WaPOR-based Performance Indicators

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WaterPIP
Water Productivity Improvement in Practice

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The Role of Indicators?

To improve system operations

To assess progress against strategic goals

To assist performance-oriented management

To assess the general health of a system

To assess impacts of interventions

To diagnose constraints

To compare the performance of a system with others or with the same system over time (Benchmarking)

More in: Molden et al. 1998

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Overall GOAL: Improving the productivity of the use of land and water resources and quality of irrigation service delivery

More in: Molden et al. 1998

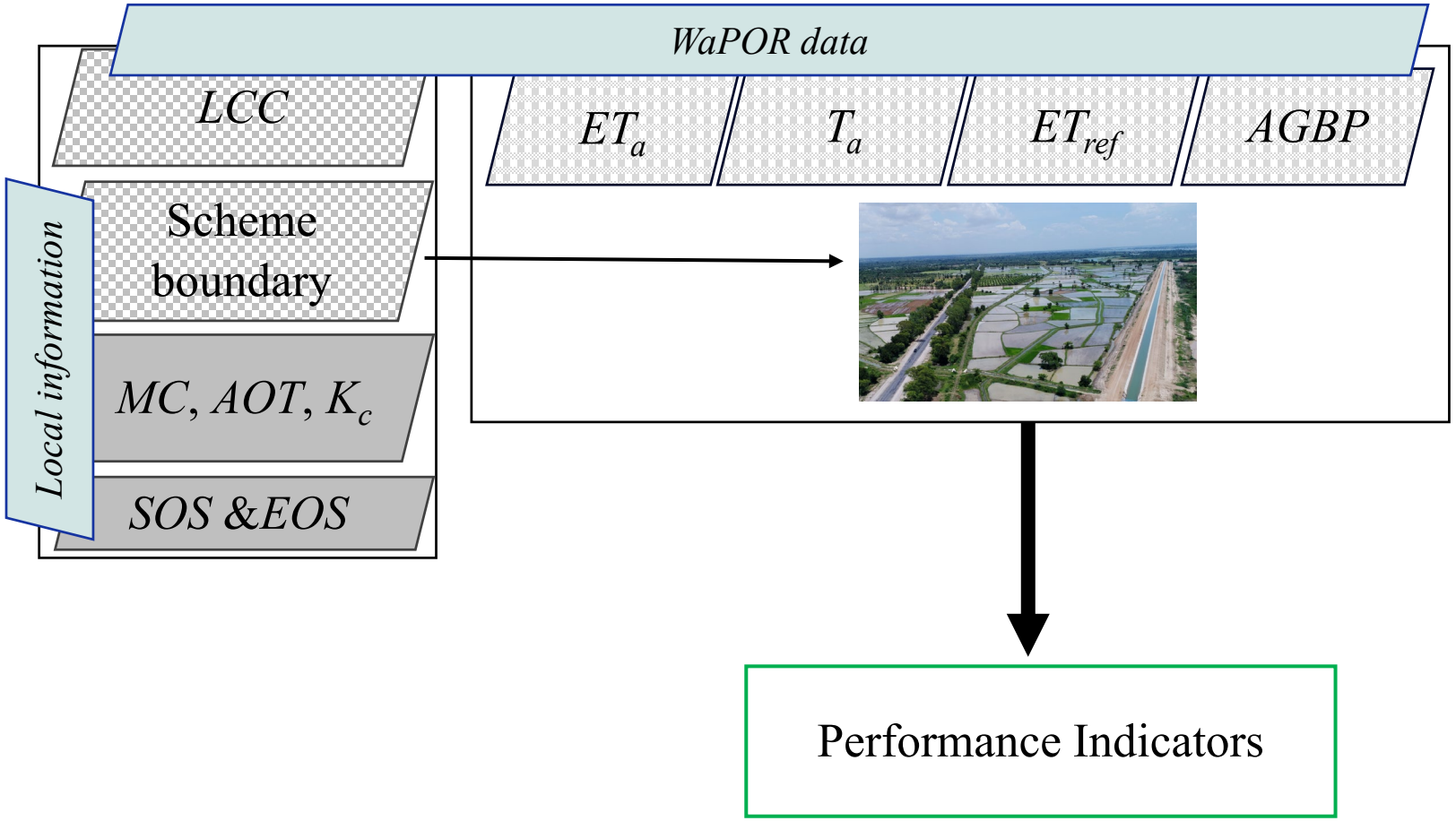
Challenges?

- Resources needed for extensive data collection
    - Time
    - Labor
    - Budget
- Lack of continuity
- Limited (or often no) knowledge of the past
- Limited geographical extent

How WaPOR can help?

- WaPOR offers freely available data on land, water, and climate
- WaPOR data is continuous
- WaPOR provides possibility of looking at the past (up to 2009)
- WaPOR covers a very large geographical extent (continent scale)

How does it work?



Some selected Indicators:

- Water Consumption (ET)
- Cropped Area
- Yield
- ET reference
- Beneficial Fraction
- Equity
- Relative Water Deficit
- Relative Yield Reduction
- Water Productivity

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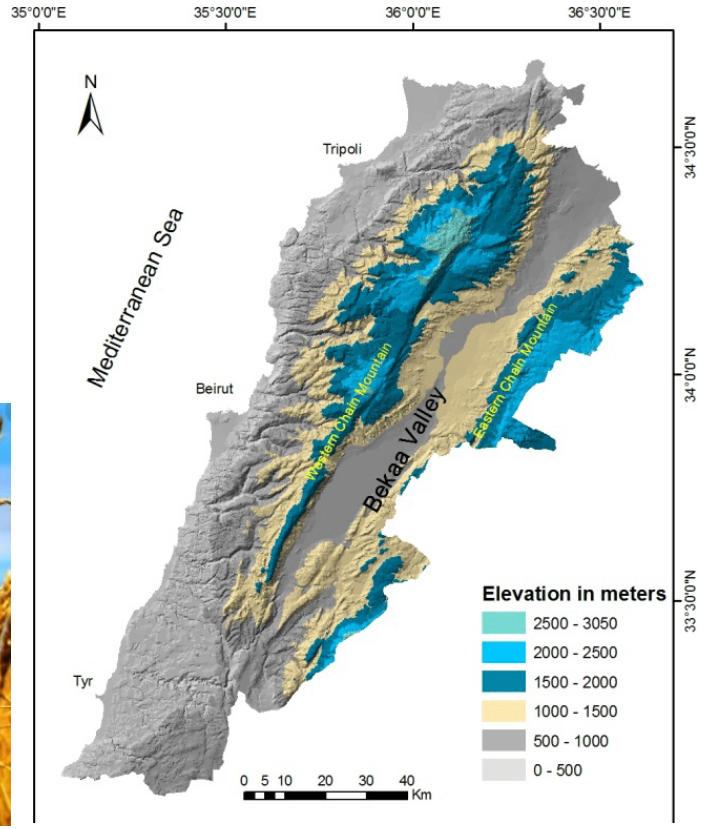
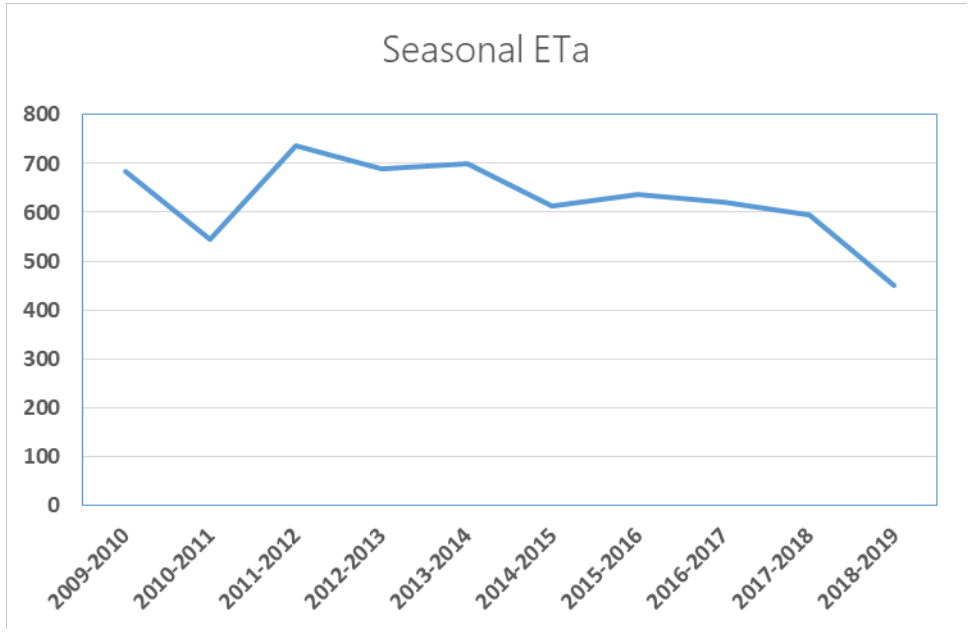
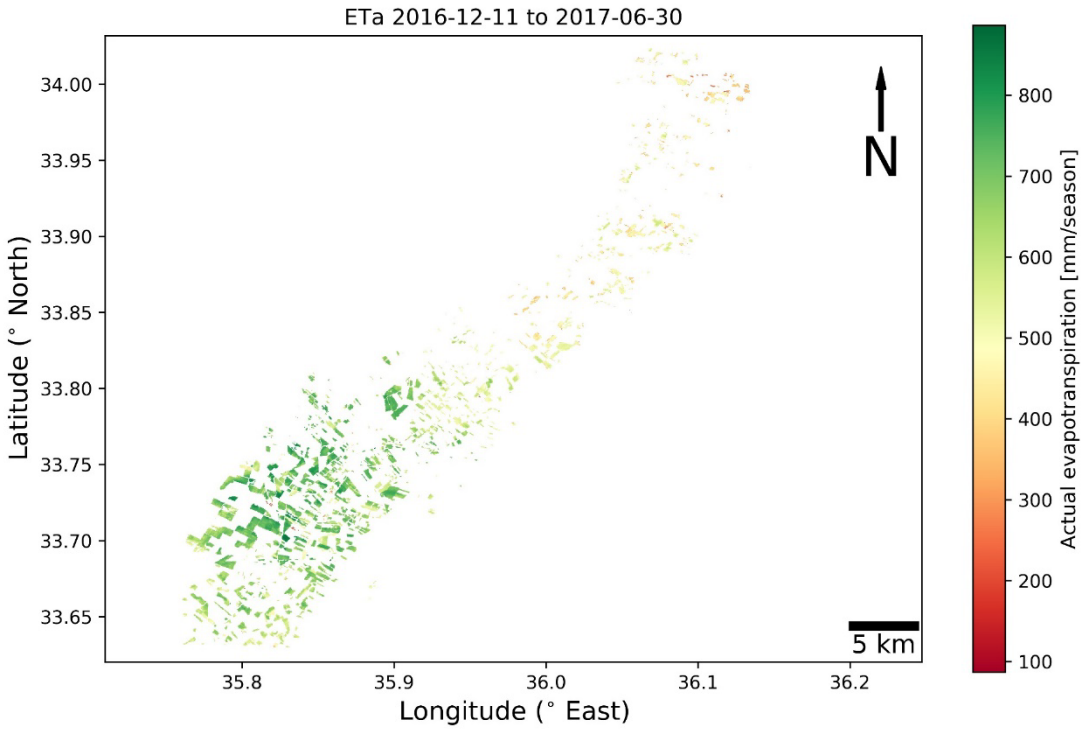


<u>case</u>

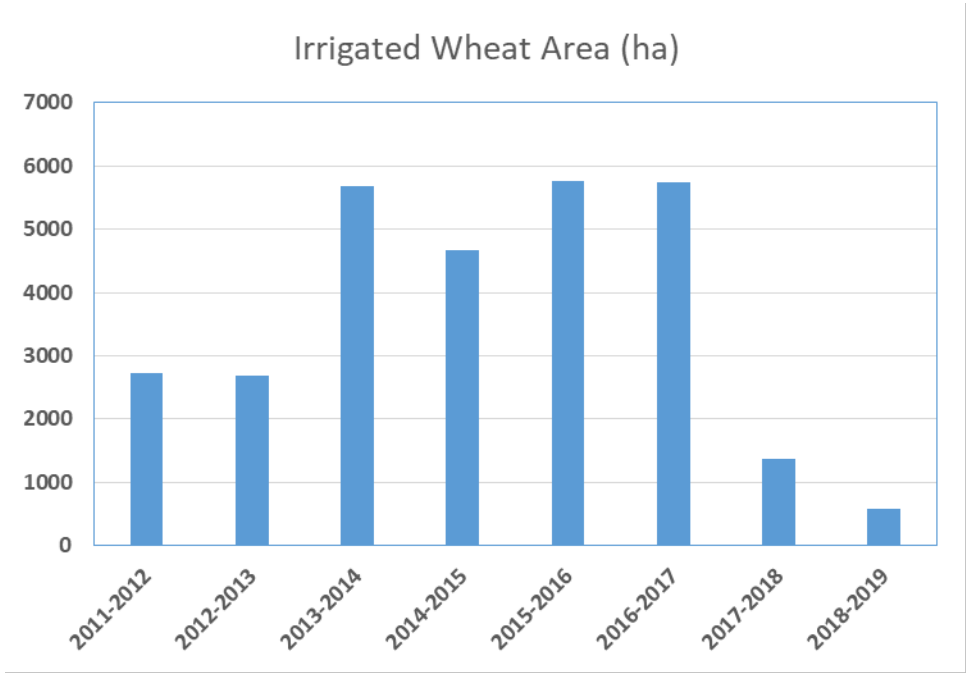
- Wheat production,
- Bekaa Valley (Lebanon)

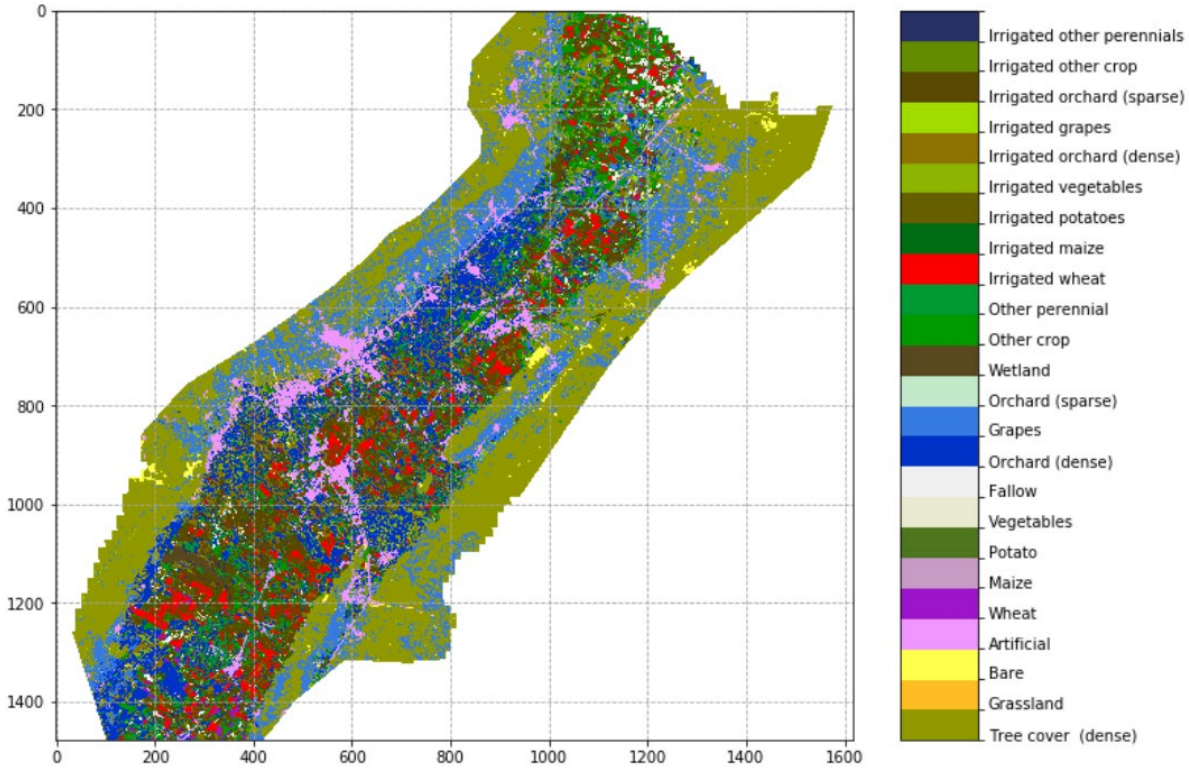
ET: Tracking crop water consumption



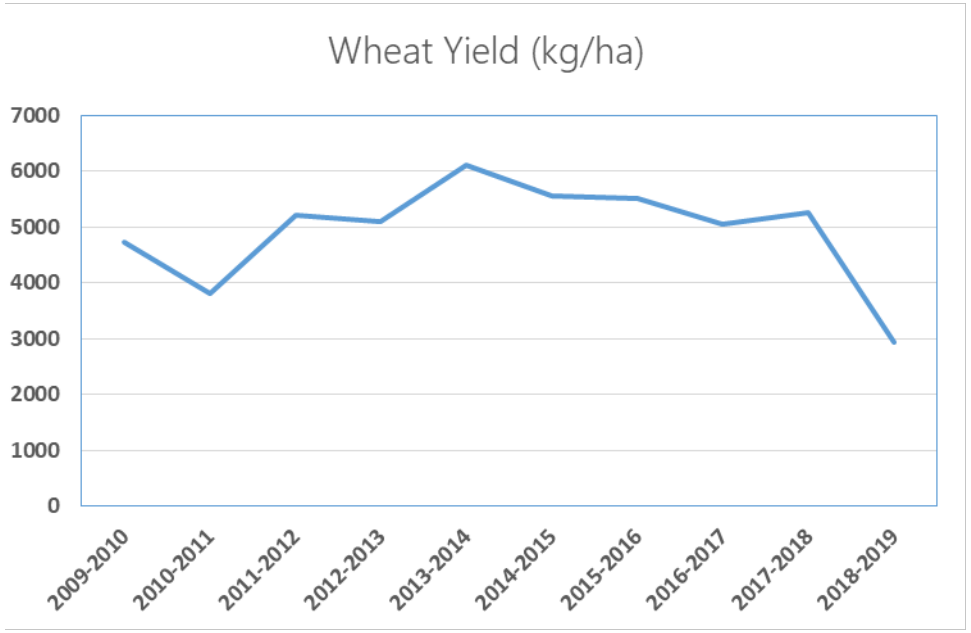


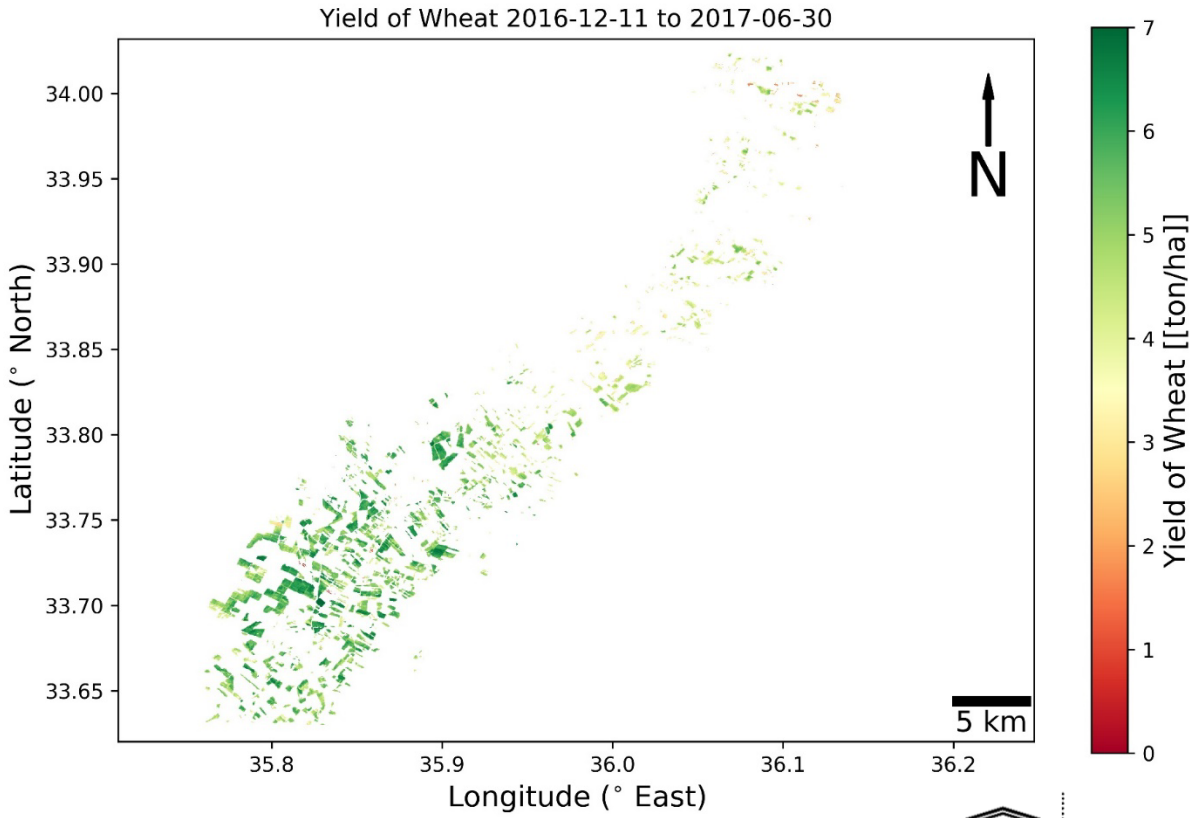
Cropped area: Tracking the extent of the use of land



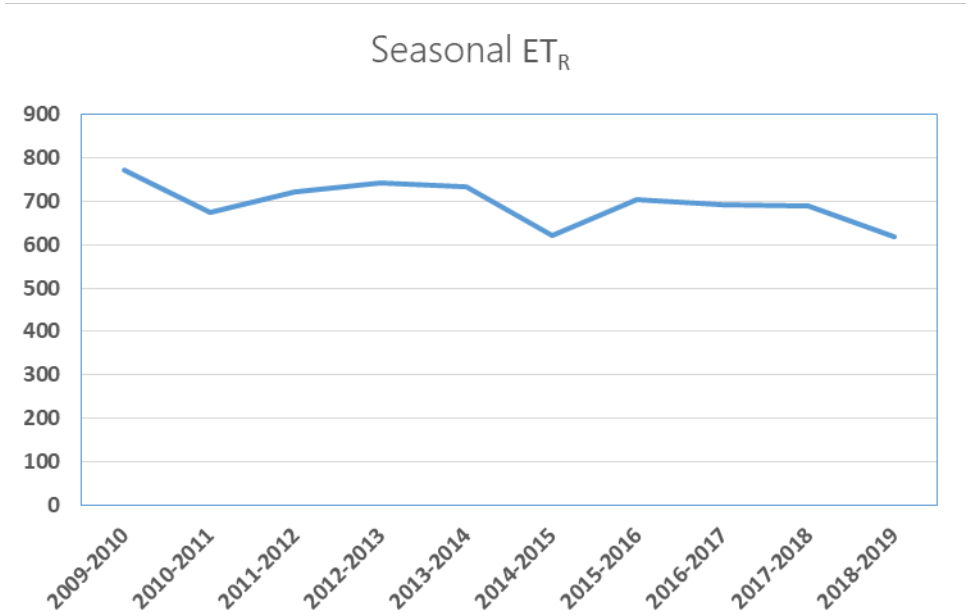


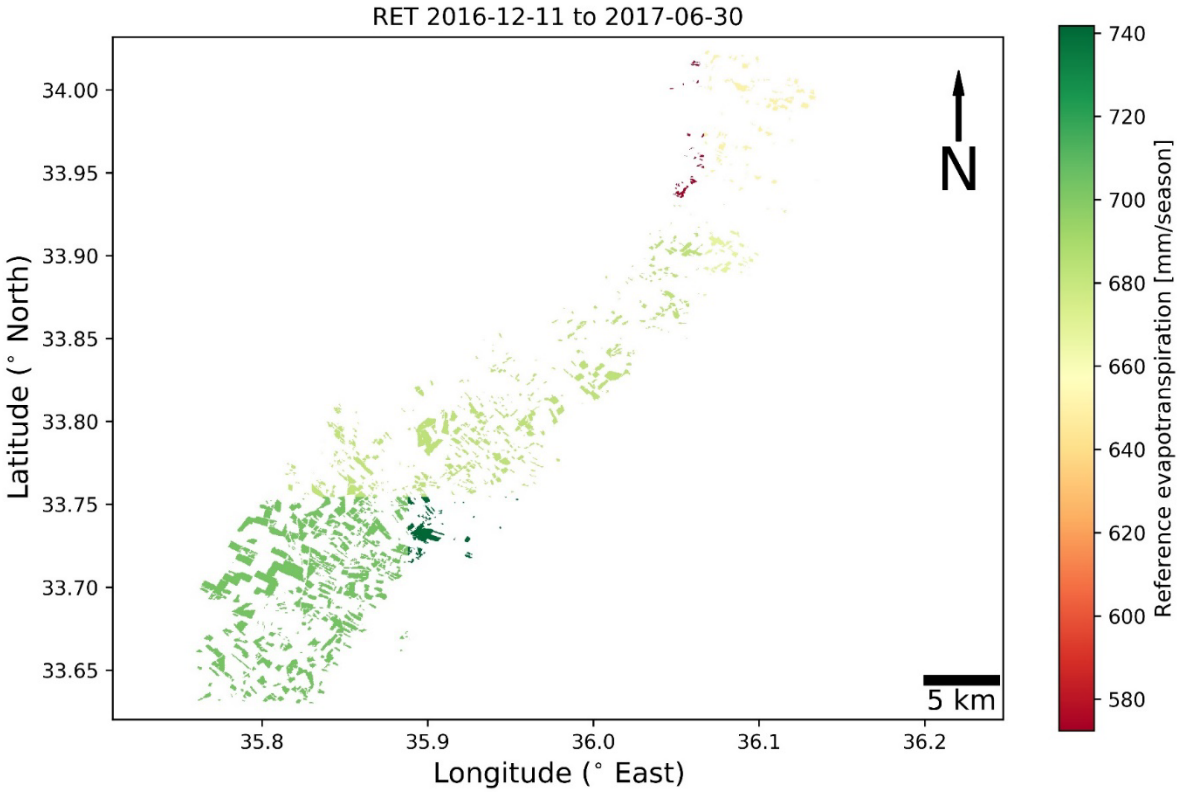
Yield: Tracking productivity of the use of land



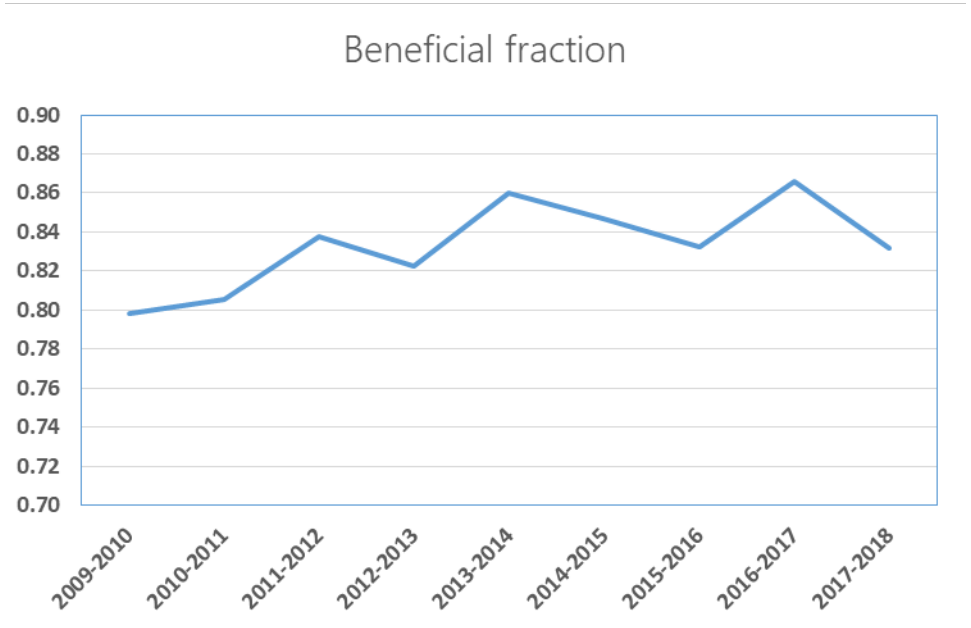


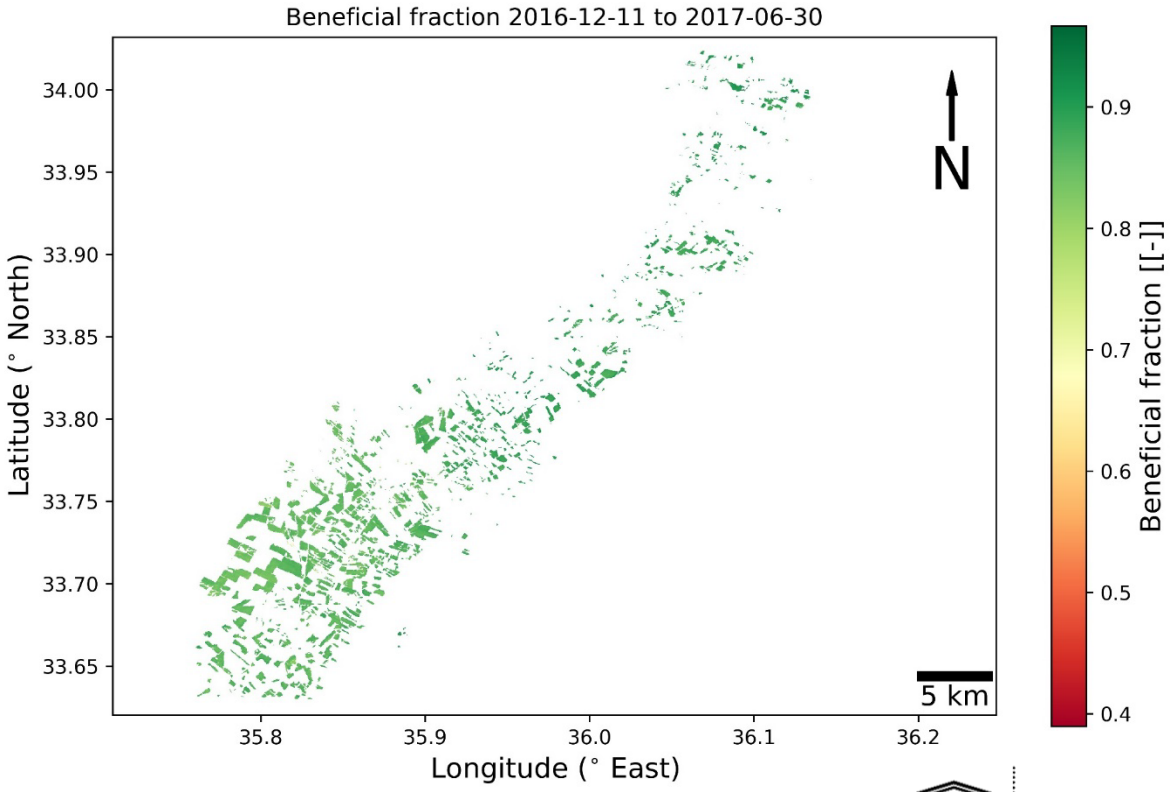
ET_R: Guiding allocations and crop Water Demand



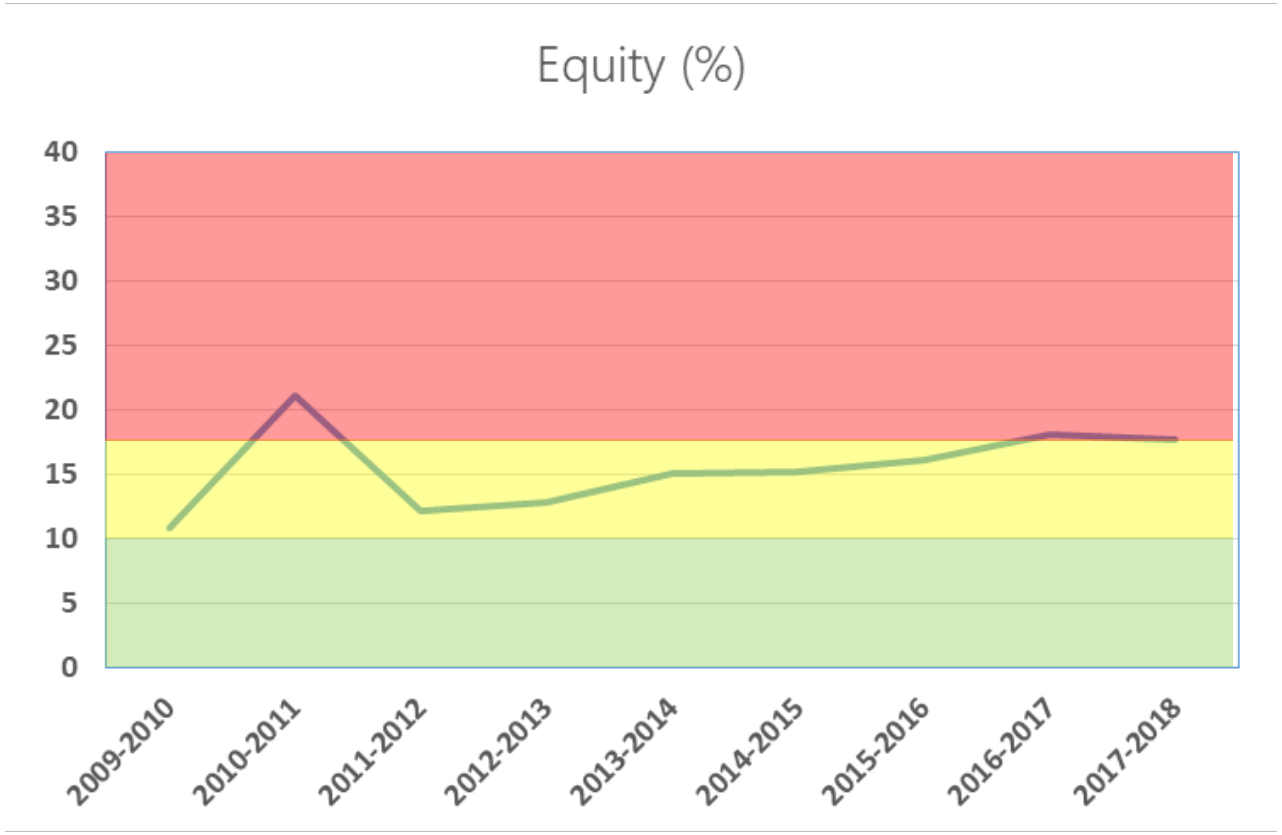


Beneficial fraction: Tracking system's efficiency

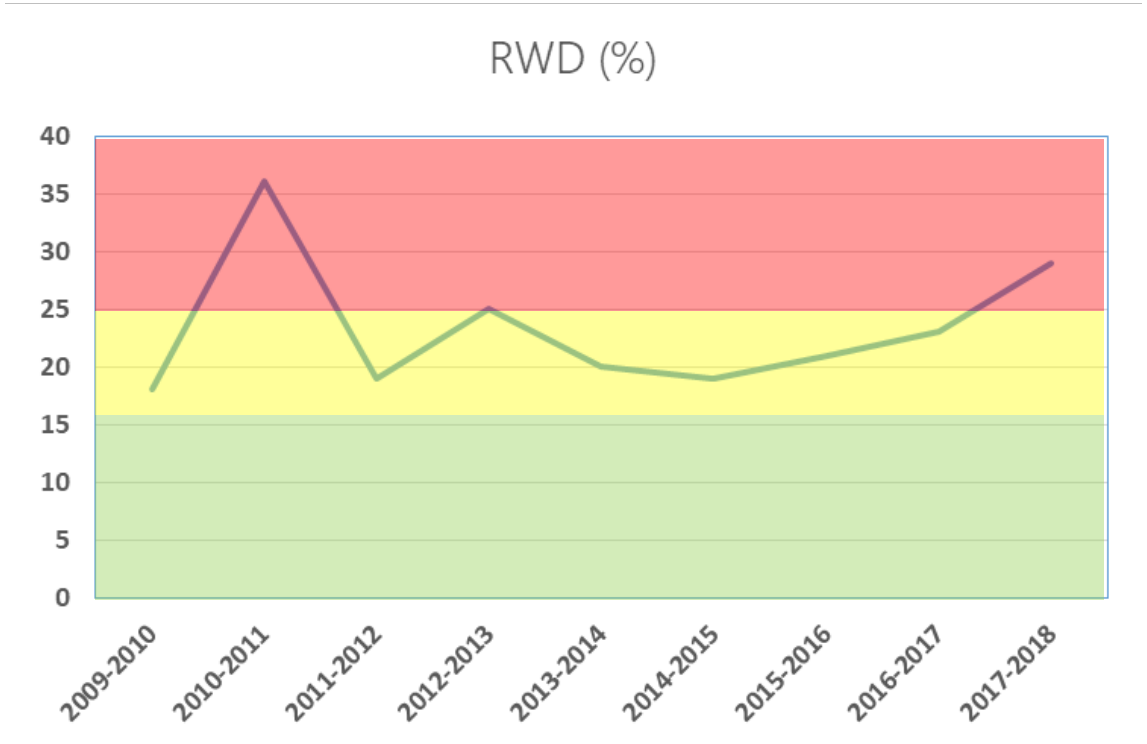


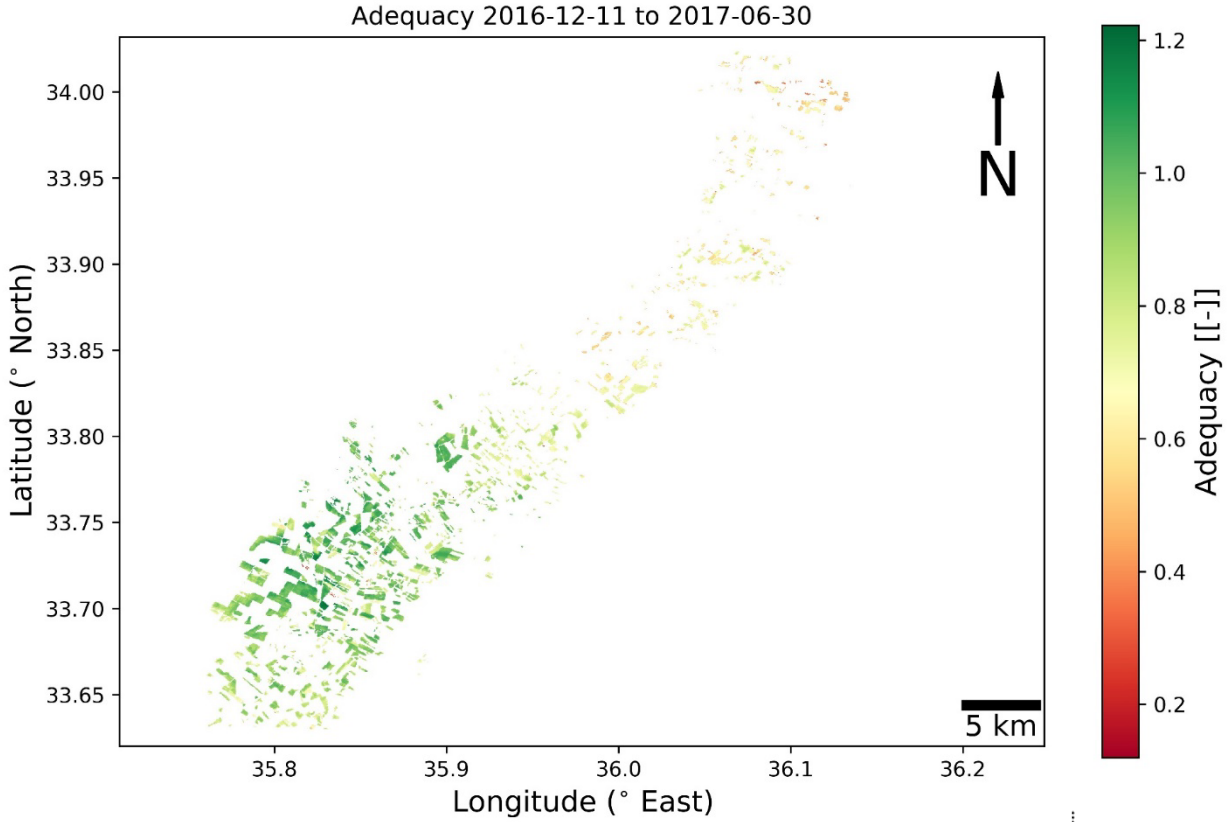


Equity: Tracking system's ability to provide equitable water distribution

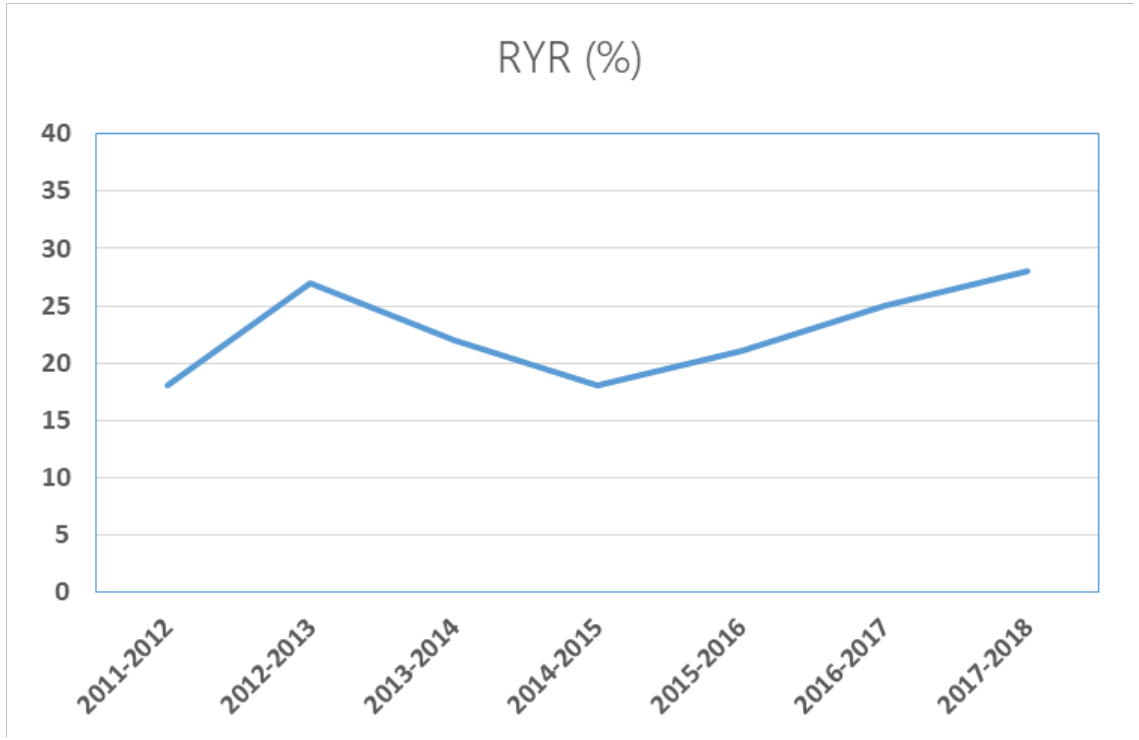


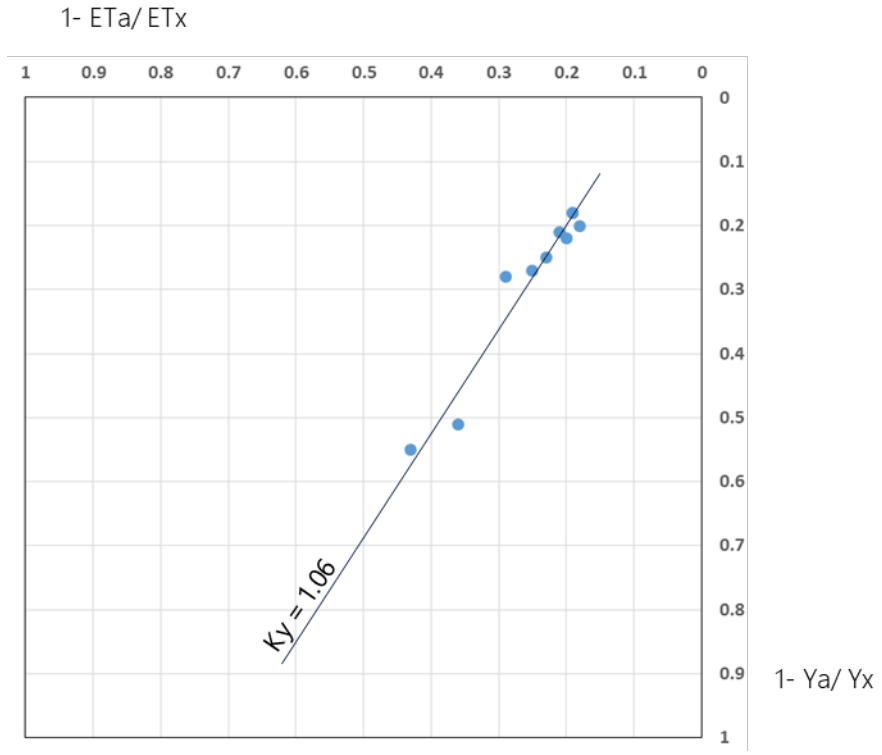
RWD: Tracking irrigation water adequacy





RYR: Tracking yield reduction



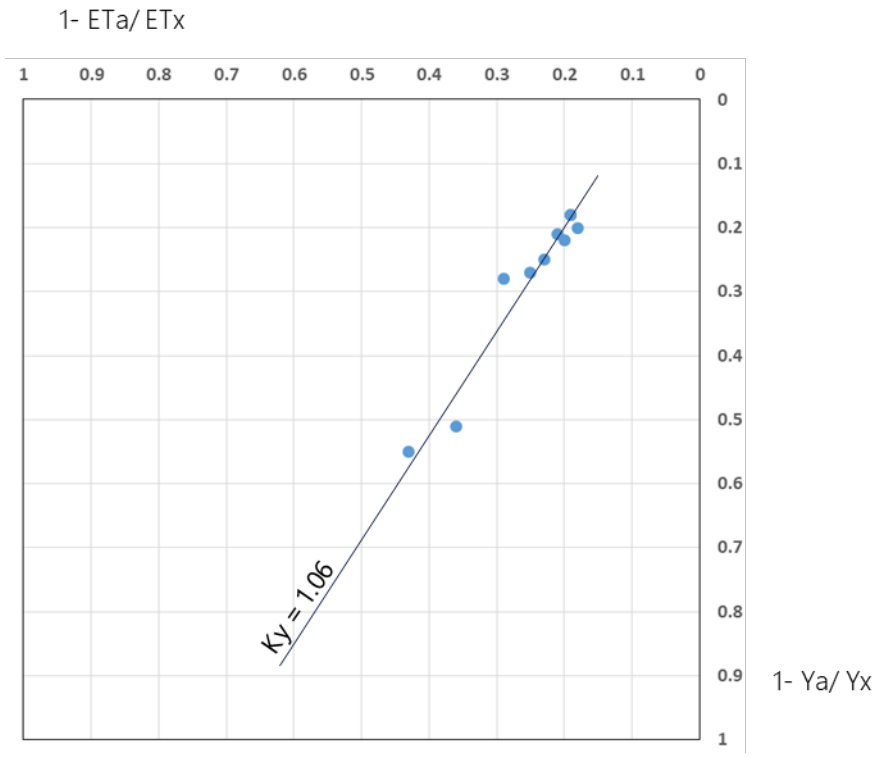


RYR: Tracking yield reduction

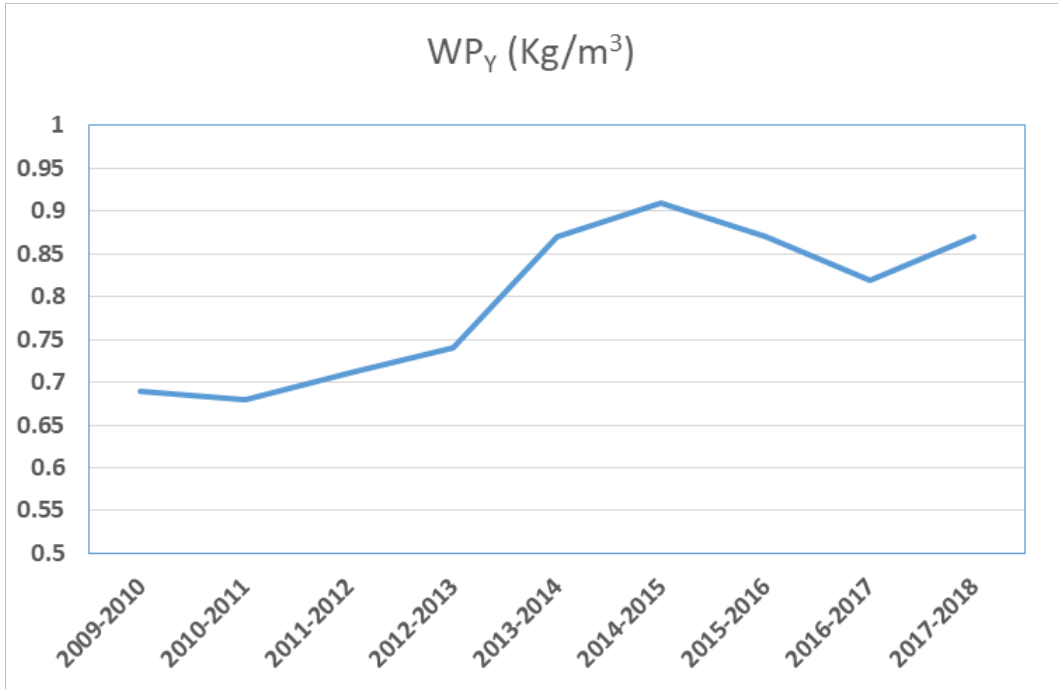
TABLE 1 Seasonal K_y values from *FAO Irrigation and Drainage Paper No. 33.*

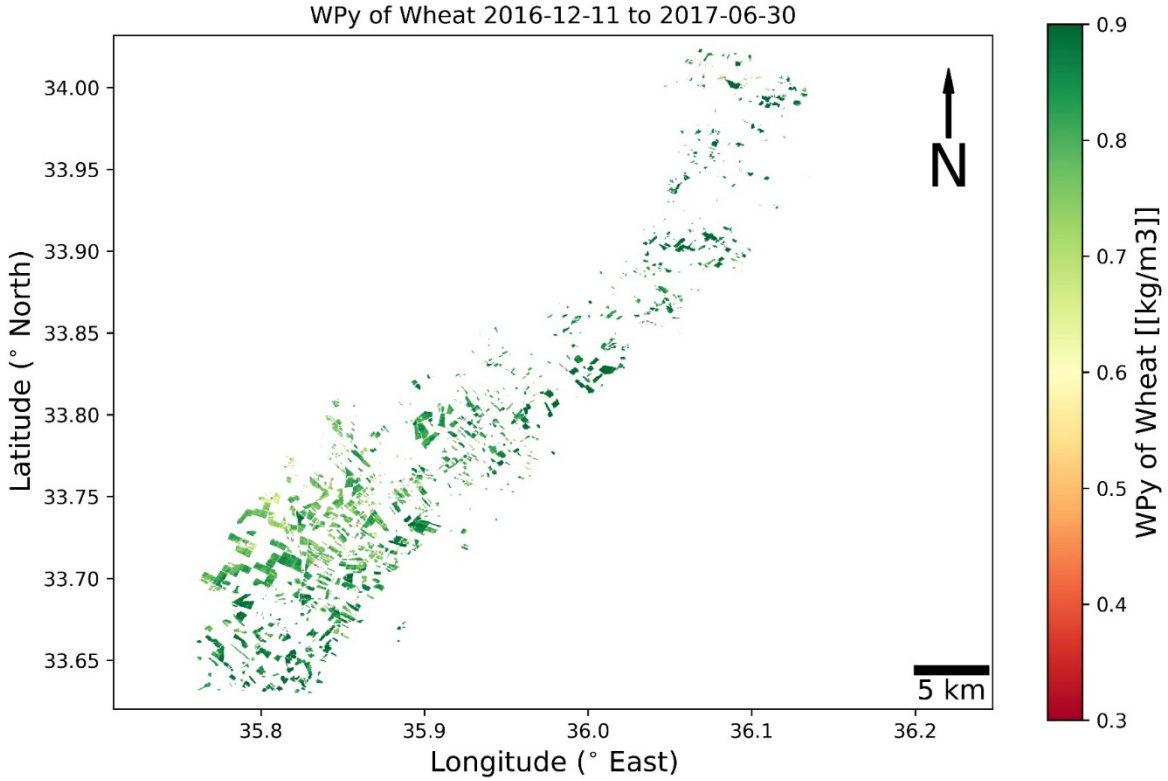
Crop	K_y	Crop	K_y
Alfalfa	1.1	Safflower	0.8
Banana	1.2-1.35	Sorghum	0.9
Beans	1.15	Soybean	0.85
Cabbage	0.95	Spring wheat	1.15
Cotton	0.85	Sugarbeet	1.0
Groundnuts	0.70	Sugarcane	1.2
Maize	1.25	Sunflower	0.95
Onion	1.1	Tomato	1.05
Peas	1,15	Watermelon	1.1
Pepper	1.1	Winter wheat	1.05
Potato	1.1		

$$\left(1-\frac{Y_a}{Y_x}\right)=K_y\left(1-\frac{ET_a}{ET_x}\right)$$



WP_Y : Tracking productivity of the use of water





Summary:

- WaPOR offers free, continuous data covering a very large geographical extent and starting in 2009
- This data can be used to track irrigation performance both spatially and temporally
- The outputs can be used for benchmarking and planning actions for improvements

References (open access):

Bos, M. G., Burton, M. A., Molden, D., 2005. Irrigation and Drainage Performance Assessment: Practical guidelines. CABI Publishng. Wallingford. (https://www.icid.org/Guidelines_Molden2005.pdf)

Molden, D., Sakthivadivel, R., Perry, J., de Fraiture, C., Kloezen, W. 1998. Indicators for Comparing Performance of Irrigated Agricultural Systems, IWMI RR 29, Colombo, Sri Lanka: International Water Management Institute (IWMI). (http://www.iwmi.cgiar.org/Publications/IWMI_Research_Reports/PDF/PUB020/REPORT20.PDF)

Steduto, P., Hsiao, T.C., Fereres, E., Raes, D. (Eds.), 2012. In: FAO Irrigation and Drainage Paper Nr. 66. FAO, Rome, Italy. (http://www.fao.org/3/i2800e/i2800e.pdf)

WaterPIP

Water Productivity Improvement in Practice

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