# Development of soil research supporting climate resilience and decision-making in Finland

The development of the balance of carbon stocks is at the EU level as well as nationally a key issue related to climate change and the state of the environment, and nowadays it is also strongly linked to the economic perspective through common agreements related to taxonomy. This places the need to produce new researched information as a basis for decision-making.

In Finland, the lack of soil information is becoming a limitation of climate-resilient agriculture and forestry policy measures. Because of this, Geological Survey of Finland (GTK) and its partners have launched several projects to improve the situation. In the new projects, remote sensing methods, digital tools and the use of artificial intelligence have been developed in particular to expand the regional coverage of soil data and to enable the assessment of the national carbon stock. By developing the production of information and making the use of databases more efficient, land use measures can be directed and targeted in such a way that they maintain and strengthen carbon sinks and stores.

GTK's partners in the projects have been the Natural Resources Institute Finland, the Universities of Helsinki and Turku, the Finnish Food Authority, the National Land Survey of Finland and RADAI, and the work would not be possible without interdisciplinary cooperation.

## Soil Pilot - An operational model for the production of soil data in the soil sector

### Collecting field data



### MaaTu – Peat data for agricultural land

- Implementing Finland's climate objectives as part of the EU's Common Agricultural Policy requires targeted measures for different types of land. For agriculture, peatlands are a major source of greenhouse gas emissions.
- The MaaTu project will produce a nationwide agricultural peatland dataset to identify peatland sections, cover and thickness of peatlands by remote sensing and machine learning combined with field work.

# **Geological Survey of Finland**

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• The Soil Pilot project aims to develop a model for producing more accurate surface soil type and layer thickness data using remote sensing, geophysical modelling and machine learning. This information will help to guide and target land use to maintain and enhance carbon sinks and reserves.

### Soil data modelling

**Co-measured calibration** and validation data

Guidance of fieldwork with the model



# MaaTi- Developing Soil Data

• The goal of the project is to develop and test a set of methods that can be used to quickly and cost-effectively produce soil information throughout Finland. In particular, we are clarifying information about peatlands.



### TURVAHIILI **Restoration of low-productive peatlands drained for** forestry

CARBON Rewetting impacts on carbo storage and GHG emissions

FUNCTIONAL DIVERSITY Rewetting impacts of functional diversity



Funded by the **European Union NextGenerationEU** 

Recovery and Resilience Facility (RRF)



Ministry of Agriculture and Forestry of Finland





HELSINGIN YLIOPISTO HELSINGFORS UNIVERSITE UNIVERSITY OF HELSINKI

### Soil carbon stocks in peatland

GOOD RESTORATI Site selecti criteria ar idance fo estoratic operation



### **GOOD PRACTICES** om interviews of restoration operat

# WaterLands

**Title:** Water-based solutions for carbon storage, people and wilderness **Programme:** H2020-LC-GD-2020-3 Type of action: Innovation Action **Duration:** Dec. 2021 – Nov. 2026 (60 months) **Coordinator:** University College Dublin, Ireland **Consortium:** 32 partners from 14 countries Aim: to assess and demonstrate how wetland restoration can be achieved in different landscape and social settings.













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### Planning for the Carbon Smart After-Use of Peatlands (Jälkihiili) 2021-2023

- Since energy peat extraction has been reducing at a rapid rate, a large number of peat production will be transferred to other uses in the near future. With carbon smart site-specific and regional planning for the afteruse of peatlands, the carbon sinks and reserves in the land use sector can be maintained and enhanced.
- The objectives of the project are:
- to develop tools for carbon smart site-specific planning that considers the properties of individual peat cutaway and their surrounding environment.
- to create a road map for regional planning of cutaway after-use that considers local synergies. As an example restoration and rewetting are suggested for cutaways near nature reserves and recreational areas.
- The project is part of the Finnish Ministry of Agriculture and Forestry's climate measures in the land use sector.





