Webinar “Seeds of the Mediterranean – Water Sustainability within the Circular Economy"

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Creating and Upscaling Sponge Landscapes by Working with Natural Water Retention and Sustainable Management

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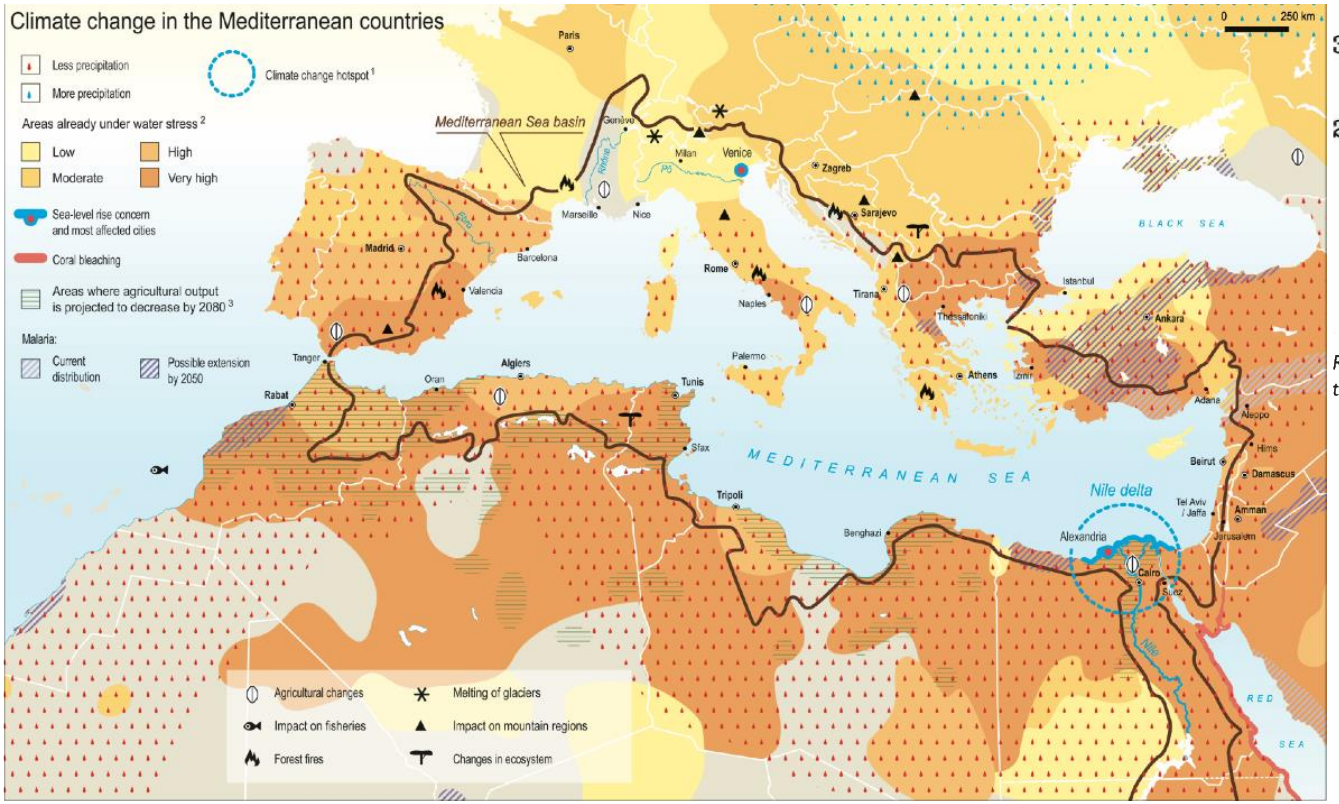
30.06.2026

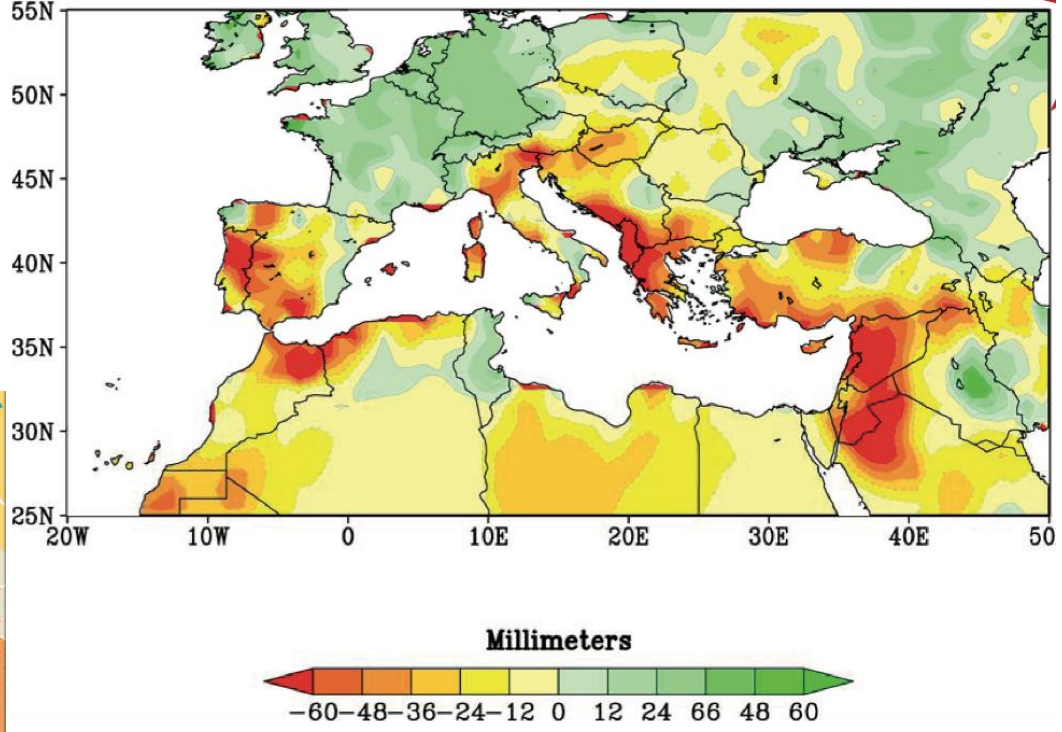
Funded by the European Union

UK Research and Innovation

The med climate hotspot…



Source: IPCC , 2007; Water stress: Revenga &Döll, 2000 updated by Alcamo & al., 2003; World Resources Institute, 2007; Rogers & Randolph in: Science, 2000; Agricultural output: Fischer & al., 2005; Plan Bleu, 2009.



Reds and oranges highlight lands around the Mediterranean that experienced significantly drier winters during 1971-2010 than the comparison period of 1902-2010. Source: NOAA.

Increased T
Decreased pptn and temporal distribution
Forest fires
Overheated cities
Energy consumption increase
Agriculture affected
Soil deteriorate
Water stress challenge
Flood events at large

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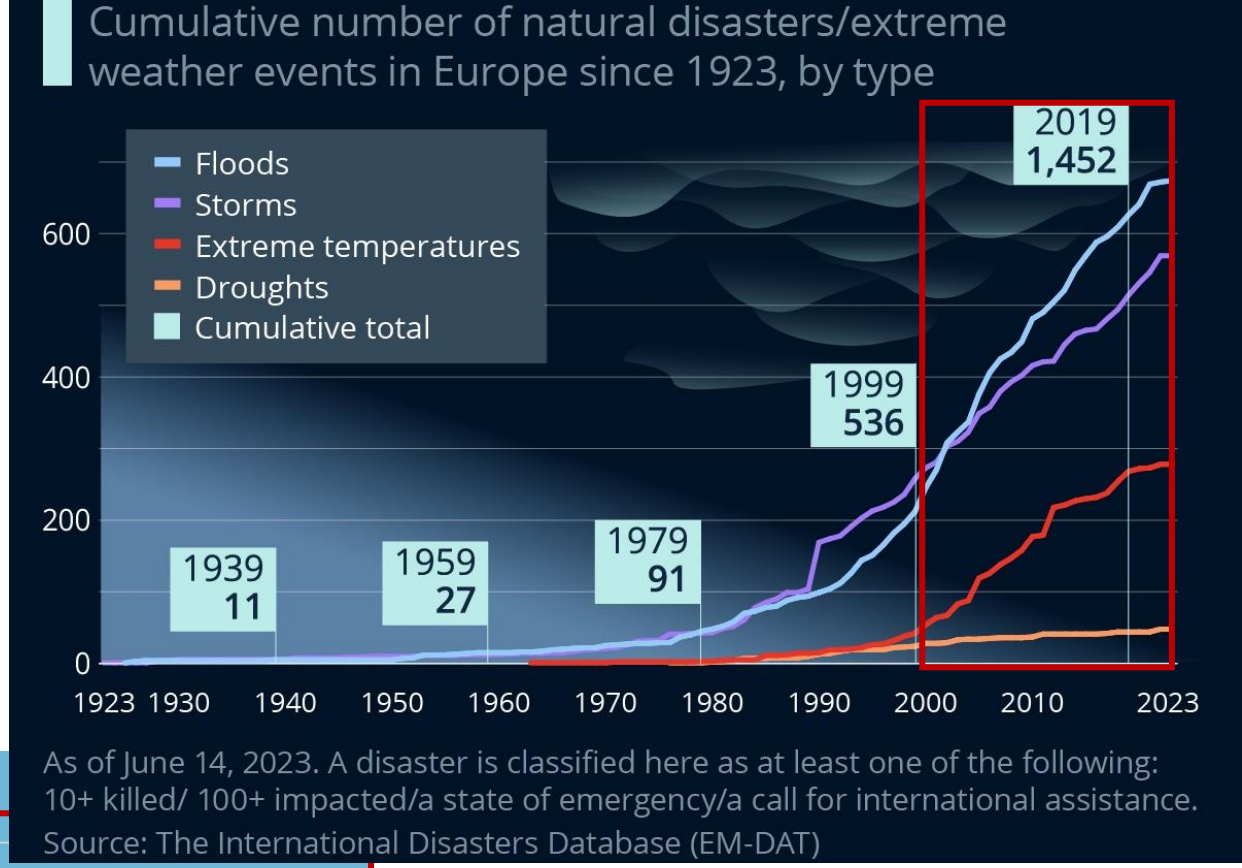
UNEP

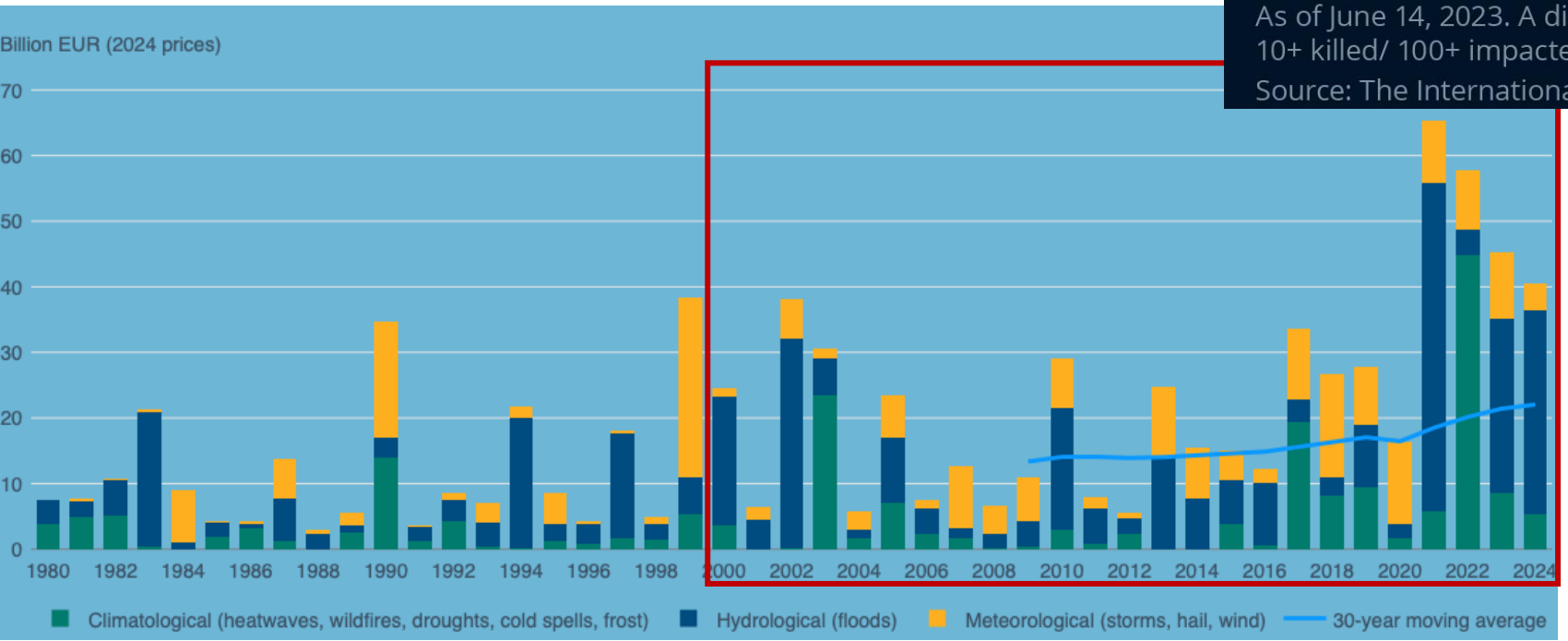
MAP

Plan Bleu

Climate change in a nutshell…

https://www.statista.com/chart/30288/cumulative-number-of-natural-disasters/





EEA, 2026. Economic losses from climate-related extremes in Europe

Sponge landscapes are needed

- Floods and droughts intensify across Europe
- Water quality, soil health and biodiversity under pressure
- Draining-focused management still deeply embedded; Options for enhancing landscape sponge functioning remain untapped – grey still on

Change does not happen fast and at scale

- The challenge is no longer awareness – but large-scale implementation under real-world constraints

Transformative change FAST

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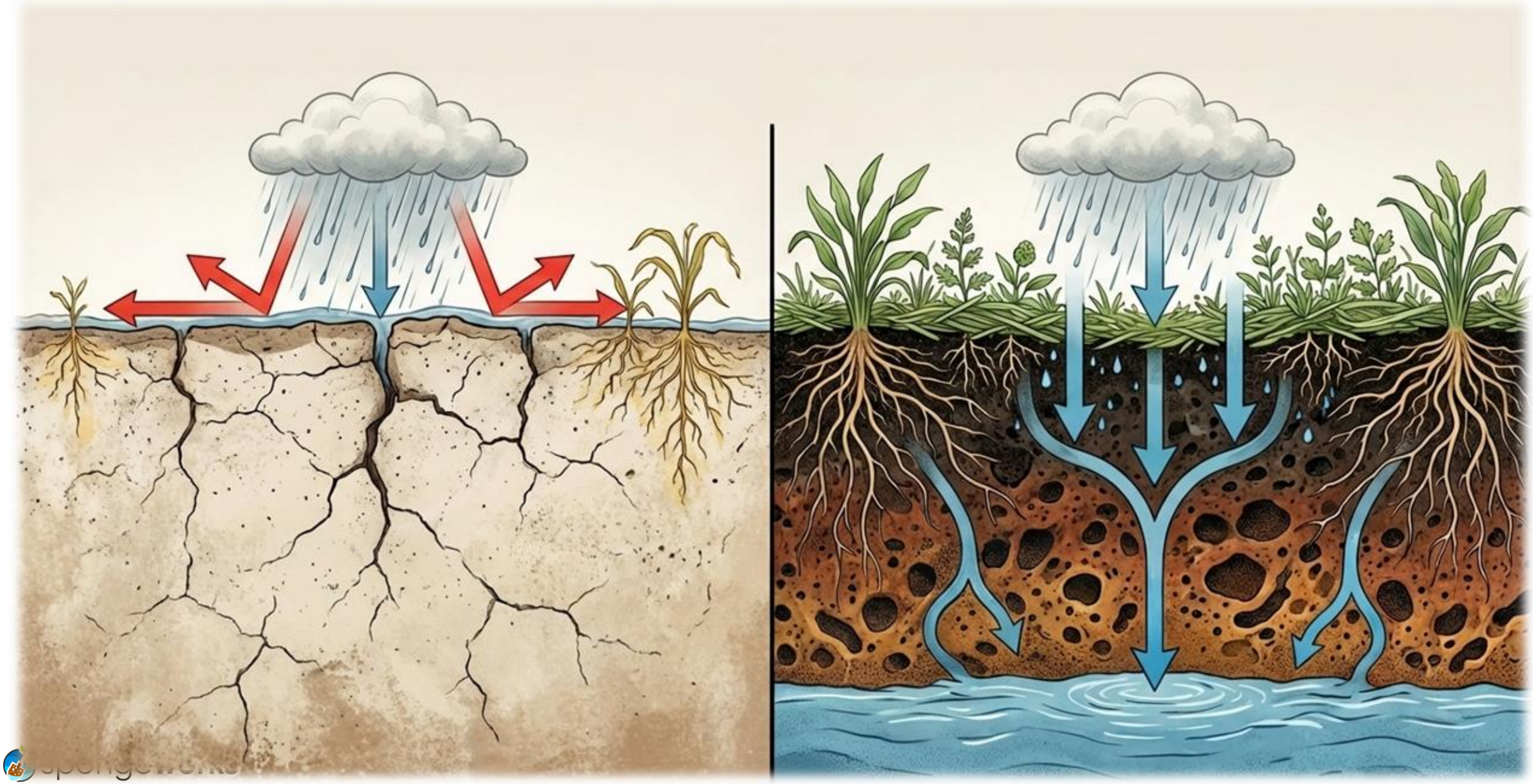
Sponge Measures



Hypothesis: Sponge landscapes at work

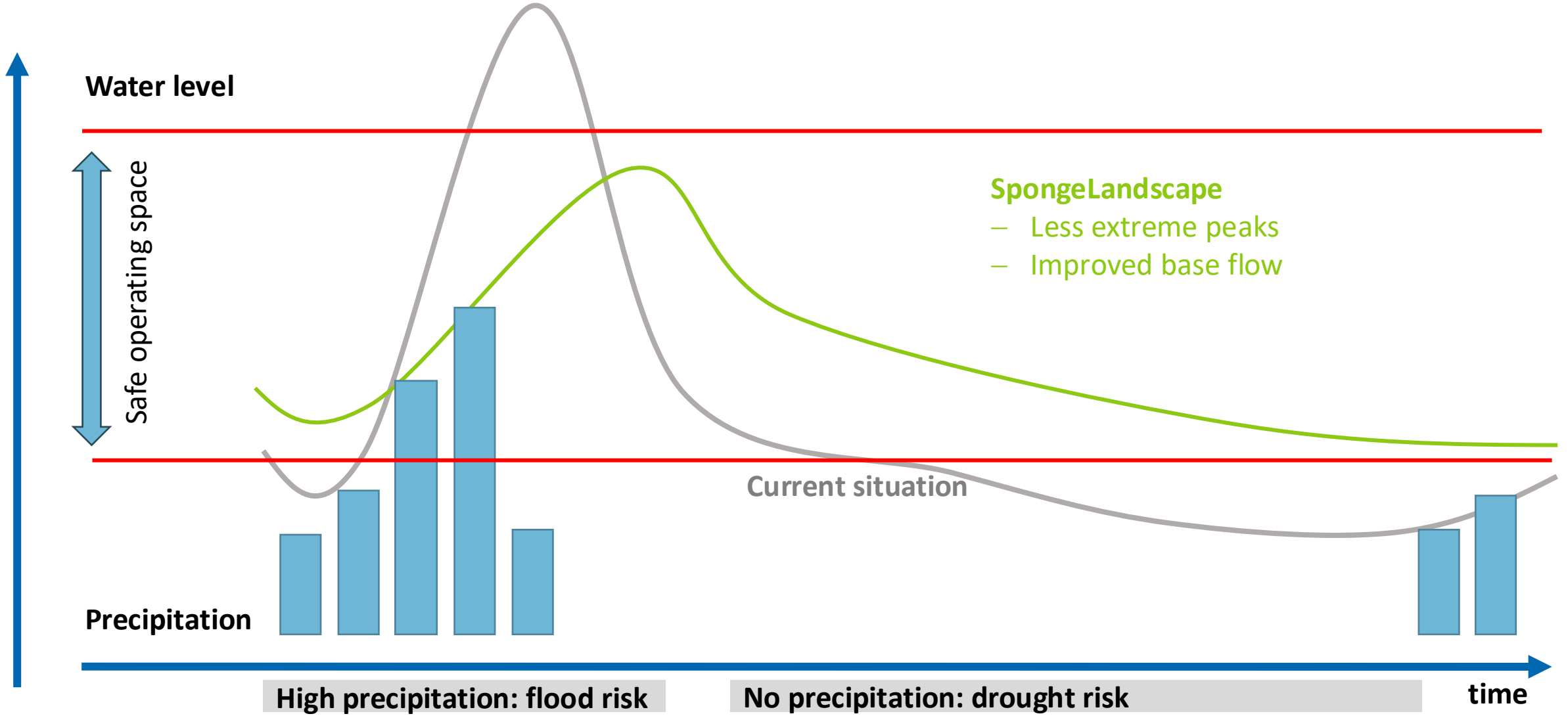


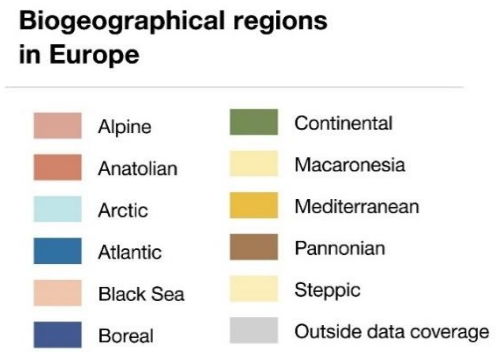
Diagram adapted from STOWA, 2017

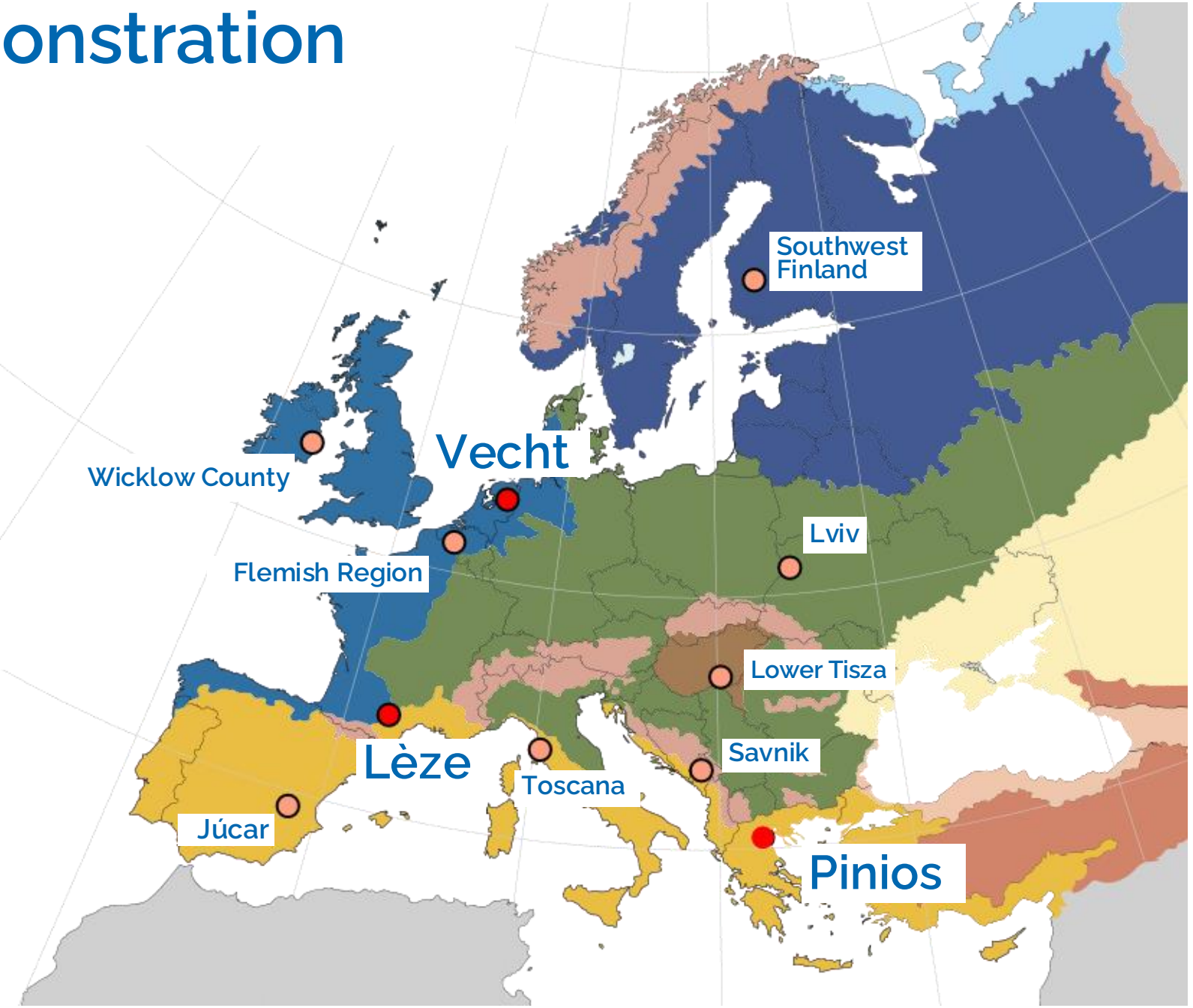
Large-scale demonstration

- 4 Years (9.2024-08.2028)
- 6 countries – 3 DBs
- 8 Associated regions
- 12 Implementing partners
- 23 knowledge partners
- 28 partners
- 29+ measures
- 200+ areas of intervention
- 4000+ ha

● Large-scale Demonstrators

● Associated Regions





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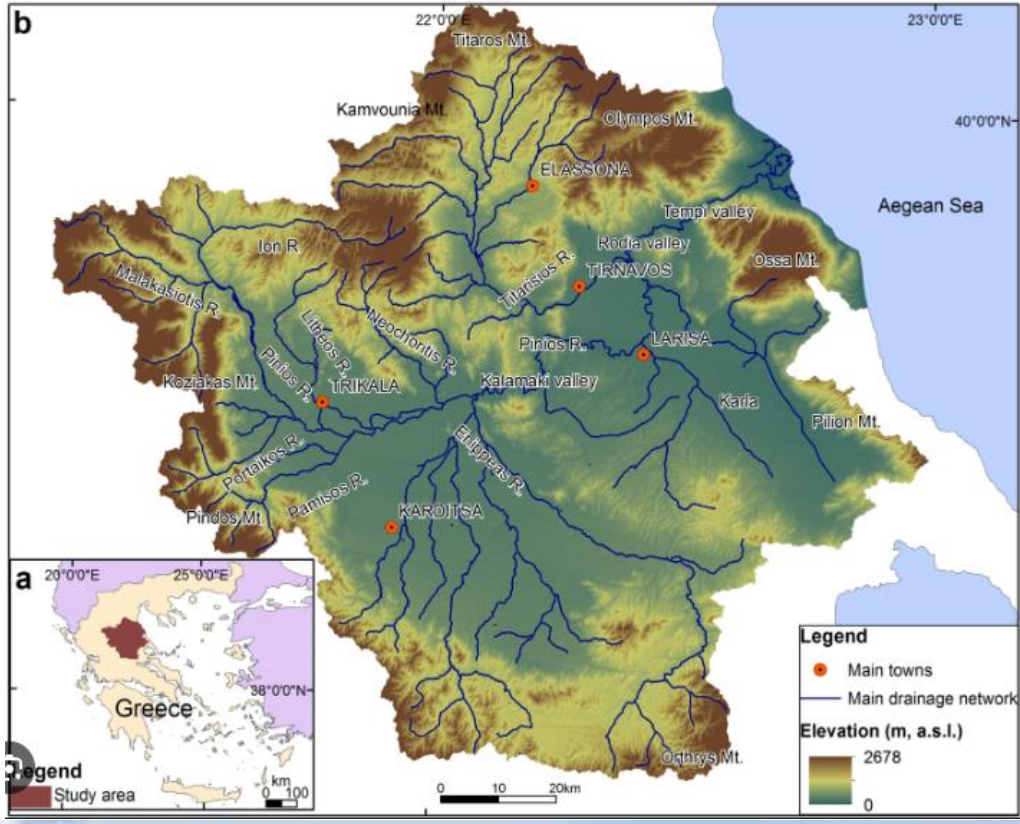
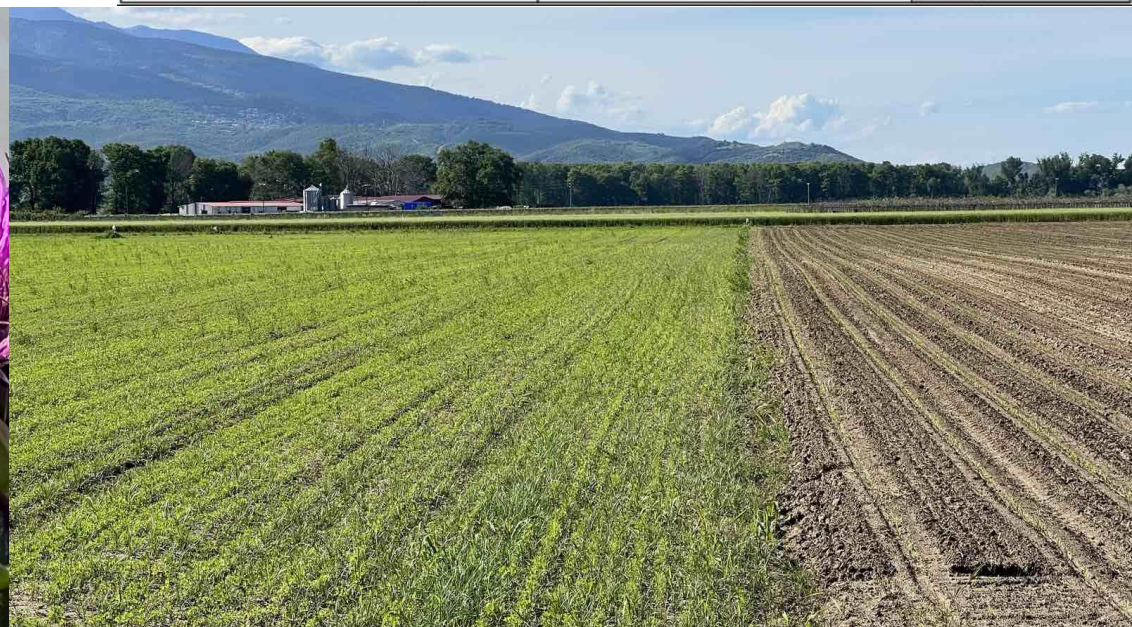
Overview of Pinios Basin

- ca 11,000km^2: 2 flat plains surrounded by rugged topography
- Contrasting precipitation pattern (from 400mm to 1800mm)- hot and dry summers
- Dense hydrographic network
- Population: 700,000 – agriculture main activity
- Fragmented governance structures
- **Deficient water budget, quality issues**
- **Signs of desertification, low soil organic matter**





Key challenges and types of measures implemented

CHALLENGES

🌊 **Increasing climate risks**

- Floods & droughts -> societal hazard, productive land wash-out/abandoned, soil erosion/degradation

💧 **Water stress & imbalance**

- Water deficit, quality deterioration

🚜 **Low resilience of agricultural practices** to climate change

- Insecure production (quality & quantity), non-financial viability

How to...

- Overcome inertia and governance fragmentation
- Convince implementers to go *"spongier"* and stakeholders to support sponges

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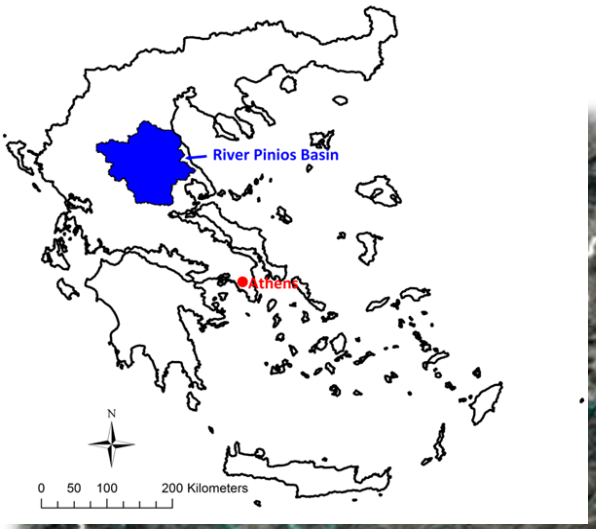
Spatial extent of intervention areas



HELLENIC REPUBLIC
PREFECTURE OF LARISSA
MUNICIPALITY OF AGIA

1 - Agia plain - Implementer: Municipality of Agia (DIMAG) | 200ha-350 fields-43 farmers

ACM MELIVIA

2 - Melivia area - Implementer: Melivia Cooperative (ACM) | 35ha-50 fields-18 farmers

3 - Tavropos area - Implementer: TOEV Tavropou (TAV) | 350ha - buffer strips (20kmx4m) & hedges (28kmx1m) - 150 fields - 15 farmers

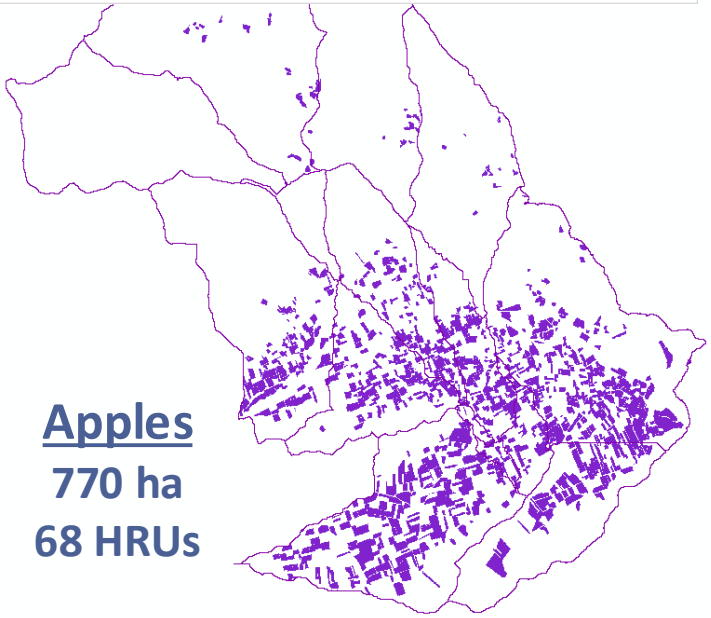
e-trikala

4 - Trikala area - Implementer: e-Trikala | Riparian forest (2.7kmx4m) & SpongePark - 2ha

NbS1: Effective soil water management through irrigation scheduling

Current irrigation practice for <u>apples</u>:

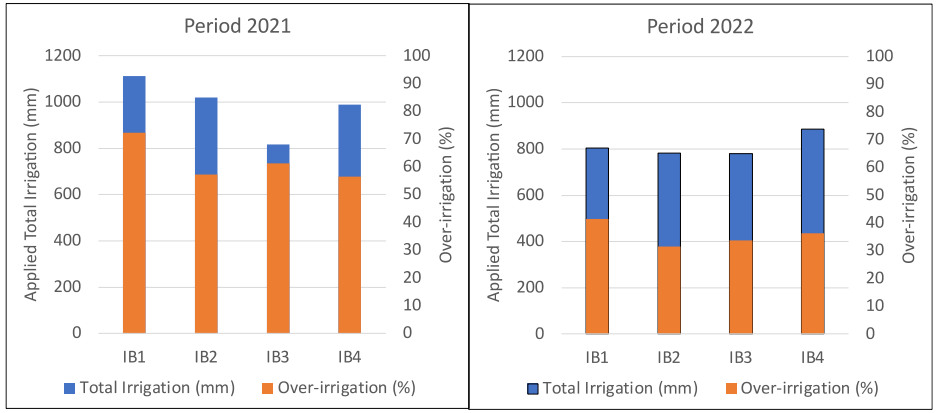
- **Empirical practice** -> fixed days, 1 irrigation event per week, as much as possible, late May – mid Sep
- **670 mm per irrigation period**, based on data from telemetric water meters



<u>Apples</u>
770 ha
68 HRUs

Irrigation scheduling

- Implementation of the **auto-irrigation algorithm** of SWAT model. **Water stress** based on **plant water demand**



<u>Reduction of apples' irrigation water consumption:</u>

- On average **by 22%**
- From **670 mm to 520 mm (dha)**

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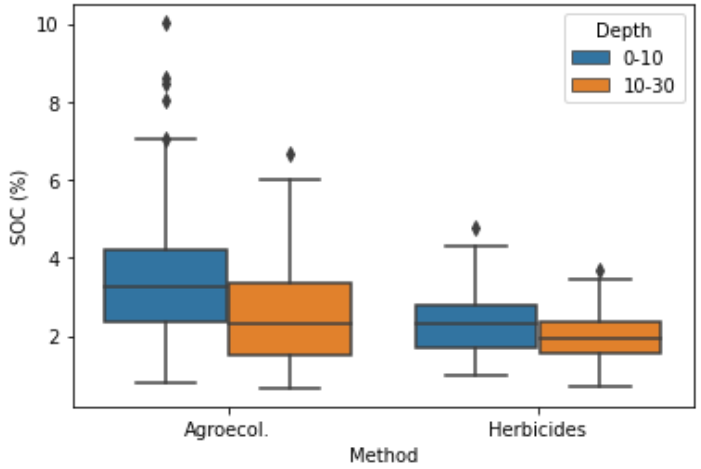
NbS2: Increasing soil organic matter though agroecological practices

Year 2022 and 2023 – 16 fields, 8 applying **mowing/mulching** and **8** applying **herbicides, 532 soil samples**

Field applying herbicides



Soil Organic Content (SOC) at fields **applying mowing/mulching** compared to fields applying **herbicides** was found to be **on average**:

- **1.2% higher** at **0-10 cm** depth
- **0.6% higher** at **10-30 cm** depth

Field applying mowing/mulching

Increasing soil organic matter though agroecological practices in Pinios Hydrologic Observatory

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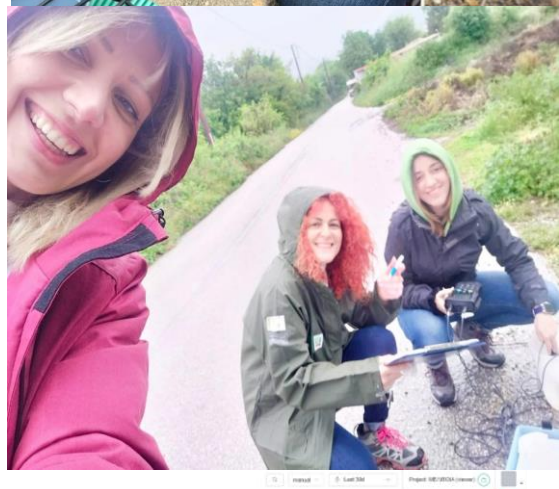
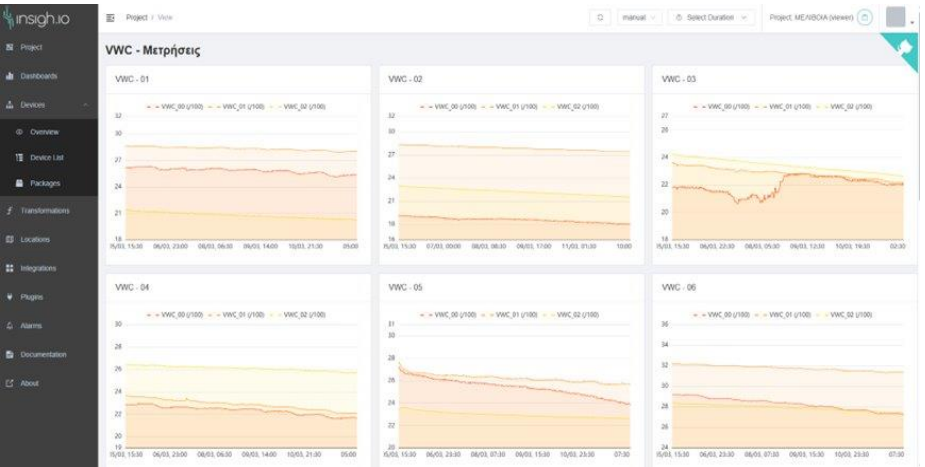
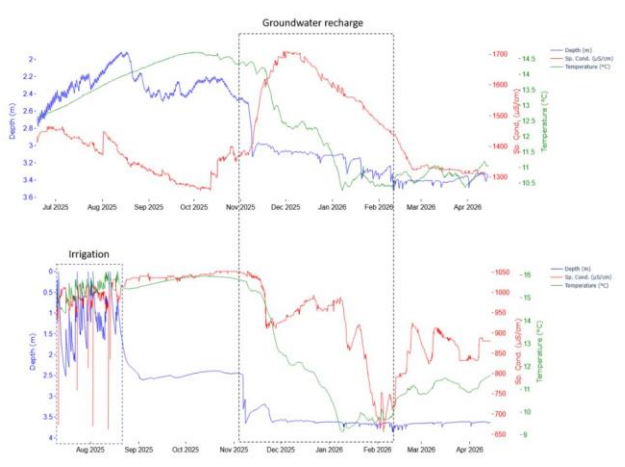
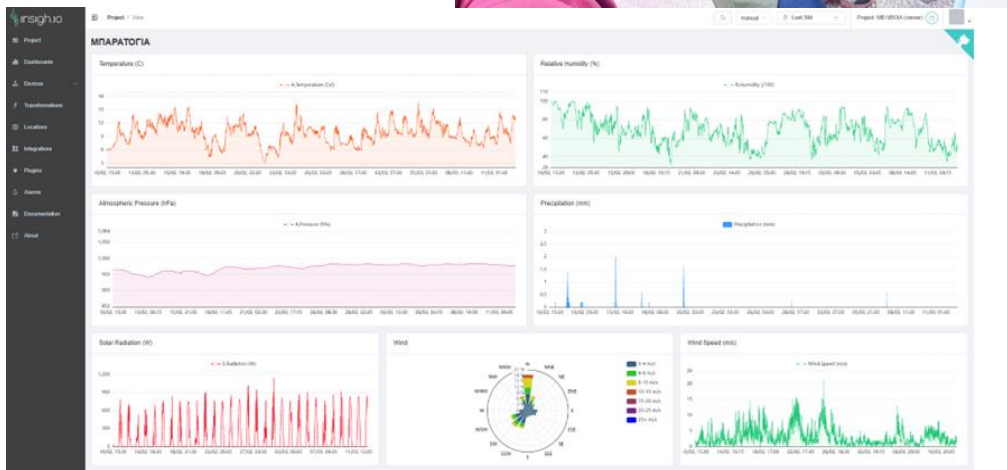
Setting-up and maintaining monitoring networks

- 4 pillars: Water retention & quality, biodiversity, socio-economics
- Monitoring network status
- Set-up per DB and implementation area
- Opt for Before – After – Control – Impact (BACI)
- Start from field and upscale to sub-basin scale
- Logbooks to digital-online sensors and EO, inc. citizen science
- Address implementers (train) -> decision makers









Co-implement sponge measures and assess their impacts

🚧 Implementation framework operationalised
🌱 Sponge measures selected & adapted

👷 Field implementation initiated
⚠️ Barriers identified & addressed
📡 Monitoring integration initiated
🧠 Modelling preparation underway

🤝 Strong coordination, governance activated
🔄 Cross-basin learning activated

📈 Clear deployment roadmap defined
📊 KPI tracking system established

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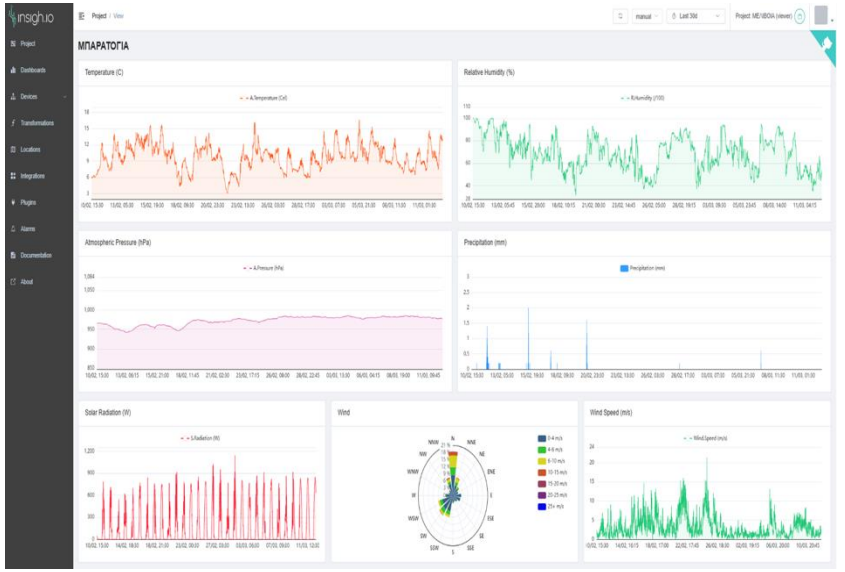
Co-implementing sponge measures and assessing their impacts

Stakeholders' engagement & strong collaboration

Inter-basin knowledge exchange supported by field visits

Initial results & mapping intervention areas



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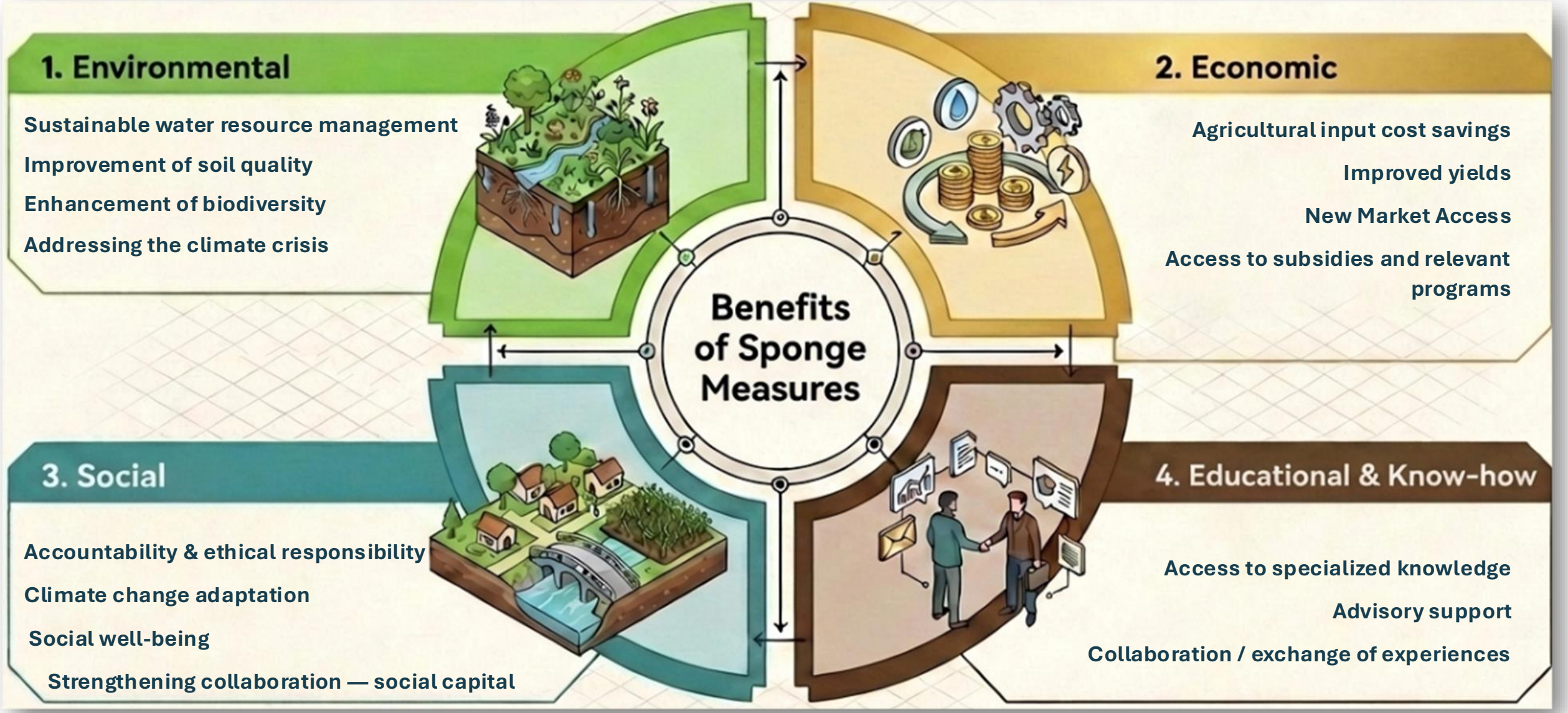
Ensuring long-term viability of implemented sponge measures



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Ensuring long-term viability of implemented sponge measures

Examples of subsidies for Sponge measures form CAP 2023 – 2027 related to Pinios River Basin

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Overview of achievements

Interaction with stakeholders

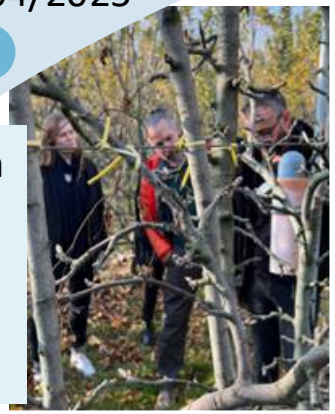
Field Day - Demonstration of strip tillage machinery 04/2025

Field Day – Demonstration of mechanical weed control machinery 06/2025

1st Technical Workshop (Knowledge Integration Workshop) 11/2025

2nd Technical Workshop (Geodesign Workshop) 05/2026

Demo basin Kick-off meeting (DBKO) 11/2024



Development of scenarios that take into account the existing conditions, including all socio-ecological and technical challenges

Development of scenarios that leverage the "supportive elements" and address the "constraints" of the current governance system, in order to identify where changes are required and where changes can realistically occur

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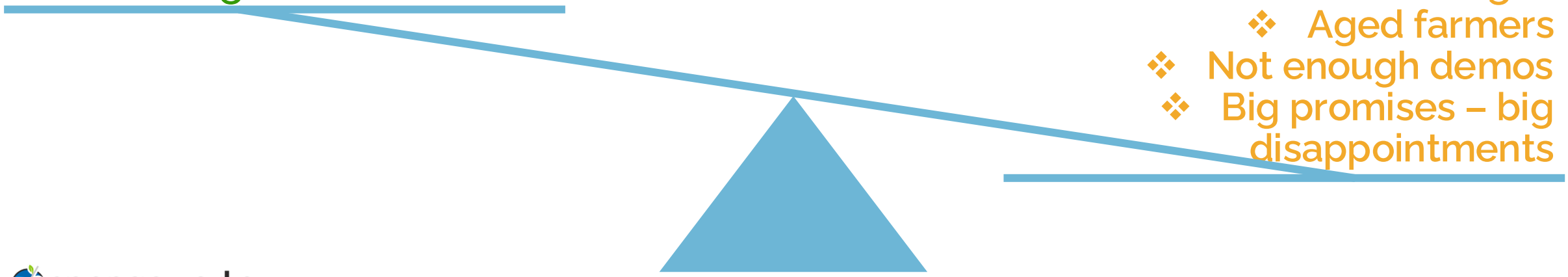
co-design, co-implement

collaborate – exchange experiences

Attempting to balance…

- ✓ Need for survival
- ✓ Need for sustainability
- ✓ Trust to individuals/bodies
- ✓ Demonstrating results
- ✓ Inspired champions
- ✓ Search for innovations
- ✓ Core of believers
- ✓ Funding mechanisms



- ❖ Low capacity/knowledge
- ❖ Governance fragmentation
- ❖ Low awareness
- ❖ Complex procedures
- ❖ Distrust to the "system"
- ❖ Inertia to changes
- ❖ Aged farmers
- ❖ Not enough demos
- ❖ Big promises – big disappointments

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The takeaways so far…

- ✓ Sponge measures about environmental protection. **Core** goal support **long-term viability and resilience of agriculture**.
- ✓ Water sustainability through **WEFE Nexus** perspective, balancing needs.
- ✓ **Stakeholder engagement** essential, **LOCAL ACTORS** determine measures are realistic, accepted and maintained.
- ✓ Early field evidence is **encouraging**: strip tillage → better water infiltration capacity.
- ✓ Large-scale implementation **incentives**, trust, technical support and evidence of benefits.
- ✓ Transition to sponge landscapes combine: practical NbS, local knowledge, realistic pathways.

Thank you!

The main challenge is no longer awareness, but moving from pilot actions to broader adoption under real-world constraints.

The future is ours - let’s take it in our hands:
WE experience the problem
WE formulate the solution

Funded by the European Union

UK Research and Innovation

The SpongeWorks project has received funding from the European Union’s Horizon Europe research and innovation programme under grant agreement No 101156116. The project will run from 1 September 2024 to 31 August 2028.
Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.