HAMK HÄMEEN AMMATTIKORKEAKOULU
HÄME UNIVERSITY OF APPLIED SCIENCES

Field observatory creates a community around crop field data handling and interpretation

Olli Koskela[1], Olli Niemitalo[1], Tuomas Mattila[2], Istem Fer[3], Olli Nevalainen[3], Jari Liski[3], Iivari Kunttu[1]

[1]Häme University of Applied Sciences, HAMK

[2]Finnish Environment Institute, SYKE

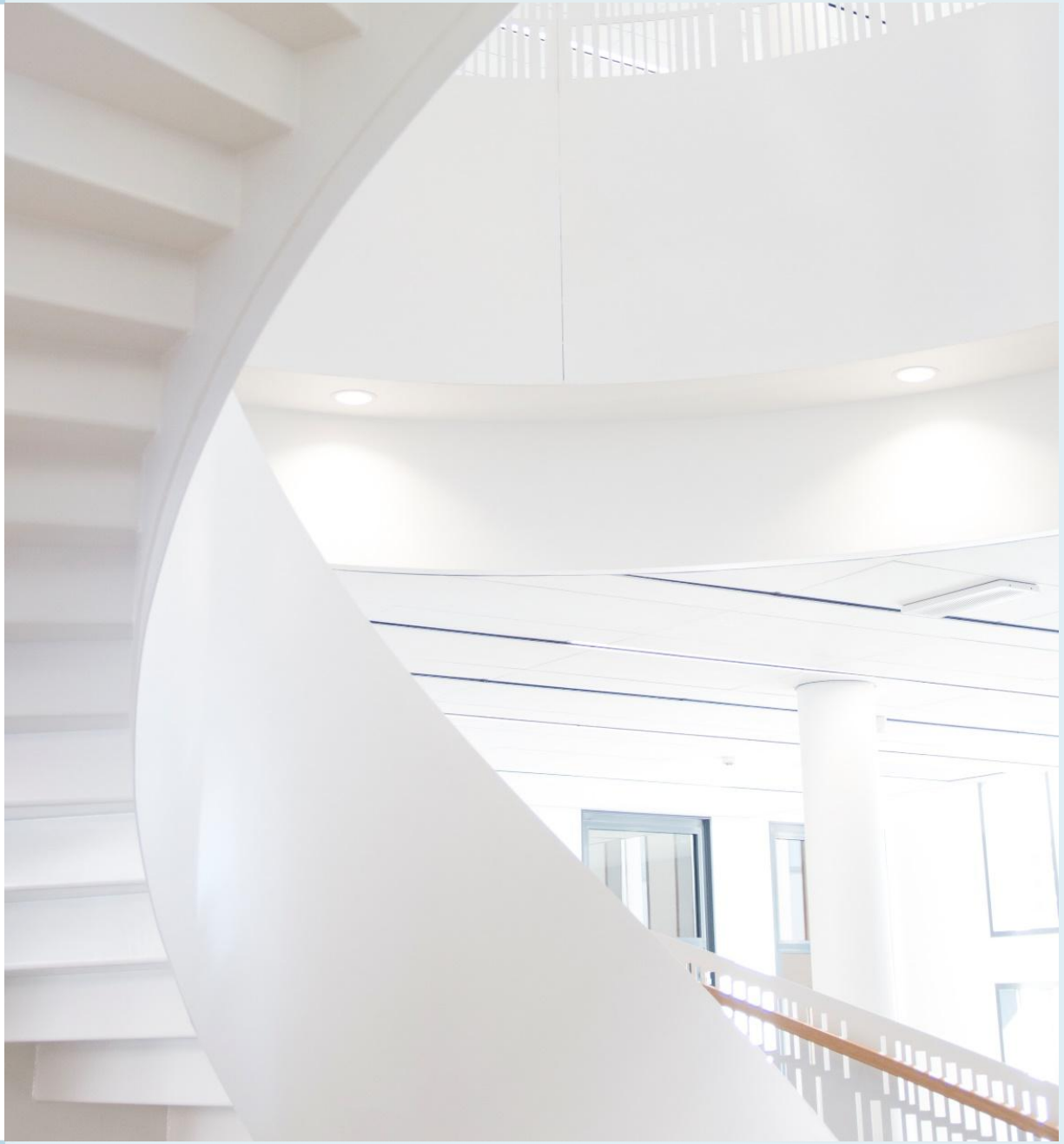
[3]Finnish Meteorological Institute, FMI

CARBON ACTION .FI

ILMATIETEEN LAITOS

BSAG® Baltic Sea Action Group

SYKE



Introduction

- Rapid development of sensor technology, Internet-of-Things, wireless data transfer as well as computing have facilitated the use of various data-based methodologies in smart agriculture
- Various types of *ecological observatory networks* have been developed to monitor different biological processes in e.g. farming, aquaculture, horticulture, and forestry
- The observatory networks typically utilize data collected from various kinds of sensors, remote sensing, and observational sampling
- In the Field observatory project, we bring together the data collected from soil sensors, sampling, weather data, and satellite images to monitor the parameters related to carbon farming
- The ultimate goal of Field observatory is to accurately model carbon sequestration and to improve the model adaptively by comparing actual, realize d measurement to the prediction made by the model earlier.

Image: Baltic Sea Action Group

Carbon Action network

- Carbon Action network consists of >100 Finnish farmers, who apply carbon farming methods in their farming
- Among the network farmers, there are twenty pilot farms having:
    1. Control plots with standard farming actions
    2. Research plots that promote carbon lifetime in the soil
- Data collection from the pilot farms
    - The plots have continuous monitoring facilitated by wireless sensors
    - Weather data
    - Satellite data
    - Manual soil analyses

Project goals

- In the field observatory project, the practical farming actions are monitored and analysed based on the computational analyses related to the soil health, nutrient emissions, carbon storage on the field, crop nutritional quality, biodiversity etc
- The project aims to bring this information available for the farmer in easily understandable form to facilitate decisions towards actions that increase sustainability and the amount of carbon in the soil
- As such, we will facilitate discussion throughout the commun ity of farmers, soil and climate scientists, decision makers an d economists. With joint interface, the communicate has me ans of collaborative data handling and interpretation from all required perspectives to create climate smart agriculture.

Image: Baltic Sea Action Group

Data flows

On-line measurements from the soil

FMI open weather data

Google Earth Engine (satellite images)

Copernicus Atmosphere Monitoring Service (PAR)

Off-line field measurement and analyses

Server

- Collecting and storing the data
- Carbon calculator
- Satellite data processing

Field observatory user interface

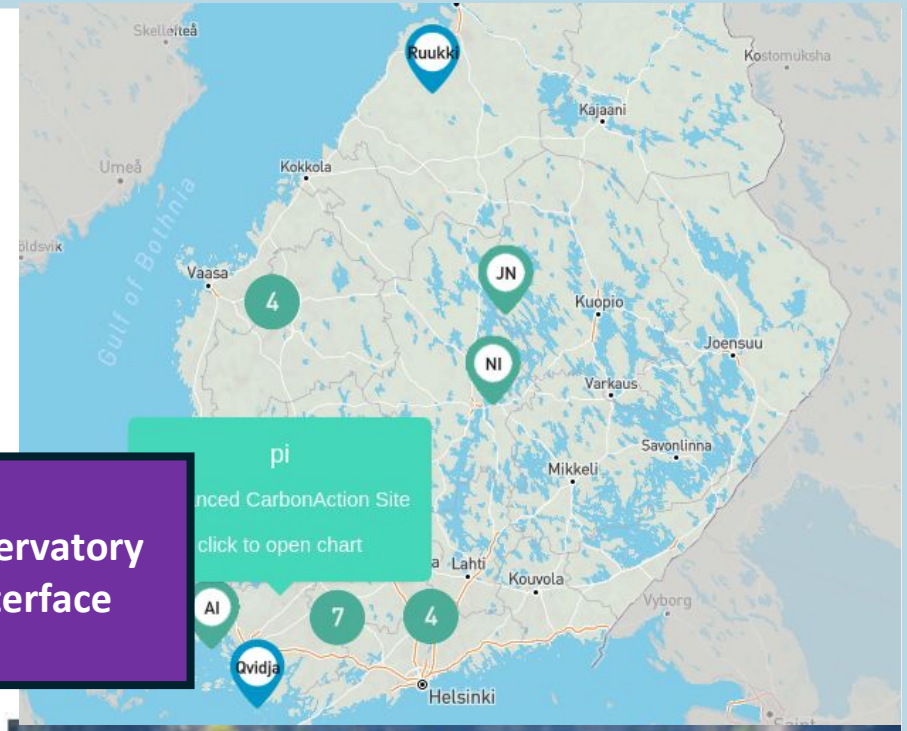


Image: Baltic Sea Action Group

Demostration

- The field observatory application:
- https://fieldobservatory.azurewebsites.net/Index

Discussion

- The field observatory will be further developed to provide more information on carbon sequestration in farming
  - Carbon calculators and simulation models are being developed in FMI
  - The field observatory application will provide more data-based information also for research use
- The observatory network will involve new farmers