Food and Agriculture Organization of the United Nations

GLOSOLAN
2nd Plenary meeting on spectroscopy

2 - 4 November 2021

GLOBAL SOIL PARTNERSHIP

New soil spectroscopy projects within a European Joint Programme on Agricultural Soils (EJP SOIL)

Johanna Wetterlind, Bo Stenberg
Swedish University of Agricultural Sciences

EJP SOIL
European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

EJP SOIL
Towards climate-smart sustainable management of agricultural soils

Objectives

To develop knowledge, tools and an integrated research community to foster climate-smart sustainable agricultural soil management that:

- Allows sustainable food production
- Sustains soil biodiversity
- Sustains soil functions that preserves ecosystem services

5 year, started February 2020

80 million €

26 partner institutes from 24 countries

EJP SOIL coordinators:

Claire Chenu, INRAE

Saskia Visser, Wageningen Research

EJP SOIL
European Joint Programme

EJP SOIL

WP6 - Supporting harmonized soil information and reporting

Task 6.4 - Accounting, monitoring and mapping agricultural soil carbon, fertility and degradation changes

- Develop guidelines on a set of data inventory techniques.
- Test and validate innovative inventory techniques (e.g. proximal soil sensing including vis-NIR-spectroscopy) and state-of-the-art modelling and mapping strategies for field- and farm-scale, to test the effectiveness of the proposed methods for monitoring soil agricultural management strategies.
- Study the possibilities to upscale to regional level, by integration with current and upcoming satellite products (i.e. multi-scale, multi-platform monitoring strategy) and the development of national Vis-NIR-MIR spectral libraries.

STEROPES – internal project 1st call – remote sensing

ProbeField – internal project 2nd call – proximal sensing

EJP SOIL
European Joint Programme

Internal project 1st call

STEROPES – Stimulating Novel Technologies from Earth Remote Observation to Predict European Soil carbon

Lead: AgroParisTech/INRAE, *Emmanuelle Vaudour*

Co-lead: SLU, *Johanna Wetterlind*

14 countries

3 year project, started 1 February 2021

https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-2

Focus on Sentinel 2

EJP SOIL
European Joint Programme

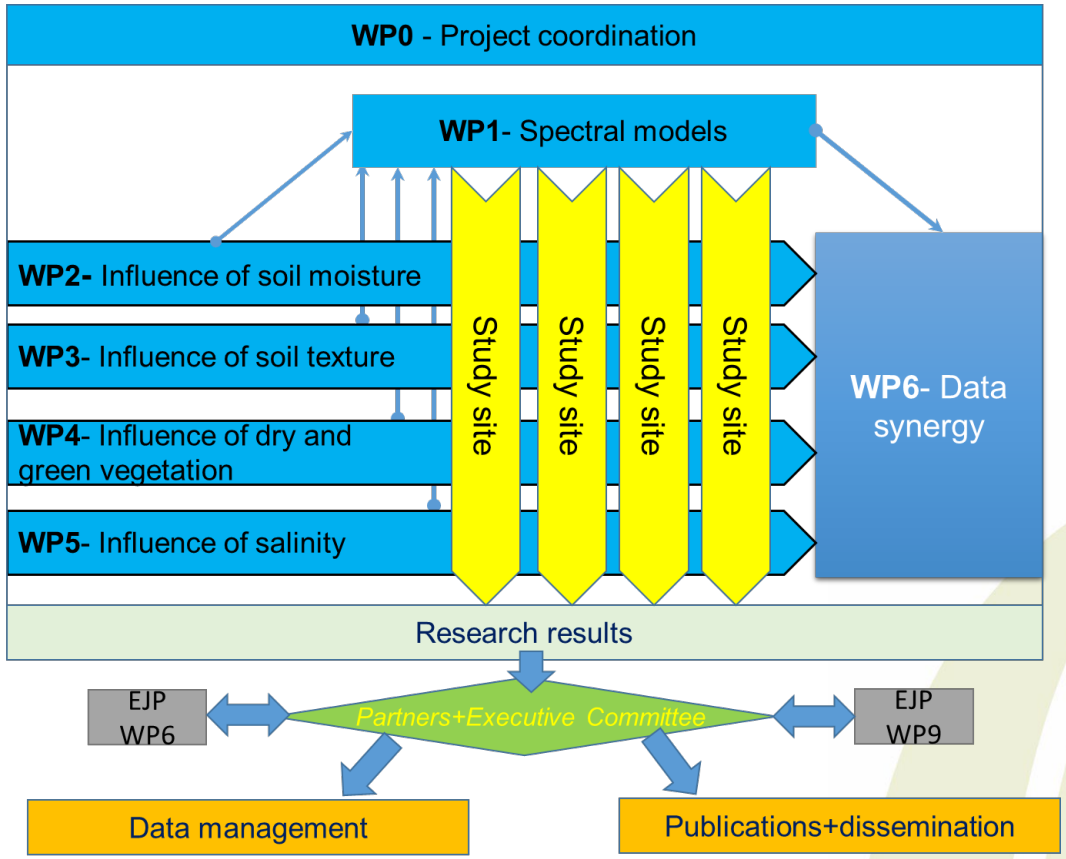
STEROPES

Objectives

1. Assess robustness of spectral models according to agroecosystems/soil types for prediction of SOC
   - at regional/catchment scale – 10 to 1000 km²
   - at farm/field scale – 0.01 to 3 km²

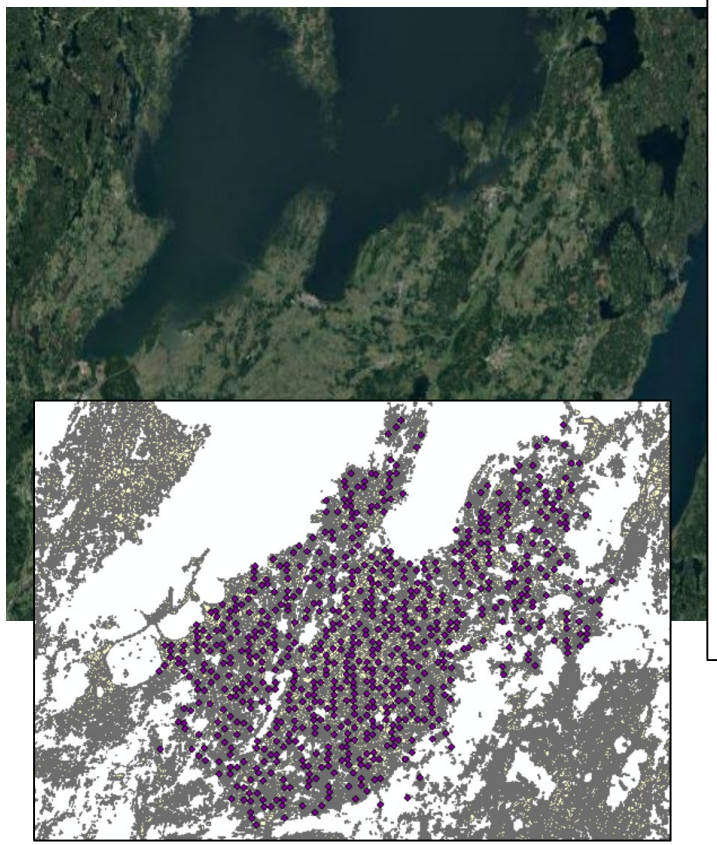
2. Assess/account for disturbing/influencing soil surface factors
   - soil moisture
   - soil texture
   - dry and green vegetation
   - salinity

3. Incorporate 1- and 2-results into spatial models
   - best performing methods/data
   - uncertainty assessment



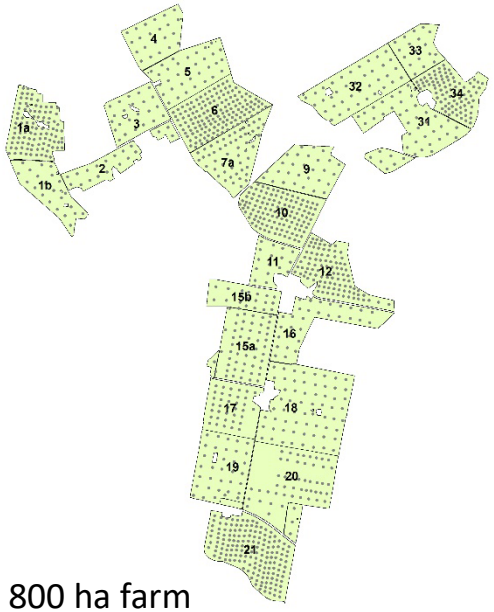
STEROPES

Data/work so far

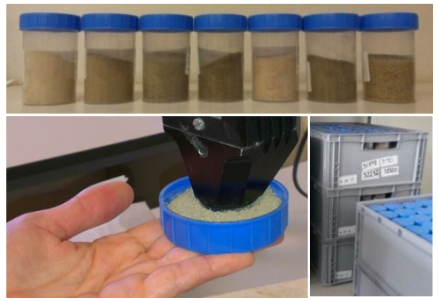


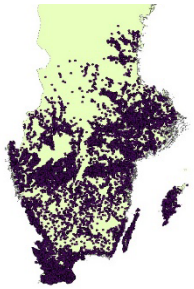
Regional 0.5 samples/km^2

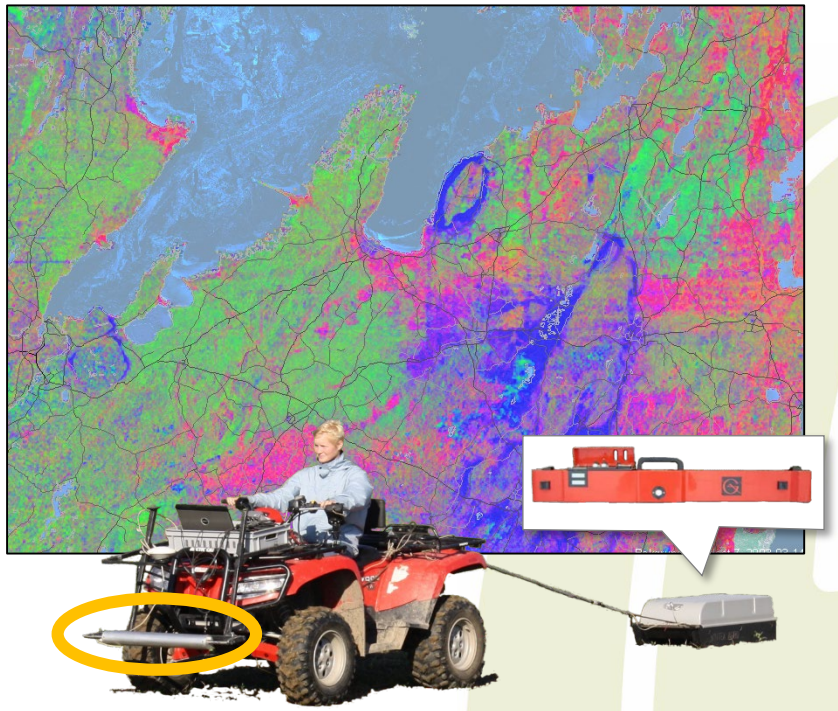
Local



800 ha farm
1-2 samples/ha



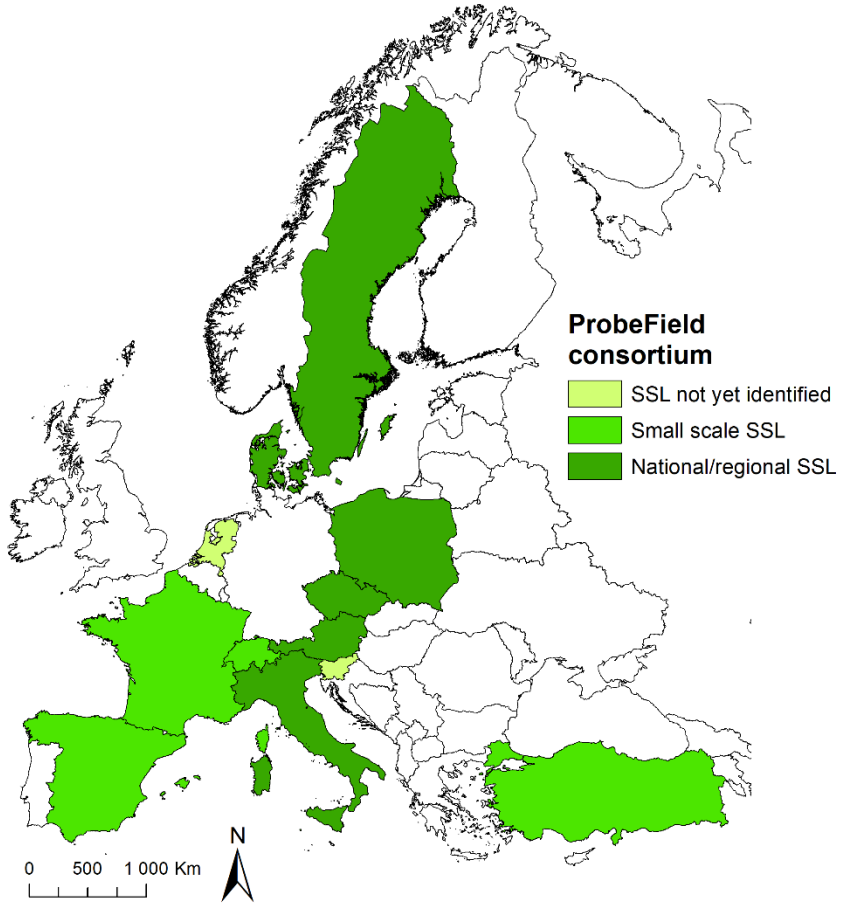




EJP SOIL
European Joint Programme

Internal project 2nd call

ProbeField –A novel protocol for robust in field monitoring of carbon stock and soil fertility based on proximal sensors and existing soil spectral libraries



Lead: SLU, *Bo Stenberg*

Co-lead: AU, *Maria Knadel*

12 countries

3 year project, start November 2021

EJP SOIL
European Joint Programme

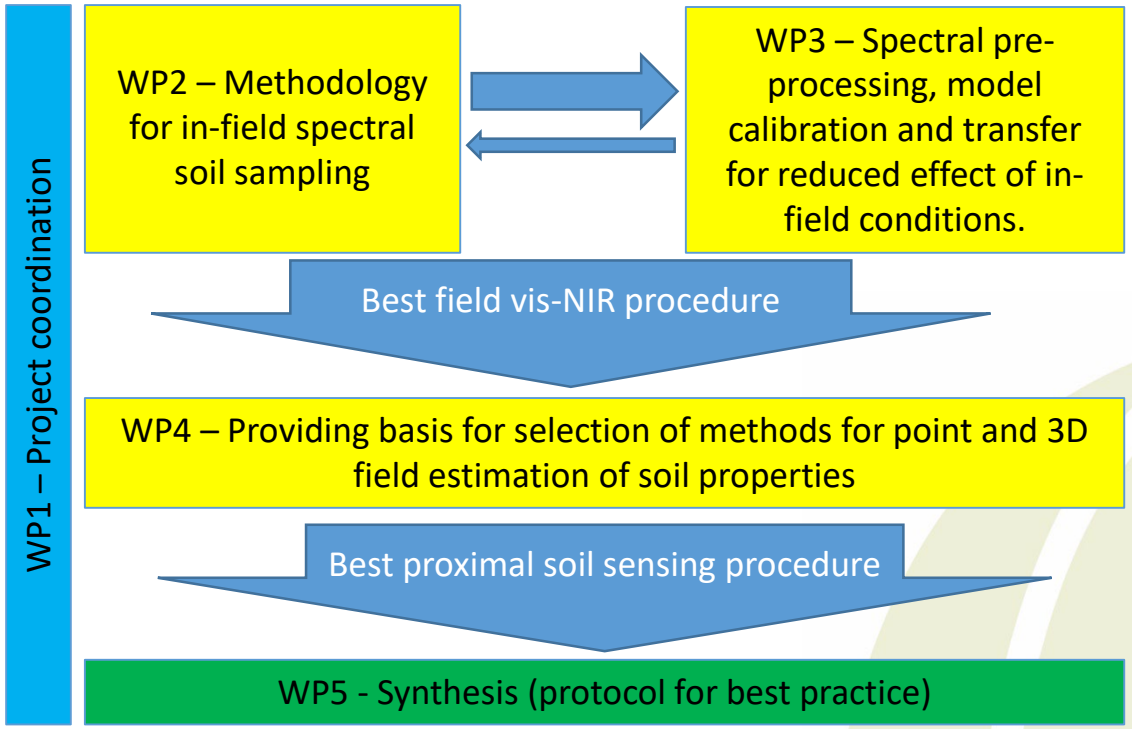
ProbeField

Objectives

- A set of procedures and methodologies presented in a protocol for reliable in field point estimates of fertility related properties in agricultural soil profiles.

- Illustrate the potential of taking data further to two and three dimensional mapping by aid of co-variates.

1. Spectra in the field need to be acquired in a way that effects of moisture and structure are reduced as much as possible.
2. Mathematical pre-processing of the spectra should be used to further reduce the remaining disturbance effects.
3. Prediction models built on lab based SSL's should be mathematically transferred to better suit the modified field spectra.



Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

GLOSOLAN
2nd Plenary meeting on spectroscopy

2 - 4 November 2021