

# IRRIGATION



## QUELLES STRATÉGIES POUR ÉCONOMISER L'EAU ? WHAT STRATEGIES FOR WATER SAVINGS ?

*REGARDS CROISÉS EUROPÉENS*  
*SHARING EUROPEAN VIEWS*



13 - 14

nov. 2019

MONTPELLIER

FRANCE



LA SCIENCE  
AU CŒUR  
DE L'ENVIRONNEMENT



PROJET COFINANCÉ PAR LE FONDS EUROPÉEN AGRICOLE POUR LE DÉVELOPPEMENT RURAL  
L'EUROPE INVESTIT DANS LES ZONES RURALES



MUSE

MONTPELLIER UNIVERSITY OF EXCELLENCE

KEY INITIATIVE

WATERS



Gestion de l'Eau, Acteurs, Usages



Association Française  
pour l'Eau, l'Irrigation  
et le Drainage



Association des  
Irrigants des Régions  
Méditerranéennes Françaises



CHAMBRE D'AGRICULTURE  
OCCITANIE



CHAMBRE D'AGRICULTURE  
PROVENCE-ALPES-CÔTE D'AZUR



# Water saving potentials of variable-rate site-specific and deficit irrigation strategies in highly structured moraine landscapes of Brandenburg, Germany

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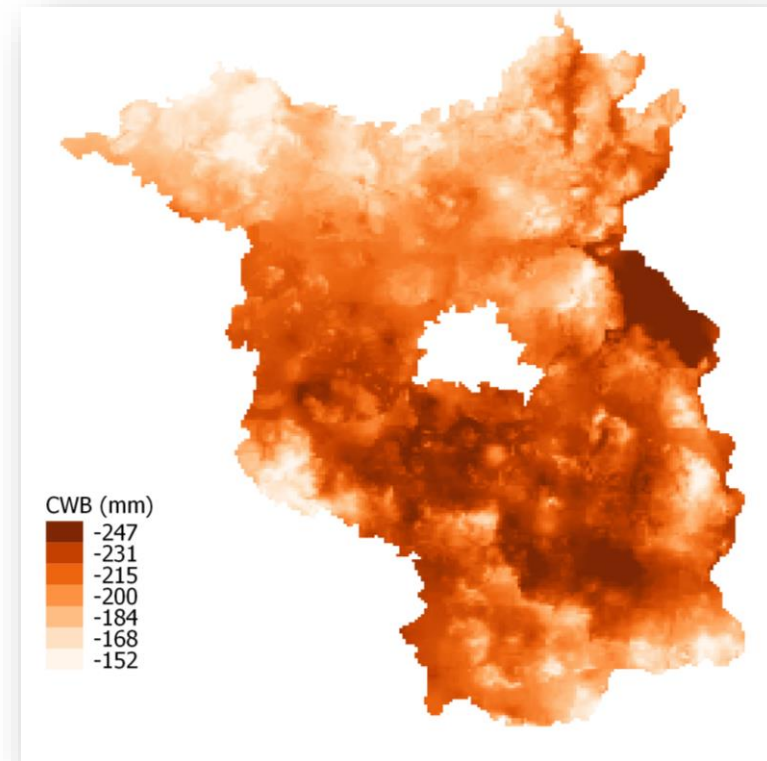
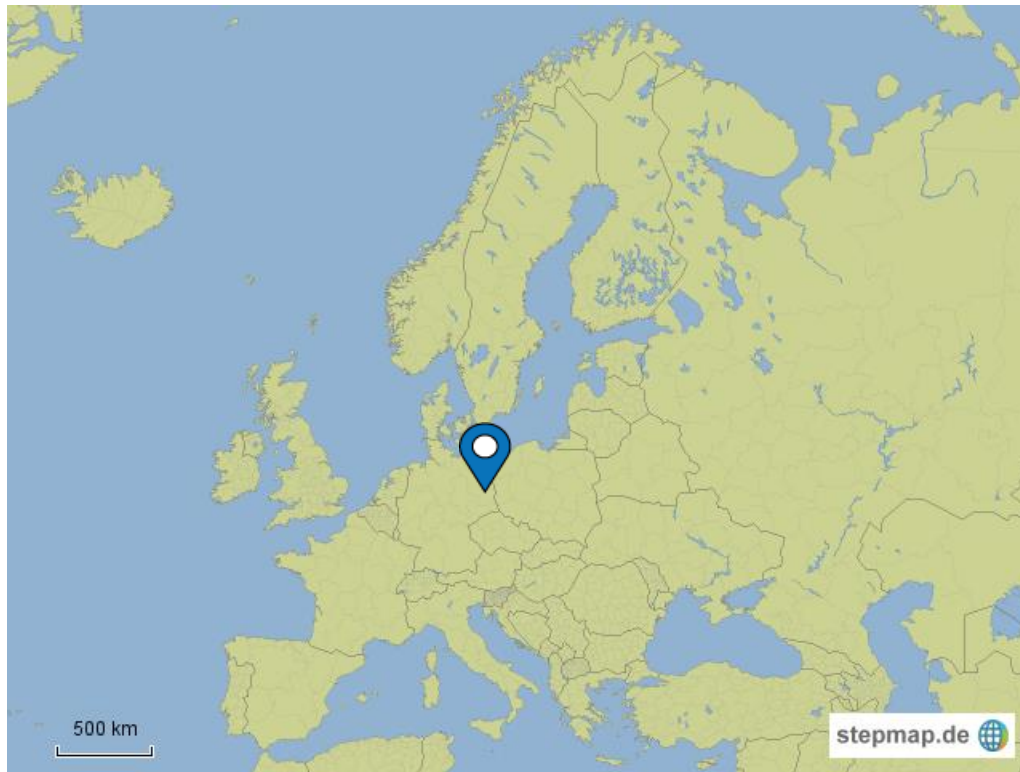


EUROPÄISCHE UNION  
Europäischer Landwirtschaftsfonds  
für die Entwicklung des  
ländlichen Raums



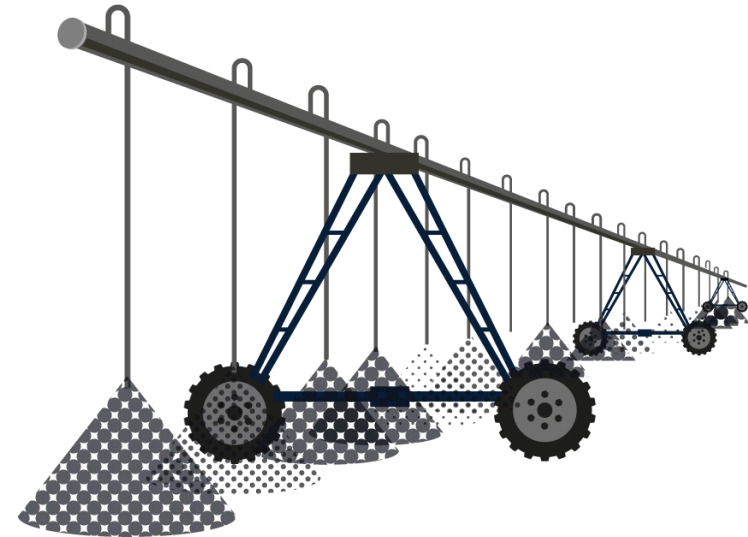
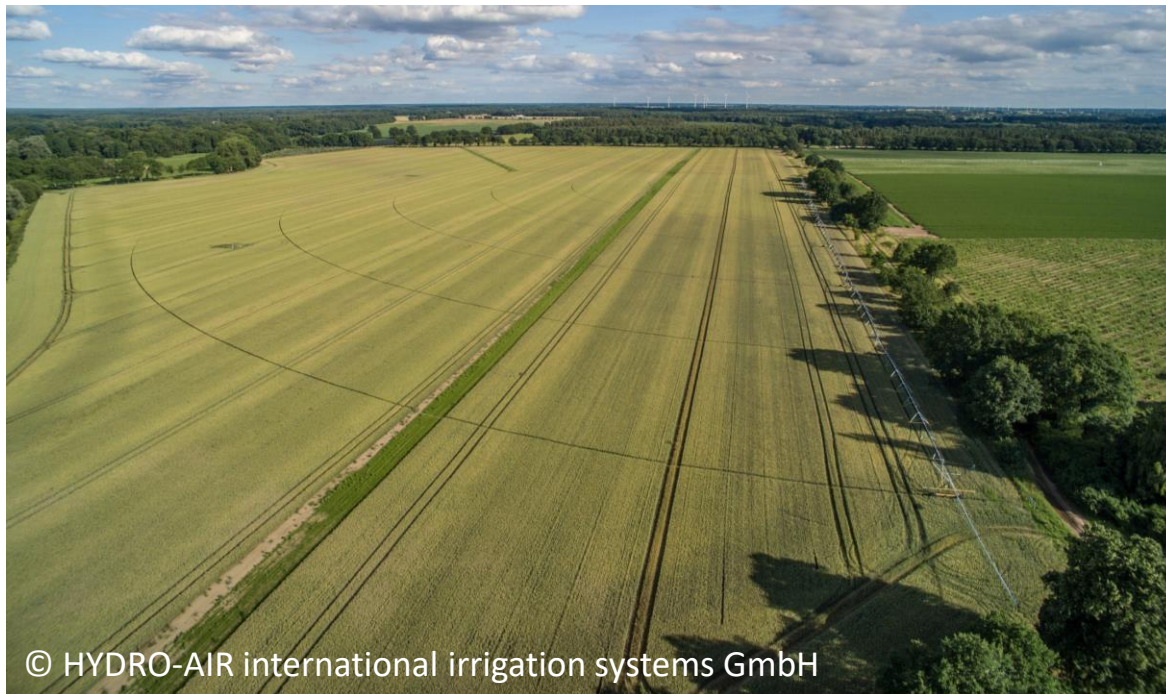
# Setting

Mean CWB March to September  
years 1991 - 2018



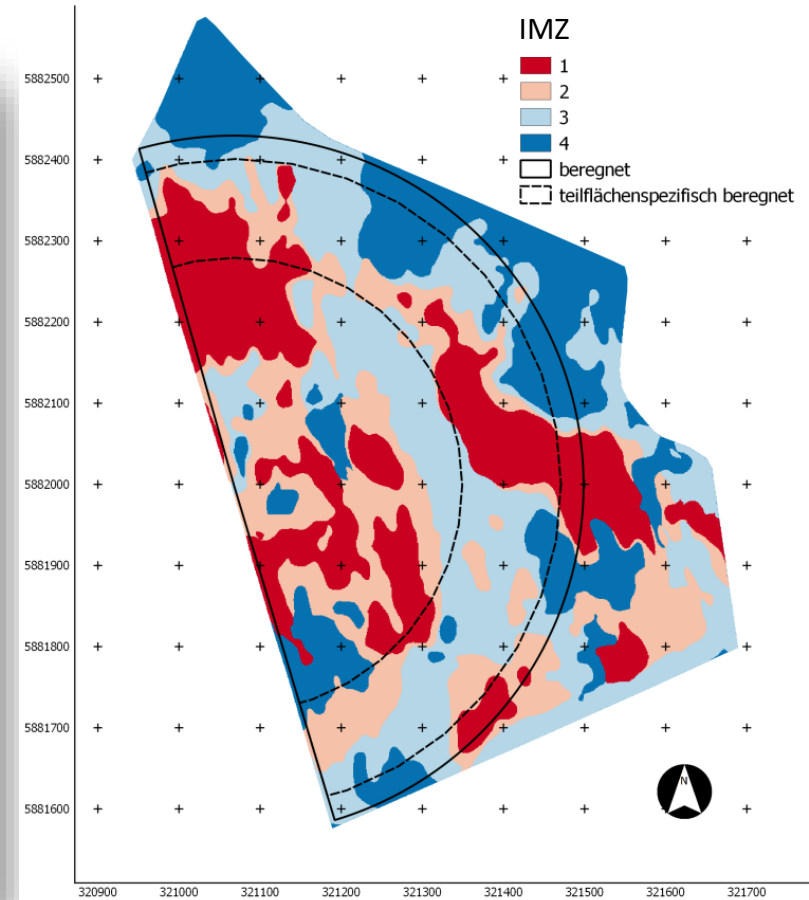
# Innovation Project « Precision Irrigation »

- Development of a user-friendly solution for steering site-specific irrigation, which takes into account the actual water need of the crops



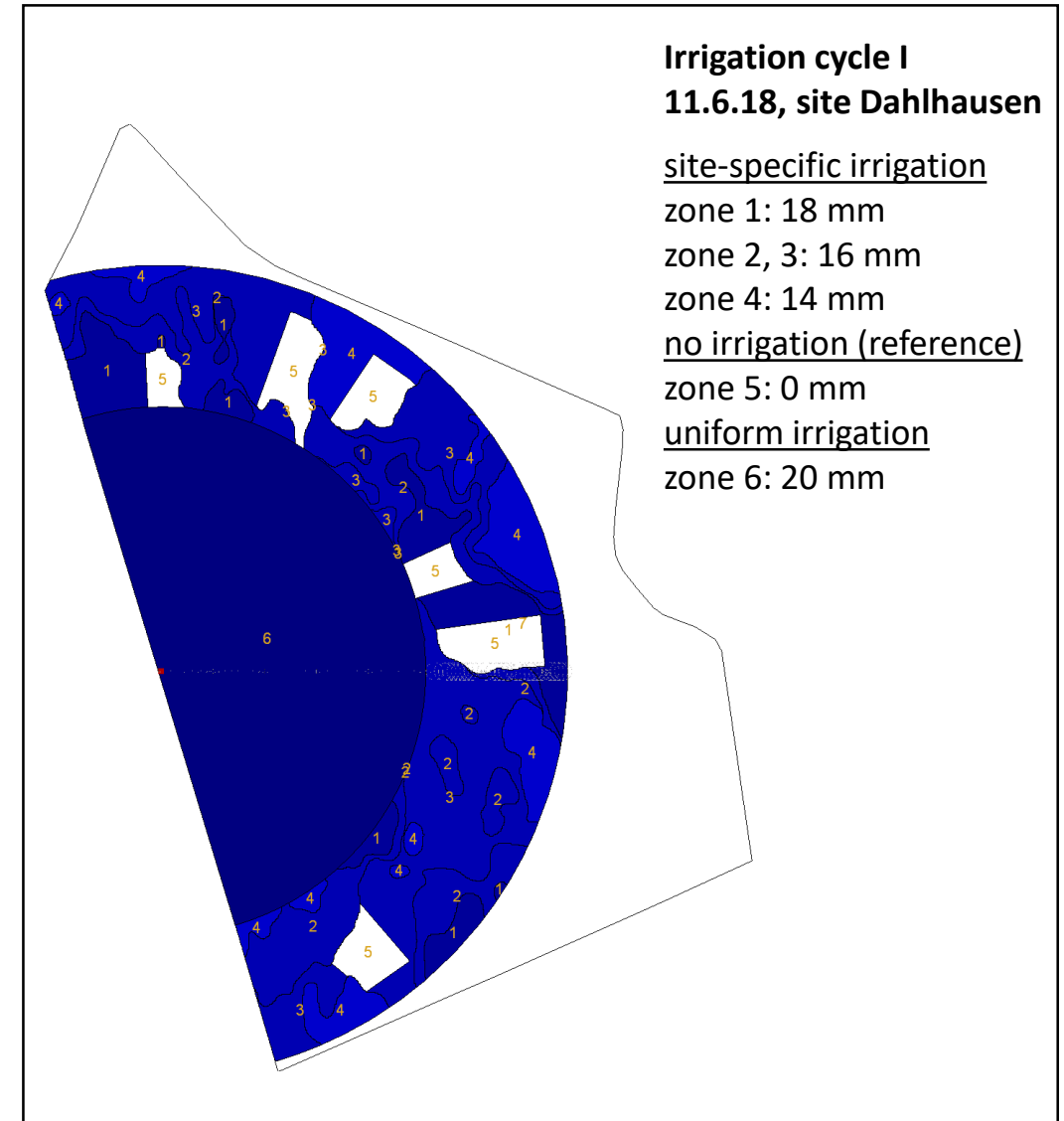
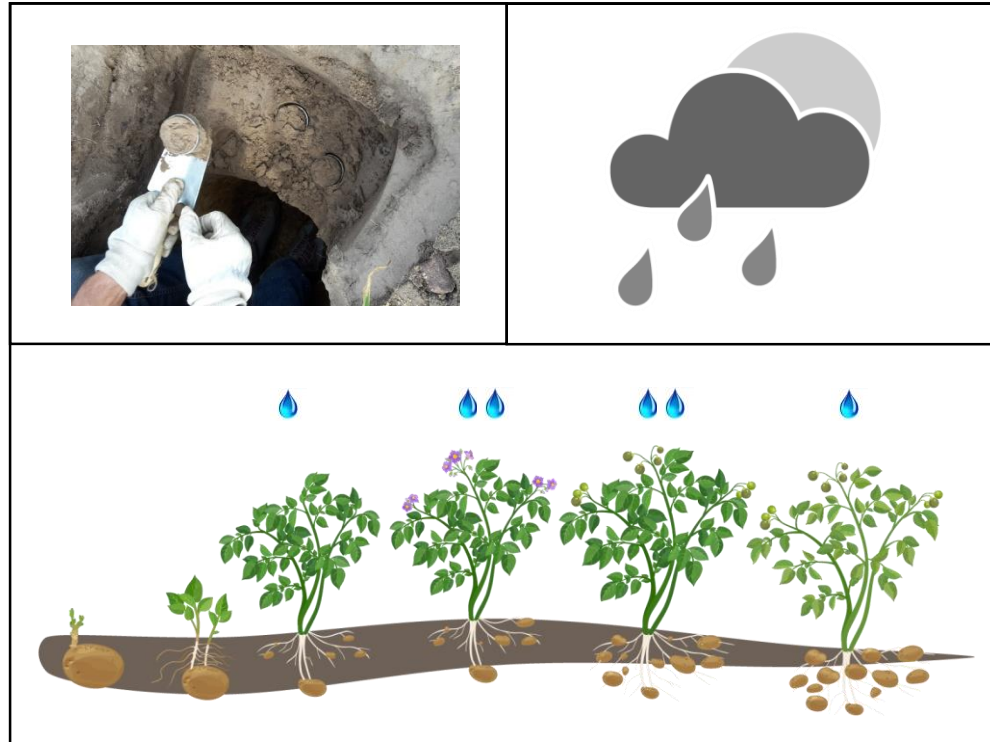
Center pivot with vri-system

# Irrigation management zones



# Prescription maps

Daily calculation of irrigation timing and amount for each management zone



# Water savings with site-specific irrigation, year 2018, maize

Recommen- dation date	Amount , recommendation date (mm)			Delay (d)	Amount, delay date (mm)		
	uniform	IMZ 1	IMZ 3+4		uniform	IMZ 1	IMZ 3+4
May 25	25	25	25	0	25	25	25
June 11	20	18	15	2	20	18	15
June 18	30	30	30	1	30	30	30
June 27	32	32	28	0	32	32	28
July 3	30	30	30	1	30	30	30
July 16	30	30	30	0	30	30	30
July 25	30	30	30	0	30	30	30
Aug 1	30	30	30	0	30	30	30
Aug 6	30	30	30	1	30	30	30
Aug 14	30	30	30	5	30	30	30
<b>Total</b>	<b>287</b>	<b>285</b>	<b>278</b>		<b>287</b>	<b>285</b>	<b>278</b>

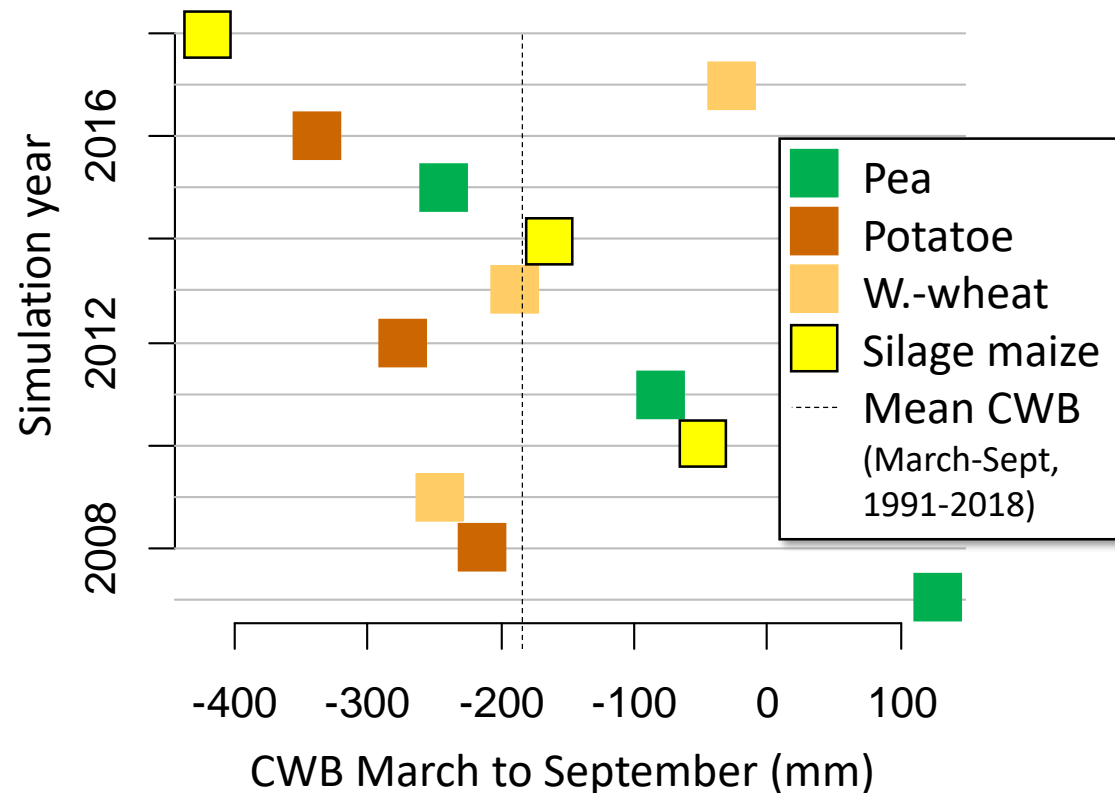
# Water savings with site-specific irrigation, year 2019, winter wheat

Recommendation date	Amount , recommendation date (mm)			Delay (d)	Amount, delay date (mm)		
	uniform	IMZ 1	IMZ 3+4		uniform	IMZ 1	IMZ 3+4
April 15	24	24	24	1	25	25	25
May 3	14	14	12	0	30	30	30
May 21	24	24	23	0	24	24	23
May 27	24	24	24	1	24	24	24
June 3	24	24	24	2	24	24	24
June 18	24	24	24	0	24	24	24
July 2	24	24	24	2	24	24	24
<b>Total</b>	158	158	155		175	175	174



# Simulation of a 12-year crop rotation

## Crop rotation

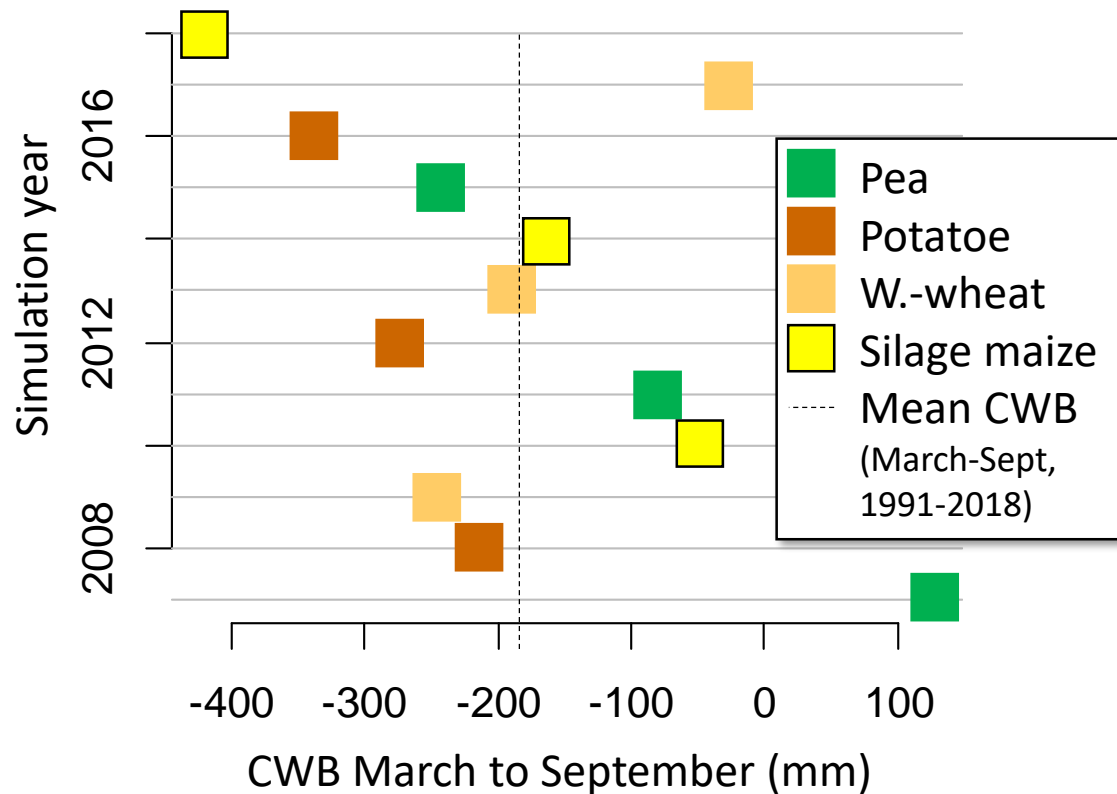


## Irrigation strategies

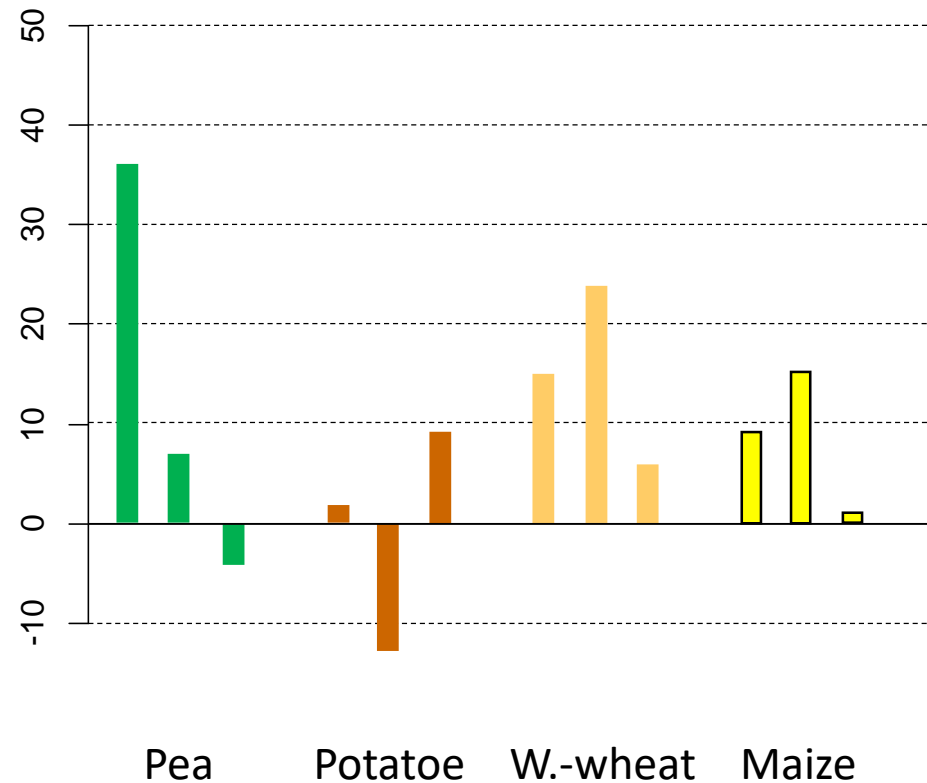
- uni = uniform irrigation
- ssp = site-specific variable-rate irrigation
- def = deficit irrigation

# Simulation results for site-specific irrigation

## Crop rotation

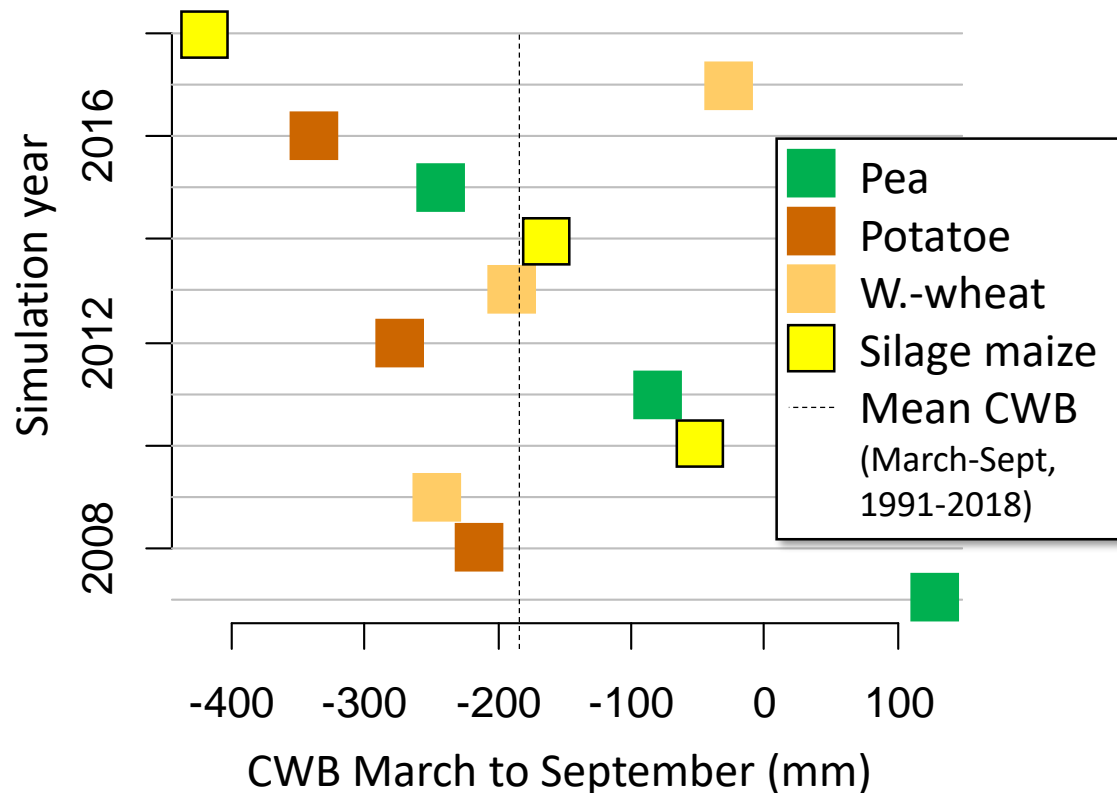


## Water savings (%)

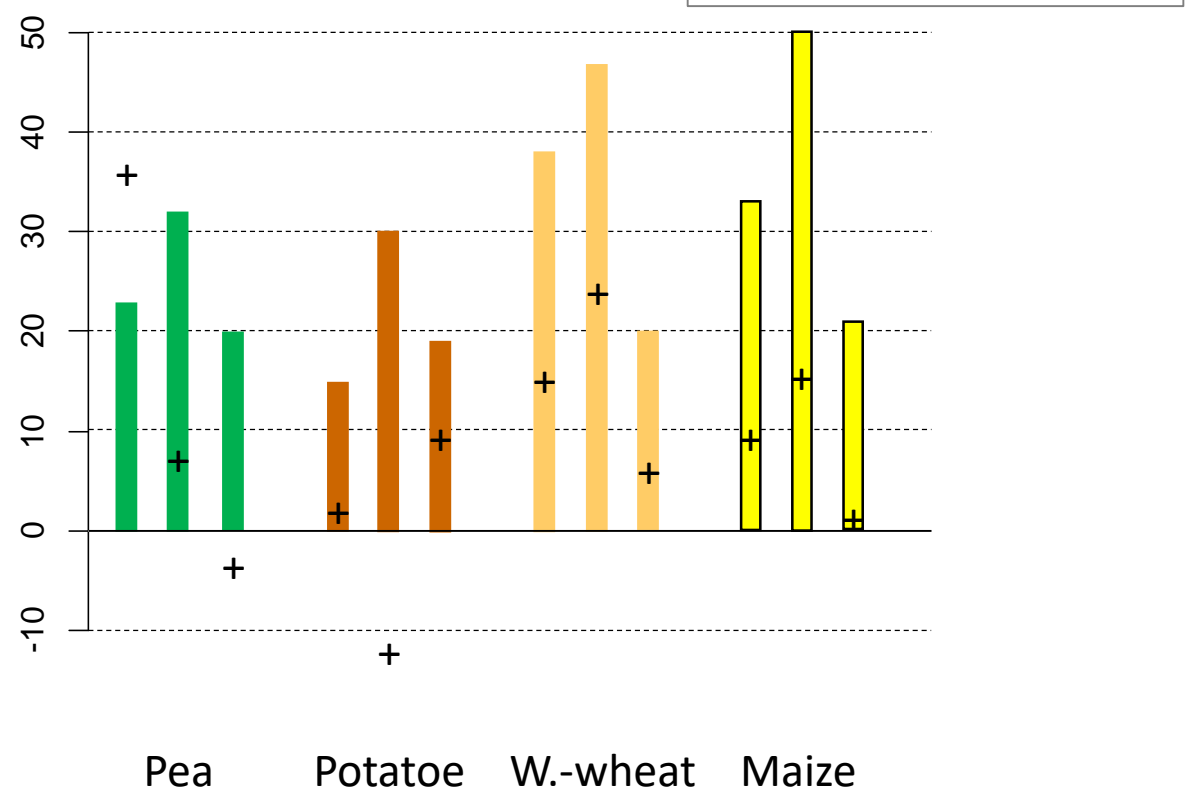


# Simulation results for deficit irrigation

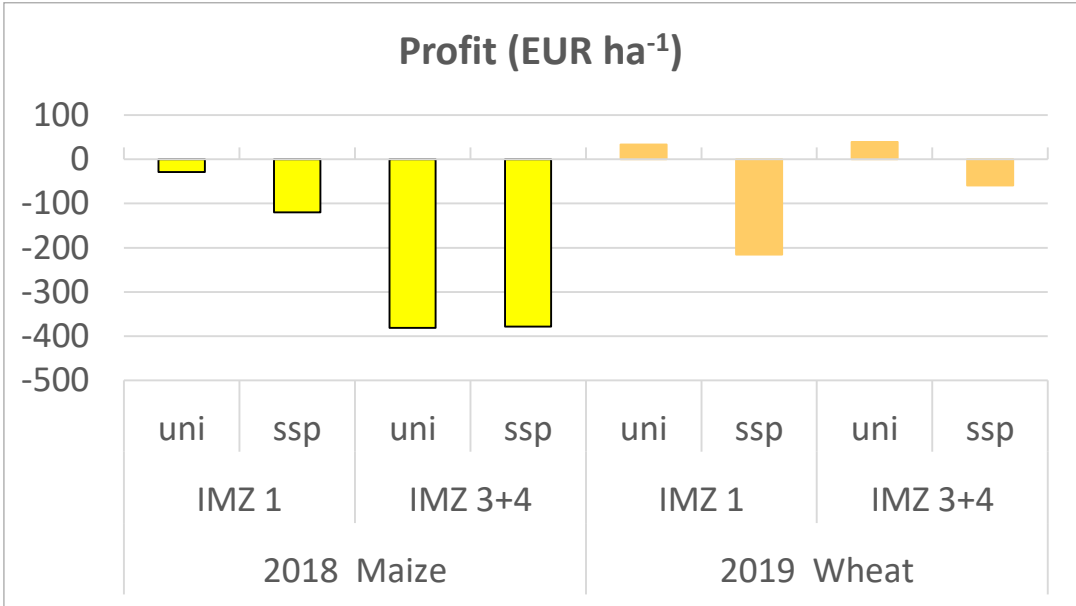
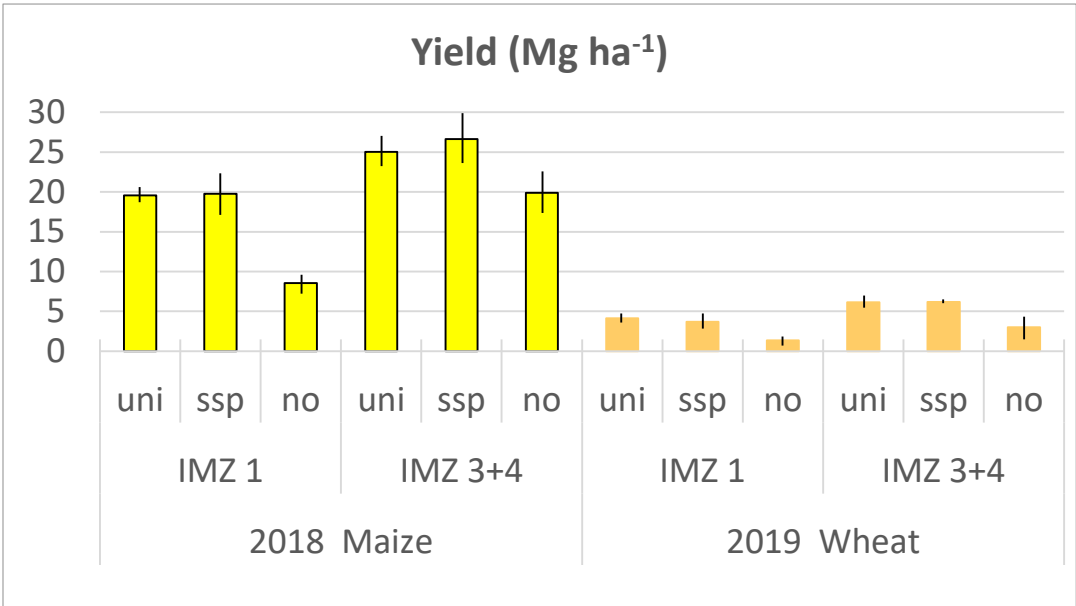
## Crop rotation



## Water savings (%)



# Economic assessment, 2018 and 2019



	2018 Maize				2019 Wheat			
	IMZ 1		IMZ 3		IMZ 1		IMZ 3	
	uni	ssp	uni	ssp	uni	ssp	uni	ssp
Irrigation costs (EUR ha <sup>-1</sup> )	690	793	690	783	528	634	528	632
Irrigation amount (mm)	287	285	287	278	175	175	175	174

	2018 Maize	2019 Wheat
Product price (EUR Mg <sup>-1</sup> )	60	180

Irrigation strategy:  
no = without irrigation, uni = uniform, ssp = site-specific

# Conclusions and outlook

- small to moderate water savings with variable-rate site-specific irrigation compared to uniform irrigation
  - water saving potential mainly depends on the relative importance of soil water storage capacity vs seasonal weather conditions
  - no economic benefits under the conditions of our study region
- deficit irrigation has a larger saving potential
  - work-in-progress regarding the most efficient deficit irrigation strategy
- equally important: irrigation equipment, drought-resistant crops and varieties, decision support for irrigation managers