

FINLAND

Climate change adaptation

Location
Mikkeli

Programming period
2014 – 2020

Priority
P4 – Ecosystems
management

Measure
M16 - Cooperation

Funding (EUR)
Total budget 700 000
EAFRD 235 200
National/Regional 324 800
Private 140 000

Project duration
2015-2019

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[https://maan-
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Collaborative learning and tools for assessing soil health contribute to farmers' understanding of problems and alternative management strategies.

Summary

The objective of the OSO project was to improve on-farm resource efficiency and deliver the most up-to-date knowledge on soil health management to farmers. It also tested and developed new tools for soil health analysis, planning and management. Eight test fields were analysed briefly to identify problems with soil health. Simplified decision-support tools were developed to address the complexity of the soil systems as well as the farm management needs.



The blended learning approach used in the project's study groups was well received. E-learning designed to meet farmers' needs and skills was complemented by theoretical workshops and practical field days. Project participants gained new knowledge and skills and were able to improve their soil health management at farm level during the project's lifespan. The project improved farmers' soil management skills and know-how for profitable and resource-efficient farming. The farmers also acquired knowledge on how to enhance soil quality to reduce erosion, increase the soil's organic matter and carbon sequestration and build its capacity to adapt to climate change. The main actions undertaken by the project are:

- On-farm research.
- Training of farmers.
- Developing tools for planning soil health management.
- Disseminating information about soil health.

Results

The project was developed around the concepts of holistic soil health management and farmer-oriented tools and training. Versatile methods were developed to engage farmers around assessing, planning and implementing soil management differently, combining scientific knowledge with the farmers' practical on-farm needs. E-learning and significant collaboration between farmers in study groups resulted in new knowledge and skills and the trialling of practices that improve soil health and increase farmers' ability to adapt to climate change.

Lessons and recommendations:

- ❑ Blended learning approaches can be effective in delivering information on complex issues based on theoretical content and practical experience. E-learning approaches were effective in engaging farmers in combination with in-person opportunities for peer-to-peer learning.
- ❑ Tools that can easily be used on-farm to assess soil quality and the problems that exist so that remedies may be identified were useful for building the farmer's understanding and uptake with the support of trained advisors.

Context

Soil health is often neglected by farming practices, but farmers' know-how and the soil's ability to grow plants are two of the most important agricultural resources. Identifying and remedying soil problems offers significant potential for increasing the productivity of agriculture. Managing agricultural soils better will also positively affect natural resources in the larger context (carbon sequestration and reduced eutrophication from runoff and erosion for example). The project's target group was farmers interested in learning more about the health of their fields.

Soil health can be improved by identifying, field by field, the factors reducing crop yield, determining their causes and planning for effective ways to remedy them. Additionally though, soil management requires a methodological development linked to the Finnish context (the northernmost agriculture in the world): the tools and methods from abroad must be tested and adapted to the local conditions.

The project took place in four Finnish regions with different agricultural soils: South Ostrobothnia, Satakunta Region, Southwest Finland and Uusimaa Region. The project team consisted of experts in agriculture, horticulture, soil management, farmers' education and rural advisory services.

Objectives

The main objective of the project is to increase resource efficiency in agriculture by managing the soil and its growth potential holistically.

Sub-objectives:

- Improve methods for testing soil quality and health.
- Improve farmers' know-how in soil health management.
- Develop practical tools and study materials for planning, implementing and evaluating soil health management at farm level.
- Inform the general public about soil health and its management.

Activities

1. Methods for testing soil health were trialled, analysed and improved via on-farm research with a network of eight farms. This was done throughout the three-year project until the end of 2018. Farmers chose certain low productivity fields to be assessed and to explore the different possibilities to improve the soil's health. Trials were carried out once per growing season; all together each participant ran three trials in three years. Each trial was modified based on the previous years' results, experiences, analyses and current needs. The research farms grew crops, potatoes and vegetables. Five were conventional farms and three used organic farming methods.
2. Several actions were taken to improve farmers' know-how on the subjects: seminars, workshops, field days and farmer study groups. A total of 41 seminars and workshops dealt with current, crucial theory around soil health management. As the project was active across a large geographical area, the same theme was discussed at several events to reach as many farmers as possible in different localities. Both Finnish and international experts delivered lectures. Field days demonstrated issues from various points of practice. Many events were organised with other projects to work more efficiently and to reach more participants. Farmers also shared knowledge gained from their experiences.

Farmers wishing to learn more about soil health management gathered in 5 regional study groups. Four were dedicated to crop farmers and one for vegetable farmers. Blended learning was applied, emphasising the use of virtual classrooms, peer discussion and concrete demonstration and observation. The groups met and discussed mainly online, but a few times a year they also met face-to-face at participants' farms. The main idea was to help the farmers make a soil health management plan for their own farms and learn to observe soil health indicators in their fields. This was processed step-by-step in the virtual classroom meetings, discussions, materials and individual homework. Well structured, analytical questions were used to guide the farmers to find solutions for the soil's health problems on their own farms.

3. Practical tools and study materials for developing individualised soil health management plans were created in cooperation with the farmers and advisors. The researchers applied new scientific information and converted it into calculators for farm use. The farmers in the study groups planned how they would manage their soil using these calculation tools and study materials. They were all then further developed based on the farmers' comments. These resources are now published as a toolkit for soil health management. It consists of analysis and planning tools, user manuals and background information.
 4. Information about soil health and more sustainable management methods has been widely disseminated at network events, agricultural fairs, seminars, in professional magazines, on various webpages as well as specifically in the farmer training events and seminars already mentioned above. In addition, the advisors participating in the project, either as project partners or event participants, then disseminated the information further to their farmers.
- A total of some 1,500 participants were actively involved in the different educational events and study groups organised. Participants acquired considerable new knowledge and skills and made significant improvements in soil health management at farm level.
 - The farmers who participated in the study groups responded well to the blended learning approach, involving e-learning as well as theoretical workshops and practical field days.
 - The project relied on the good collaboration amongst 26 local, regional and national projects and actors.

Key lessons

- Identifying and remedying soil problems and enhancing soil quality, organic matter and structure may increase farm productivity, but it also reduces the potential impacts from extreme climate conditions by building agroecosystem resilience and adaptation capacity.
- Simplified decision support tools are needed, but they must account for the complexity of soil systems in relation to the potential options and recommendations for farm management.
- The project's results are transferrable and have the potential to have a wider impact, with 30 advisers under the MAANEUVO project having been trained on how to effectively use the methods and tools developed in the OSMO project.
- Additionally, the results are applicable to and may be used by all farmers, advisers, trainers and researchers to improve soil health management.

Main results

- In analysing the soil health of eight test fields, each field was found to have its own set of problems. Poor growth was caused by poor drainage, compaction in the topsoil and subsoil, nutrient deficiencies (especially micronutrients), poor biological activity, and low soil organic matter.
- Upon identifying these factors impacting soil health and thereby reducing crop yield, the farmers used the information and tools developed through the project to plan effective ways to remedy them.
- 11 study reports, 8 planning tools, 30 leaflets and many PowerPoint presentations have been published.
- 45 articles have been published in professional magazines ensuring a wide dissemination of relevant information about soil health management.

Additional sources of information

[https://tuhat.helsinki.fi/portal/en/projects/known-how-and-tools-f\(bd6c2d08-4090-4433-b955-4993d2c7b4a6\)](https://tuhat.helsinki.fi/portal/en/projects/known-how-and-tools-f(bd6c2d08-4090-4433-b955-4993d2c7b4a6))

*This project has been categorised under 'Climate change adaptation' by the nominating National Rural Network