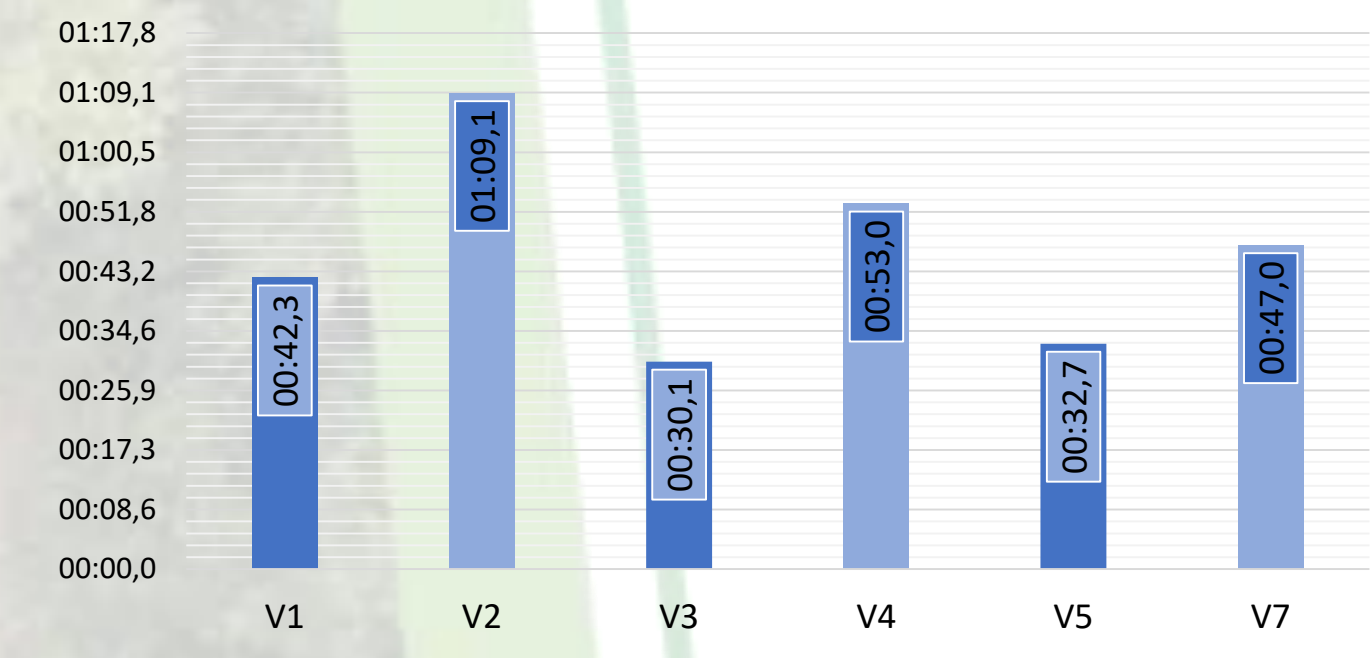


UFR/WSL/CTFC

Time study for planting with hydrogel

Time per Plant for each Version



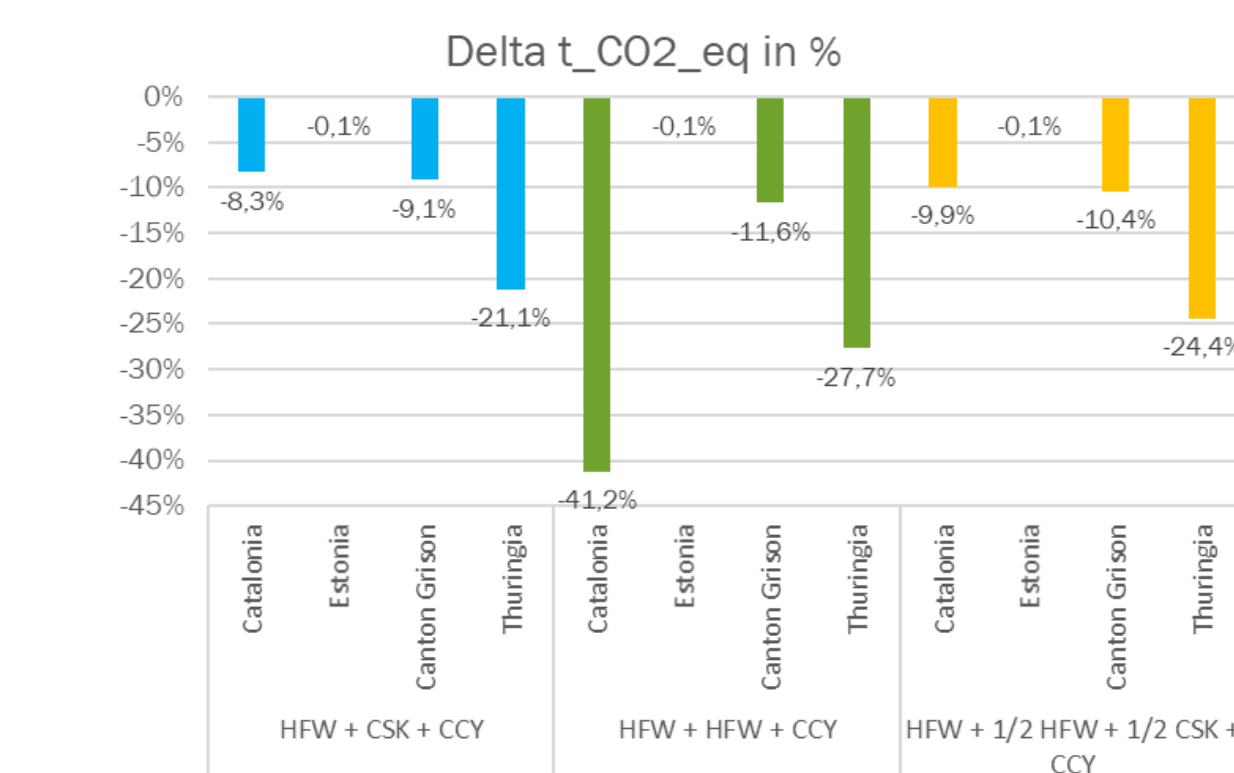
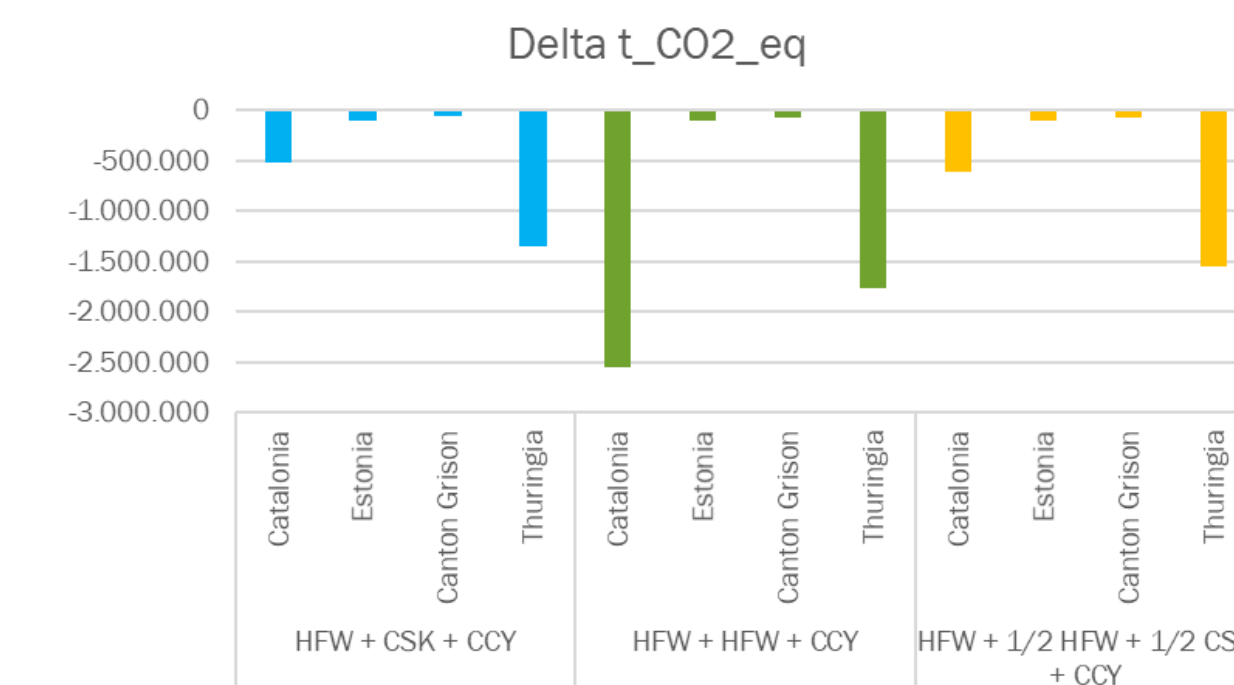
Indicators were identified for each CSR and a Best-Harvesting Method was calculated

here the Indicators and its value for Catalonia

	CO2-Emissions (kg CO2/m3)	Productivity (m3/smh)	Jobs (PM/10000m3)	Costs (€/m3)	Fuel consumption (l/m3)
HFW	6,95	11,80	4,51	10,54	1,10
CSK	7,71	3,33	15,96	24,90	0,85
CCY	1,75	4,65	11,44	14,95	5,10

Based on the slope, each method was assigned an annual timber harvest volume. The indicators can then be calculated from this.

Possible reduction of CO₂ emissions by using the Best-harvesting method



Planting with fully biodegradable Hydrogel based on wood fibers. Studies on: Biomass analysis, Vegetative status, Degradability, Water storing capacity, Application

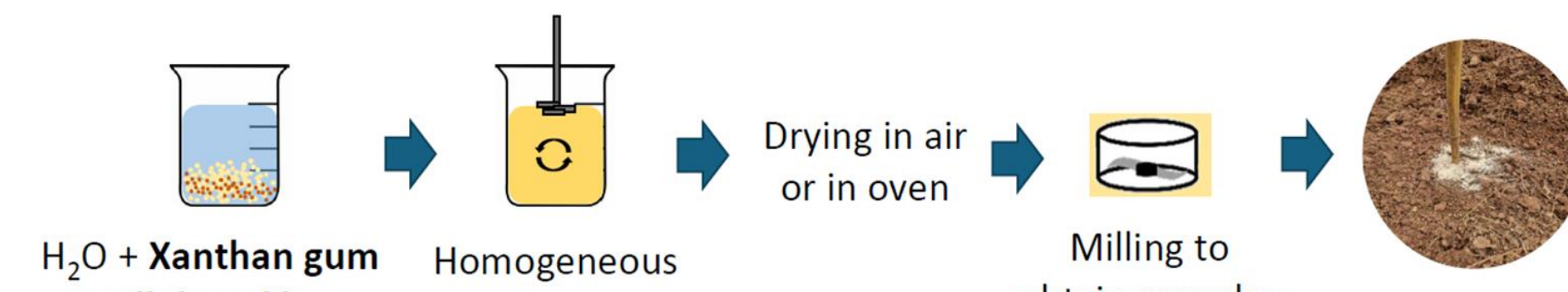
Risk maps and practical guidelines for preparation against disturbances for all CSR regarding: Drought, Fire and Wind

UTR

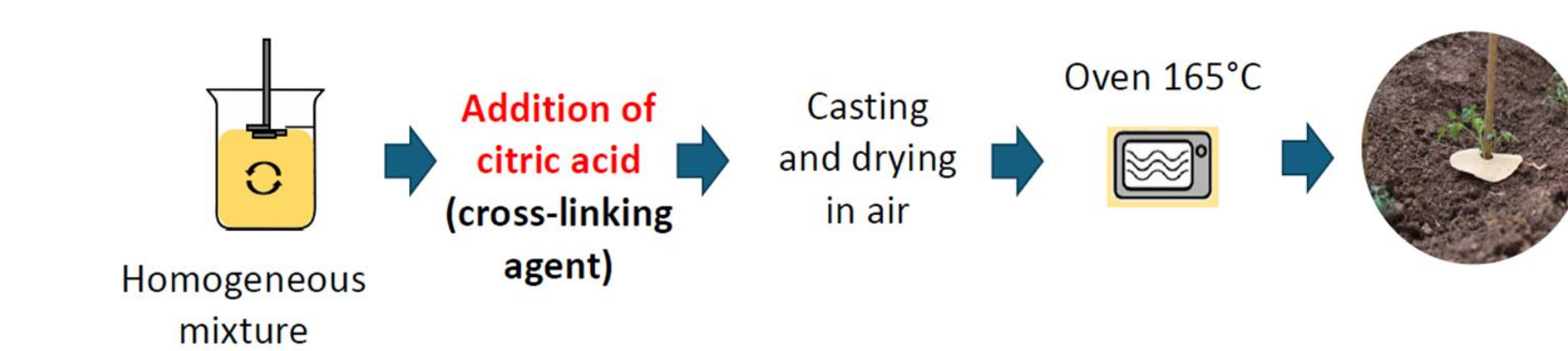
Top soilcover (TSC) and Soil Conditioner (SC) engineering and planting to promote plant growth

- SC as hydrogels based on biopolymer xanthan gum (X) dissolved in water and mixed with cellulose pulp (W).
- TSC as films based on cross-linked xanthan gum and wood fibers.

Production of xanthan gum hydrogels (for SC)



Production of xanthan gum cross-linked hydrogels (for TSC)



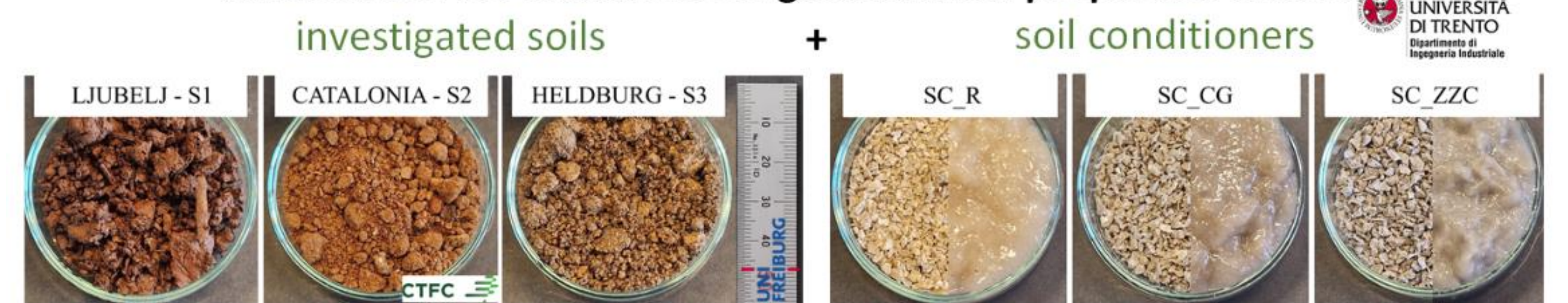
	Our products	Commercial product
SC	19.7 €/kg	5 - 25 €/kg
TSC	0.41 €/unit => UTR (16 cm diameter)	0.5 - 6 €/unit (25-45 cm diameter)

Parameter	Unit	SC (1kg)	TSC-UTR (1 unit)
Abiotic depletion (fossil fuels)	MJ	1.17E+02	2.27E+00
Global warming (GWP100a)	kg CO ₂ eq	9.91E+00	1.84E-01
Ozone layer depletion (ODP)	kg CFC-11 eq	5.21E-07	2.02E-08
Fresh water aquatic ecotox.	kg 1,4-DB eq	9.89E+00	1.63E-01
Photochemical oxidation	kg C ₂ H ₄ eq	2.44E-03	4.12E-05
Acidification	kg SO ₂ eq	4.74E-02	8.99E-04
Eutrophication	kg PO ₄ -eq	2.93E-02	4.34E-04
Water scarcity footprint	m ³ eq	3.49E+00	1.17E-01

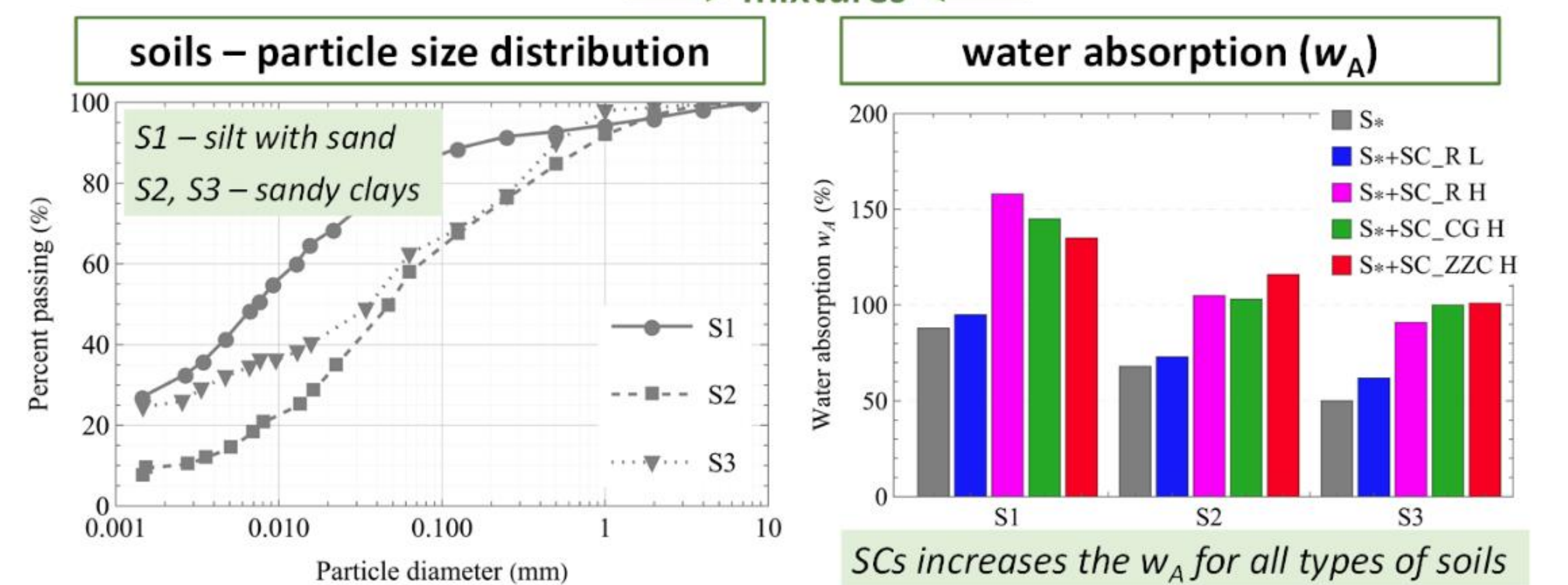
- Composition optimization (cellulose fibers, cross-linking agents, production method)
- Efficacy evaluation (water absorption/retention, germination, tomato planting trial, durability tests, quality assessment)
- Dataset of costs and environmental impacts

ULJ

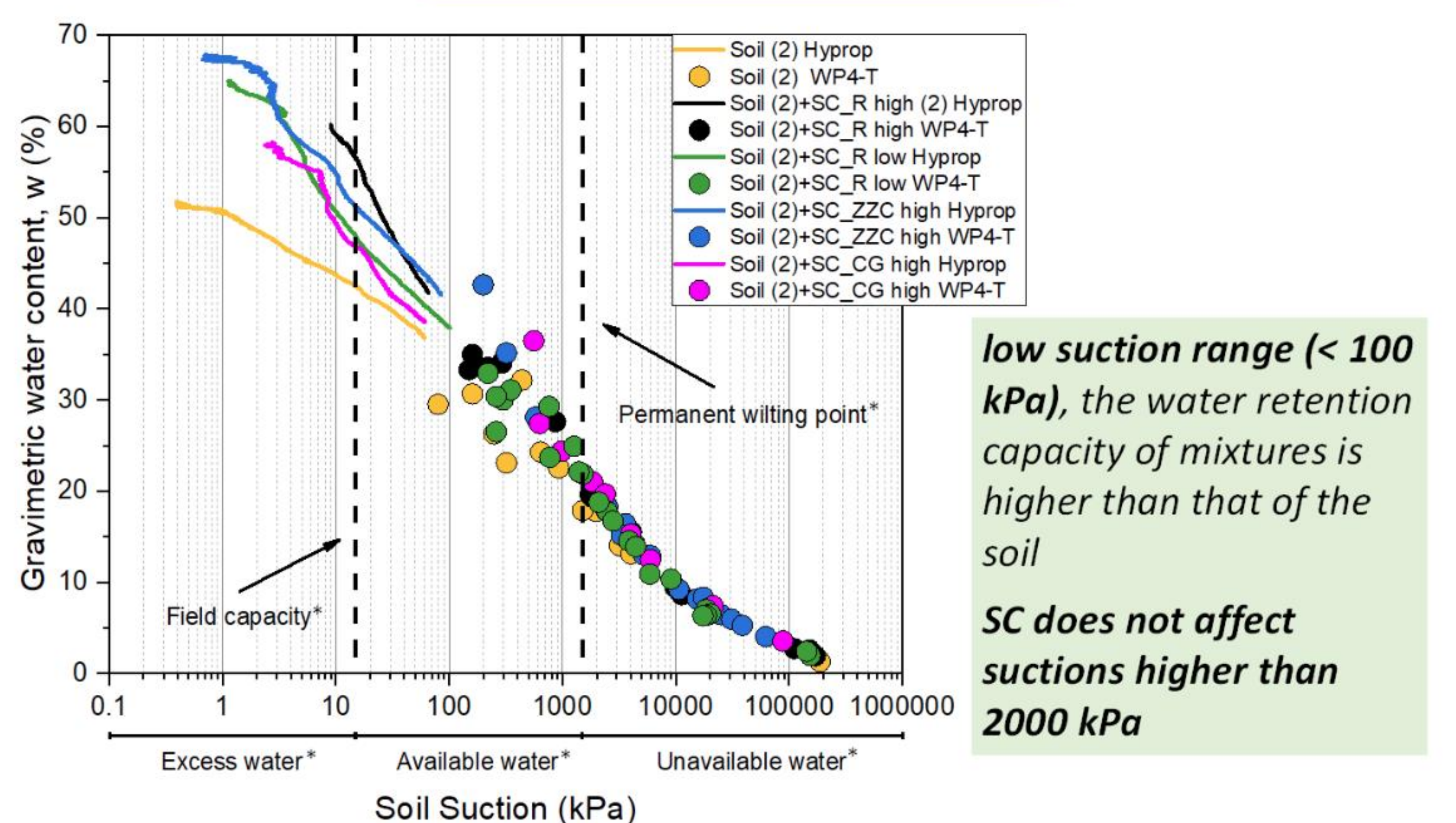
Influence of XG-based SCs on geotechnical properties of soils



dosage: L – low 0.4 %, H – high 1.7 % per dry soil mass



SWRCs of soils and mixtures – S1

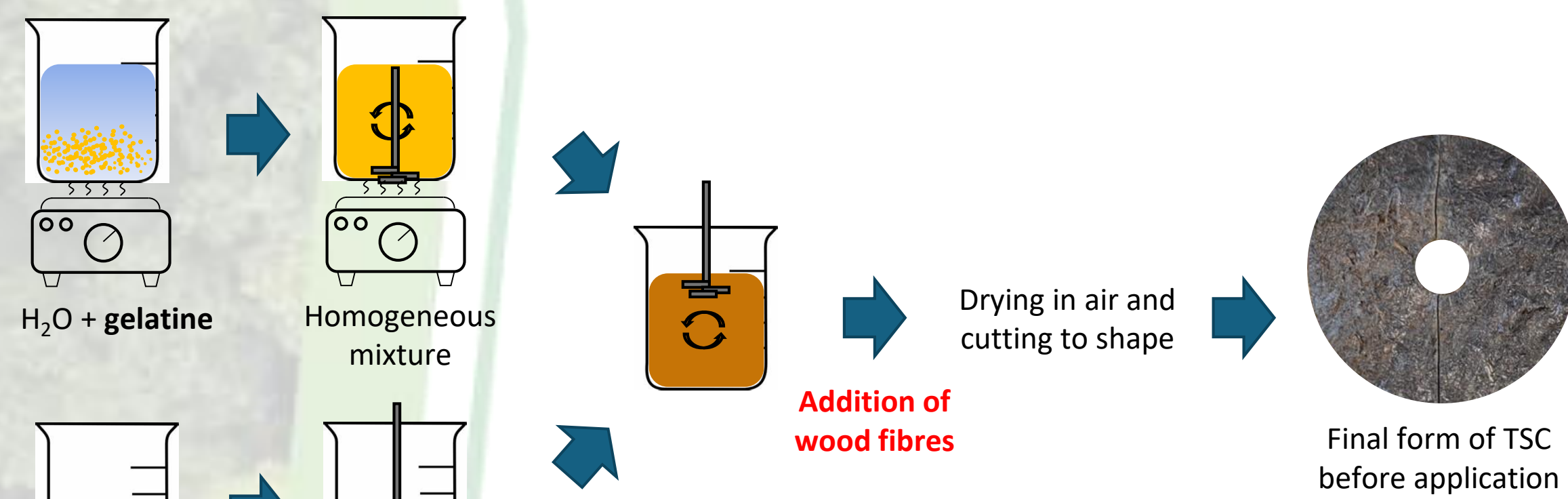


low suction range (< 100 kPa), the water retention capacity of mixtures is higher than that of the soil
 SC does not affect suctions higher than 2000 kPa

*Shortt, R.; Verhallen, A.; Fisher, P. Monitoring soil moisture to improve irrigation decisions; Ministry of Agriculture, Food and Rural Affairs: Ontario, Canada, 2011.

THRO

Topsoil Cover (TSC): Production of gelatine crosslinked hydrogels



Water uptake

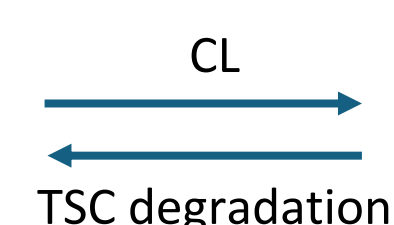
In 24 h, TSC takes up to (350 ± 20) % of water compared to its dry mass

Germination

New TSC: inhibits germination
 Degraded TSC (6 months weathering): germination and plant growth

Long-term weathering

Degradation after 11 months strongly dependent on amount of cross-linking agent (CL):



Water storage for drought conditions

No initial competing weeds

Degradation rate highly customisable

UBZ

Properties	Soil conditioner (SC)	Top Soil Cover (TSC)
Biodegradability	✓	✓
Indigenous microbial community	✓	✓
Unaltered soil properties	✗	✓
Increased microbial richness in soil	✓	✗
Increased microbial activity in soil	✓	✗
Increased microbial evenness	✓	✗
Decreased microbial dominance	✓	✓

✓ Advantageous ✗ Disadvantageous