

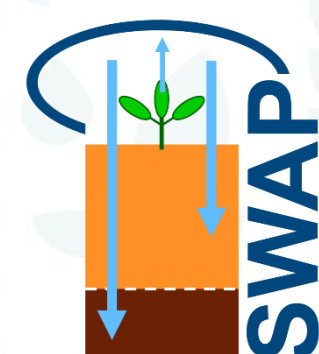
Effectiveness of natural soil water retention measures at field scale under current and future climate – case studies in three European biogeographical regions

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1. Introduction

Objectives: to perform an integrated, model-based assessment of the effectiveness of Natural/Small Water Retention Measures (NSWRMs) under current and future climate conditions at field scale, using a harmonised methodology developed within the OPTAIN project. The assessment is based on the adaptation of the SWAP field-scale mathematical model to seven pilot sites across three European biogeographical regions.

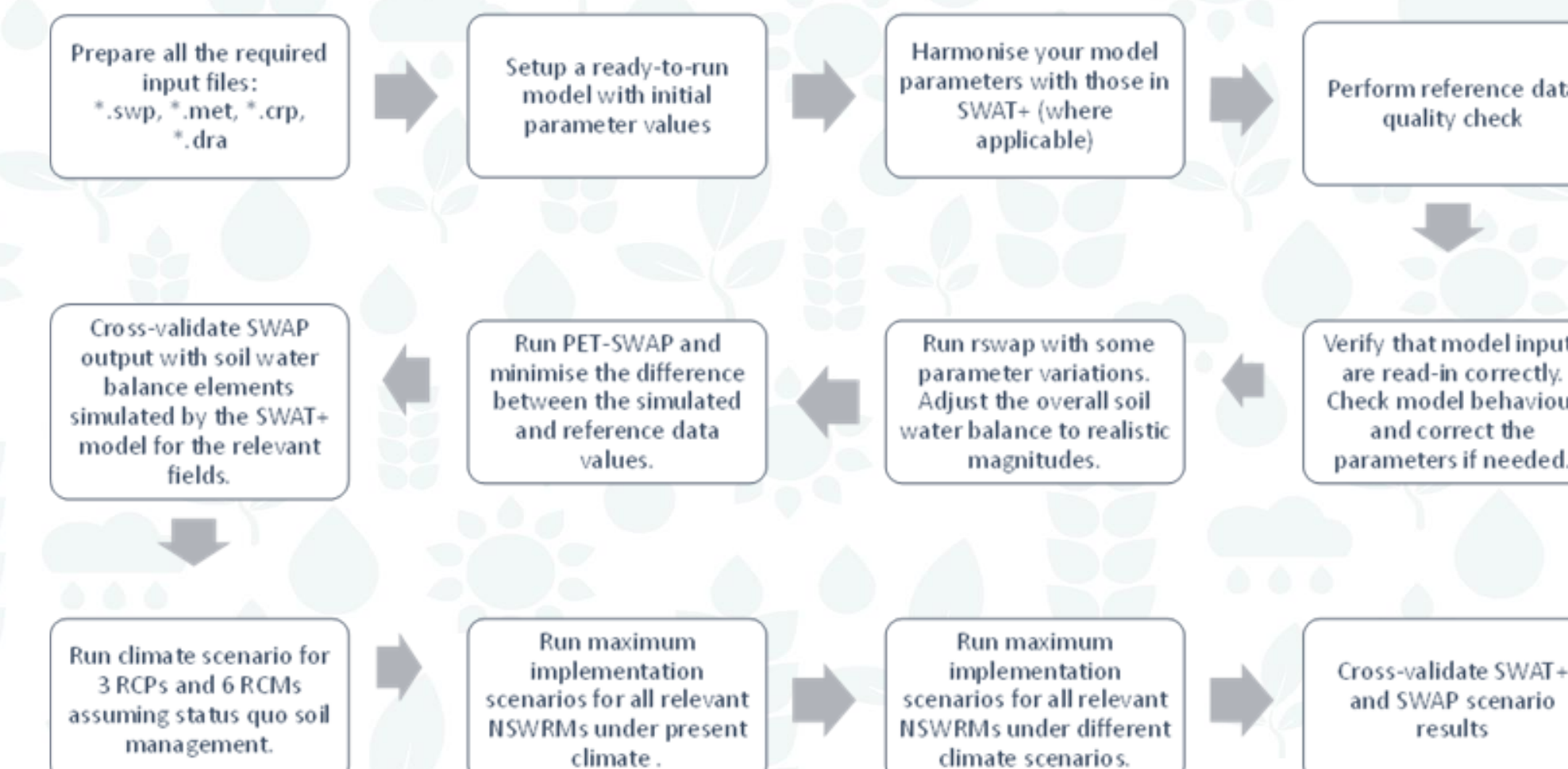
The rSWAP R package is being used for SWAP model verification, soft-calibration and visualisation.



Location of pilot sites

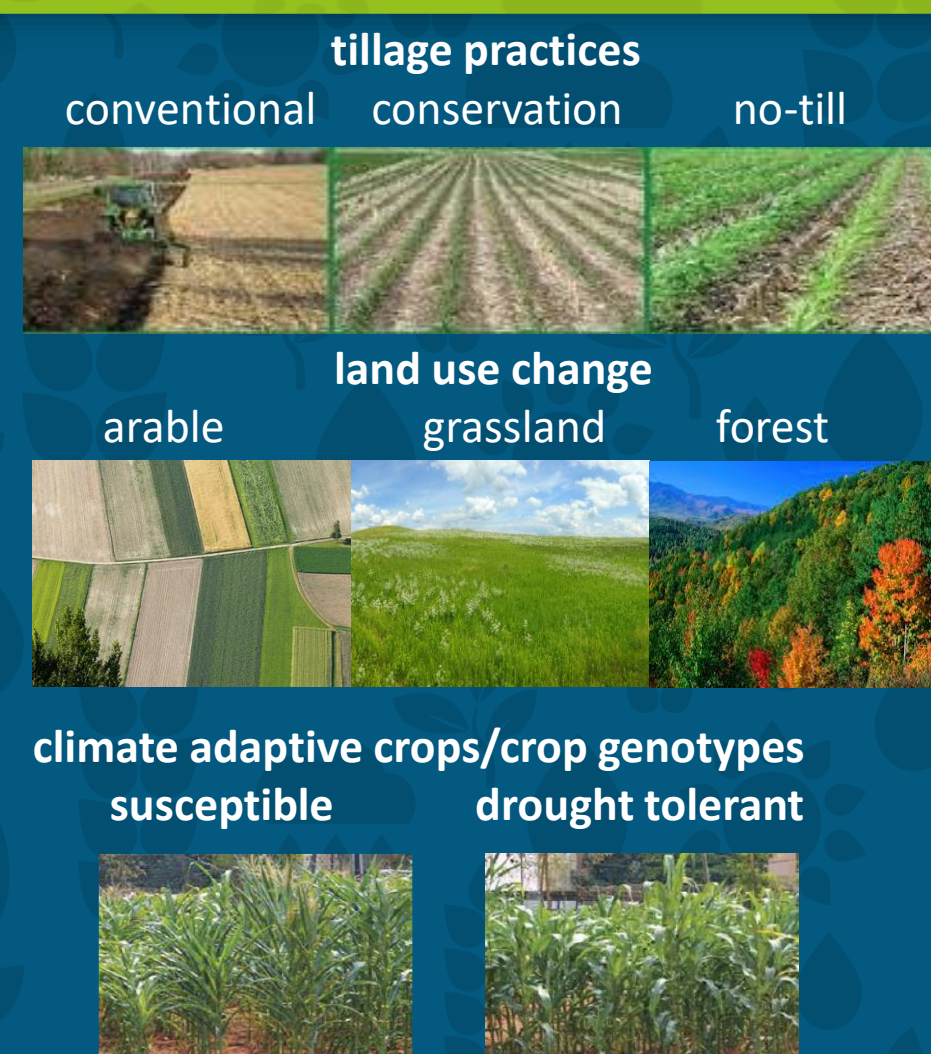


2. Workflow

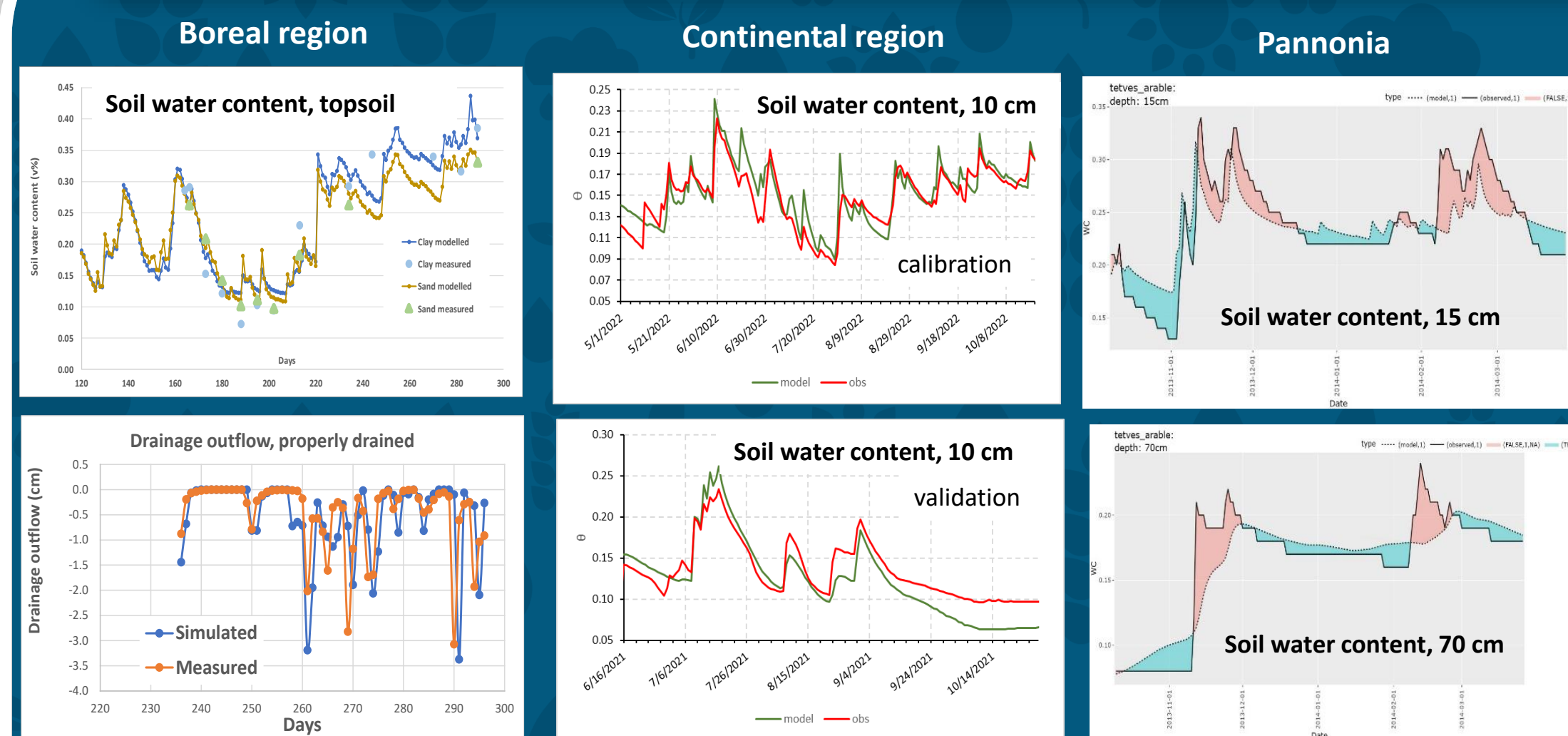


3a. Measures incorporated in the SWAP model

Management measures		Biogeographical regions		
		Boreal	Continental	Pannonia
Land use change	Afforestation	+	+	+
	Shift to grassland	+		
Tillage systems	Direct seeding		+	+
	No autumn tillage	+		
	Subsoiling		+	
	Reduced tillage	+		+
Drainage design	Depth, spacing	+		
Cropping	Intercropping		+	
	Green cover			+
Other	Drought resistant plant	+	+	+
	Mulching		+	



4. Model calibration (highlights)



5. Climate scenarios

➤ OPTAIN bias-corrected climate scenarios:

<https://zenodo.org/record/6202062>

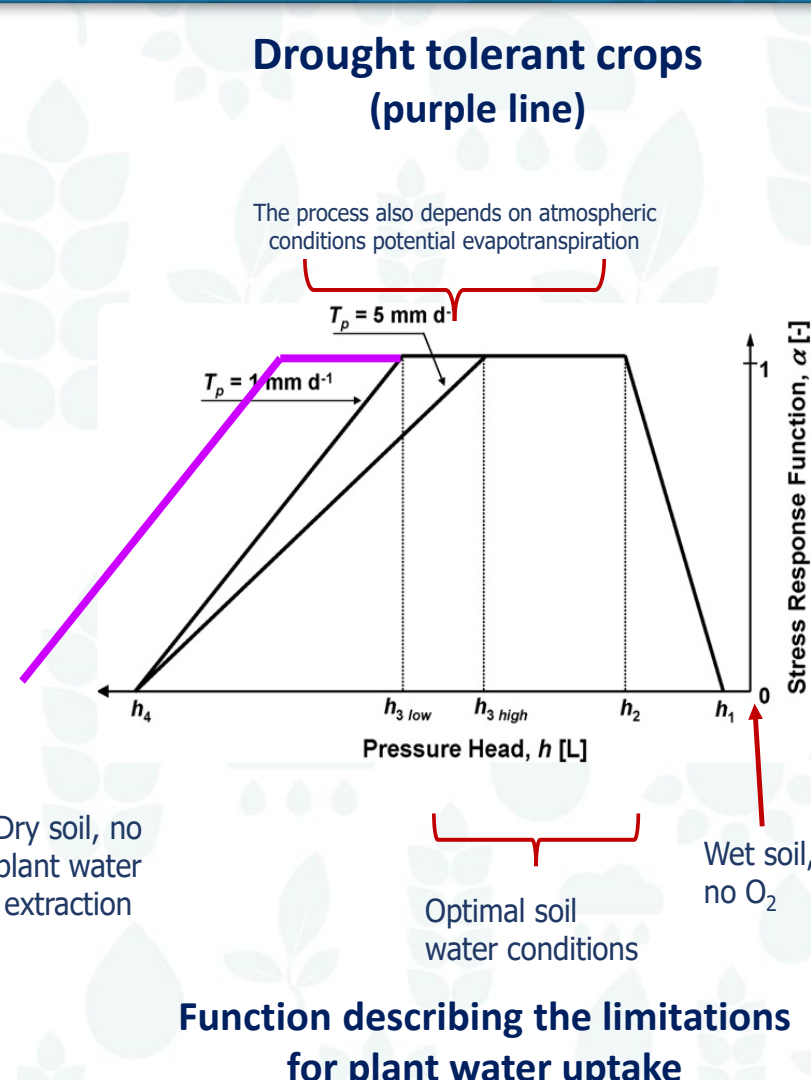
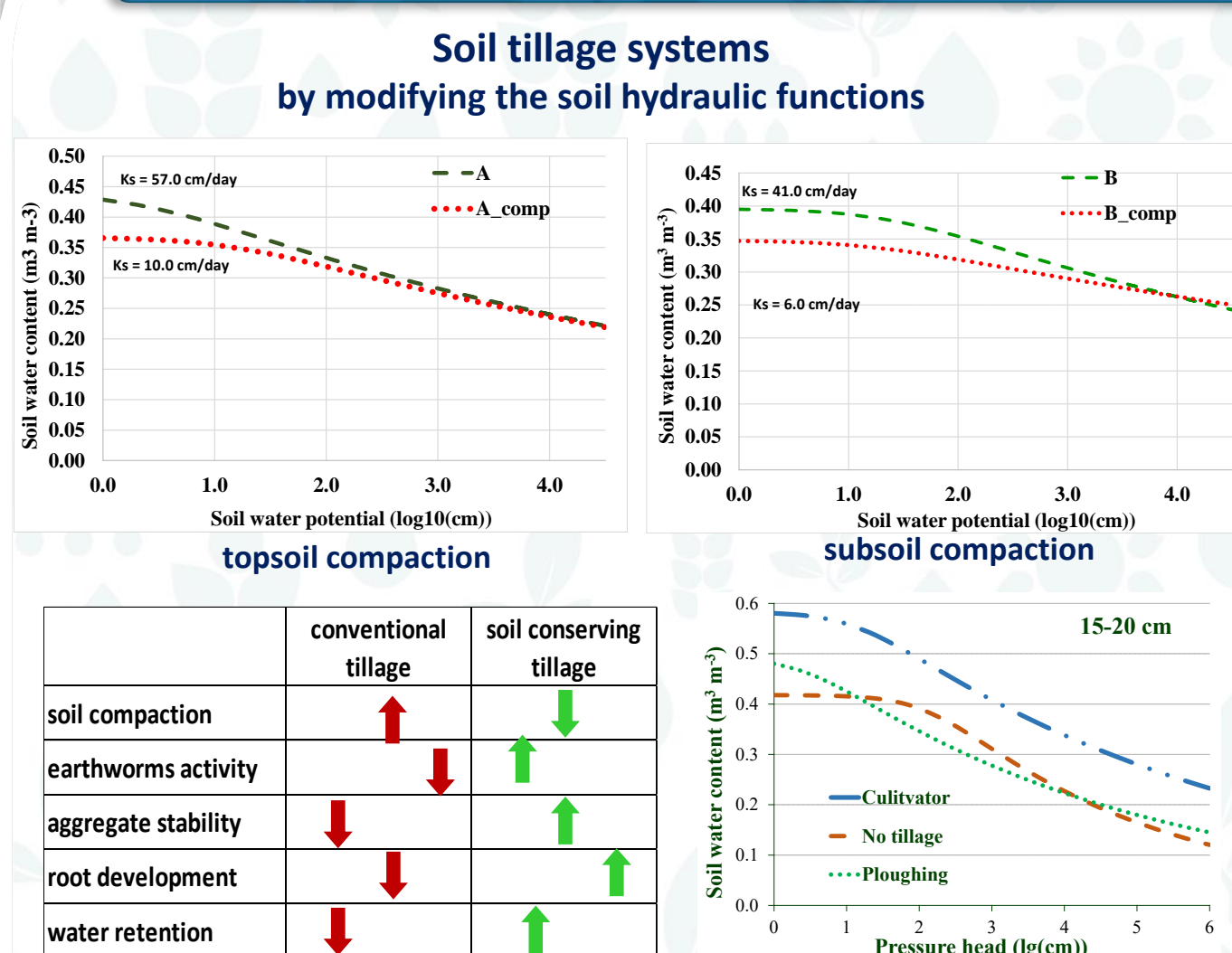
- ✓ Contains climate data series from 1981-2100
- ✓ 1981-2010 – reference period (baseline)
- ✓ Incorporates 6 climate models
- 2.5, 4.5 and 8.5
- ✓ Daily timestep
- ✓ T_{min} , T_{max} , T_{mean} , precipitation, humidity, wind speed, solar radiation

➤ Data provided for all the OPTAIN case-study catchments in gridded format (SWAT+), and for reference fields (SWAP)

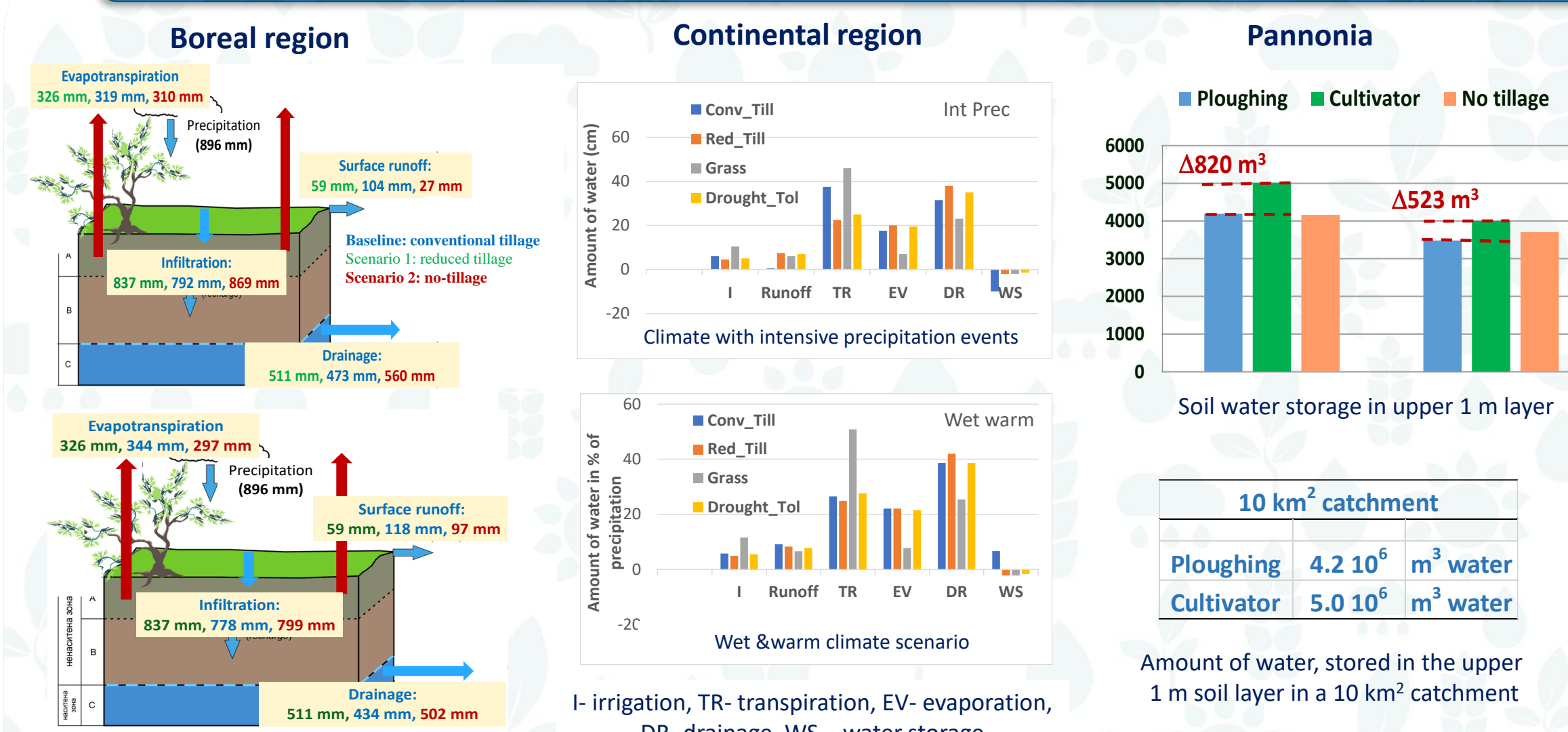
➤ Harmonised approach for implementing climate scenarios

Model ID number	Driving Model GCM	RCM	RCP's
1	EC-EARTH	CCLM4-8-17	
2	EC-EARTH	HIRHAM5	
3	HadGEM2-ES	HIRHAM5	2.6
4	HadGEM2-ES	RACMO22E	4.5
5	HadGEM2-ES	RCA4	8.5
6	MPI-ESM-LR	REMO2009	

3b. Incorporation of measures in the SWAP model



6. NSWRMs effects on selected indicators



7. NSWRMs effects, future climate conditions

