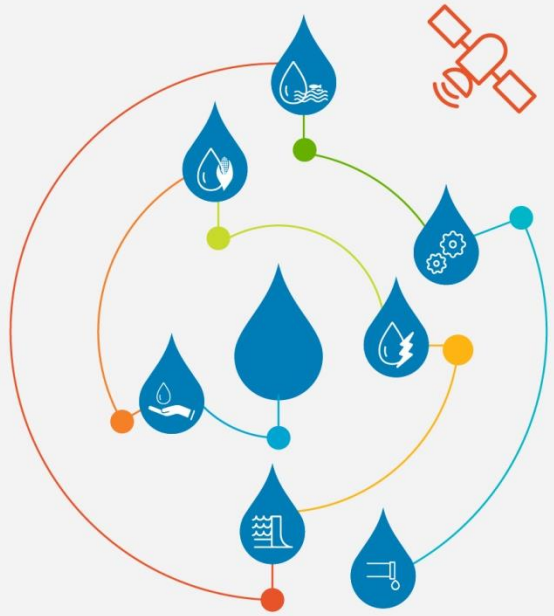
Monitoring water productivity of investments in agriculture



Lucie Pia Pluschke

Land and Water Division, Food and Agriculture Organization (FAO)

3 October 2018

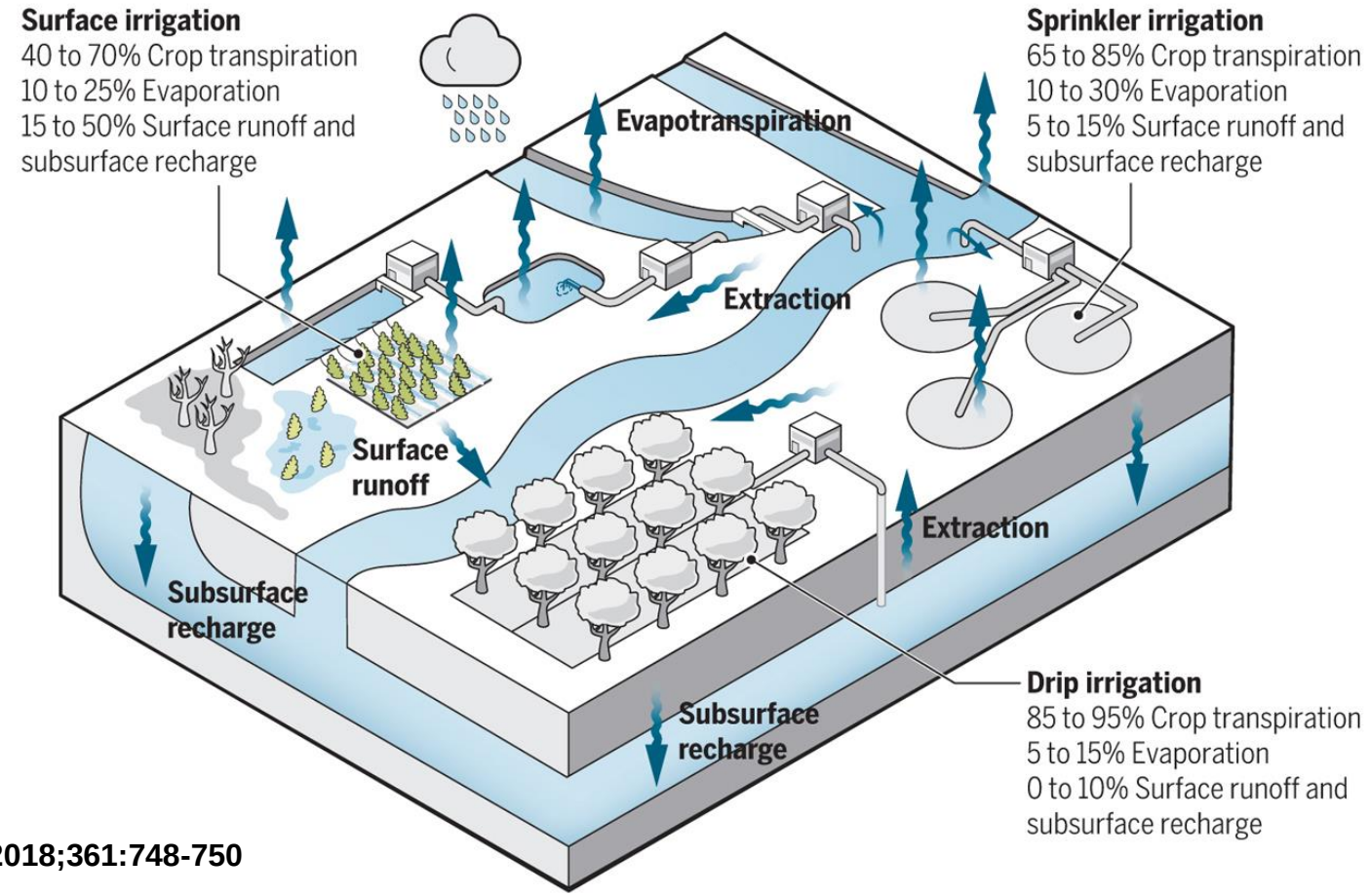
Knowing your water resources is the first step **towards fair and sustainable allocation** – especially in times of climate change, urbanization and rural transformation.

Towards achieving SDG 6

Why do we care about water productivity?

Accounting for water

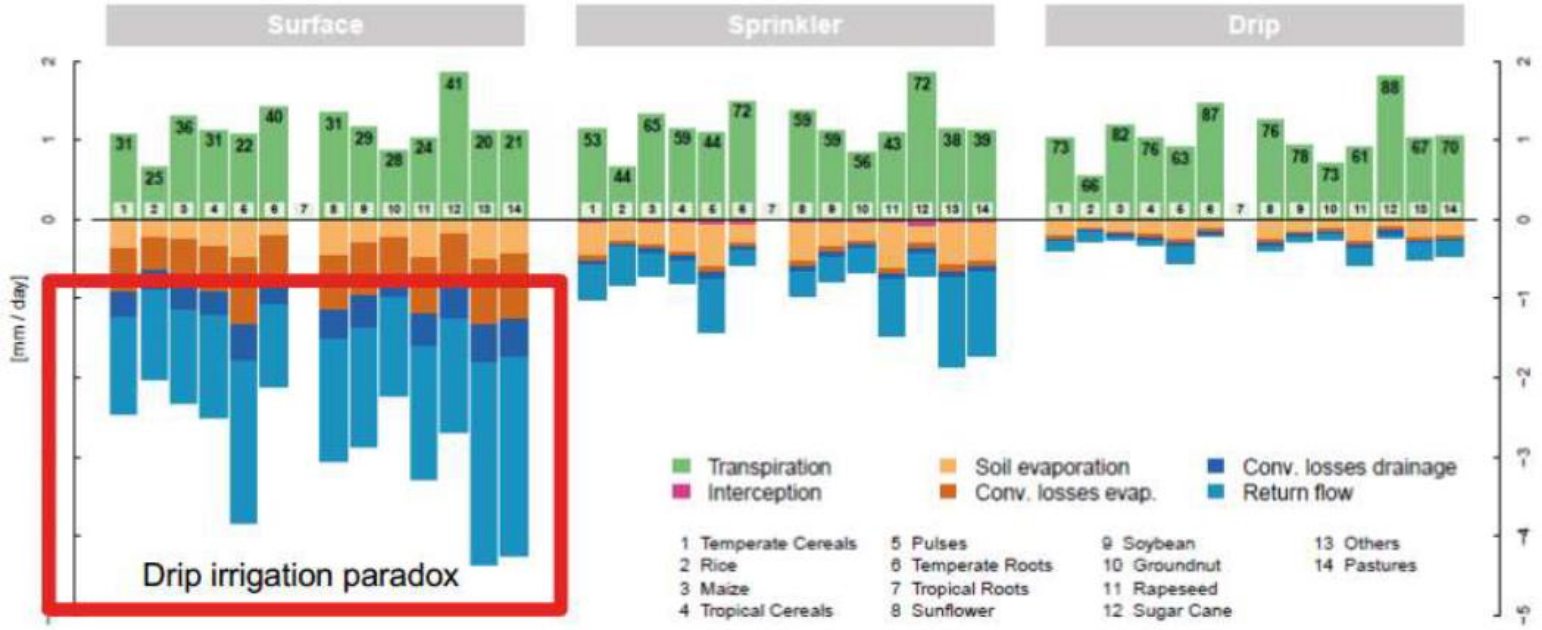
The paradox of irrigation efficiency (surface, sprinkler, and drip) and the water inflows and outflows can be seen in a watershed example. Ranges of crop transpiration, evaporation, runoff, and recharge are authors' judgment of possible values. These values depend on crop and soil types, weather, and other factors.



R. Q. Grafton et al. Science 2018;361:748-750

Scale matters for irrigation efficiency

Irrigation paradox

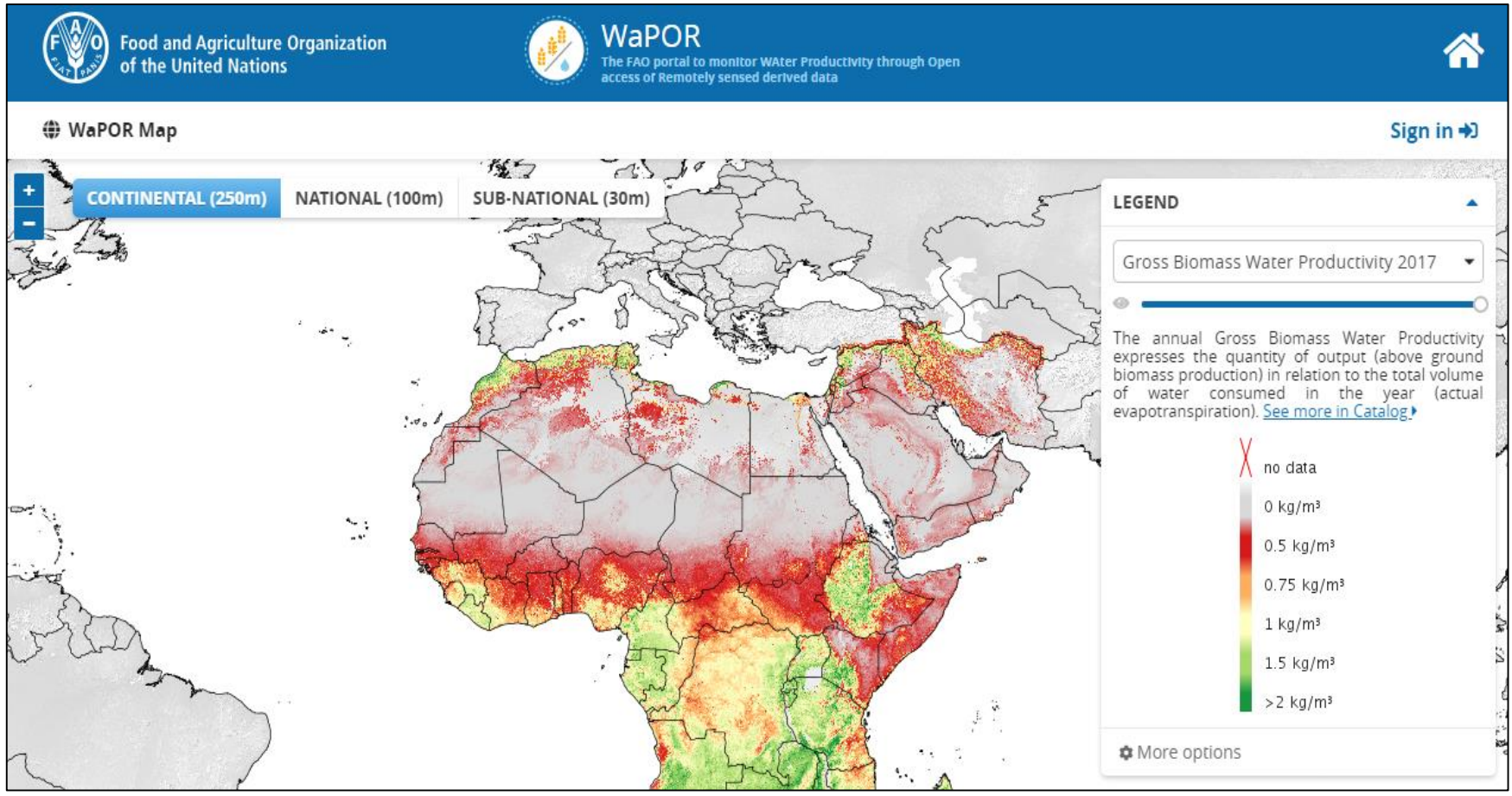


Irrigation efficiencies for different techniques (Source: Jägermeyr *et al.*, 2015).

WaPOR

Big data to tackle to world's water crisis

Near real time monitoring of water productivity at 30m-250m resolution with data updates every 10 days over 10 years



1. What is the water balance of a country or river basin?

Water accounting

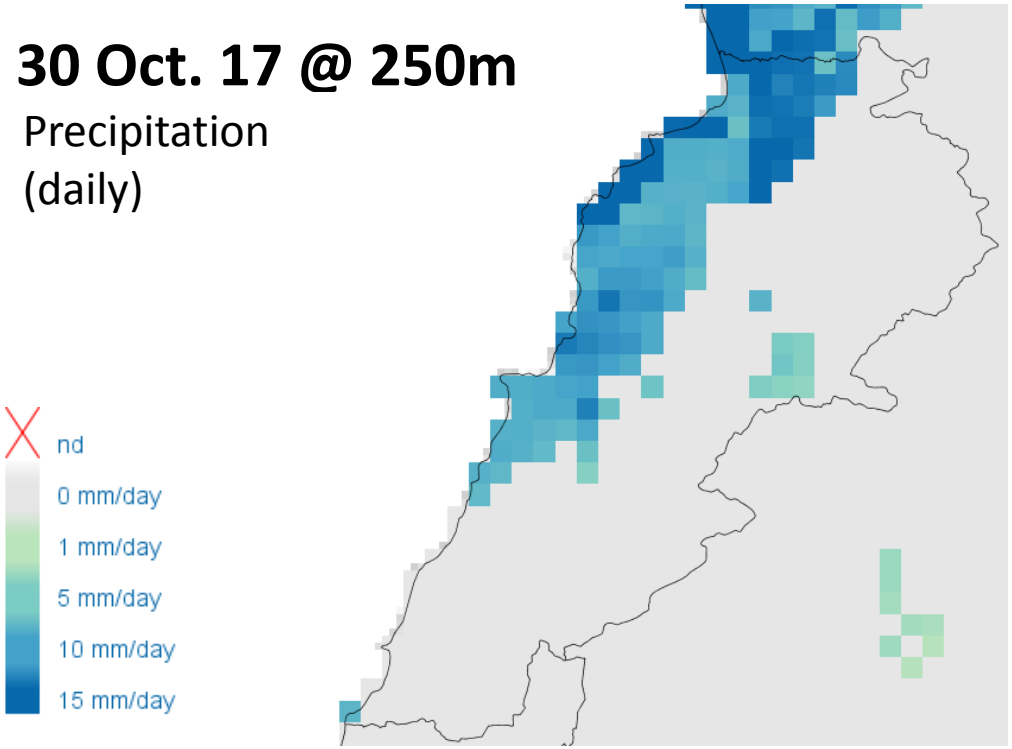
Precipitation → IN

Evapotranspiration → OUT

= basic water balance

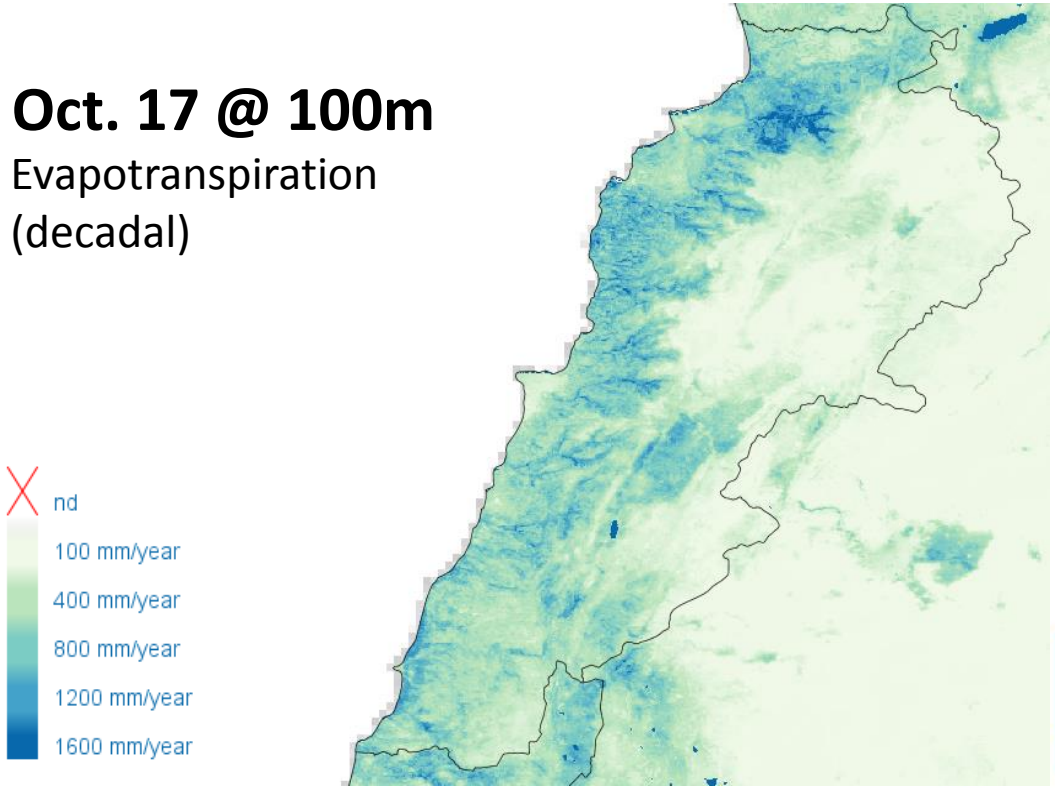
30 Oct. 17 @ 250m

Precipitation
(daily)



Oct. 17 @ 100m

Evapotranspiration
(decadal)



ADB

2

How productive is agricultural land use?

Primary biomass production

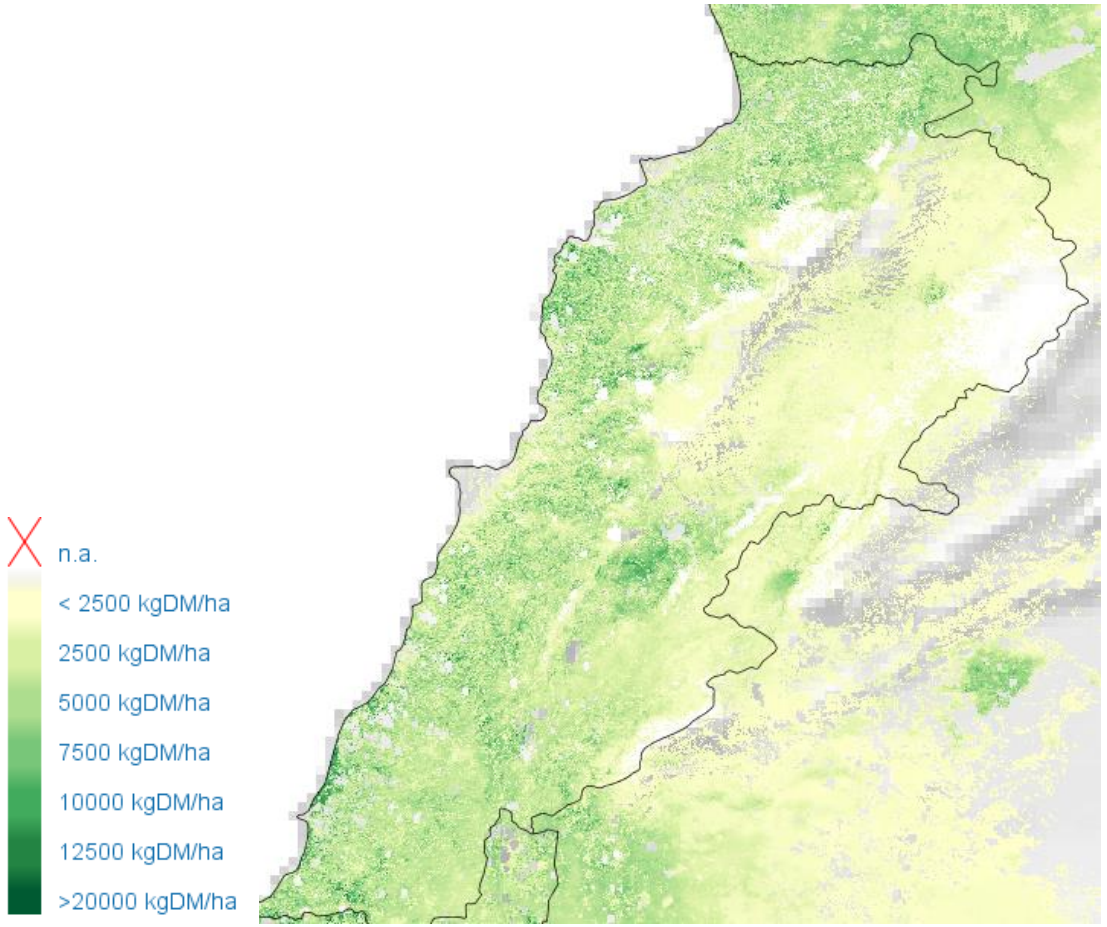
Indicative of yields (+ ground level data)

2

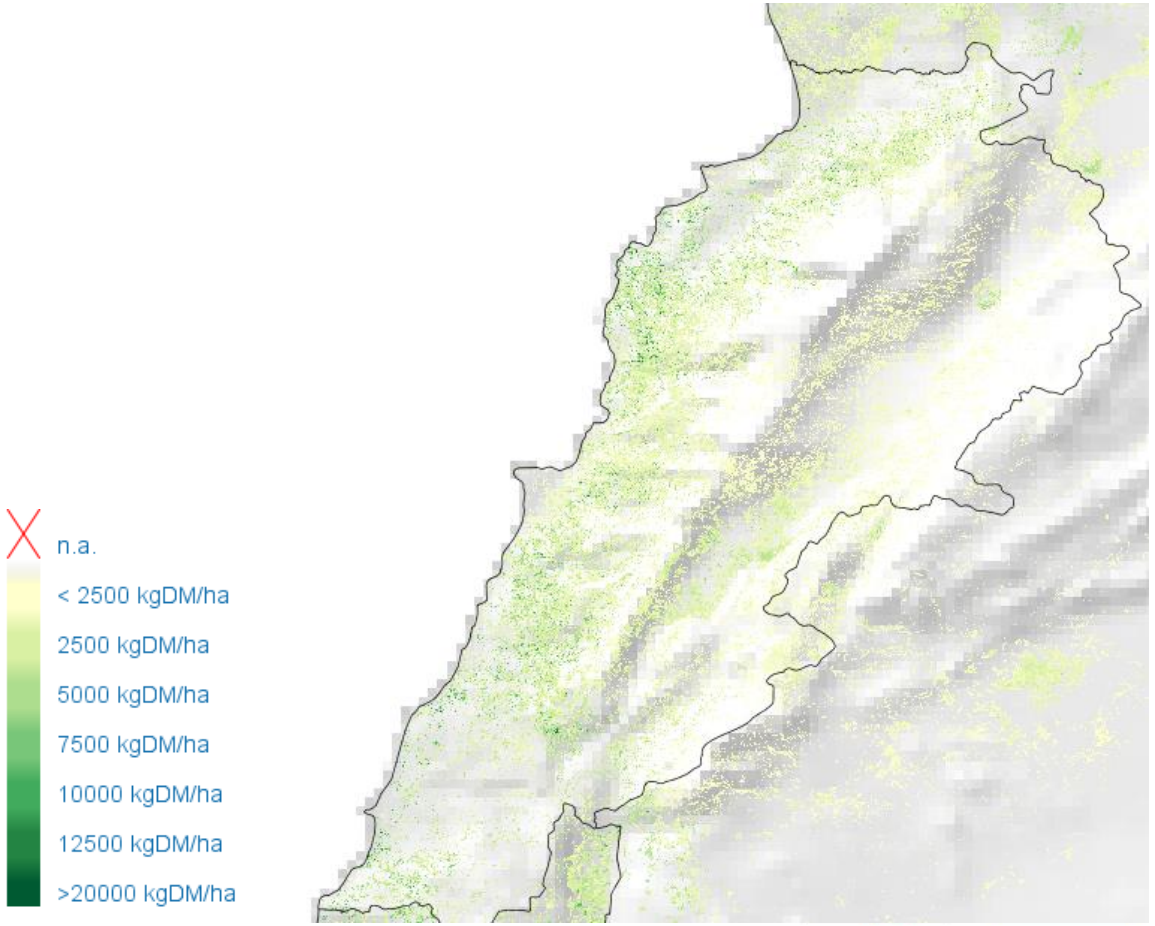
An Example from Lebanon

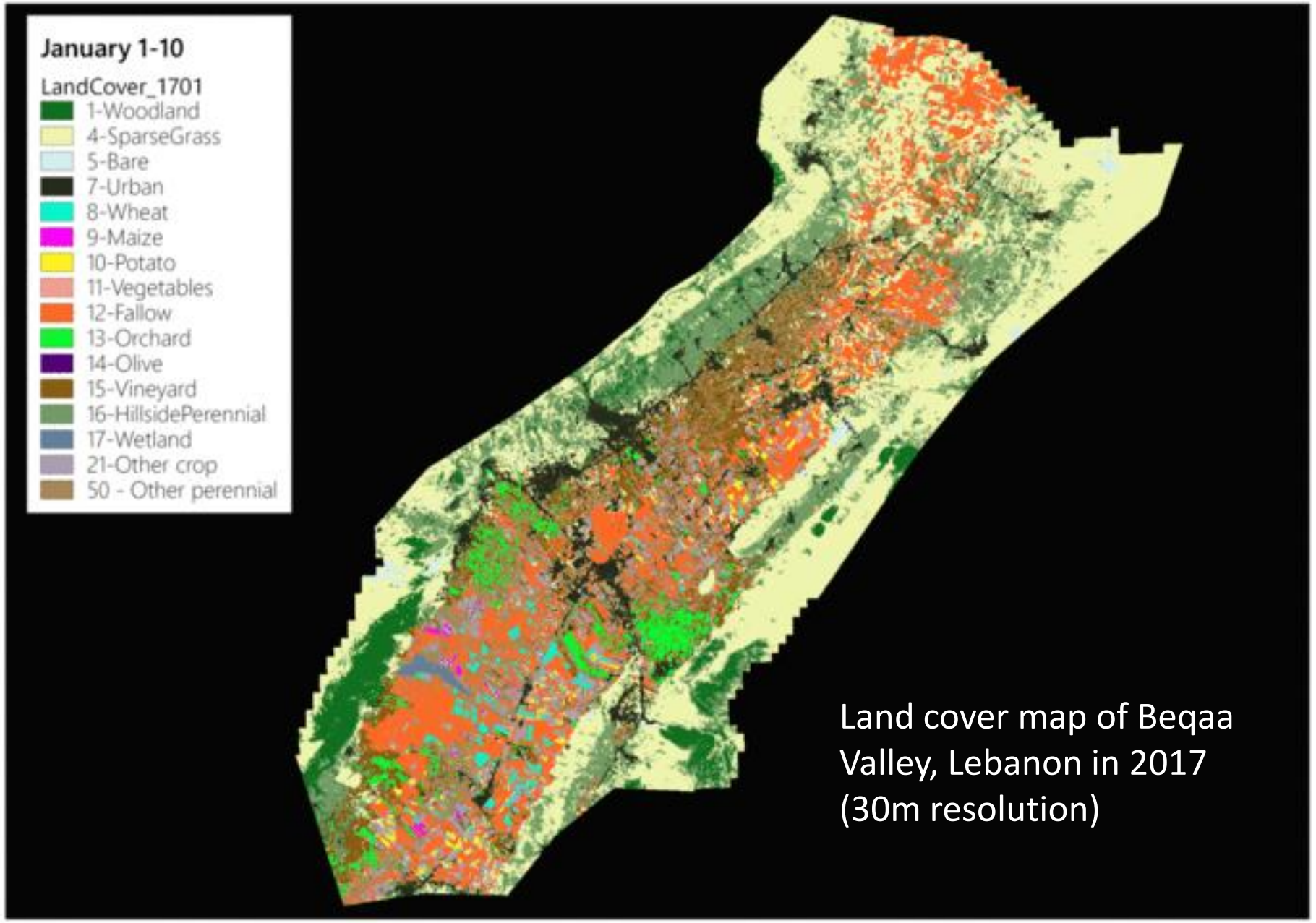
Above Ground Biomass Production in Lebanon (100m resolution)

2015 – First growing cycle

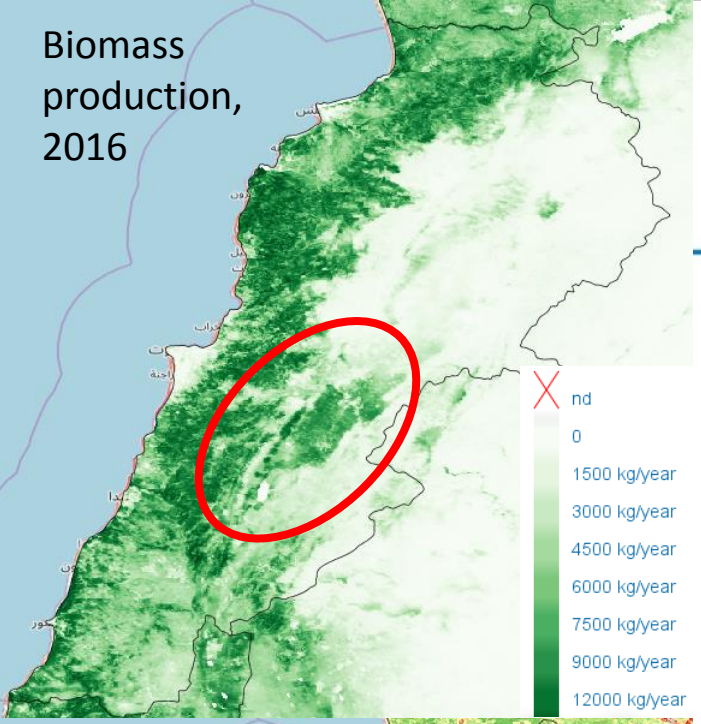


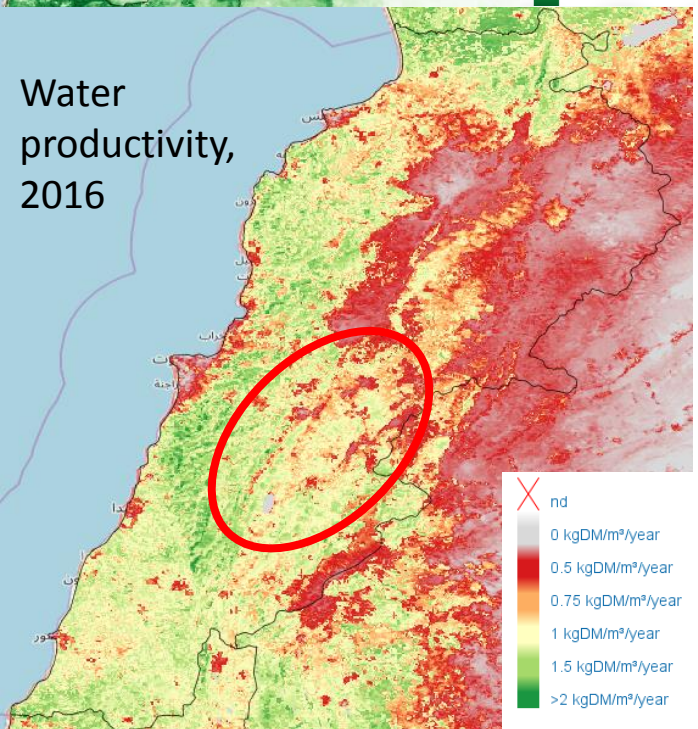
2015 – Second growing cycle





Land cover map of Beqaa Valley, Lebanon in 2017 (30m resolution)





3

How productive is agricultural water use?

Water productivity

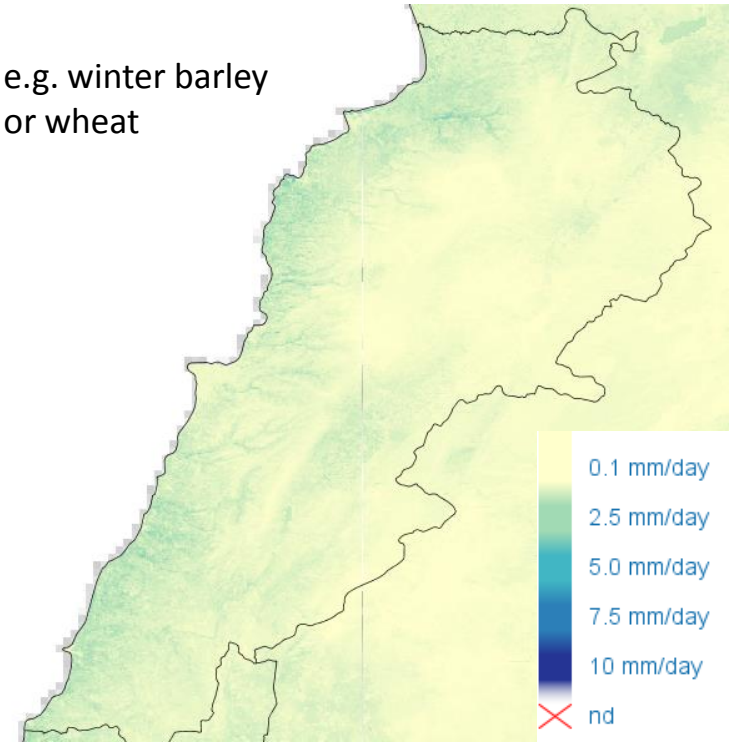
***More crop, per drop*: Water productivity varies in space and time depending on management**

3

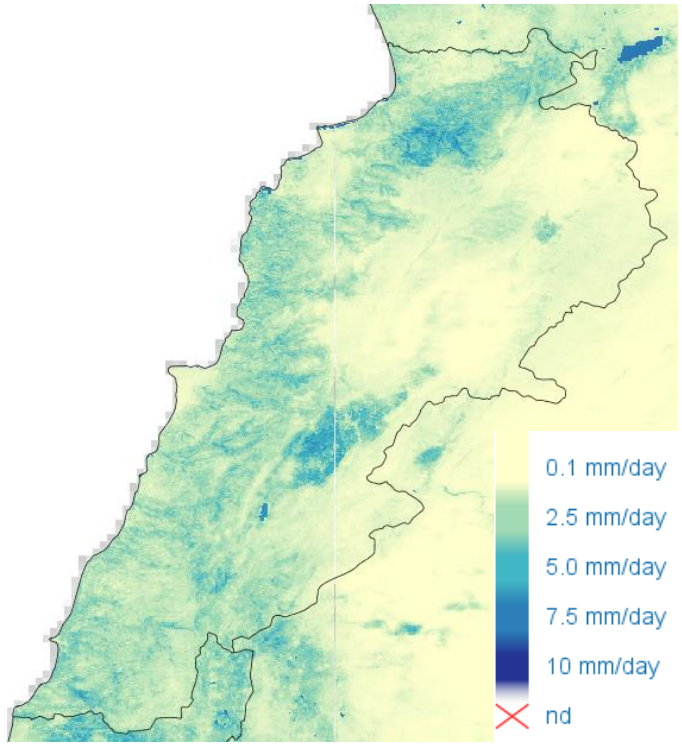
Actual Evapotranspiration in Lebanon (100m resolution)

31 January 2015 – wet winter; growing period of winter crops

e.g. winter barley or wheat

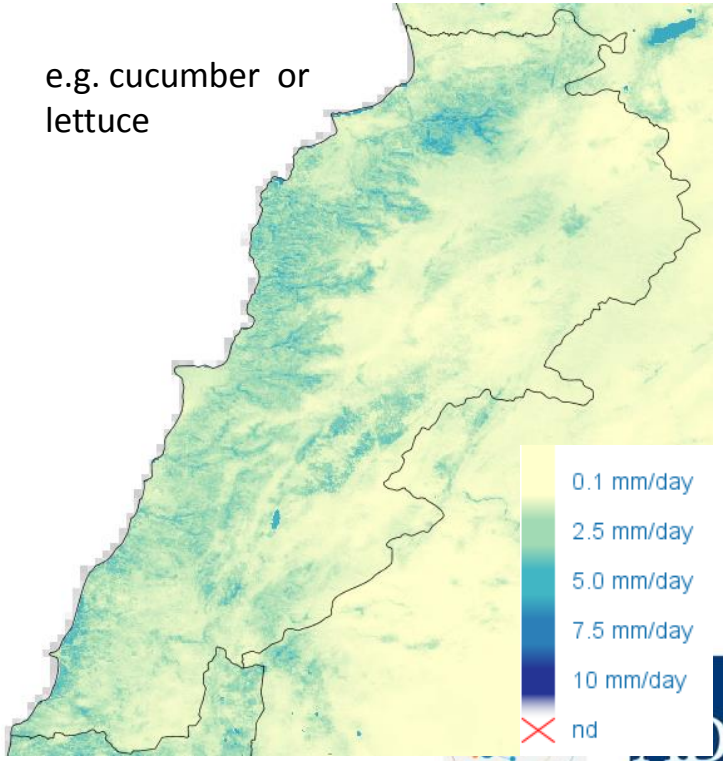


31 May 2015 – harvest period of winter crops

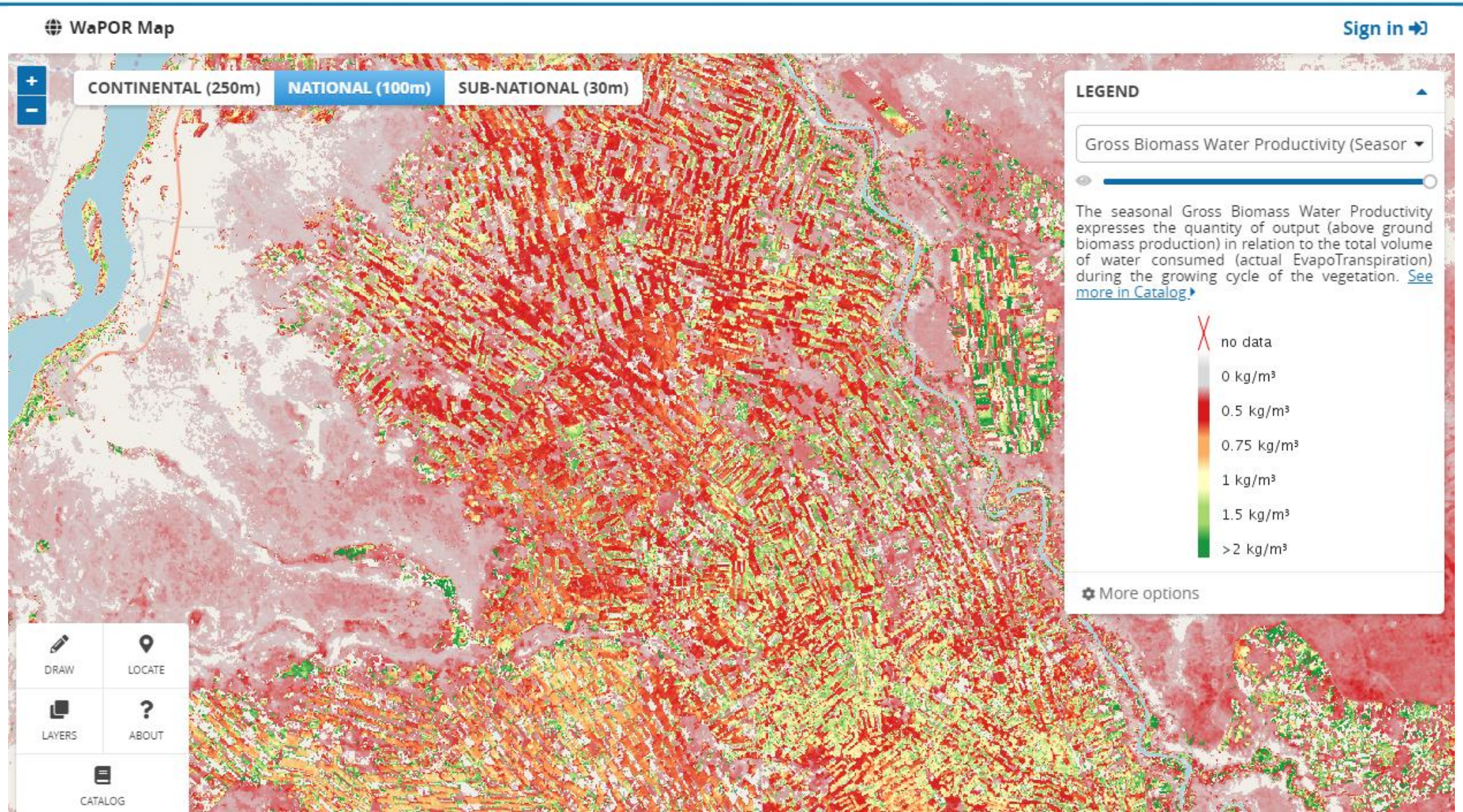


30 September 2015 – end of dry summer and growing period of summer crops

e.g. cucumber or lettuce



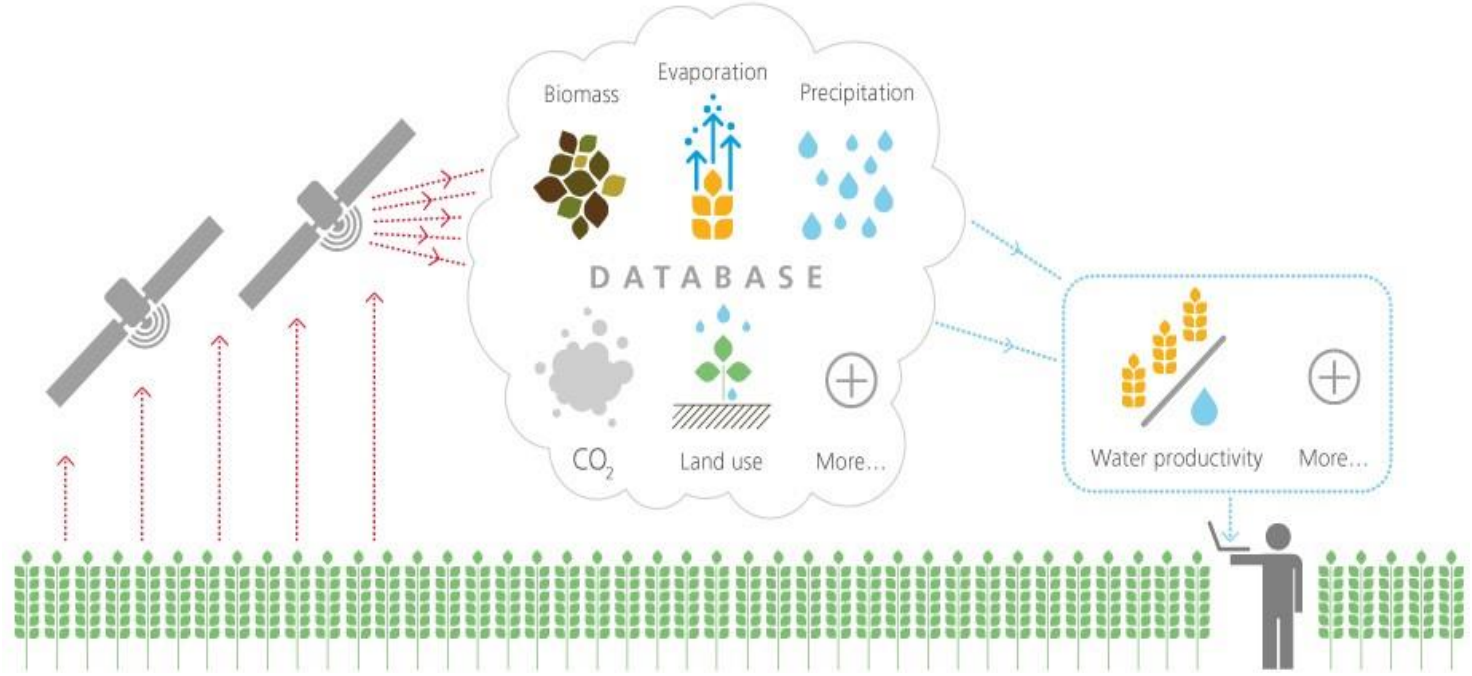
Identify where and why investments are needed (most effective)



Unleashing the Power of ICT

1. Water accounting is hard (*but getting easier*)

2. Enforcing recommendations (think water allocation, consumption limits…) are even harder (*but can be phased in)*



WAPOR

Food and Agriculture Organization of the United Nations

IWMI International Water Management Institute

UNESCO IHE DELFT

Ministry of Foreign Affairs of the Netherlands

ADB