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MICROAKIS OF DEMONSTRATION FARMS IN THE CZECH REPUBLIC

ABSTRACT

The demonstration activities are considered as the most effective way to transfer knowledge and innovation among farmers. In the Czech Republic, these activities are supported under Measure 9.F.m Demonstration Farms from national sources.

The paper focuses on understanding the "microAKIS" (farm-level knowledge networks) of these demonstration farms to identify key types of actors. The research seeks to answer the research question: Where does the demonstration farm get the information it needs? Semi-structured questionnaires were used to collect data and the results of the questionnaire survey were processed using the Social Network Analysis method.

The contribution of the paper can be expected at evaluation and practical level. The evaluative contribution is in uncovering the knowledge network of demonstration farms and assessing their ability to provide an environment for the dissemination of innovations in agriculture (Innovation Support Services). The practical contribution is in establishing a relationship with demonstration farms and ideally agreeing on regular collection of information supporting the coordination and development of the Agricultural Knowledge and Innovation System.

Key words: demonstration farms, innovation support services, microAKIS.

JEL Classification: D83, D91, O31, O35.

1. INTRODUCTION

As a result of the circumstances that are happening around us – the climate crisis and the biodiversity crisis being the most frequently mentioned now – it is becoming increasingly clear that our functioning on the planet is not in line with its capabilities (exceeding the so-called planetary boundaries). The transformation of agriculture towards sustainability is supported by the Farm to Fork strategy within the European Green Deal.

In the same strategic document, the knowledge and advisory services are mentioned as a key to achieving sustainability. Therefore, national Agricultural Knowledge and Innovation Systems (AKIS) are being built in each member state. And in most national AKIS systems, the demonstration farms are key actors to disseminate knowledge and innovation into practice.

The paper focuses on the situation in the Czech Republic, particularly on how the demonstration farms with MoA status under the title 9.F.m of national subsidies were implemented and how they are networking to keep themselves updated and innovative. Social network analysis shows that the microAKIS of demonstration farms includes all actors almost equally, however the structure is significantly changed by using the scaling of the 5 most important actors.

2. STATE OF KNOWLEDGE

Agriculture is undergoing significant changes and will be increasingly dependent on knowledge and availability of up-to-date and correct information and advice for sustainable management decisions (EU, 2020). Therefore, the Commission calls on Member States to increase support for the Agricultural Knowledge and Innovation System (AKIS) and resources in their CAP strategic plans to develop and maintain the appropriate advisory services needed to achieve the objectives of the Green Deal (MZe, 2022).

The Agricultural Knowledge and Innovation System (AKIS) is a system involving all actors that create, share and use knowledge and innovations for agriculture and related fields. To increase the support of AKIS means to know and coordinate the interactions of people, organisations and institutions that use and create knowledge and innovation for agriculture and related fields. It brings together actors on a structured and regular basis, thus creating a continuous interaction to accelerate knowledge exchange, knowledge flows, innovation, and above all, implementation in practice (EIP-Agri, 2022). And just the demonstration farms are one of the key actors in AKIS.

Demonstration farms are a key tool for sharing and disseminating knowledge and innovation into practice. Numerous studies and research works (Sutherland *et al*., 2021) show that the transfer of knowledge and experience to farmer is most effective through another experienced farmer who is able to respond to even the most detailed questions from everyday practice. The key importance of demonstration farms is also used and supported by the European Commission, for example in the framework of the Soil Mission (EC, DG RI, 2023).

To analyse in detail the actors cooperating with the farm in sharing knowledge and innovations, the concept of microAKIS (Sutherland & Labarthe, 2022) can be used.

The concept of 'microAKIS', *i.e.* the micro knowledge- and innovation-system that farmers personally assemble to manage their agricultural practices and ensure sustainability includes the range of individuals and organisations with whom farmers seek services and exchange knowledge, and the processes involved in the formation and working of this system, including the way farmers translate these resources into innovative activities (or not). Utilising the concept of microAKIS enables us to identify and assess the range of information sources and

media through which new knowledge is generated and transformed (Sutherland & Labarthe, 2022).

Garforth *et al*. (2003) argue that "an almost universal finding from studies of farmers' sources of information and influence is that 'other farmers' are their most frequently reported source". Recent research has emphasised that both knowledge gained through experience and exchange with peers and scientific knowledge are important for achieving sustainability in agricultural systems (Curry a Kirwan, 2014, Labarthe and Laurent, 2013, Tovey, 2008).

Social network analysis (SNA) allows to study the microAKIS of farm from several points of view. One could be the size of the network (the number of actors). The other could be the structure of the actors included in the microAKIS (their proportion). Because the size as well as structure matter, we were curious about the structure of actors in the limited size of the 5 most important actors by using the ordinal scaling.

The literature revealed that the current papers focus on how the demonstration farm are beneficial for the other farms, however no study focused on the information resources of the demonstration farms to keep them updated and innovative. Therefore, this paper tries to fill in this gap in the case study from the Czech Republic.

3. MATERIAL AND METHOD

To achieve the objective, we conducted desk research by studying the literature and available materials, including the submitted projects of the individual demonstration farms provided by the Ministry of Agriculture and conducted our own data collection from the demonstration farms. The data collection was done in two steps, in the form of an online questionnaire followed by semi-structured interviews.

The online questionnaire consisted of 30 questions divided into three sections: general information about the farm, questions related to the information needs of the farm, and finally questions related specifically to the implementation of the demonstration activities. The questionnaire was sent online to all demonstration farms with a return rate of 90% (18 out of 20). Farmers' willingness to answer the questionnaire was supported by telephone contact.

The follow-up interviews were always conducted on the farms with the representative of the demonstration farm responsible for organising the demonstration events during the year. Those responsible for the demonstration events were in different positions – farm owners, agronomists, external advisors and in one case even the farm economist. For the microAKIS analysis, the demonstration farm representative was primarily asked to fill in a list of actors with whom they collaborate in the preparation and implementation of demonstration events and then select the 5 most important actors.

According to the experience of previous projects eight types of microAKIS actors were defined: REA – research organizations, EDU – educational institutions, ADV – advisors, COM – commercial firms, FBO – farm-based organisations, NGO – non-governmental organizations, GOV – state administration, FARM – agricultural enterprises. A ninth category was added as OTHer, for entities not elsewhere classified, in this case entities from abroad. These were assessed in absolute terms and then in ordinal scaling.

Subsequently, a qualitative analysis of the data collected from the interviews and online questionnaires was carried out, supplemented by information from public sources on individual demonstration farms.

Social Network Analysis (SNA) using NodeXL software was used to graphically represent the knowledge networks of the farms and identify the actors connected to each demonstration farm.

In 2023, a total number of 20 demonstration farms were approved in the Czech Republic and granted demonstration farm status by the Ministry of Agriculture, which can apply for support from national sources (Title 9.F.m). At the time of the conference for which this paper was prepared, the results of the analysis of the first 11 demonstration farms were available.

4. RESULTS AND DISCUSSIONS

Understanding the microAKIS of demonstration farms means understanding the knowledge network where the demonstration farm gets the information and knowledge involved in its innovation activities.

The analysis shows that the size of the knowledge network varies significantly among the demonstration farms, with the number of microAKIS actors ranging from 8 to 22, regardless of farm size or production type (Figure 1).

The total number of microAKIS actors of the eleven demonstration farms investigated was 171. Counting only unique actors (*i.e.*, no repetition), the microAKIS consists of approximately 85 specific actors (including 9 research organisations, 8 educational institutions, 14 commercial firms, 12 advisors, 10 farmers' associations, 2 state administrations, 11 NGOs, 15 farms and 4 other entities from abroad).

Like the size of microAKIS, the representation of different types of AKIS actors varies between farms. There are demonstration farms (DEM_8, DEM_2) that have a significant representation of farms and commercial firms in their knowledge network, *i.e.*, they give priority to practice. On the other hand, demonstration farms DEM_10, DEM_11, DEM_15 favour representatives of science and education. For all demonstration farms, the knowledge network includes a representative of an educational organisation and an advisor. According to the project plan, SNA graphs of microAKIS are prepared for each demonstration farm to show the main information flows (see Figure 2 for an example).
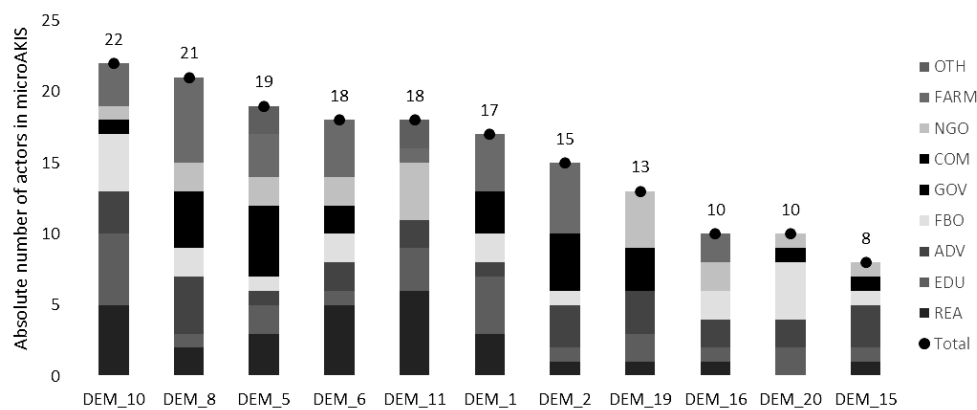
Source: Author's calculations using own data.
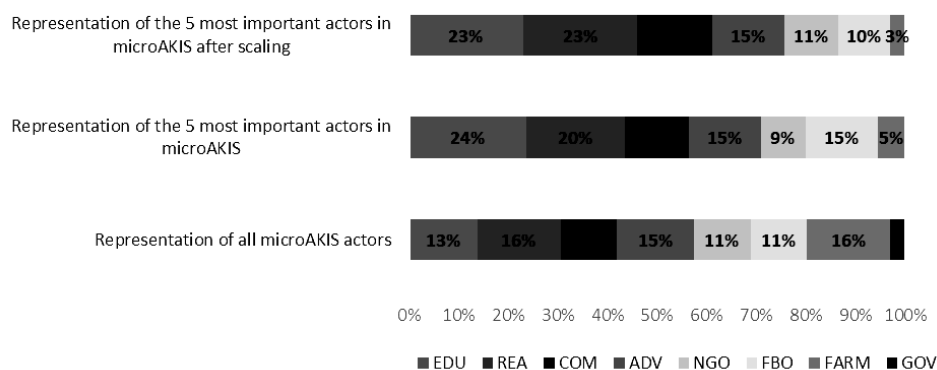Figure 1. Number of actors in microAKIS demonstration farms.
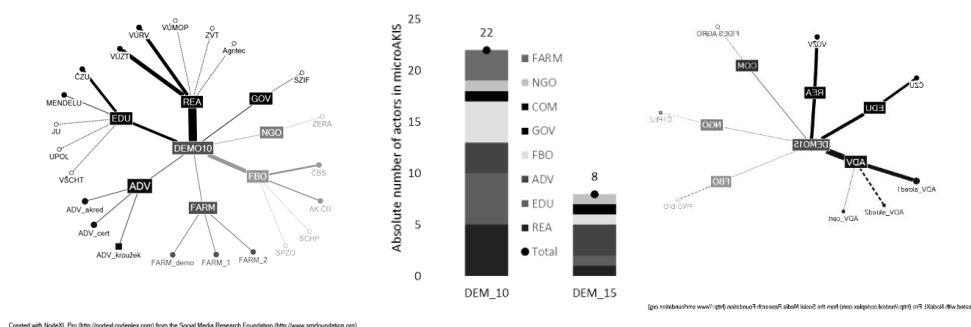
Source: Author's calculations using own data.
Figure 2. Sample SNA graph of microAKIS demonstration farm DEM_10 and DEM_15.

When comparing the knowledge network for the demonstration farms in total, it can be noted that the representation of different actors in absolute terms is almost equal (between 11 to 16%), except for the state administration (only 7%). However, if we select the five most important actors and further scale them on an ordinal scaling from 1 to 5 points, the representation of actors changes in favour of educational institutions, research organisations and commercial firms (Figure 3). On the other hand, the importance of farmers' associations and farms in the farm microAKIS significantly decreases, and the state administration disappears completely by using ordinal scaling.

Figure 3 further shows that the importance of commercial firm representatives (often input sellers) in the knowledge system increases when only the five most important actors of microAKIS are investigated. They acquire a comparable or slightly stronger role than independent advisors (ranked in the third position, 15%).

Bar chart with three horizontal bars:

Representation of the 5 most important actors in microAKIS after scaling: 23% | 23% | | 15% | 11% | 10% | 3%

Representation of the 5 most important actors in microAKIS: 24% | 20% | | 15% | 9% | 15% | 5%

Representation of all microAKIS actors: 13% | 16% | | 15% | 11% | 11% | 16% |

Axis: 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Legend: ■ EDU ■ REA ■ COM ■ ADV ■ NGO ■ FBO ■ FARM ■ GOV

Source: Author's calculations using own data.
Figure 3. Representation of actors of microAKIS demonstration farms (%).

In our investigation, we identified eight main types of actors (see Material and Method). However, in some cases, it was not easy to distinguish between them in practice, and this confirmed the findings from earlier projects that actors, especially the more active ones, act under multiple organisations, *i.e.*, they are different types of actors at the same time.

Very active actors were mentioned both in various demonstration farms across the country among the key partners for knowledge and information exchange and in different roles/types of actors, *e.g*., representing a research or educational institution while acting as an accredited advisor; working for a commercial firm while working as an agronomist on a farm; representing an NGO while working in a newly certified advisory body.

Interesting results were obtained by comparing the size of the microAKIS of the demonstration farms with the outputs in the literature, where it is reported that the microAKIS of farmers tend to be rather small. The authors (Sutherland & Labarthe, 2022) cite 2–3 sources of information. In the case of demonstration farms, the size of microAKIS was 4 times larger (8–22 subjects), even for the least developed ones. This is probably due to the role of demonstration farms as a "broker/disseminator" of knowledge between science and practice.

The second interesting outcome is the position of independent advisors in the microAKIS demonstration farms, where they rank fourth behind representatives of research organisations, educational institutions and just behind representatives of commercial firms (input sellers). In the interviews, the representatives of the demonstration farms very often confused these two roles. They cited commercial firms supplying them with inputs as advisors. It is confirmed that there is a very thin line between these two types of actors (COM and ADV). This confirms the paradox of the current advisory system mentioned in the literature, where privatisation led to the fragmentation of advisory entities and the emergence of new

forms of advisory services (Knierim *et al*., 2015; Knierim *et al*., 2017), while state policies continue to focus on traditional providers of advisory services (Fieldsend *et al*., 2021).

The results of our analysis also confirm findings in the literature that lessons learned from peer/other farmers are important for achieving sustainable farming systems (Garforth *et al*., 2003). However, in the case of demonstration farms, the need for knowledge gained from collaboration with a research or educational organisation takes on a much larger scale. The need for scientific knowledge is also mentioned by Curry & Kirwan 2014, Labarthe & Laurent 2013, Tovey 2008.

5. CONCLUSIONS

In the paper, we focused on how demonstration farms get the information they need. To find out the answer, we used desk research, questionnaires, semi-structural interviews. To display the size and structure, we used the NodeXL tool for social network analysis.

The results reveal that the types of representatives of surveyed actors are almost the same in all mikroAKIS of the farms. The proportion of representatives of all surveyed mikroAKIS actors (research organisations, educational institutions, advisors, commercial firms, farm-based organisations, non-governmental organizations, state administration, agricultural enterprises) is also almost the same. The difference starts by using the ordinal scaling *i.e.*, by displaying 5 most important actors for the farms (on scale 1–5). By picking up 5 most important actors, the educational institutions, research organisations and commercial firms pop up as the most important type of actors for the demonstration farms. In the interviews, farms reported that although they primarily ask for help from their microAKIS actors, the internet and Facebook are also significant knowledge sources to be mentioned.

Despite of the fact that the type of representatives of the surveyed actors are almost the same in all mikroAKIS, we identified two main groups of farms. The first group of demonstration farms are mainly influenced by the suppliers and the second group of demonstration farms are mainly influenced by actors from universities.

The research results confirmed the importance of creating a knowledge network around the demonstration farm (microAKIS). However, the size and composition of microAKIS actors, especially key ones, varies between demonstration farms. It was clear from the interviews that without linking the demonstration farm to a research or educational institution or being in a research project, it is very challenging to bring innovations to share with other farmers at demonstration events in the long term.

6. ACKNOWLEDGEMENTS

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