Living Labs to support sustainable soil management practices and the implementation of decision-support Tools in Europe

ASD 2024, Vilnius

Presenter : Meriem Jouini

Med stöd från

SLU

VÄSTRA GÖTALANDSREGIONEN

EJP SOIL

PRAC2LIV

EJP SOIL
European Joint Programme

PRAC2LIV

Fostering soil management PRACtices and uptake and developing decision support TOols through LIVing labs in EU

SLU

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The overall objective of PRAC2LIV

To improve and promote the uptake of DSTs for sustainable soil management under changing climatic conditions, where soil quality, environmental impact and the farm economy are all considered.

- The focus is on Soil Organic Matter, Water Retention, and Nutrient Use Efficiency in the EJP SOIL Member States + Türkiye.

1 Literature review on perspectives for DSTs in Europe

Summarise and highlight all relevant aspects

2 Stock-take of DST

Perform a systematic stock-take of DST across Europe, targeted at NC's as well as farmers.

3 Stock-take Evaluation

Analyse principles of assessment and strategic development and assess their usability across pedo-climatic zones.

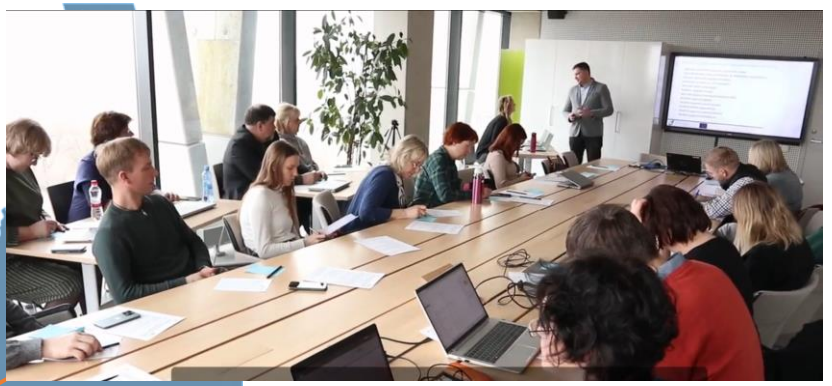
4 Recommendations / Stakeholders exchange

Draw recommendations, e.g., guidelines and guidance for use in applied research and non-university development of DST; discuss findings with stakeholders.

5 Design mock-ups

Design mock-up web-portal/dashboard and discuss relevance for promoting soil health in Living Labs.

Stakeholders Exchange



Upcoming workshop : June 2024

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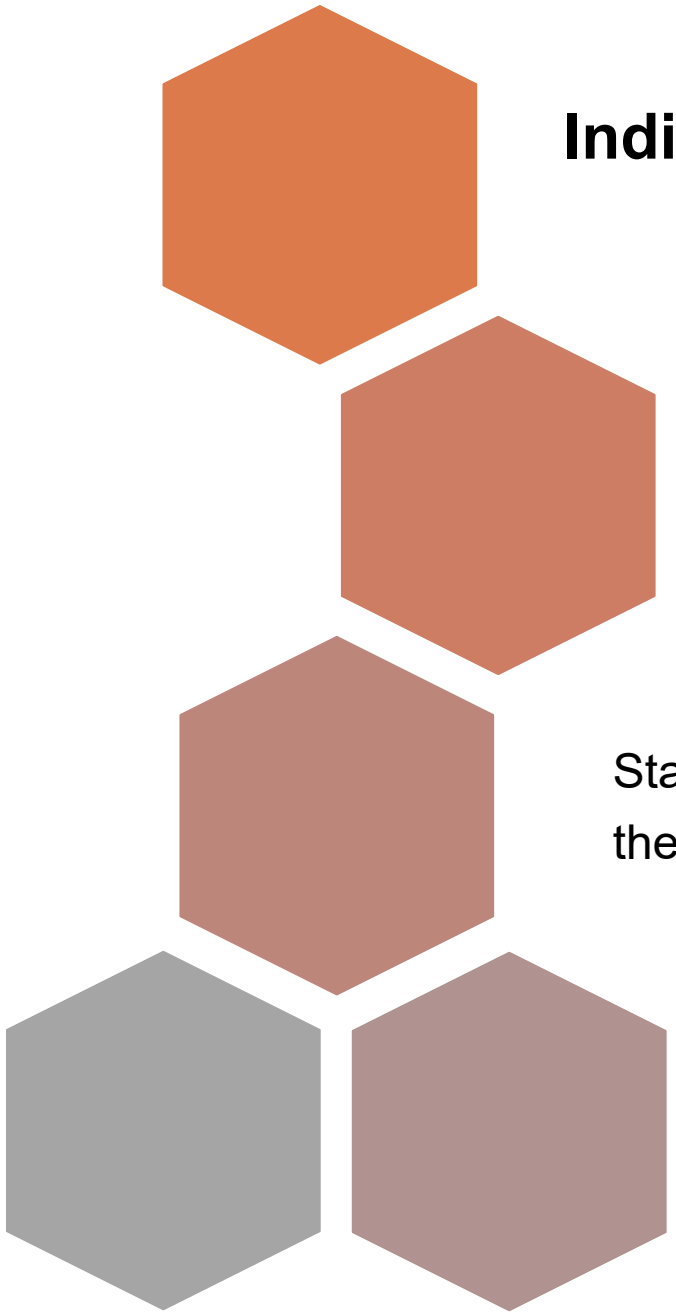


Individual decisions taken by farmers determine the change towards more **sustainable** agriculture and resource management.

Farmers' knowledge and **capacity** to define and decide on sustainable systems.

Stakeholder at **local level** is needed that is legitimate for all stakeholders to support the process of **transferring knowledge and innovations**

The **participation** and the **involvement** of all the legitimate parties concerned by resources management.

Aim

- The aim of this study is to **explore** the main **factors** that explain why the **use** of the available **tools** to improve resource use efficiency and management is still insufficient in Europe, while the necessary tools in many cases are freely available.

- This study focused on EJP SOIL project PRAC2LIV and case study in Sweden conducted within a Swedish regional project (VGR-project).

Increasing the availability and use of technologies and tools

1. Identify the target **audience** and raise **awareness**
2. Increase the **acceptance** to adopt the available and new technology
3. **Actions/ strategies** : To make it easier for farmers to adopt the available and new technology

Approach

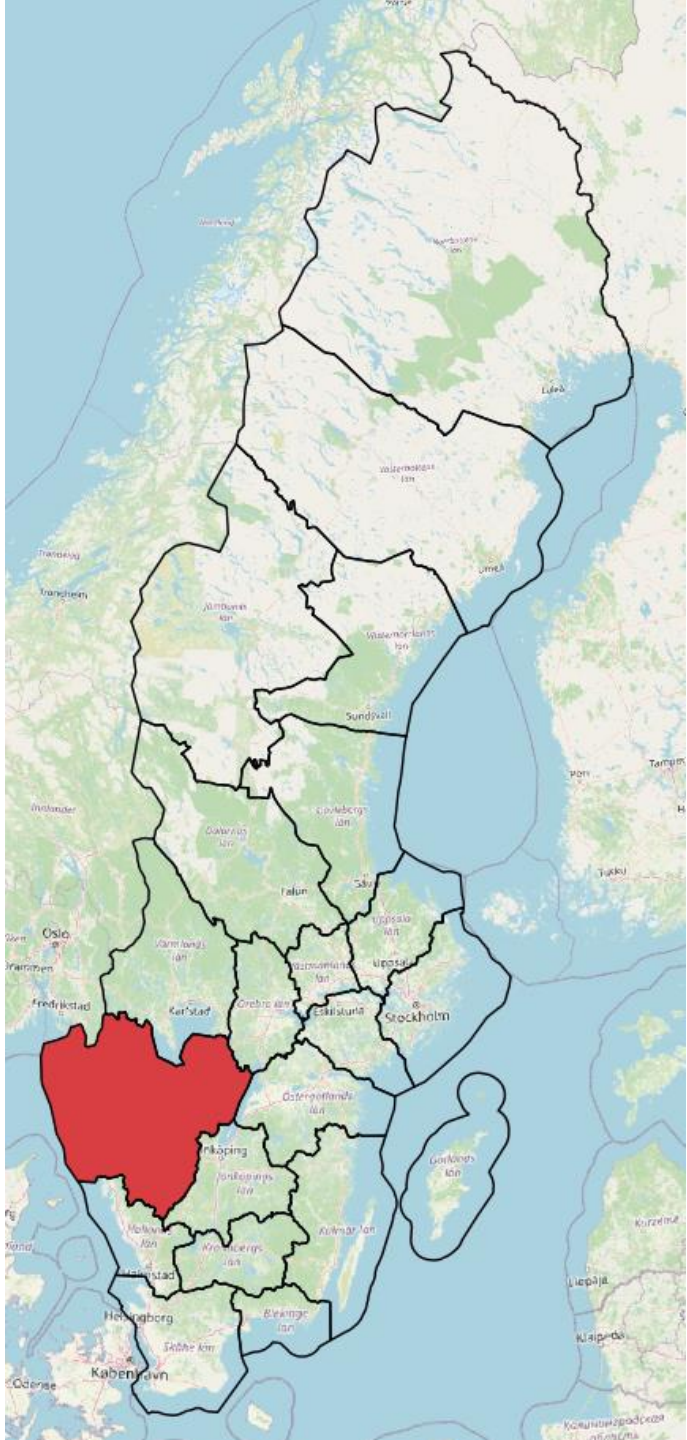
Targeted farmers :

- Cereal production
- Pig production
- Cattle for meat production
- Cattle for milk production
- Seeds production
- Organic farming

Step 1: Interviews: Semi-structured interviews (for about 45 - 60 minutes)

Number of farmers : 69 farmers (30 short interview, not a farmer or not interested for a full interview).

Step 2: Multi-stakeholder workshop



Multi-stakeholder workshop

Presentations + discussions

Interactive sessions

What are the **barriers** and **motivations**?

Within the **EJP SOIL project PRAC2LIV**, a wide range of **DSTs** has been identified in Europe:

- 38 DSTs for soil water availability and retention,
- 46 DSTs for soil organic carbon,
- 72 DSTs for soil nutrient use efficiency.

Drivers to increase farmers' acceptance to use of PA tools and DSTs

DST features

- Ease of use
- Standardisation
- Flexibility of tools
- Input data

Information

- The flow and quality of information :
- Reducing information asymmetry
- High-quality information sharing
- Transparent tools where you understand what lies behind

Reliability

- Demonstration to prove the viability of economic return
- Profitability : *How much you get out of precision?*
- Uncertainty towards outcome and incomes
- Alternatives

Aspects related to the farm

- Defining the key needs of farmers
- Need for more Knowledge-Information
- Interest
- Awareness
- Trial-and-error characterization of some sequences

Stakeholders / Information

National level

Lantmännen

Swedish board of agriculture

LRF (National Farmers' Union)

SLU

Yara

DataVäxt

Greppa Näringen

Regional level

Agroväst Livsmedel AB

Länsstyrelsen Västra Götaland

Regional LRF

Varaslättens Lagerhus

Hushållningssällskapet

Local level

Local advisors

LRF (at municipality scale

Local equipment suppliers

Group 1

Group 2

Group *n*

Information

Farmers

- **Need for trusted sources of information**
- **Need for more coordination between different parties to provide structured information**
- **Need of more strategies at local level.**

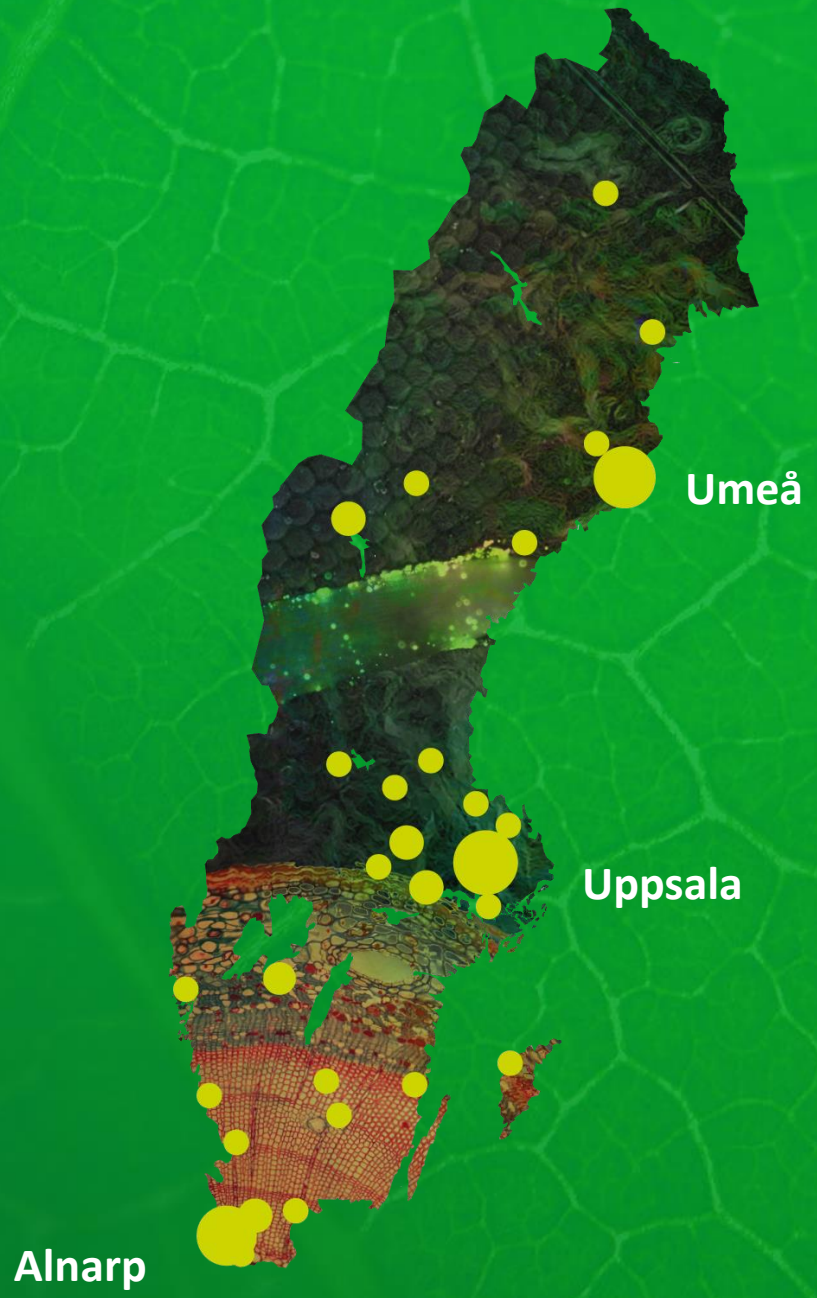
To what extent are the tools applicable at different scales?

	Farmers' goals	Regional goals
Soil organic matter	•Reduce inputs and increase the economic profitability of farms •Recommendations for crop rotations and soil management •Farm-level carbon budget calculation •Increase carbon content •To make informed management decisions for sustainable production. •Sustainable soil management monitoring •Sustaining/improving soil fertility and moisture retention •Increasing and maintaining the productivity of farmer's land, will provide more income, protect soil against climate change	•LULUCF targets •Climate policies •Retention of soil carbon, Soil C balance •Regional SOC targets •Informed management decisions •Need to better identify Corg •Sustaining / improving soil Carbon •In terms of soil fertility and soil health, it could contribute to monitor, maintain and increase SOC, especially in agricultural lands
Nutrient use efficiency	•Fertilizer use efficiency and increase the economic profitability of farms •Reduce N & P surplus and risk of loss per hectare. •Increased soil fertility due to improved nutrient distribution within the farm •Better yield and historical data •Reduce costs and sustainable production. •To make informed management decisions •Increasing and maintaining the productivity of farmer's land, will provide more income, protect soil against climate change.	•Reduce GHG emission without reducing yield •Reduced nitrate leaching •Nitrates Directive •Environmental policies •Water quality maintenance / improvement and GHG mitigation •Informed management decisions •In terms of soil fertility and soil health, it contributes to achieve nutrient balance and better nutrient management in soil.
Water retention	•Reduced use of irrigation water •Irrigation scheduling, yield estimations •Cost-effective interventions •Irrigation efficiency •Optimization of soil moisture •Increasing and maintaining the productivity of farmer's land.	•Estimate water demand for irrigation •Drought preparedness •Minimizing the risk of nutrient runoff due to reduced water infiltration rates •Water saving •Achieve proper irrigation management and early detection of drought.

On-farm experiments

SLU EXPERIMENTAL SITES

SLU conduct research and collaborative activities at many research stations, experimental parks and campuses throughout Sweden.



Farmers' statements

Farmer 1 quote: *"Regarding experiments, we provide land for field trials, it is very good, we get to see all the results from it. Then we may want an experiment from a different angle. Scientific experiments have limitations that we do not have so all the results they get may not be applicable to our production. We may have a different question than what they have and then we can try on our own field."*

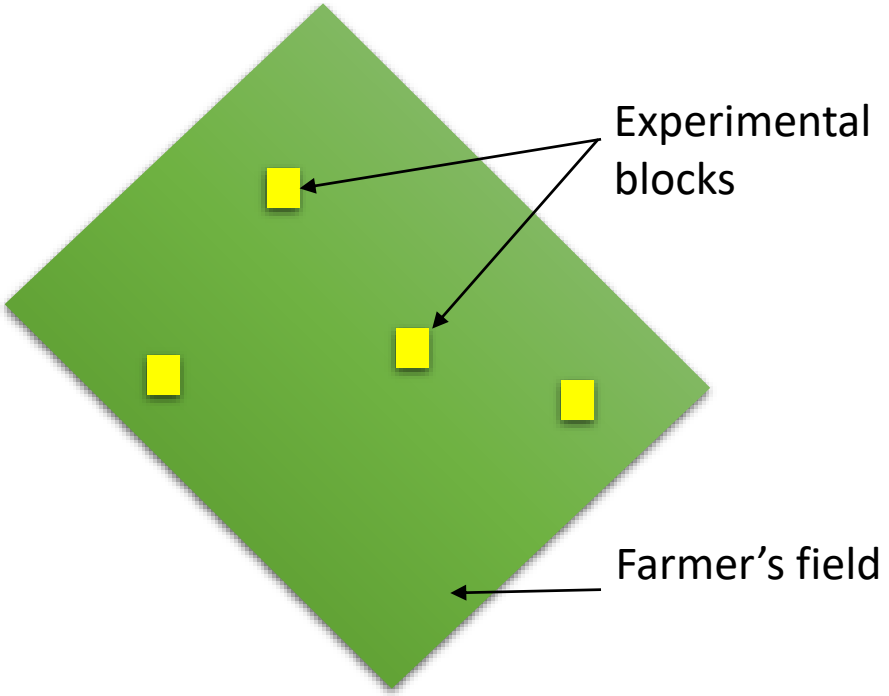
Farmer 2 quote: *"The field trials are too small. I don't think they're representative. I prefer to see what another farmer is doing on his 300-hectare land. Then I can see what works and what doesn't."*

Farmer 3 quote: *"Technology is good and expensive. There is a lot and I don't know what I really need".*

Trials carried out on nitrogen fertilization of winter wheat : Scientist's experience versus farmer's experience :

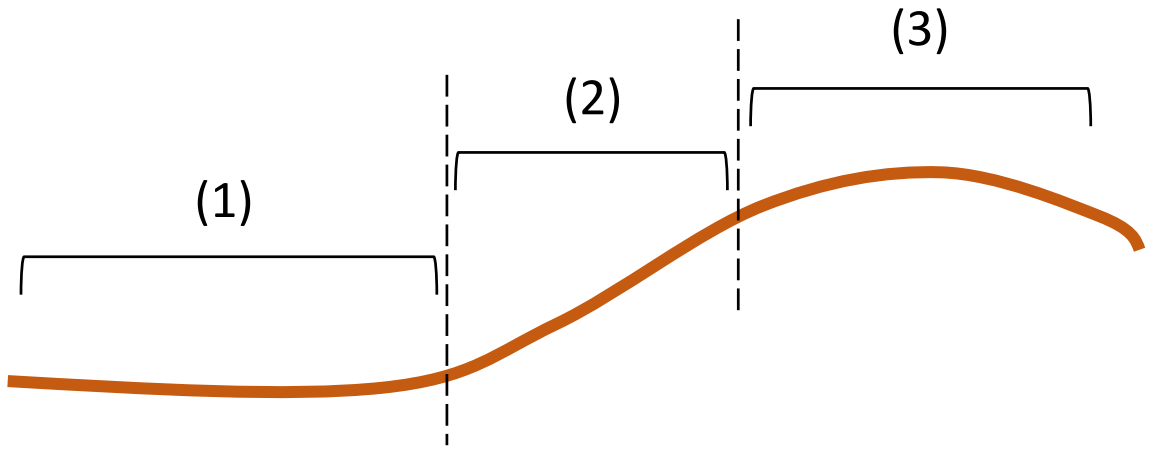
Scientist's experiment

- Homogeneous blocks based on vegetation index
- Size: 12 m X 48 m.
- The tested treatments are spatially distributed



Farmer's experiment

- The experiment is carried out on a transect
- Size : 4 m X 500 m



Farmer’s experiment : nitrogen fertilization

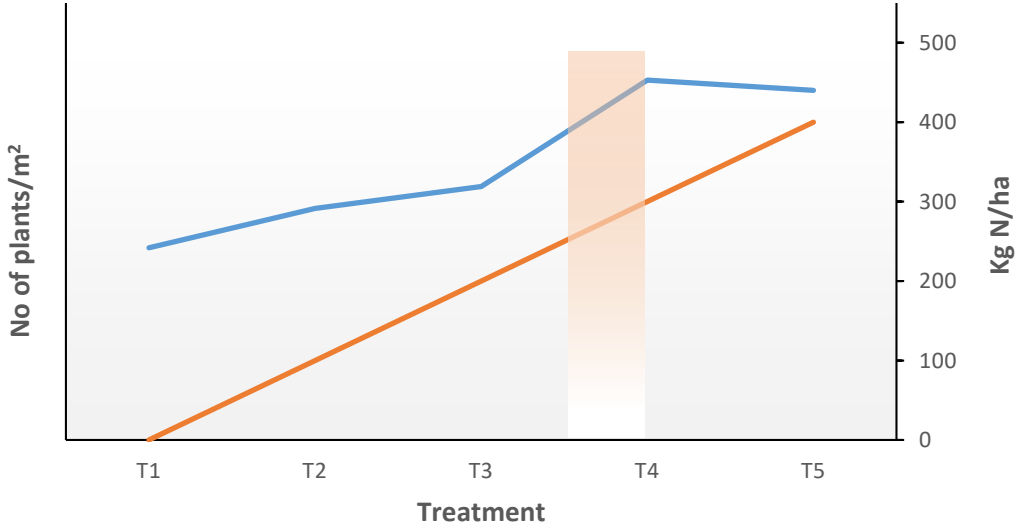
T1

T2

T3

T4

T5



Conclusion

- There is a **knowledge gap** between farmers and tool developers related to the proposed use and interpretation of tools.
- The need for more coordination between different parties to provide **structured information** to farmers.
- **On-farm experiments** are conducted by farmers as a method to enhance their decision-making capacity. The importance of identifying the drivers for sustainability in a real-life context, in order to produce scientific knowledge and make the most of this knowledge at the intervention level.
- Experimentation practices might **support farmers' transition** towards more sustainable practices and support innovation processes to foster sustainable soil management practices and the implementation of DSTs.
- **Tailored interventions** for sustainability are needed at local and regional level.
- The acceleration of sustainable soil management requires efforts by multiple **stakeholders**, at different organization levels.
- **Living Labs** can be key stakeholders in the **articulation** of different scales, from local to national and European levels, and in the development of tailored interventions based on multi stakeholder participation and working in real-life context.

Thank you for your attention

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Med stöd från

EJP SOIL
European Joint Programme

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