Training Water Productivity

Hans van der Kwast, Ph.D.
Jonna van Opstal, Ph.D.

UNESCO IHE DELFT

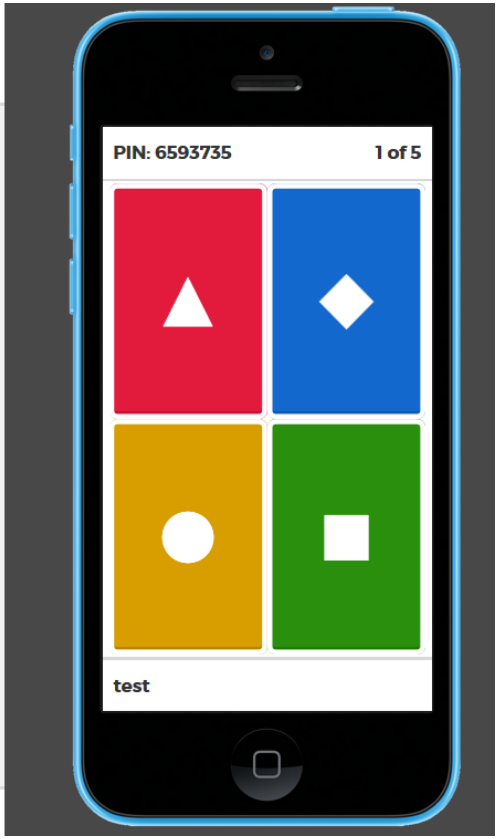
WATER for GROWTH RWANDA

Schedule

- Day 1
  - Concepts, Methods
  - Intro to the FAO database WaPOR
- Day 2
  - Practical Applications
- WiFi
  - Parkinn By Radisson, Kigali
  - Huawei: H9F37LQ7QJ9 (Please only half sitting on my side of the room)

Let's Kahoot

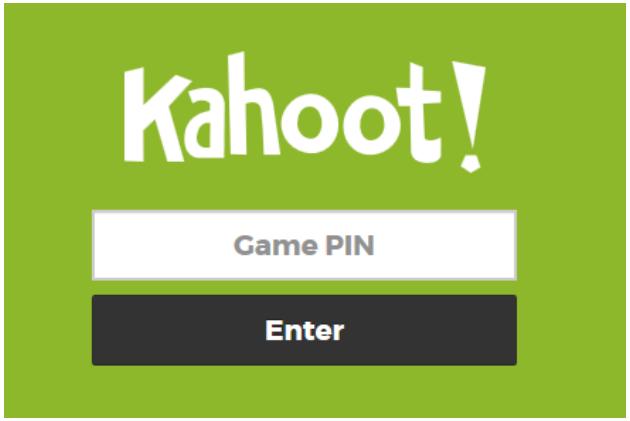

What is your role in water management?
115
Skip
0
Answers
policy maker
researcher
engineer
other
kahoot.it Game PIN: 6593735


PIN: 6593735
1 of 5
test

Let’s Kahoot!

Go to kahoot.it or the Kahoot app

and enter the Game PIN



Introduction to Water Productivity

Concepts, Methods, and Applications

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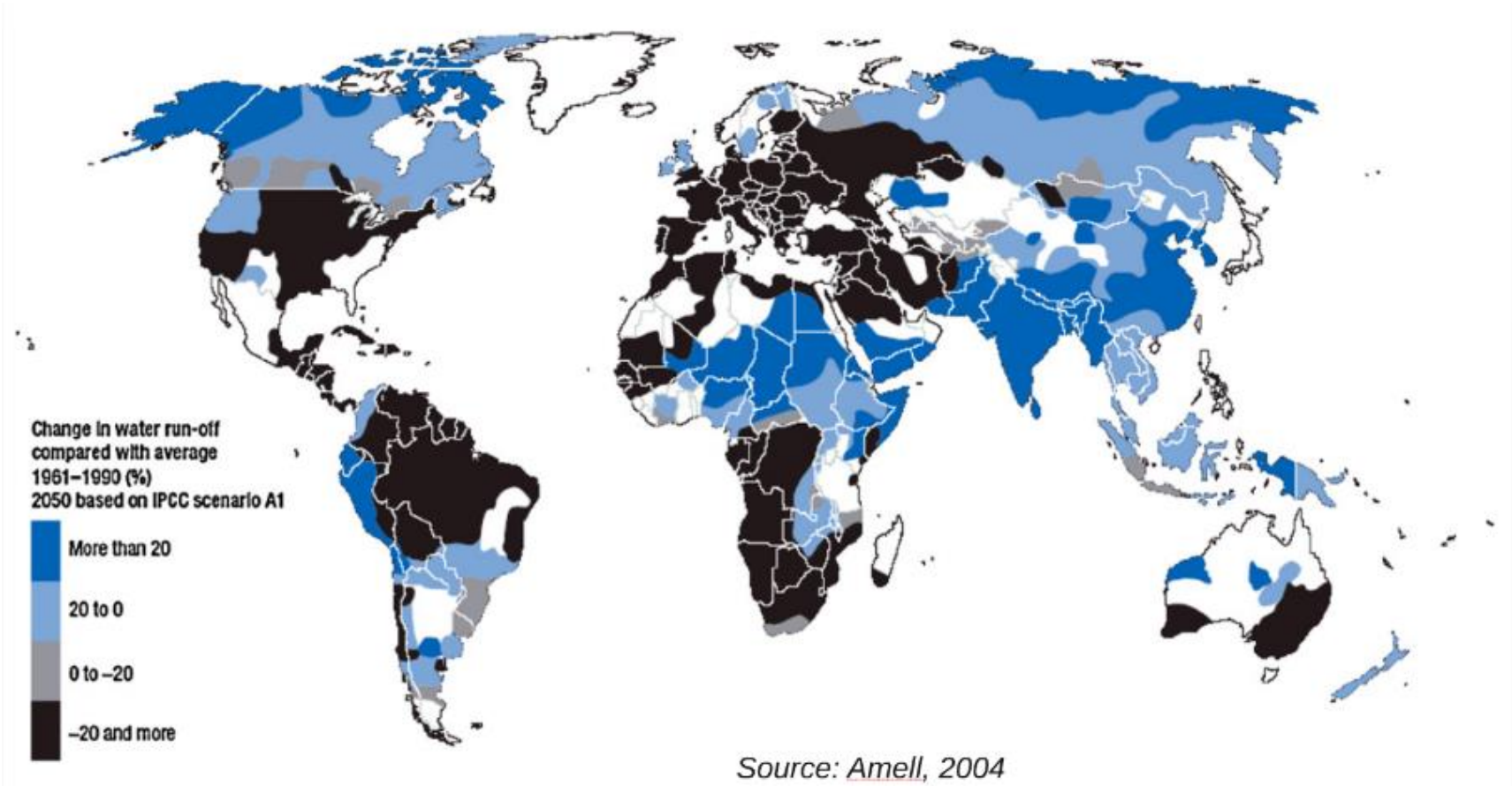
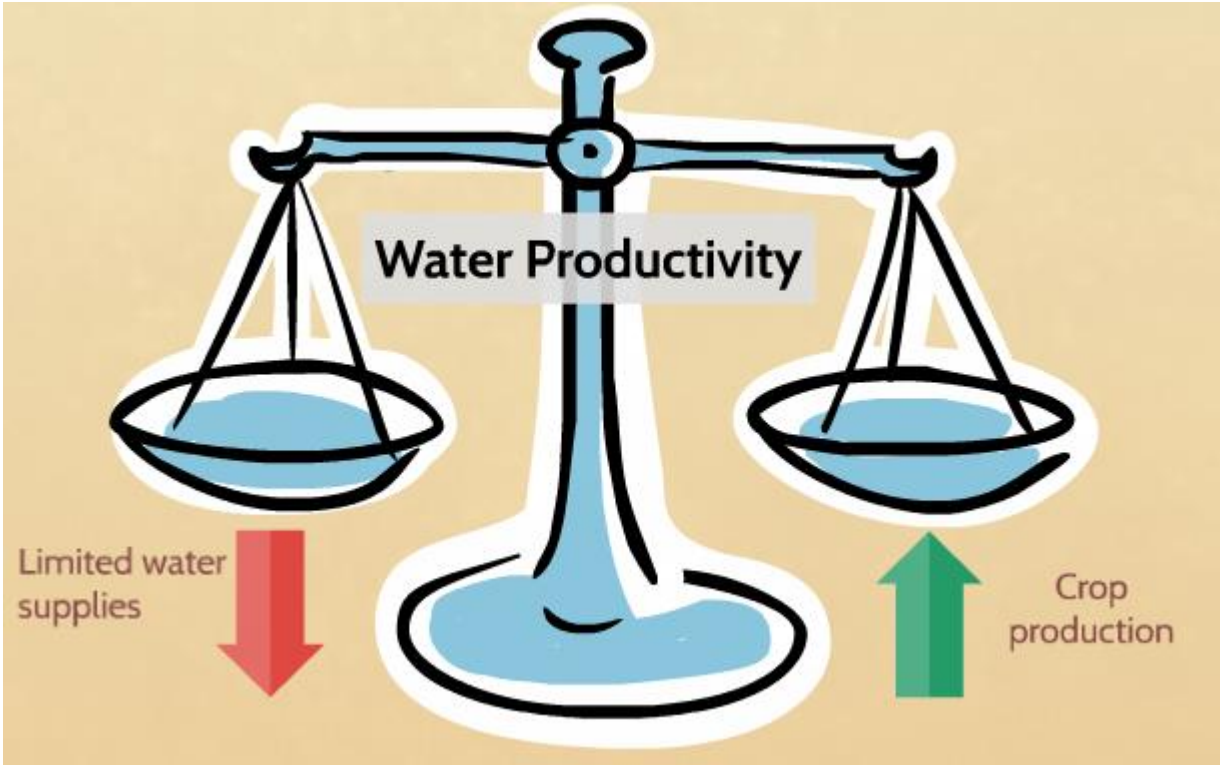
Scarce water resources

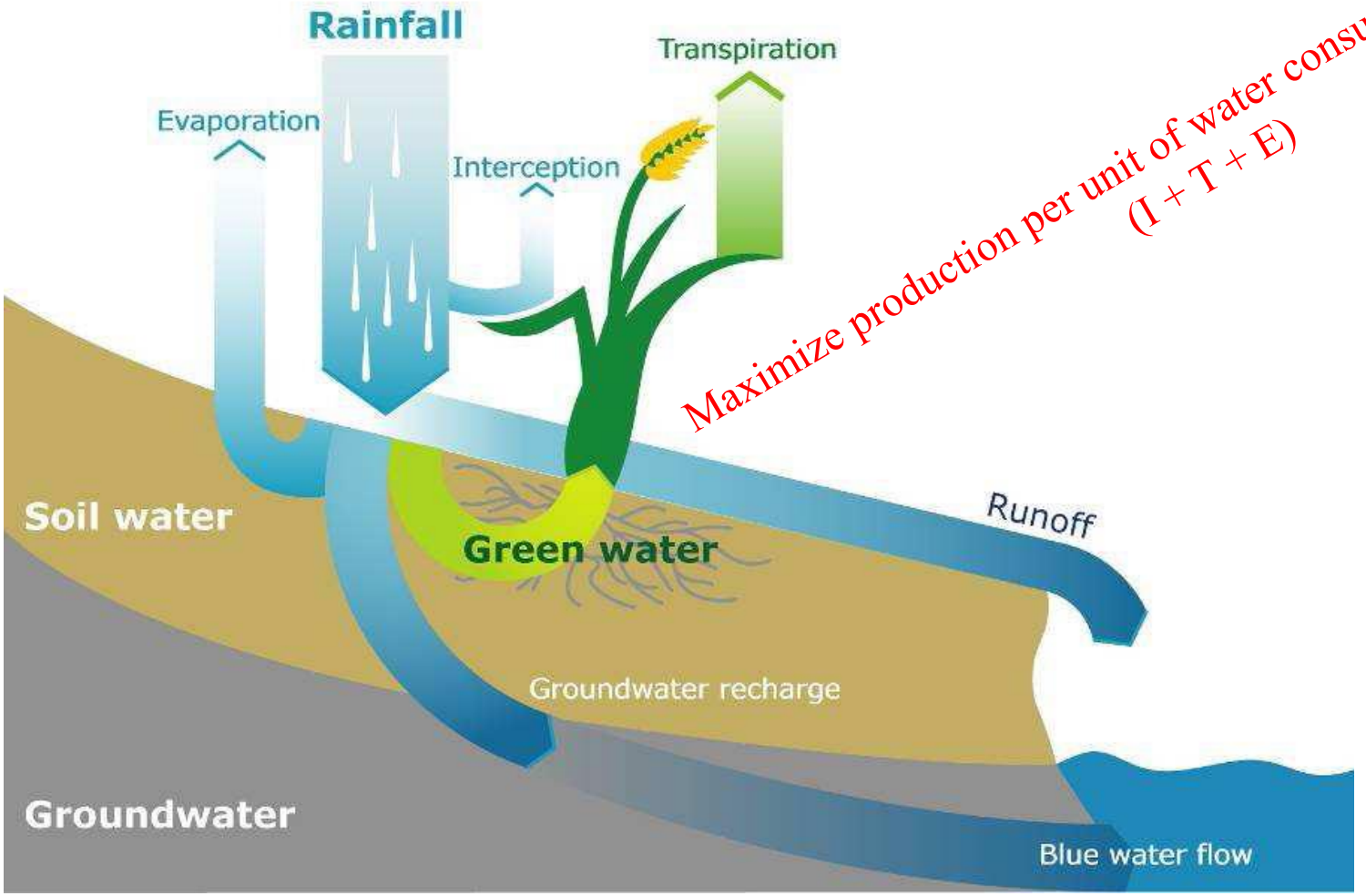


Source: Amell, 2004

Need to calculate Water Productivity

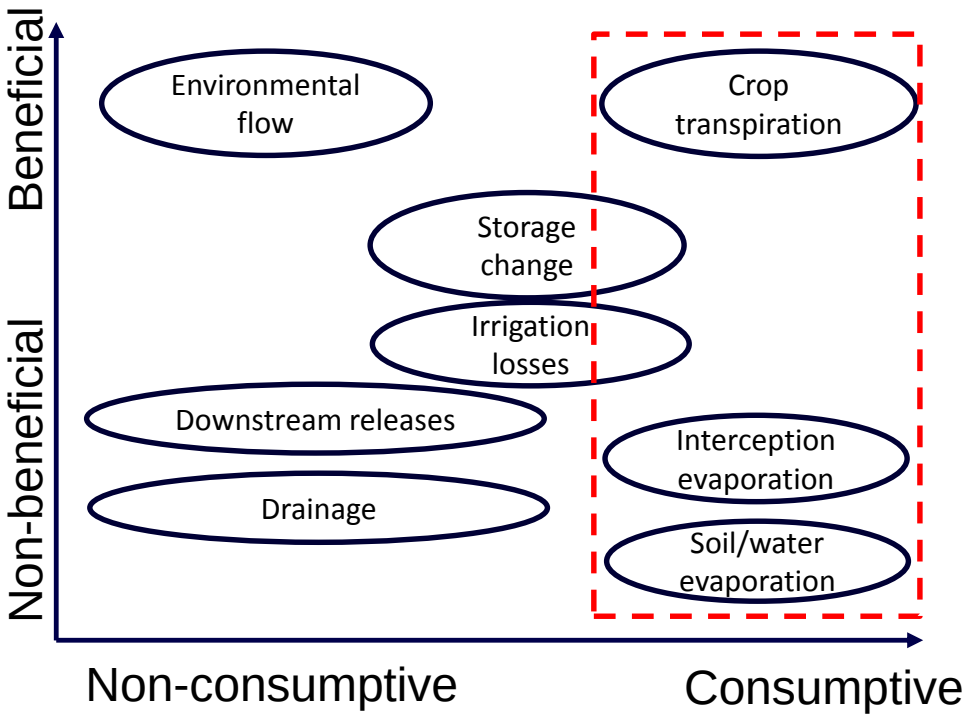


The water cycle



Maximize production per unit of water consumed
(I + T + E)

Consumptive use of water



Definition

$$\text{Water Productivity} = \frac{\text{Production}}{\text{Water consumed (ET)}}$$

Water Productivity - Concept

$$\text{Water Productivity} = \frac{\text{Production}}{\text{Water consumed (ET)}}$$

- Production:
  - Crop biomass or yield
  - Economic value
  - Jobs
  - Ecosystem value
  - Recreational value
  - Aesthetic value

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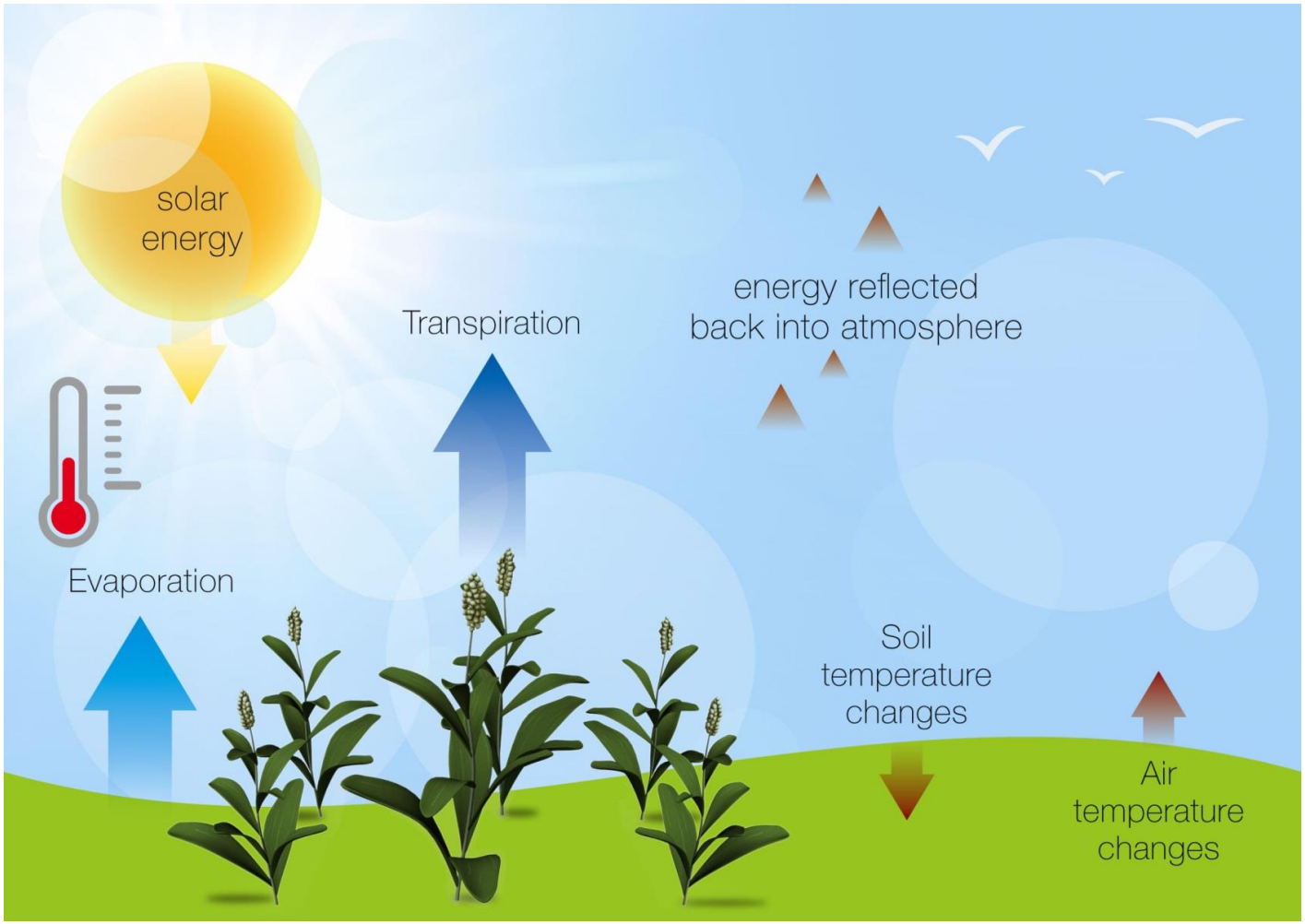
Water consumed

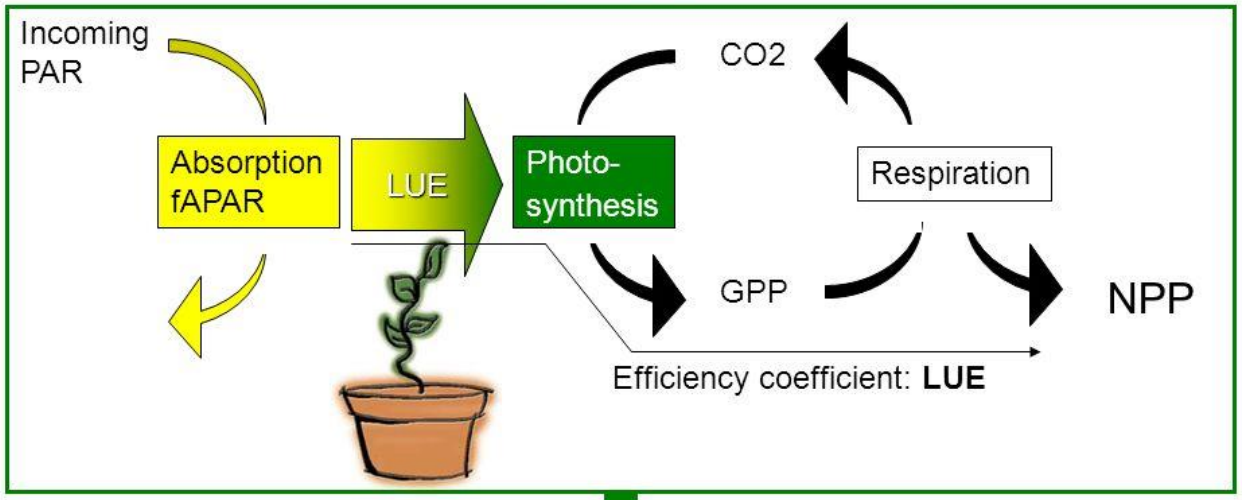
$$\text{Water Productivity} = \frac{\text{Production}}{\text{Water consumed (ET)}}$$



Biomass Production

$$\text{Water Productivity} = \frac{\text{Production}}{\text{Water consumed (ET)}}$$

Light Use Efficiency models



$$NPP = LUE \cdot \sum_{day=1}^{365} fAPAR \cdot PAR$$

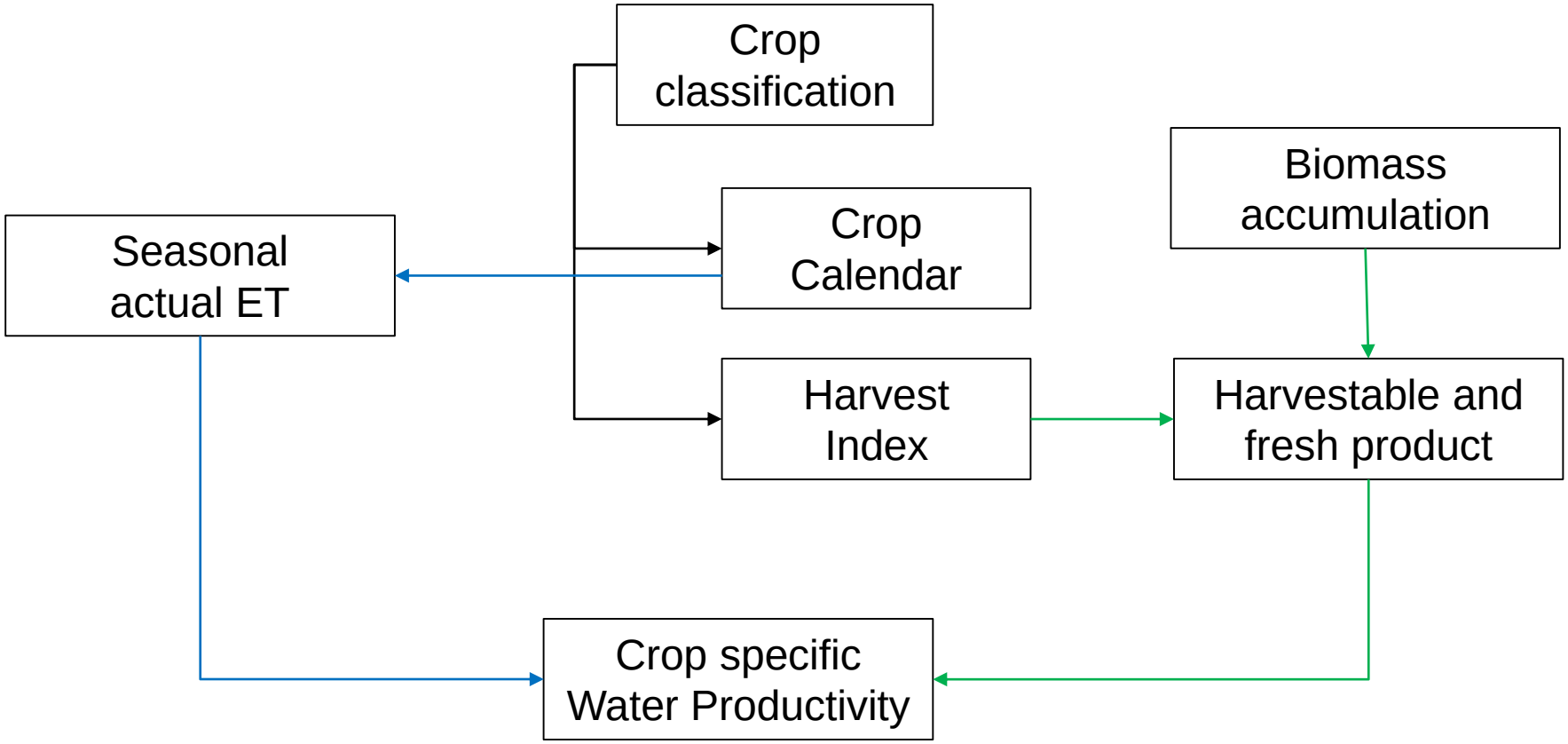
PAR = photosynthetically active radiation
fAPAR = fraction absorbed PAR (leaf area index)
LUE = light use efficiency (stress factors)

The LUE may depend on biome, soil moisture, temperature, nutrients, age,

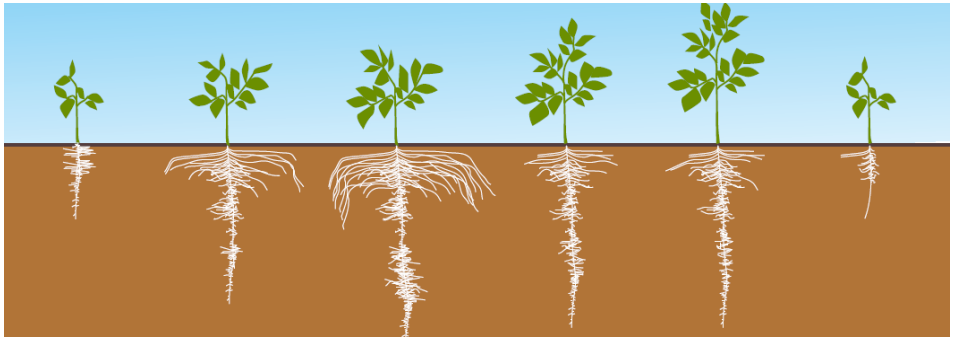
Measured by satellites

Modeled or measured by satellites

Calculation of Crop Water Productivity



Above and below ground biomass



Yield and Harvest Index

$$\text{Fresh yield [kg]} = \frac{\text{Harvest index} * \text{Biomass dry weight [kg]}}{1 - \text{moisture content product } \theta}$$

Harvest Index

Which crop do you think has a higher harvest index?

Olive oil

~0.012

Onions

~0.55

Harvest Index

Which crop do you think has a higher harvest index?

Grass hay

~0.6

Oranges

~0.22

Harvest Index

Which crop do you think has a higher harvest index?

Rice

~0.33 (rainfed)
~0.42 (irrigated)

Wheat

~0.37

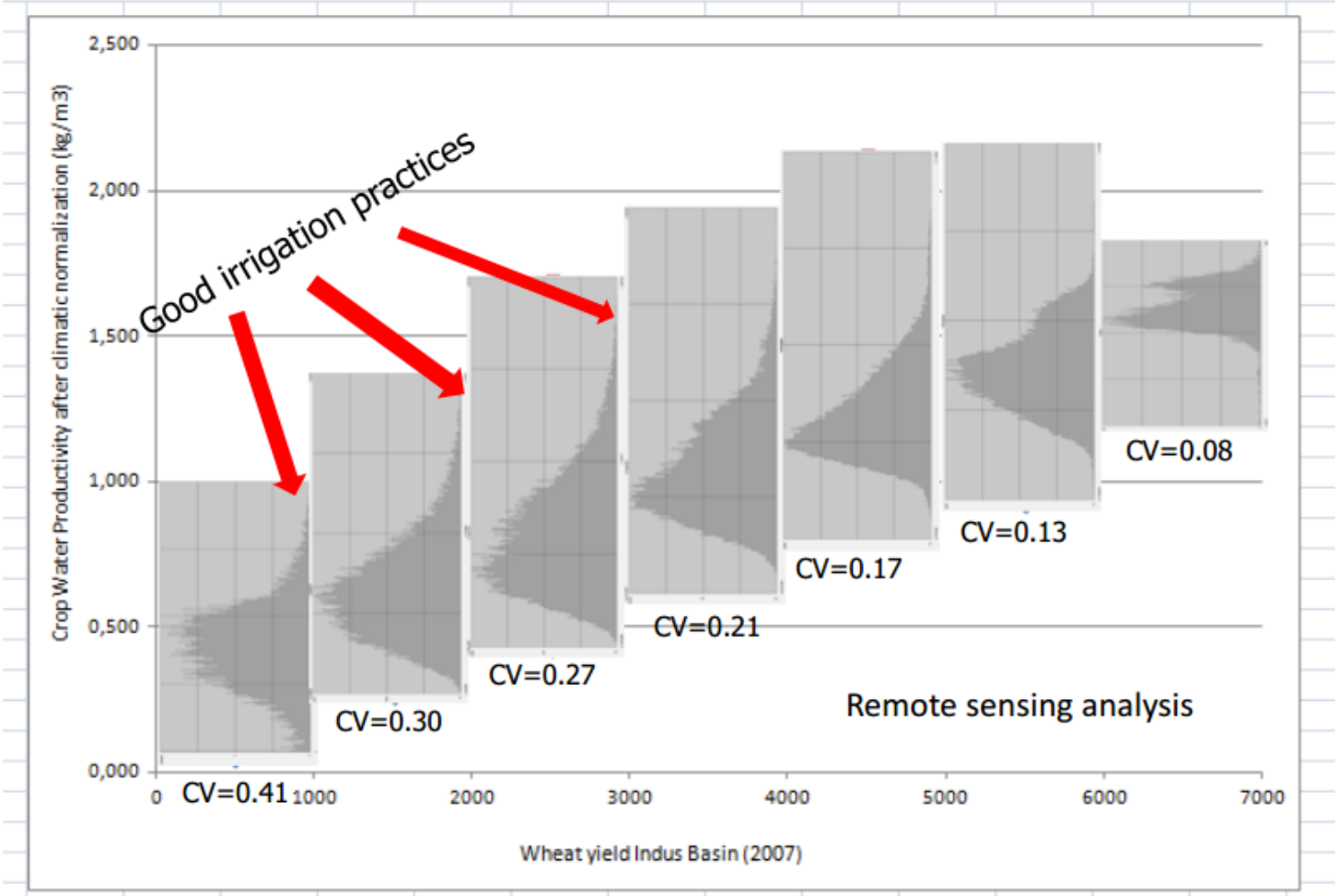
Applications SDG 6.4.1

- Water Use Efficiency for agriculture and other sectors (industry, domestic)
- Reporting and monitoring method needed

SUSTAINABLE DEVELOPMENT GOALS

Yield gaps

Crop yield zones as expression for production potential



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Farmer Applications

Additional resources

MasterClass on Water Productivity

http://www.thewaterchannel.tv/waterproductivity

Discussion

Enter the Game PIN


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