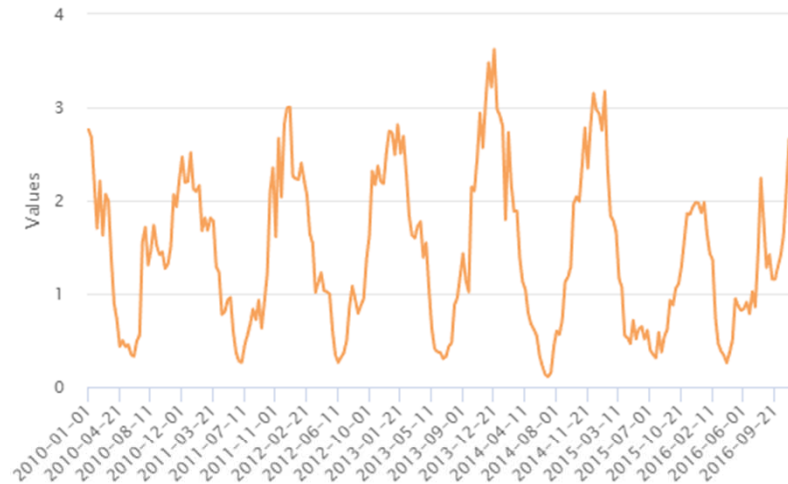
From 01/01/2010

To 01/01/2017

Generate time series

Net Primary Production

From 01/01/2010 To 01/01/2017



Net Primary Production

SELECTED VALUES

STATISTICS

2016-12 from 21 to 31
2.76
gC/m²/day

Latitude 11.462
Longitude 41.514

Time series





Map filter

Theme

Net Primary Production

Dekad (10-Days period) *

21/12/2016

Search

Reset

Net Primary Production

Time series

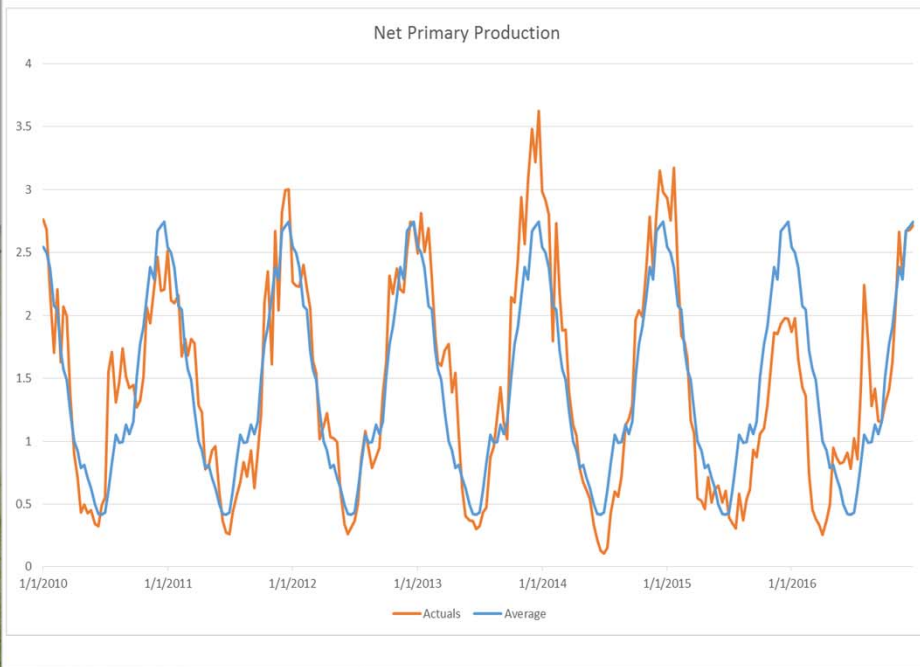
From

01/01/2010

To

01/01/2017

Generate time series



Net Primary Production

SELECTED VALUES

STATISTICS

2016-12 from 21 to 31
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Time series

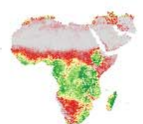


100 km



Browse data

Gross Biomass Water Productivity



The annual Gross Biomass Water Productivity expresses the quantity of output (above ground biomass production) in relation to the total volume of water consumed in the year (actual evapotranspiration). By ...

Net Biomass Water Productivity



The annual Net Biomass Water Productivity expresses the quantity of output (above ground biomass production) in relation to the volume of water beneficially consumed (by canopy transpiration) in the year, ...

Actual EvapoTranspiration (Annual)



The EvapoTranspiration (ET) is the sum of the soil evaporation (E) and canopy transpiration (T). The value of each pixel represents the annual actual evapotranspiration in a given year.

Above Ground Biomass Production (Annual)



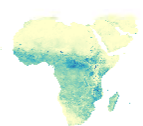
The annual Above Ground Biomass Production expresses the total amount of dry matter produced over the year. It is calculated by dekadal and summarized as annual total. Each pixel represents the amount of ...

Transpiration (Annual)



The annual Transpiration is the portion of annual ETa due to canopy transpiration only (net of soil evaporation). The value of each pixel represents the total annual transpiration for that specific year.

Actual EvapoTranspiration (Dekadal)



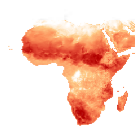
The Evapotranspiration (ET) is the sum of the soil evaporation (E) and canopy transpiration (T). The value of each pixel represents the average daily actual evapotranspiration for that specific dekad.

Transpiration Fraction



Transpiration Fraction is an additional, complementary data layer that is provided with the AET data component. Each pixel of this data layer indicates which % of AET is made up of transpiration for that ...

Reference EvapoTranspiration



Reference evapotranspiration (RET) is defined as the evapotranspiration from a hypothetical reference crop and it simulates the behaviour of a well-watered grass surface. Each pixel represents the daily reference ...

Net Primary Production



Net Primary Production (NPP) is a fundamental characteristic of an ecosystem, expressing the conversion of carbon dioxide into biomass driven by photosynthesis. The pixel value represents the mean ...

Precipitation



Precipitation data is delivered on a daily basis. The source of this dataset is CHIRPS (Climate Hazards Group InfraRed Precipitation with Station) quasi-global rainfall dataset, starting from 1981 up to near ...

<http://www.fao.org/in-action/remote-sensing-for-water-productivity/wapor/en/>



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THANK YOU
