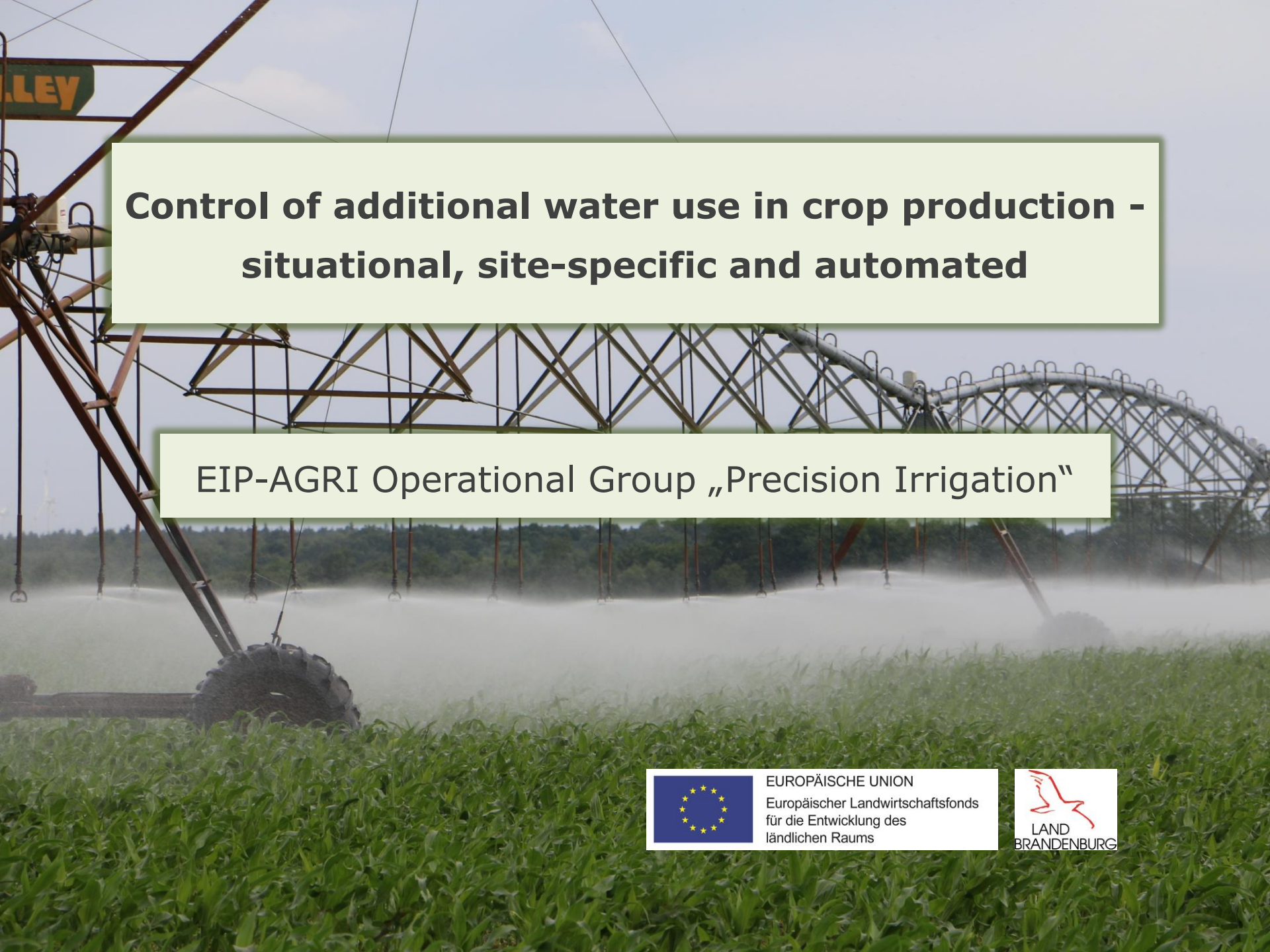


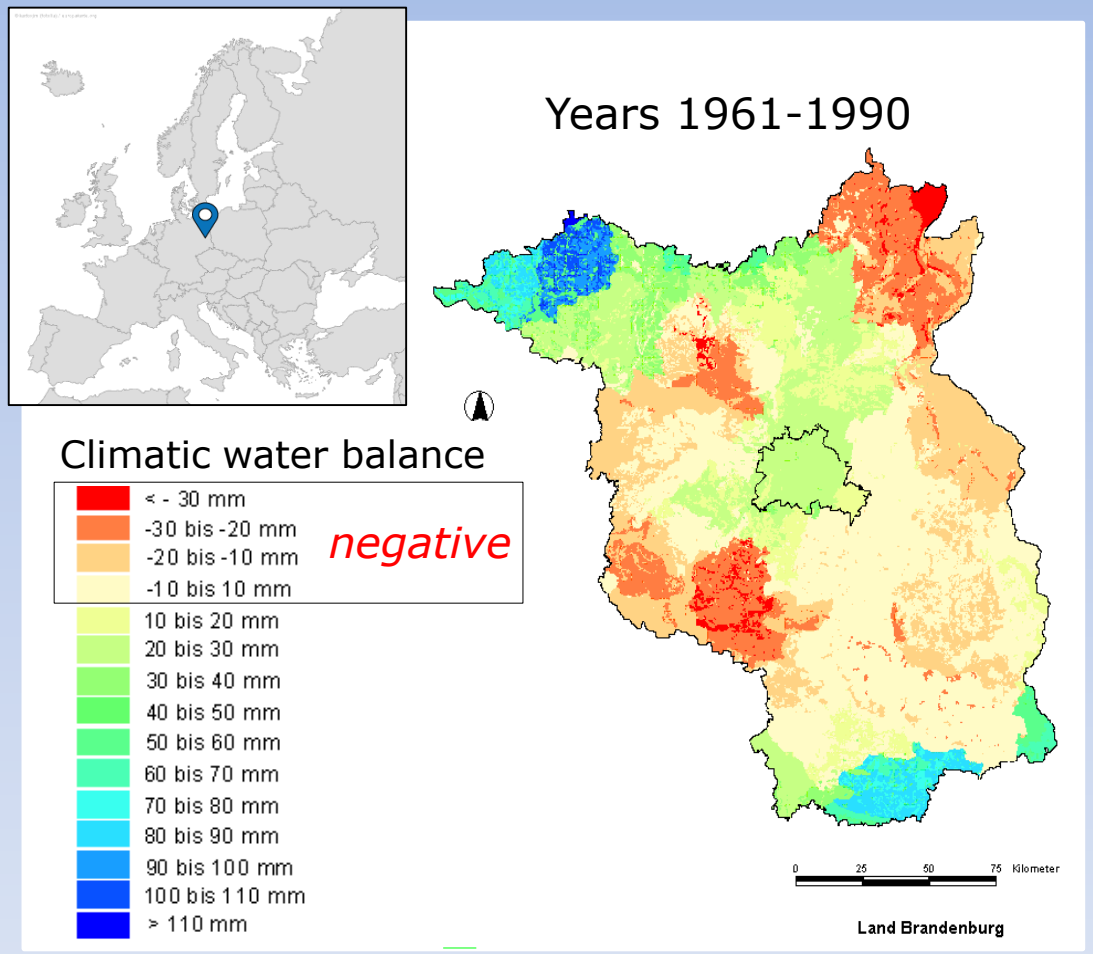
Control of additional water use in crop production - situational, site-specific and automated

EIP-AGRI Operational Group „Precision Irrigation“

EUROPÄISCHE UNION
Europäischer Landwirtschaftsfonds für die Entwicklung des ländlichen Raums

LAND BRANDENBURG

North-Eastern Germany: Need for irrigation



Agricultural challenge:

partly negative climatic water balance with decreasing trend

+

soils with a low water holding capacity

Irrigation technique



Center pivots: > 70 % of all irrigation machines in Brandenburg

Objective of the initiative „Precision irrigation“

Development of an economic solution for **irrigation control** which

- considers the site-specific actual water need of the crops and
- works automatically

Partners

- Farms
- Private company
- Consulting agency
- Professional association
- Research institute

Beneficiaries

- Local farmers
- Regional authorities
- Environment
- Future: farmers at national and EU level

Irrigation control: timing and amount of additional water supply

Efficiency & demand

Appearance



analogue

Calculations

Based on climatic water balance and plant coefficients (kc-values)

analogue or digital

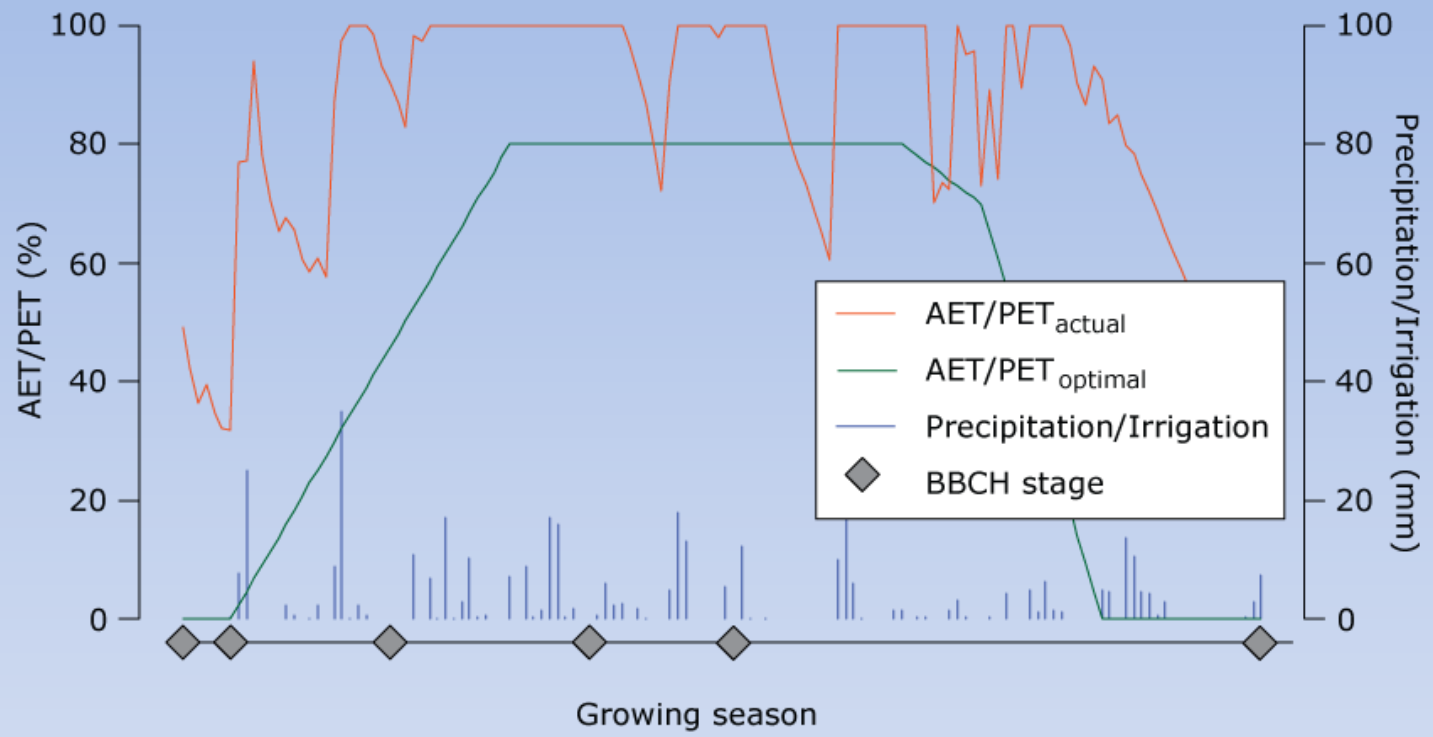
Models



Modelling interactions between soil, plant and atmosphere

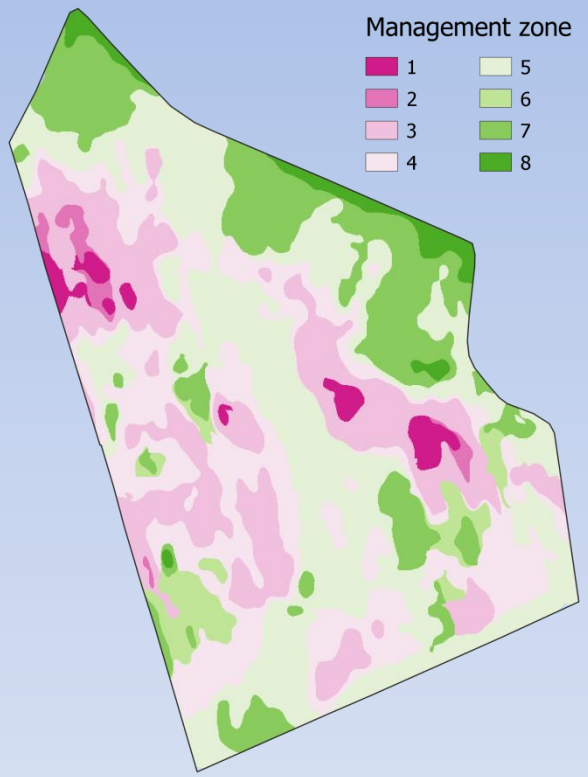
digital

Irrigation control with IRRIGAMA



AET/PET	control factor (AET: actual evapotranspiration, PET: potential ET)
AET/PET_{actual}	model output: actual value of control factor
$AET/PET_{optimal}$	optimal value – maximising yield without wasting resources

Project developments I: Site-specific irrigation



- ✓ IRRIGAMA can model several management zones simultaneously
- ✓ The output of IRRIGAMA can be fed semi-automatically into control panels of center pivot irrigation machines

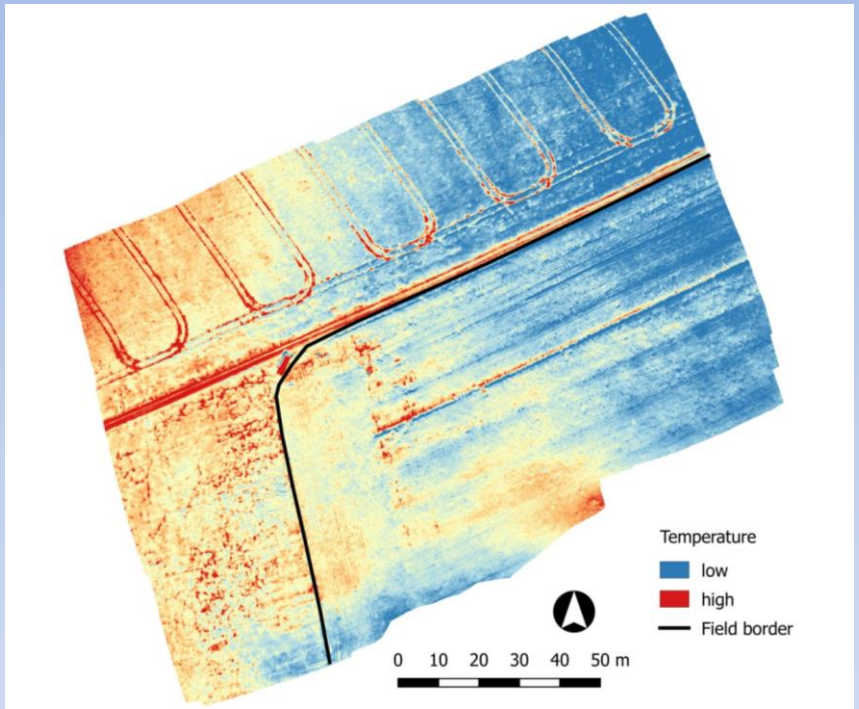
To-do

- Economic feasability analysis
- Improvement of the software-hardware interface

Project developments II: Infrared themography

- Energy balance models are an alternative to estimate the AET
- Crop surface temperatures are required as input data for these models.
- We use an unmanned areal vehicle (UAV) equipped with an infrared camera to measure these temperatures at a high spatial resolution

➢ Work-in-progress!



Surface temperatures of crops measured with our UAV-based infrared camera

Summary

- Site-specific irrigation with center pivots can be controlled with IRRIGAMA in a semi-automatic procedure

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- **We are interested to collaborate with international partners on a resource-efficient water use in crop production!**