
Horizon 2020 multi-actor project LANDMARK's "**Soil Navigator** [1]" takes into account: primary productivity, water purification and regulation, carbon sequestration and climate regulation, nutrient cycling and biodiversity and habitat provision. The Decision Support System (DSS) is able to assess these five soil functions simultaneously and to provide management recommendations for improved soil functions.
Most agricultural DSS are focused on short-term goals for the next growing season, such as increasing plant available nutrients or optimising crop yield, whereas other important soil functions such as water purification and regulation, carbon sequestration and biodiversity provision are neglected. Making the right management decisions for long-term sustainability is therefore challenging, and farmers and farm advisers would greatly benefit from an evidence-based DSS targeted for assessing and improving the supply of several soil functions simultaneously.

HOW CAN I MAKE THE MOST OF MY LAND?

The Soil Navigator DSS may assist farmers and farm advisers who are seeking answers to the overall question "How can I make the most of my land/soil in a sustainable way?" by going through the following three steps:
1. assessing the initial supply of the five main soil functions based on data obtained from the LANDMARK database coupled with data entered by the user
2. providing a number of management recommendations to improve specific soil functions based on the demand and importance entered by the user
3. evaluating the resulting supply of soil functions based on user preferences for the suggested management recommendations

METHODOLOGY

The LANDMARK project combined scientific rigour with a series of field tests with farmers, on their farms. Farmer Alfred Grand appreciates the fact that the researchers took his feedback into account: "When we first tested the soil navigator on my farm, it was difficult to use and it seemed not to be adapted to the way I am farming, using cover crops and crop rotation, and no fertilisers for the past 13 years. When we tested the new improved version recently, it was much easier to handle, and it is now quite sophisticated."
The project team designed the Soil Navigator DSS by applying multi criteria decision modelling using Decision EXpert (DEX) integrative methodology. Five teams of scientific experts have developed, calibrated and validated DEX models for five main soil functions: primary productivity, water purification and regulation, carbon sequestration and climate regulation, nutrient cycling and biodiversity and habitat provision. Subsequently, the five DEX models have been integrated into the Soil Navigator DSS to assess these soil functions simultaneously, and to provide management recommendations for improving the supply of prioritised soil functions. Following the first tests in 2017 and 2018, in spring-summer 2019 several soil navigator evaluation workshops, as well as the on-farm tests, were in held EU countries (Austria, Denmark, France, Ireland, Germany).
The Soil Navigator is translated to German, French and Danish for the country-specific field evaluations, and additionally to Italian, Spanish and Romanian. The Soil Navigator is now available in seven languages! The video tutorials are available in three languages: English, French and German.

FUTURE PERSPECTIVES

By including all five main soil functions, the Soil Navigator DSS has a potential to complement the Farm Sustainability Tools for Nutrients included in the Common Agricultural Policy 2021-2027 proposal adopted by the European Commission. Furthermore, the Soil Navigator DSS could be used as an educational tool for farmers, farm advisers and students.
More information on the project: **www.landmark2020.eu** [2] and access to the **www.soilnavigator.eu** [3]
Watch the video tutorial [4]

Links
[1] http://www.soilnavigator.eu/
[2] http://www.landmark2020.eu
[3] https://ec.europa.eu/eip/agriculture/en/www.soilnavigator.eu
[4] http://videolectures.net/soil_english_tutorial/