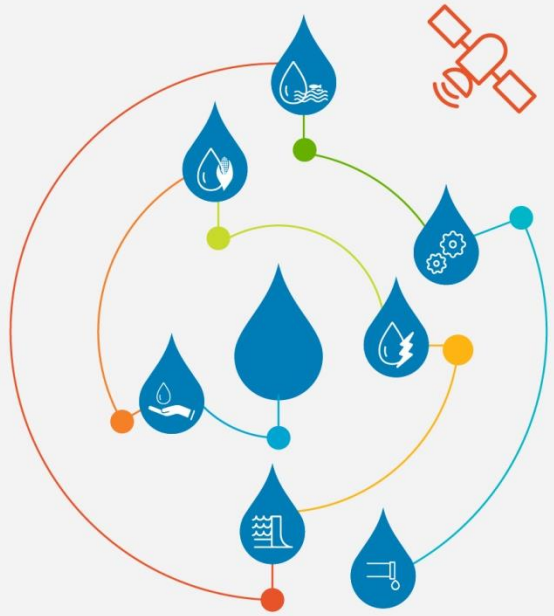
Variability of Field Scale Water Productivity in Different Crops as a Basis for Policy Making



Wim Bastiaanssen & Xueliang Cai

IHE-Delft

Water for Food Session, 2 October 2018

ADB

Problem description

- Water in the agricultural sector is not used optimally
- Significant within-irrigation system variability of crop production and water availability = NON Uniform practices
- Irrigators think in terms of water supply; water resources planners in terms of water consumption
- Applied water is rarely measured
- There is no WP reference for different agro-ecosystems, hence benchmarking is absent: WHEN IS IT GOOD ?

Let’s focus on the impact of irrigation: food produced and water consumed

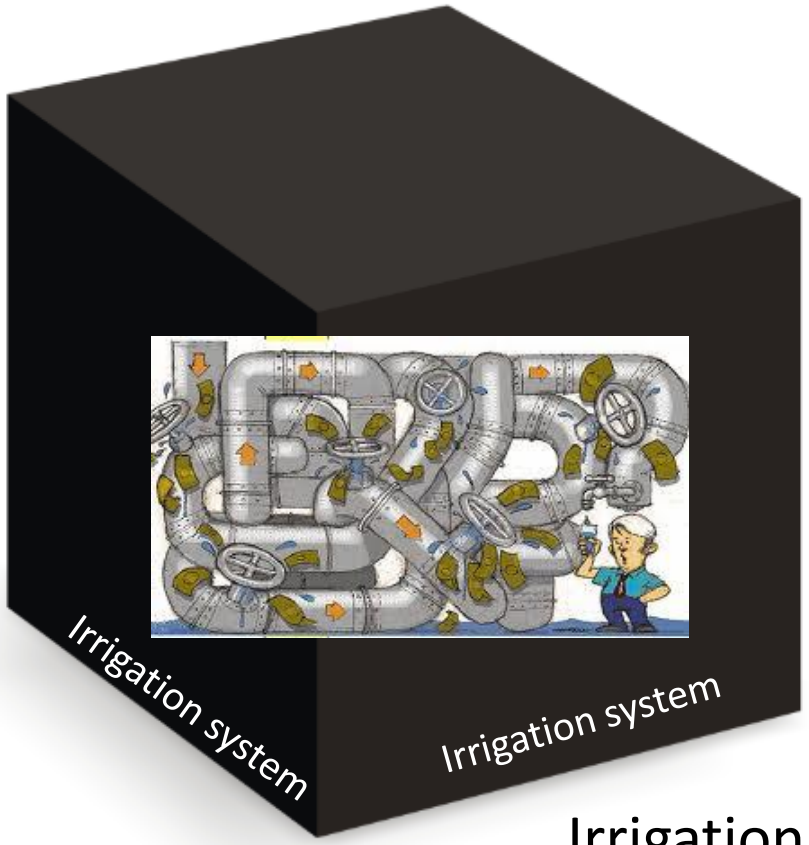
Crop production

Maximize it

Crop evapoptranspiration

Minimize it

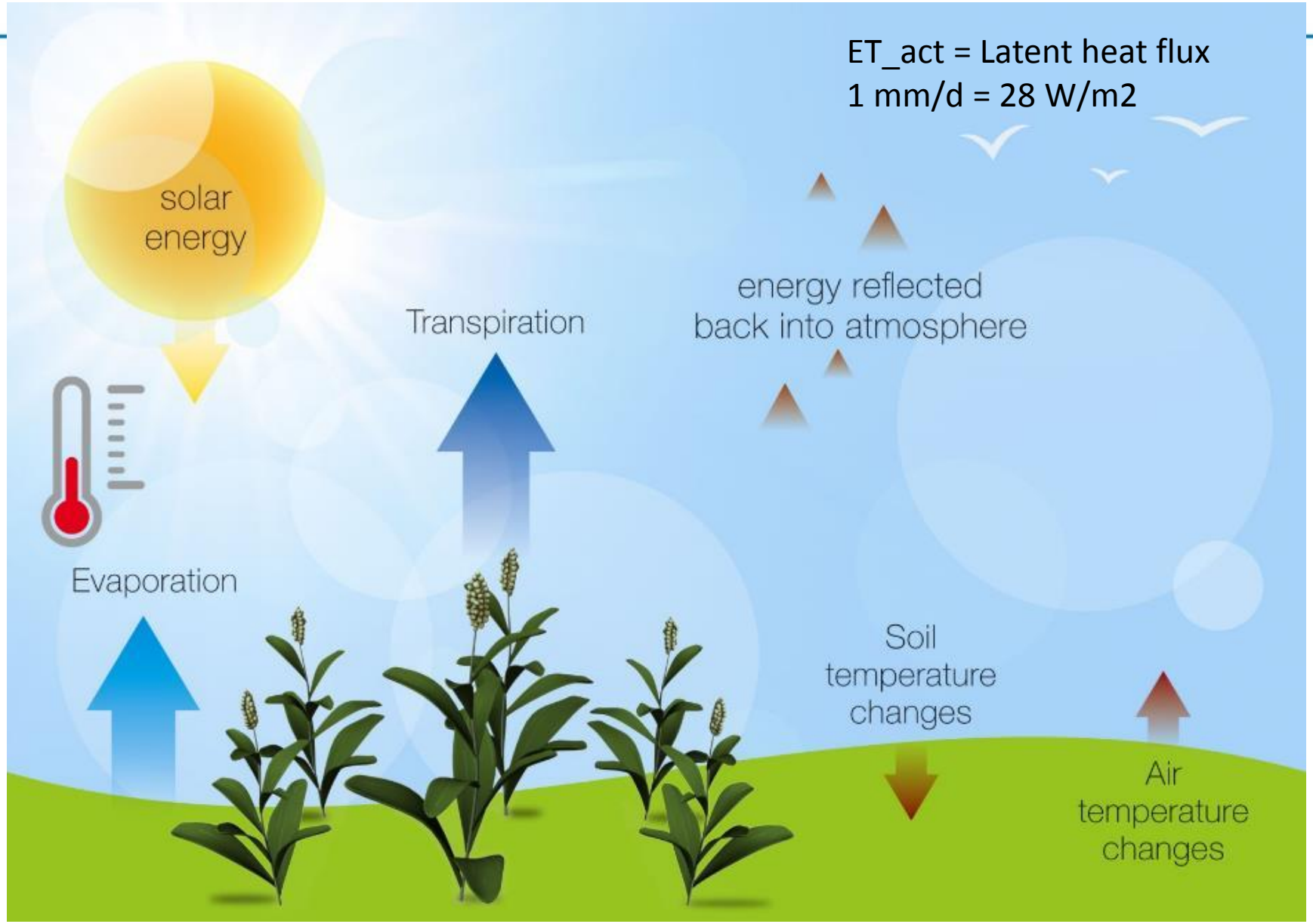
Water In



Water Out

Irrigation is a big black box

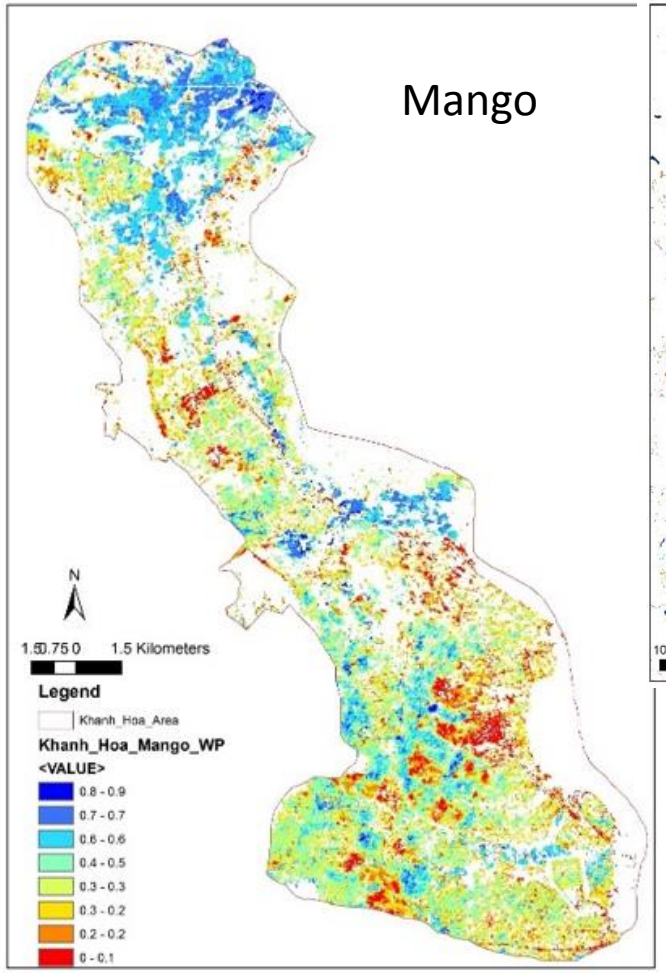
SEBAL energy balance model applied in 6 Asian irrigation systems

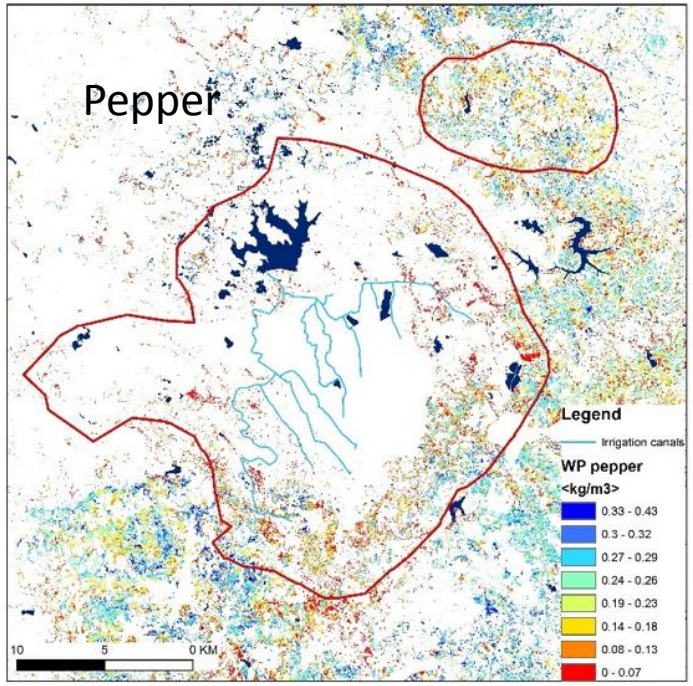


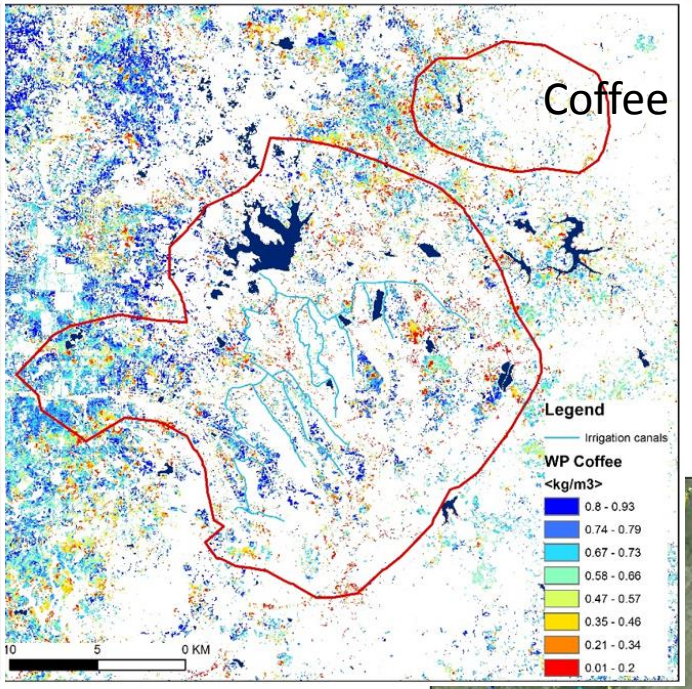
What did we do ?

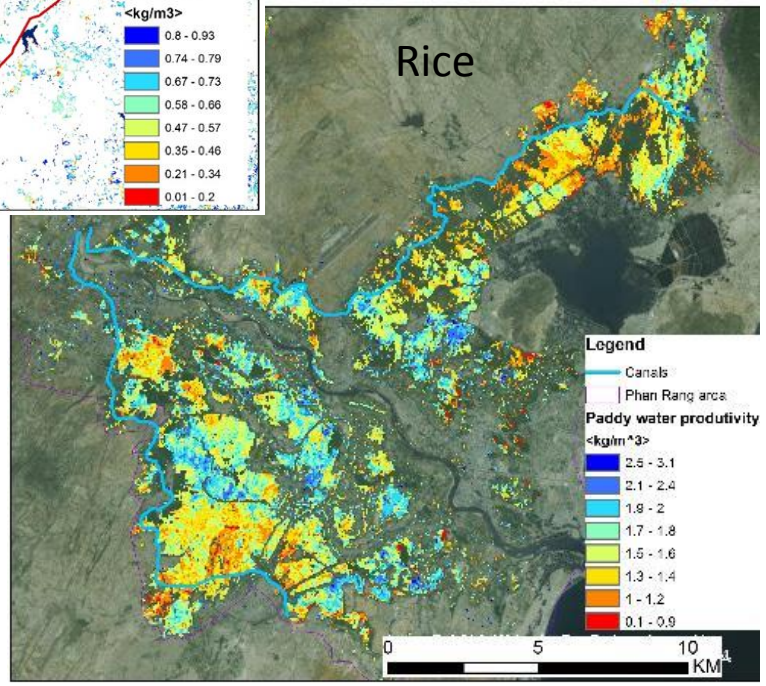
- Six irrigation systems in Indonesia, Vietnam, India, Pakistan and Sri Lanka have been diagnosed with one standard remote sensing measurement and methodology
- Local agronomists inspect the crop types and the yield from ground surveys; Crop yield is thus calibrated
- Ranges of land (kg/ha) and water productivity (kg/m3) have been determined
- Gaps of local water productivities are determined
- One week training course on SEBAL modelling provided

Water productivity for different crops (Vietnam)









Mango	: 110,000	Dong/m3
Pepper	: 51,000	Dong/m3
Dragon fruit	: 11,000	Dong/m3
Rice	: 8,000	Dong/m3
Coffee	: 4,500	Dong/m3

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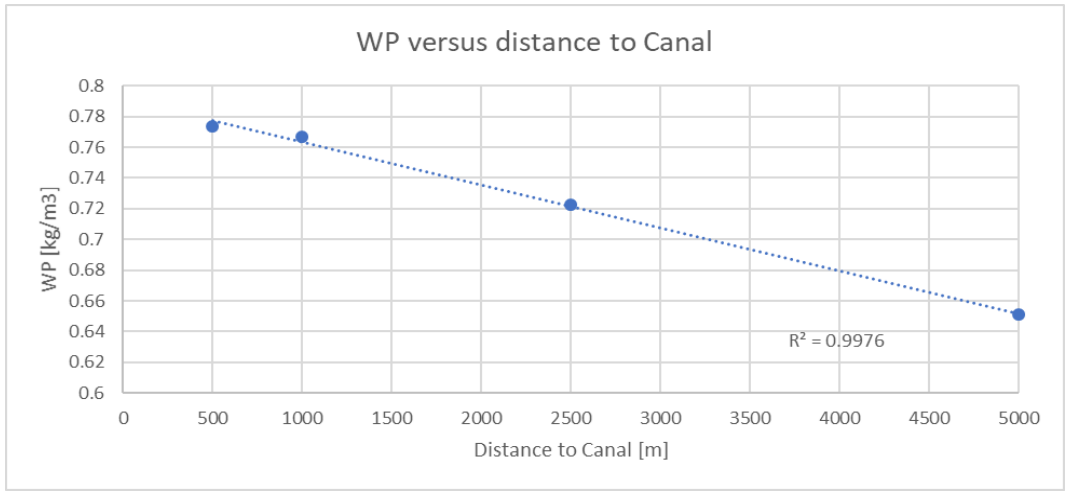
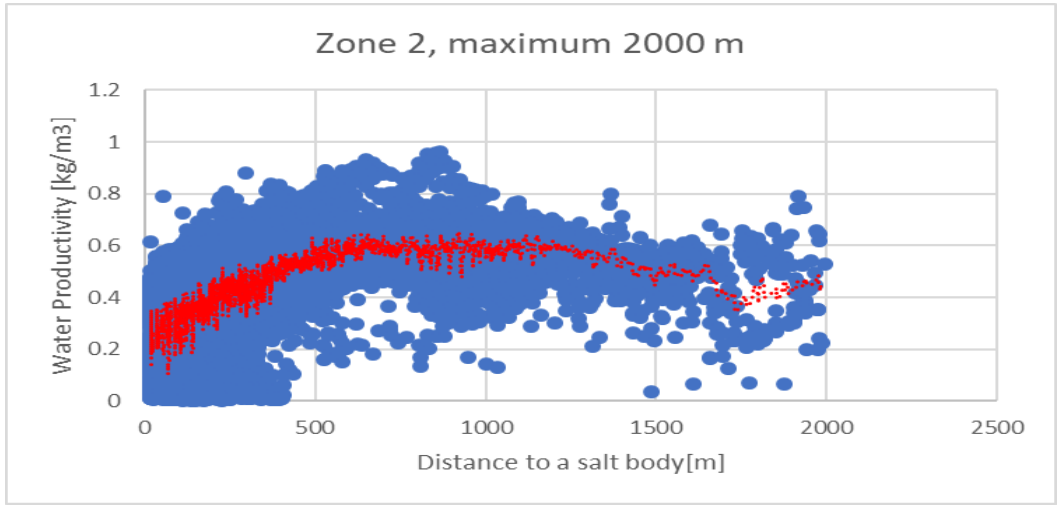
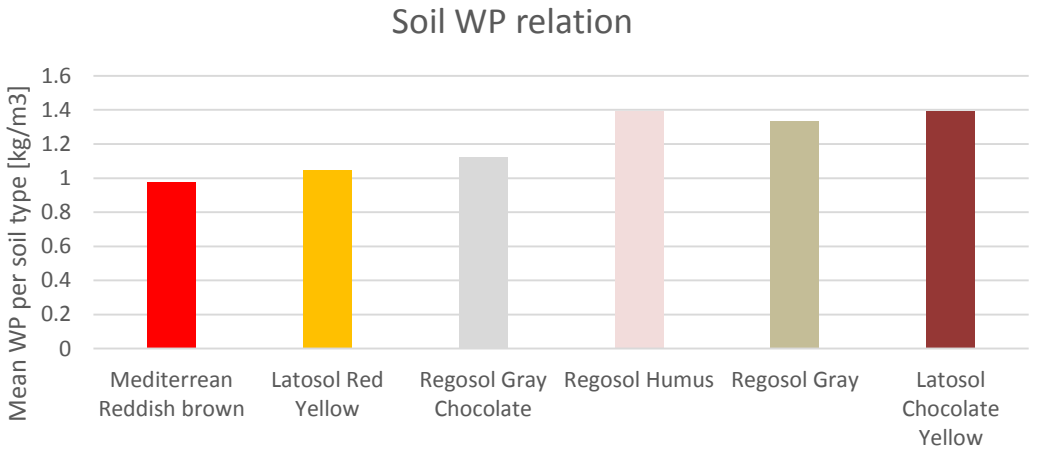
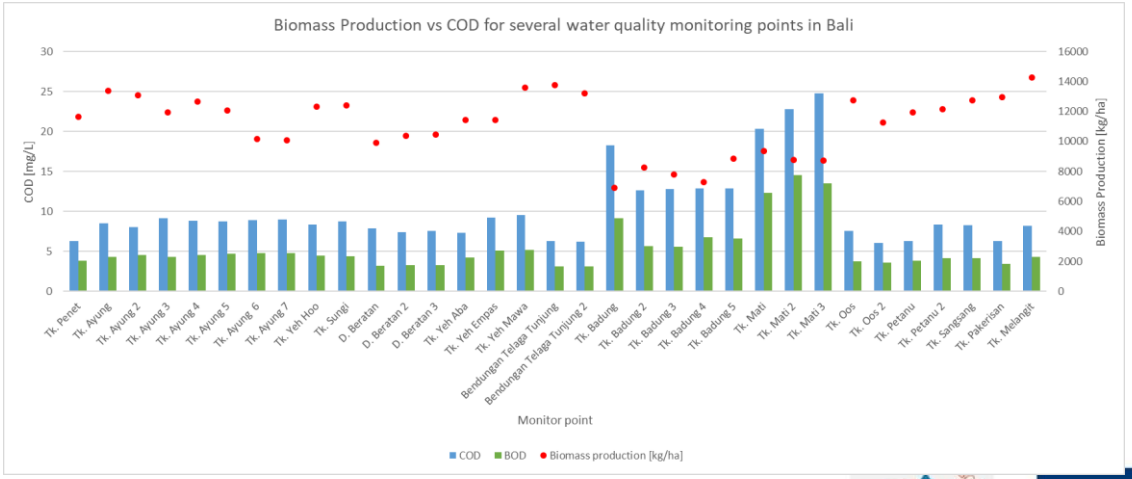
Explanatory factors for WP variability (Indonesia)



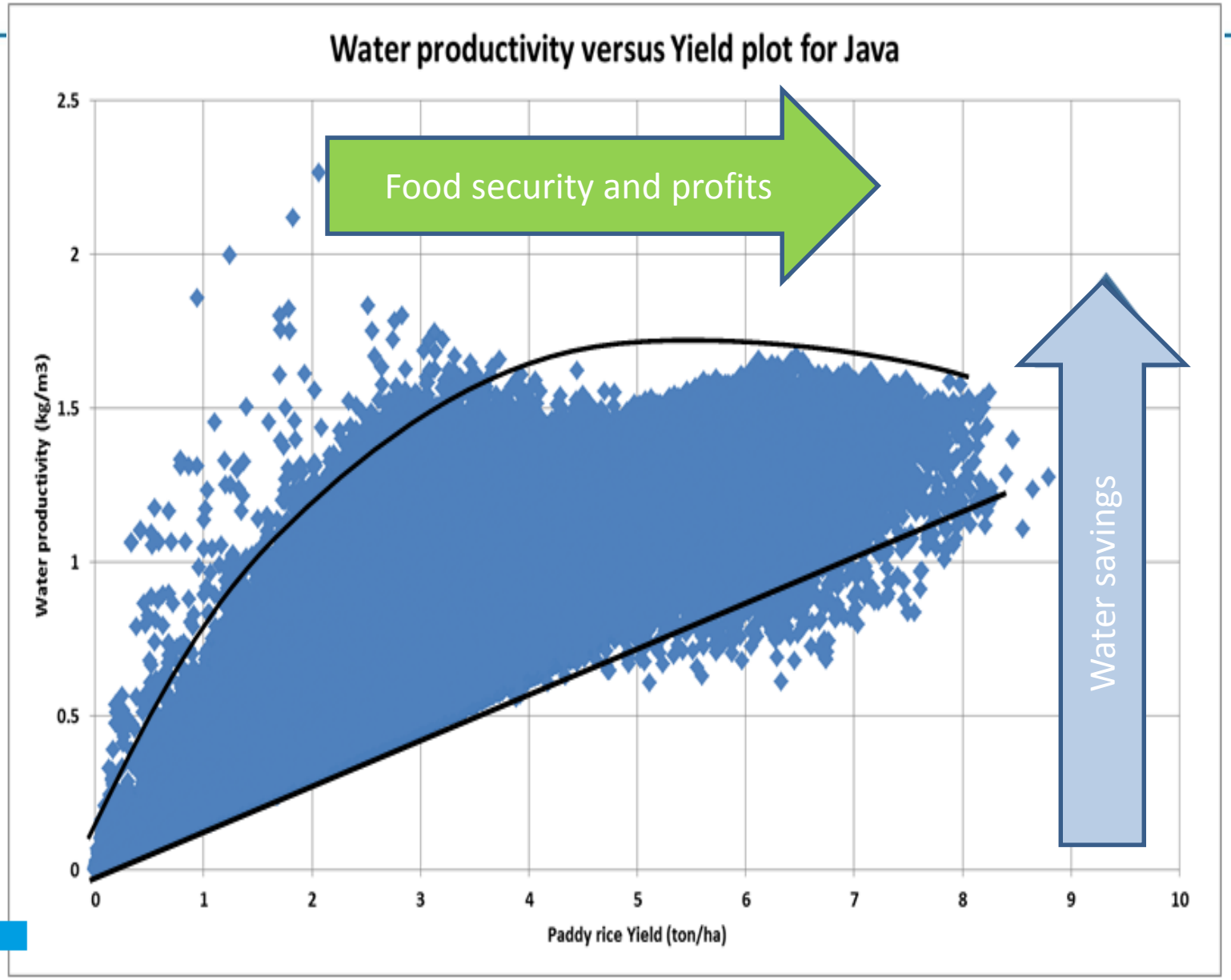




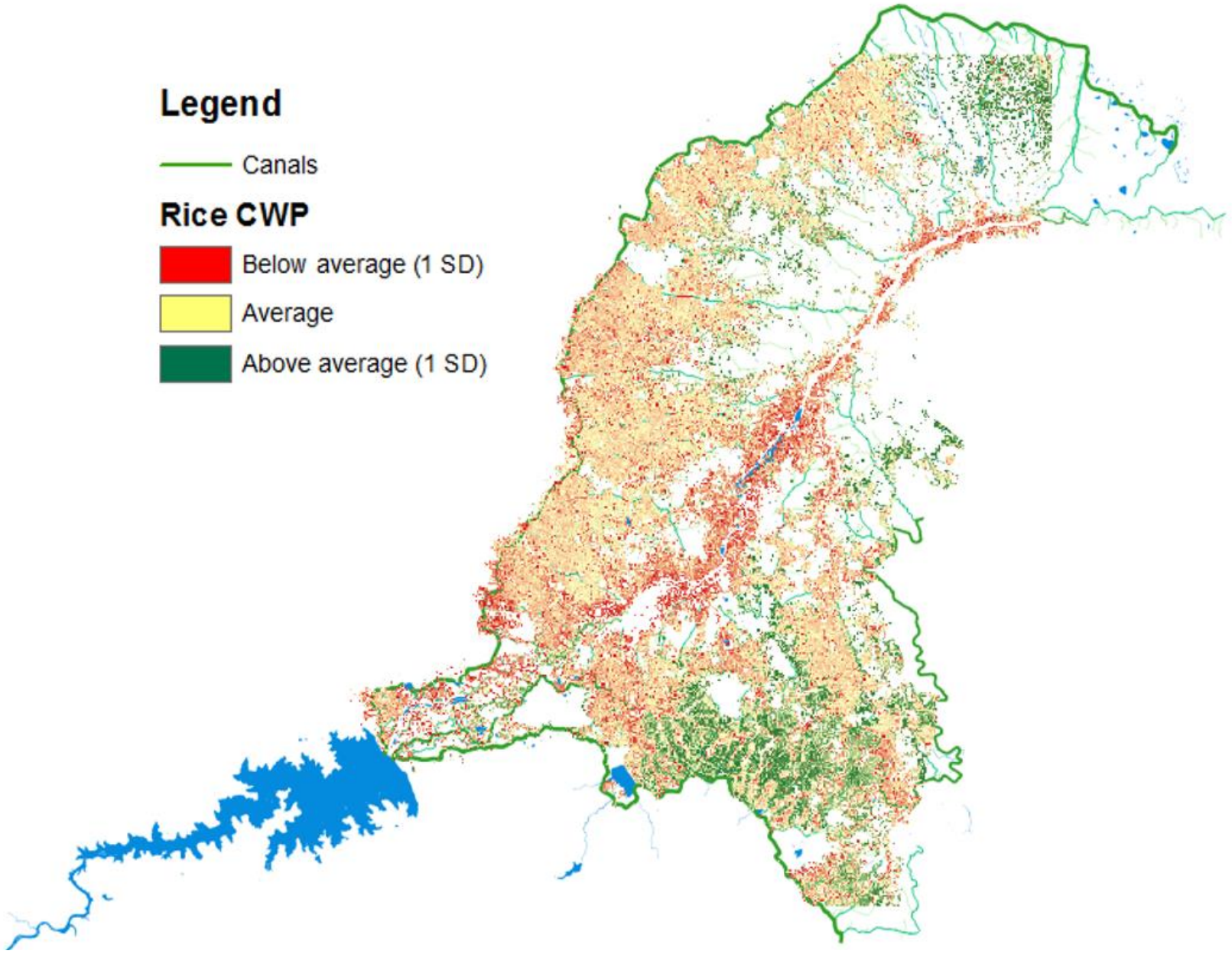


What is the target ?

Optimizing land and water productivity



Priority investment Karnataka (India)




Remote Sensing for Water Productivity
ssessment to Improved Irrigation Performance

Some observations

- Efficiency and productivity are confused; they are different concepts and policy makers confuse them – guarranteed. ADB staff is also on the learning curve
- Improving by **x %** as a project target across **y years** should be introduced (is also Dutch policy)
- Baseline survey is crucial for ADB projects to evaluate success
- Local crop maps can only be made by local agronomists; this cannot be automated and upscaled

Way forward

- Policy makers need to understand the merits of water productivity and develop policy accordingly
- Definition of target values of WP for zones with similar physical conditions and economic opportunities. The Governments of Indonesia and Cambodia want this. 5 and 10 year targets need to be developed
- India and Pakistan are also interested, but less concrete actions (at least for now)
- Reduce huge spatial variability of production and water consumption by community engagement and extension services using modern devices (after policy is set)
- Building Water Productivity online tool where users can upload crop maps of a particular region and WP assessments will be made. WaPOR for Africa and Near East is a nice example
- SDG 6.4 is difficult to implement; better seek for Water Productivity based on water consumed
- ADB staff and international consultants becoming confident to explain differences between efficiencies and WP and use it in RRP an DMF

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