Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

Transfarm4.0

FOCUS GROUPS WITH FARM ASSOCIATIONS & EIP OPERATIONAL GROUPS - HUNGARY

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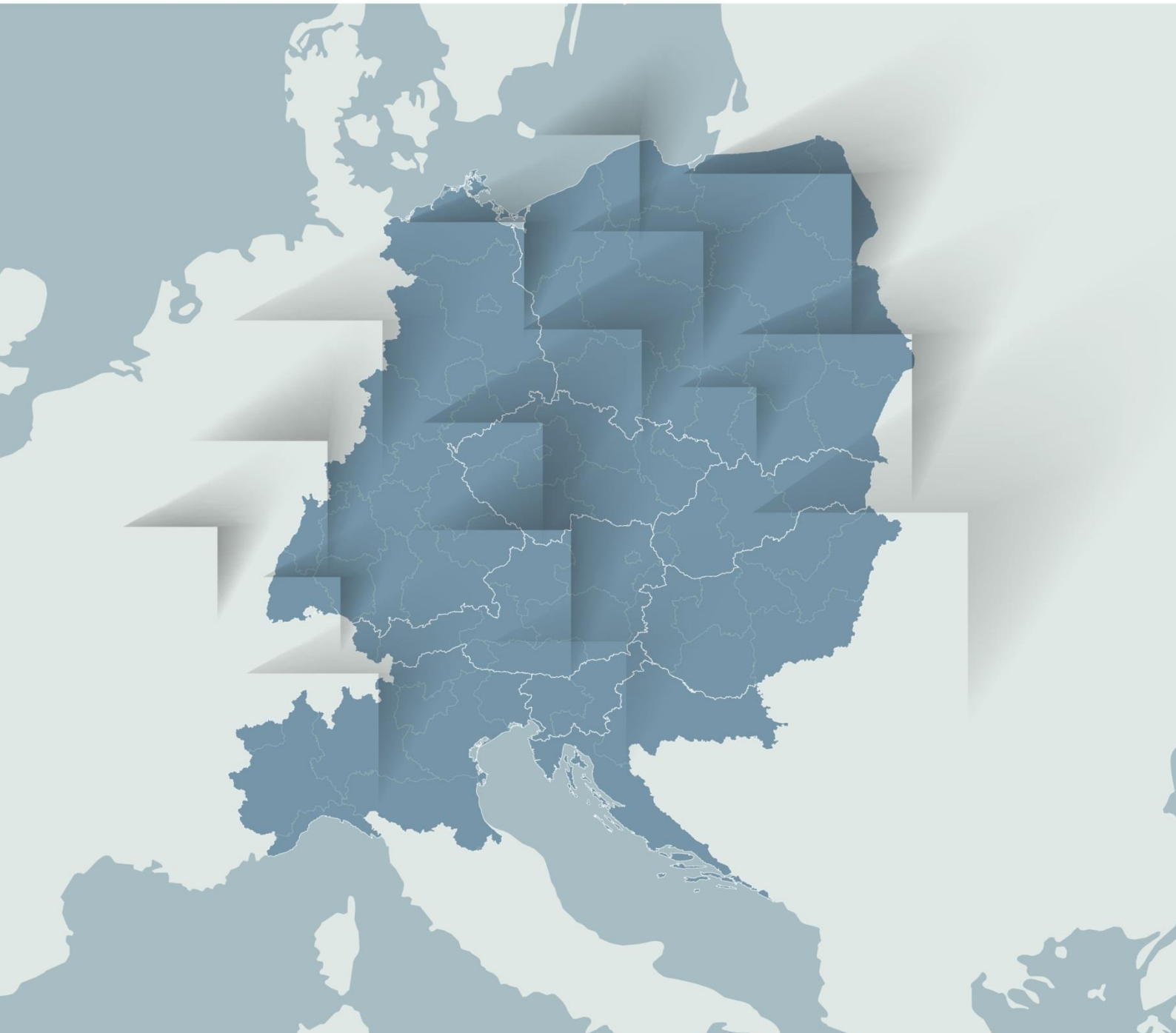
Version 1
04|2021



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A. Introduction

The aim of this task is to interview representatives of private farmers, farm associations, technology providers and researchers to learn how tech trajectories of PF are influencing them and how they could be led to catch the farmers needing. Since Hungary don't have EIP-AGRI operational group this target group was not included in the interview. Hungary has several associations representing the viti-viniculture sector. Some of the associations linked to certain growing regions, or special sub-sectors within viticulture and enology, while others have global role in Hungary. Among these, Junibor is the organization representing the young winemakers. Circle of Balaton (Balatoni kör) for example aims to promote the wine growing regions around the Lake Balaton and stimulate tourism, to visit the region during the whole year, not only in the summertime. Wine Academy is a board of wine professionals, academic members, artists organizing conferences, meetings, wine competitions etc. These associations play important role in the Hungarian viticulture and enology according to their academic knowledge, publications, networking and influence on the sector.

To this interview Junibor, the association of young winemakers were invited.

Technology providers in viticulture offer services for example in establishment of new plantations, performing cultivation practices such as mechanization of the pruning, canopy management, soil cultivation, plant protection or offer machines to purchase. Main PF companies are involved in weather forecast, disease monitoring and machinery. They also offer remote sensing and digital image analysis based on UAV. Within this the main methods are the RGB imaging, NIR-based vegetation mapping, and topographic evaluation of the grapevine terroirs. Nutrient supply is assisted by laboratories where soil and plant nutrient content measurements are provided. Since drone technology plays important role, several service providers organize courses in drone certification with practices in image and data analysis.

To understand the possible directions of the PF technological development two technology providers Winedata and Eurosmart were invited.

Beside the above mentioned participants, private growers, experts and academic members of the MATE were invited to the meeting to get an overview about the present state of the PF in Hungary and about the possible tech trajectories.

Two interviews were organized one with the member of the MATE Institute for Viticulture and Enology, Research Institute for Viticulture and Enology, and one for the Junibor, Winedata, Eurosmart, and the private grower.

In the interview we raise questions according to our present knowledge about the status of the PF in Hungary based on the Transfarm4.0 survey on CE farmers (D.T1.3.1). The survey were filled by 49 farmers with diverse age, having high-school and university education background, and farm size from under 10 hectares to over 1000 hectares. Results of the survey showed that age of the farmers have an influence on their interest in PF technologies. Professional users were between 30 to 40 years. All groups except 30-39 and 70-79 years consists respondents who were not interested in PF. In the same time, all groups have respondents who stated that they are beginners in PF but want to become professional, or they are not using PF technologies but

possibly they will in the future. According to the farm size those who stated that they are not interested in PF were under 10 hectares, while professional users were under 10 ha, 20 to 29 and over 1000 hectares. Over 100 hectares all respondents have been using PF applications on their farms or considered as beginner who want to become professional in the field of PF.

The use of PF technologies are highly influenced by the price and simplicity of those. Most respondents would use PF technologies if those cost would be lower or the technology would be simpler and more reliable. Better education were an important aspect in the age 20-29 years. According to the farm size also price and simplicity of the methodologies were the most important aspect in using PF technologies.

According to the importance of data type, most respondents considered localization (GPS) as the least important data, while information about the field was considered as the most important beside weather, production and allocation of products.

Based on the answers most respondents considered that tracking system (GPS), applications (APPS), satellite data, soil sample services, site-specific fertilization, site-specific tillage and sowing, site specific plant protection, adequate irrigation, real-time farm-, machinery-, and devices data, records (documentation obligations), records for supporting farm business decisions have benefit or advantage, while the use of drones or robots showed diverse opinion of the respondents.

Respondents considered that political instruments, education&consulting and farmers need to make actions to be PF more widely accepted while industry and research&development have lower impact on this process.

Regarding the information exchange responses were divers. Famers are using fairs, field days, contacts with the other farmers, contacts with contractors and farm associations to be updated in PF technologies, also getting information directly from the supplier and newspapers. In general newspapers and internet are the primary sources of information. Interestingly farmers with age 20-29 years informed more from newspapers than internet, while in the age above 30 years in most cases is the opposite.

According to these results provided by the D.T1.3.1, we raised up the following questions to the invited farm associations, farmers and technology providers:

- What is the grower's overall opinion about precision agriculture?
- Which services (drone technology, remote sensing…) are available at the technology providers?
- At which sectors the technologies are the most widespread?
- Which are the main limits of the further spreading of the PF?
- Are the technology providers getting feedback from the farmers? How it influence the development of their new technologies?
- From where the growers get information about the new technologies?
- How difficult and how long it takes to get the farmer's trust in the PF technologies and PF services?

B. Organisations

1.1. Farmers and Associations to be contacted

1.1.1. MATE Institute for Viticulture and Enology, Res. Inst. Vitic. and Enol.

The Institute is the late successor to the Institute for Ampelology of Hungary founded in 1896 at the time of phylloxera disaster in Europe. Now, after several reorganization experiments during the last 45 years, the residue of the former institute consists of two research stations (Badacsony and Kecskemét) as an R&D&I institution involved in the network of the National Agricultural Research and Innovation Centre since 2014, that was integrated into the MATE University on 1st February 2021. The fundamental task of the Institute is to provide research and advisory services to the wine industry parallel with carrying out educational activities in institutions of higher education. In the frame of its research activities it focuses primarily on applied research topics, via developments in vine-growing and wine-making technologies for Hungarian vineyards, wine districts, cultivars and clones. The Institute is the main coordinator of the production of virus-free propagation material in Hungary and also, it has fundamental role in maintaining the national vineyard cadastre of Hungary. The sustainment and development of genetic stocks (1,600 items) serving variety research as well as their description by means of molecular genetic techniques are important tasks of the Institute. As part of variety sustenance, it provides propagation material of high biological value (PBVT, BVT) for production on 14 ha of nursery stock, providing service to the whole wine industry in Hungary. Consulting and advisory activities are considered to be extremely important. Within the framework of consulting activities a large number of winter bud examinations are carried out and a plant protection warning system is operated to help the growers. In the Institute's accredited laboratory soil and plant samples are examined, soil conservation and nutrition plans are drawn up related to agro-environmental management programmes. Researchers and technical staff members participate in national and international educational programmes on all levels from basic education through secondary and tertiary education, as well as conducting professional trainings and postgraduate training courses. PhD students are provided the opportunity to participate in research projects. Institutes of higher education as well as professionals are welcome to use the Institute's facilities as experiential venue and presentation area.

1.1.2. Junibor

Junibor is the association of the young Hungarian winemakers belonging to family wineries. The association has several event to improve wine quality according to open discussions. 42 member of the association represents several among the 22 wine regions. Membership can be awarded under 35 years old, and participants stay in the association till 40 years old. The association represent both small and large size farms in Hungary.

1.1.3. Mikóczy & Mikóczy Family Estate

Mikóczy & Mikóczy Family Estate is the second largest farm in the wine region, producing grapevine on more than 80 ha. The family estate is the partner in the Big and Smart Data Management (CS3): Sensor data acquisition for precision Viticulture in a fiware data lake pilot action, providing surface for the case study. The owners make notable efforts to stimulate precision viticulture in the area according to the highlighting the necessary steps against the climate change. The farm is a leader in irrigation of the wine grape in Hungary.

1.1.4. Eurosmart

Eurosmart is a 25-year-old company that started as a family business with welding kits and equipment. Later, it has become one of the biggest partners for brands like Milwaukee, Bosch and has its own branded products under the Superon and Smartech brands. Launched in 2016 with remote sensing and artificial intelligence business that works with drones and sensors that can be mounted on drones (RGB, Multispectral, Thermal Imager). The analysis of data collected with the help of sensors is analyzed with high-performance systems and artificial intelligence is developed using task-specific in-depth learning algorithms. In the past year, at the request of a specialist authority, Eurosmart has developed a self-learning system that can be used to identify objects and anomalies based on drone recordings. It has been implemented in collaboration with Dr. András Jung and thanks to the results of the research, this algorithm can be successfully applied in various agricultural activities, thanks to which significant savings can be achieved. In the period ahead, we are working on the further development and wider application of this in-depth learning algorithm.

1.1.5. WineData

WineData is an intelligent production monitoring system for vineyards that provides real-time, high-precision monitoring of all important aspects of production and makes processed information available to the producer. This system provides valuable information extracted from a large amount of data: from environmental factors through human labour and mechanical work to workflow monitoring without the need of human interaction or manual data recording. Different from competitors, WineData applies sensor technology, positioning and 21th century communication to assist producers' decisions by providing a complete, integrated overview of the production environment, thus offering a unique opportunity to reduce costs, eliminate losses and increase efficiency. The unique approach and workflow of the WineData system assists producers improve grape quality while significantly reducing production costs. WineData is recommended to all grape and wine producers who want to keep close eye on their production process.

1.1.6. Participants

Péter Bodor-Pesti	(MATE)
Tamás Deák	(MATE)
Péter Frittmann	(Junibor Association)
József Kránitz	(Eurosmart)
Nárcisz Mikóczy	(Mikóczy & Mikóczy Family Estate)
Attila Szabó	(MATE)
Gábor Szeifert	(Winedata)
Gyula Váradi	(external expert)
János Walter	(Winedata)

C. Results

1.2. Innovation needs for precission farming

In the following we introduce the general message of the meetings according to the interviewee's responses and opinion in the open discussions.

One of the technology providers highlighted the **difference between precision farming and digitization in agriculture**. Former refers to the high precision localization of the objects (plant, leaf, plant-abnormalities) and acting based on the knowledge of the position. For example RGB, multispectral and hyperspectral imaging based on UAV imaginary. While the later one (digitization in agriculture) includes elements which are similar to the corporate governance: decision support system is based on reliable information related to variable aspects of the farm. For example localization and machine monitoring, control the use of different materials (pesticide, petrol) based on sensors. Tech provider highlighted the importance of those information derived from the farm and operational steps.

A general opinion is that **PF is more spreading in the agriculture than in the sectors of horticulture or viticulture**. This is verified by former reports, stated that agriculture has larger areas and better financial possibilities than have the horticultural sectors. It was also noted by one of the interviewees that viticulture has especially fewer possibilities in the spreading of PF technologies, which should be improved.

Age has a notable influence on the spreading of the PF technologies. Farmers under the age 20 years are usually studying and involved in the farming - only in part time - meaning that they have no overall experience in the needs of the farm. Older farmers - belonging still to the young generation - are interested in the PF and looking forward the possibilities as they are involved in IT in the everyday life and are involved daily in the operation of the farm. Young generation realize the benefit of the IT and PF tools, as those can reduce the time for each technological steps in the production. Older generation in some cases are not interested in PF because they are not interested generally in the IT tools.

One of the interviewee highlighted that **monitoring of the past and present conditions have enormous importance but long-term environmental forecasting would be beneficial** since in viticulture – in contrast with most agricultural products – plantation established for 30-40 years. It would be important to forecast environmental circumstances and design the plantation: cultivar, trellising and training system according to this knowledge and long term forecast.

Different farming directions (traditional, integrated, bio, biodynamic) has different limitations and regulations. One of the interviewee assumed that **spreading the more environmental friendly farming forms will increase the importance of the PF technologies**, especially because these type of farming are difficult to manage.

As the survey showed **size of the farms have an important role in the application of the PF technologies**. Both farmers and technology providers agreed about that this factor is a limit of the PF since under a certain size it is not beneficial (from the farmer's point of view) and heterogeneity is not possible to be detected and anomalies are not possible to be identified

(from the technology provider's point of view). A possible solution would be the corporate equipment, namely common machinery or PF tool which serve the whole ownership of a region and small parcels are possible to be integrated.

According to one of the interviewee it would be beneficial if service providers **diversify the PF services according to the farm size.** Each farm size face with different problems which needs different solutions. For example a farm with 1 ha needs different services than a farm with 1000 hectares. It would be helpful if the farmers knew which service would be beneficial according to the size of their farm.

Application of the PF technologies need trust between the farmers, the technology providers. PF aims to improve and keep quality, reduce the cost of production and reduce ecological footprint, also to avoid those factors which increase any of these last two. For this purpose sensor network, imaging, decision support system (DDS) established or services purchased. It has a cost and a risk. For example if a sensor network provides the advice in plant protection it would have multiple risk factors: over-spraying (resulting waste of money and increased environmental impact), under-spraying (resulting the risk of infections and fruit loss). In contrast with this a well-established network will support the grower to make good decisions. One of the interviewee highlighted that as soon as the farmer realize the advantage in the DDS they trust in the technology.

Targeted financing of the PF investment would improve the spread to the precision farming technologies. One of the interviewee referred that farmers investments are mainly linked to the everyday activities. For example soil cultivators or tillers, canopy management equipment such as pre-pruners and trimmers. Purchase of the PF technologies are not a prime factor. According to targeted financing investment would possibly increase.

Increasing the available sensor-types. Most sensors are linked to the plant protection: humidity, temperature, wind, radiation which serve the forecast of different diseases. One of the respondents was of the opinion that this is useful, but other sensors would be beneficial to monitor the plant itself. It would be important to get real-time information about "**how the plant feels itself**" according to plant analysis. This statement is in accordance with our mission in the pilot action and confirm our measurements which are linked – beside the microclimatic measurements - to the plant physiology.

According to one of the respondents **PF should be more involved in the evaluation of the terroir**, and definition in the boarders of the terroir and PGI, PDO appellations. It would be important to use these new technological possibilities for the uniform evaluation of the grapevine growing areas and those agro-ecological potential. An aim would be the involvement of the PF in the whole production chain from grapevine plantation to the wine.

Simplicity of data handling. There are multiple data available in the vineyard such as climatic data comprise temperature, humidity, precipitation etc. One of the interviewees mentioned that simpler data collection and data handling would be beneficial.

Robotics is a possible increasing sector of PF. According to one of the respondents difficulties in production and in maintenance of the farms partly caused by the shortage of labour. Robotics can be a possible way to increase productivity, and decrease the cost of production.

There is a need for multiple channels obtaining information about PF. Both technology providers, and farmers agreed the importance of information exchange about new possibilities and possible needs in PF. Identification of the channels are still an important task.

Service providers mentioned that farmers have no time to be updated in PF technologies, in this way they have no possibility to identify the technology they need, and it is not their tusk. "**Farmers don't have to be informatics**". Farmers should identify the difficulties they are facing in the farm, and technology provider will identify the technology which serve the solution. The usual problem is that farmer do not know about that there is a possible solution for their problem. Importance of the Transfarm4.0 program were verified during the interview since it was clear demand for **a link between the farmers and technology providers** who initiate the conversation and identify the needs and serve suggestions.