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SUSTAINABILITY IN FOCUS: THE DEVELOPMENT OF KNOWLEDGE BASE AND ECO-FARM ASSESSMENT TOOL IN THE CAPTIVATE PROJECT

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Abstract
One of the key objectives of the new CAP (2023-2027) is to ensure the contribution of agriculture to achieving the EU's Environment and Climate Policy objectives. Within the framework of the CAPTIVATE project, we aimed to develop a farmer-centred evaluation and training system with the participation of experts from five institutions. The main goal of this system is to improve the understanding of farmers and advisors regarding sustainable agriculture. As part of the initiative, an e-learning platform was established to offer a course on the theoretical background on sustainable agriculture, essential EU strategies and connections between good ecopractices in organic farming and new CAP subsidies. In addition, an Eco-Farm Assessment and Decision Tool (EAD) was developed that allows farmers to evaluate their farms from a sustainability standpoint, and based on its findings, it proposes where and how improvements are needed. The electronic platform was presented to the stakeholders through multiplier events in four countries.

1 Introduction

Agriculture impacts nearly every aspect of life including nature, society and politics while its success depends on the factors listed above. Maintaining sustainable, resilient agricultural production requires a comprehensive approach that considers system interactions and conflicting objectives.

The new Common Agricultural Policy (CAP) (2023-2027) will play a key role in supporting the European agricultural sector, steering the transition to sustainable food production systems and strengthening the efforts of European farmers to contribute to the EU's climate and environmental objectives, as set out in the European Green Deal and related strategies such as the 'Farm to Fork' (F2F) or the Biodiversity Strategy [3].

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In their daily lives, farmers encounter the Common Agricultural Policy primarily through subsidies and benefits, that often have a decisive impact on the decisions on how to manage their farm. It is an important task to understand farmers' decision making [10]. In many cases, they do not have sufficient knowledge of the purpose and background of the measures and the rules and conditionality for their implementation. A key element in changing farmers' mindsets is the proper transfer of practical knowledge. This requires advisory support, farm demonstration events and forums that bring actors together to share knowledge.

Although, available data show that the number and area of farms switching to organic farming is increasing in Hungary, the number of pesticides used does not show a decrease [6]. Encouraging farmers across the EU to switch to more sustainable farming is a very important objective. An environmental and sustainability assessment of the farm is an essential first step in the transition process.

Nowadays, there are several farm-level sustainability assessment tools available to assess a wide variety of farming practices and farmers' attitudes [1].

However, the existing procedures and tools are more suited to scientific purposes, as in many cases farm evaluation is carried out at a very abstract level, which makes it difficult for farmers and consultants to carry out the evaluation and put the results into practice [4]. Some of the best-known examples of assessing on-farm sustainability are the Sustainability Assessment of Food and Agriculture Systems (SAFA) [5] developed by the Food and Agriculture Organization (FAO) and the SAFA-based SMART Farm Tool [11] . Sustainability assessment at farm level is a challenging task due to the complex interaction of various factors influencing agricultural production.

Sustainability assessment is an important tool for moving agriculture and food systems towards sustainability [9]. It is crucial to have an overview of the available and most widely used methods and tools for sustainability assessment. Defining the right approach to on-farm sustainability assessment is the first step to improve the sustainability performance of the farm. Today, several farm-level sustainability assessment tools (SAT-sustainability assessment tools) are available to assess agricultural practices and farmer attitudes. The available tools vary in complexity, primary purpose, etc. [2]. However, based on several studies, the adoption and usage of these tools seems to be relatively low [1]. One reason can be that they are more scientific in nature and their sophisticated methodology makes them difficult to use for farmers and advisors.

The three-year Erasmus+ project CAPTIVATE (CAP Transfer of Information Via Assessment, Training and Extension) (2021-2024), which involved five participating institutions, aimed to develop methodologies and tools for farmers and advisors to increase their knowledge in key areas relevant to sustainable farming. The main objective of the CAPTIVATE project was to improve the knowledge, skills and attitudes of farmers and advisors on sustainable development and sustainable agricultural practices. We also aim to increase their understanding of the link between available funding opportunities and relevant good ecological practices, to increase empowerment and implementation efficiency.

To achieve this, the participating partners set themselves the objective of developing a farmer-centred evaluation and training system linking the new CAP requirements with good and innovative good organic farming practices to better implement different measures, increase the use of subsidies, increase production efficiency and protect the natural environment [6] also aim to raise awareness of environmentally friendly farming practices and to support the successful implementation of the European Green Deal.

2 Material and methods

Five institutions from four countries participated in the three-year Erasmus+ project to be implemented between 2021 and 2024: IZPI (formerly known as Agroinstitut Nitra) (Slovakia), FiBL Austria, IPS Konzalting (Croatia) and two Hungarian institutions: the Research Institute for Organic Agriculture (ÖMKI) and the Faculty of Horticulture and Rural Development of Neumann János University (NJE KVK). The central elements of the farmer-centred assessment and training system developed within the framework of the project are:

- A platform of CAP „greening measures";

- Self-assessment tool (Eco-Farm Assessment and Decision Tool, EAD);
- E-learning platform;
- all linked to good eco-farming practices.

The leader of the project is ÖMKI. The participating partners are responsible for coordinating certain priority areas, such as the EAD tool FiBL Austria, NJE KVK coordinated the preparation of electronic learning materials, IZPI coordinates the IT background for the electronic interface, and IPS Konzalting is responsible for presenting the results and coordinating marketing activities.

The experts from the participating institutions first processed the CAP regulations and then, with the help of national experts, collected the relevant good practices for each regulation. This data was then recorded in an Excel database.

The e-learning system was developed on the Moodle platform. It consists of two modules, the first module containing learning materials that briefly explain the Common Agricultural Policy, the European Green Deal and the relevant strategies. The second module of the training platform aims at presenting good ecological practices. The learning materials were prepared in English by the participating institutions, mainly by experts from the WFP, and then translated and transcribed into national languages, taking into account the specificities of each country. The course materials present the above information in a concise and understandable way, and at the end of each course there is a self-test to check the knowledge of the respondent.

In parallel, the CAP-specific Eco-Farm Assessment and Decision Tool (EAD) was developed. This segment of the work started with a literature data processing, in which national experts processed scientific knowledge related to sustainability assessment tools (SAT) and economic decision support tools (DST). The aim of the literature processing was to review, evaluate and coordinate the different evaluation approaches with the requirements of the CAPTIVATE project to create a solid basis for the creation of a CAP-specific EAD Tool.

3 Results and evaluation

Within the framework of the project, we first created the interfaces and descriptions necessary for the management of the project: the website, Facebook profile, quality assurance and communication plans. The project website is available at the following link: https://cap-tivate.eu/.

During the professional work, first the CAP regulations were processed, then we collected and thematically grouped good practices applicable in sustainable farming and paired them with the appropriate CAP regulations.

The online course on the created e-learning platform consists of two modules. The first module contains learning materials on relevant EU policy regulators: "The European Green Deal", "Farm to Fork Strategy", "The new EU Common Agricultural Policy", "EU Biodiversity Strategy", "EU Soil Strategy for 2030" and "EU Organic Action Plan". The second module contains good eco-practices related to sustainability: "Principles of sustainability", "Sustainable use of soil", "Agroecology", "Plant protection", "Animal welfare", "Diversification". In addition to text-based learning materials, we also published videos and recommended resources for further reading related to the subject. The individual topics cover several sub-topics, for example in topic Agroecology, sub topics are: "Agroecological practices affecting soil, Soil fertility and fertilisation practices, Crop rotation (including cover crops and green manure) etc.

To test acquired knowledge, each lesson is followed by a multiple-choice test. Finally, a self-test quiz ensures that participants have mastered the knowledge. Those who successfully complete the final test can download a printable certificate to prove that they have completed the course (*Figure 1*). The course material is complemented by an electronic glossary to help understand and master the terminology.

Figure 1. Captivate E-learning, certificate on completion.

The pilot testing of the Hungarian version of the CAPTIVATE e-learning platform was carried out by consultants at the Faculty of Horticulture and Rural Development of the John von Neumann University on 6 October 2023, organised by ÖMKI and NJE. By the end of the project (31 October 2024), the e-learning platform had 280 registered users.

The EAD tool is a central part of the CAPTIVATE system, which aims to link EU CAP policies with good ecological farming practices. A key objective of the EAD tool is to support farms in selecting CAP measures according to their specific conditions and to improve their environmental sustainability performance. This will lead to a better understanding and better implementation of CAP measures and will have a positive impact on the environment as more farmers implement measures properly.

Based on literature data, the evaluation methods relevant and most useful for the CAPTIVATE project were selected [8].

The EAD tool is structured from ecological themes and sub-themes based on the SAFA guidelines: atmosphere (greenhouse gases, air quality), biodiversity (species diversity, genetic diversity, ecosystem diversity), materials and energy (material use, energy use, waste reduction and disposal), land (soil quality, land degradation), water (water withdrawal, water quality), animal welfare (freedom from stress, animal health). CAPTIVATE project team, together with their national experts, representatives of the research community and agricultural advisors, carried out weighting of the various indicators of the EAD tool. This step was crucial for the further development and refinement of the EAD tool, as it helped to better understand whether an indicator has an impact on a given sub-theme and whether this impact has a positive or negative impact on achieving the objectives of the sub-theme. Level of detail was determined by the critery that the tool have to be user friendly and users should be able to complete the assessment in maximum two hours. As a result of assessment the user gets a Radar chart showing the farm performance listed by eco-themes (SAFA sub-themes) in percentages, compared with the “ideal farm” (100 %) (*Figure 2, Figure 3*). Results above 70% are considered as good, while under 40% it “needs to be improved”. Users get a List of sub-theme goal achievement, together with recommended good eco-practices and CAP measures, based on the results under the SAFA sub-themes. Indicators which are contributing the most to stronger and weaker results (making the more positive or negative impacts) are listed. 68 assessments were performed by the end of October 2024.

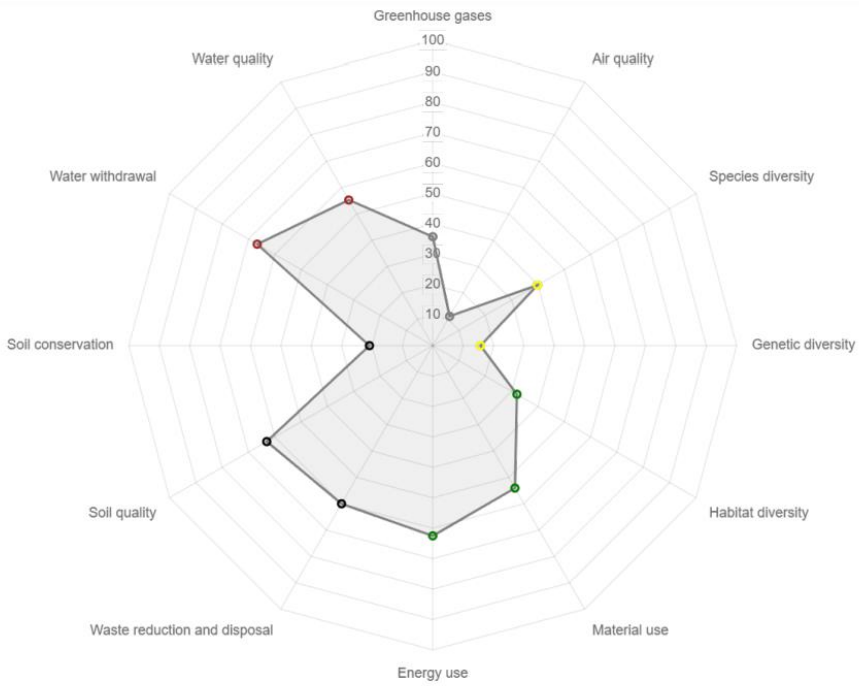

Figure 2: Evalutation by CAPTIVATE EAD tool. Radar chart showing the farms sustainabiltiy performance.

RECOMMENDATIONS based on the results

CAPTIVATE supports you in implementing the best eco-farming practices that will help your farm in reaching its maximum sustainability potential and bring you closer to the CAP measures suitable for your farm!

Check the list of recommended eco-practices for your farm here (link to the KMP and inventory of relevant eco practices – connection with keywords and SAFA subthemes)

Greenhouse gases	35.81%	Recommended eco-practices >>	Connected CAP measures
Air quality	11.11%	Recommended eco-practices >>	Connected CAP measures
Species diversity	39.77%	Recommended eco-practices >>	Connected CAP measures
Genetic diversity	15.69%	Recommended eco-practices >>	Connected CAP measures
Habitat diversity	31.99%	Recommended eco-practices >>	Connected CAP measures
Material use	54.05%	Recommended eco-practices >>	Connected CAP measures
Energy use	62.5%	Recommended eco-practices >>	Connected CAP measures
Waste reduction disposal	60%	Recommended eco-practices >>	Connected CAP measures
Soil quality	63.06%	Recommended eco-practices >>	Connected CAP measures
Soil conservation	20.82%	Recommended eco-practices >>	Connected CAP measures
Water withdrawal	66.67%	Recommended eco-practices >>	Connected CAP measures
Water quality	55.25%	Recommended eco-practices >>	Connected CAP measures

Recommendations based on farm type(s):

cattle, arable, permanent grassland

Check the list of available CAP measures for your farm here (link to the KMP)

ECO-SCHEMES, Agro-environmetal measures

Figure 3: Evalutation by CAPTIVATE EAD tool. Recommendations based on the results of assessment.

The completed CAPTIVATE system was presented to the stakeholders in Slovakia, Croatia and Hungary in multiplier events in autumn 2024.

Figure 4: Introduction of CAPTIVATE results to stakeholders. Multiplier event at John von Neumann University, Kecskemét 2024.10.11.

The last Hungarian multiplier event took place at John von Neumann University on October 11, 2024 (*Figure 4*). The event was attended by more than 30 advisors and farmers. The number of registered users is continously growing.

4 Conclusions

The Erasmus+ project was finished by end of October 2024. The tools developed within the framework of the CAPTIVATE project will hopefully help farmers and consultants to develop more sustainable farms and gain the financial resources to achieve this.

The electronic learning platform providing theoretical knowledge on the Common Agricultural Policy, sustainability and good ecological practices was evaluated by stakeholders. Advisors, farmers, researchers and universtiy students gave positive feedback on the knowledge platform of CAPTIVATE.

The EAD tool, which is the other central element of the system, was developed according to a novel approach. Although many procedures and tools have been evaluated in the literature on this topic, the existing procedures and tools are rather abstract, scientific and assess the economy in many sustainability dimensions. Because of this, is might make difficult for stakeholders (farmers and consultants) to carry out the evaluation and put the results into practice. In addition, application is made more difficult by the fact that in most cases these tools do not pay sufficient attention to the skills and attitudes of the farmer, which can have a decisive impact on the adoption of different environmentally friendly farming methods. CAPTIVATE farm evaluation tool was prepared in the light of the above and it is in connection with the database of good eco practices.

The Eco-Farm Assessment and Decision (EAD) Tool is a digital self assessment approach for farmers and advisors to evaluate ecological sustainability at farm level, comprising a set of sustainability indicators that attempt to provide information about the current status and that can assist during farmer’s decision making process to identify suitable CAP Measures and Eco-practices.

The evaluation (data) of the farm can serve as a starting point for decision-making in the new CAP period 2021-27 in order to implement measures that are well suited to the activities on the farm as successfully as possible.

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