# WiseFarmer

## Connecting farm generations in the digital age
## Project Inventarium

Erasmus + Programme of the European Union

KA2 - Cooperation for innovation and the exchange of good practices

KA204 - Strategic Partnerships for adult education

**Project period:** 09/2019-08/2021
**Target group:** Farmers, farm advisors

**Participating countries:** Greece, Croatia, Romania, Slovak Republic
**Target countries:** Hungary, Serbia

WiseFarmer

Co-funded by the Erasmus+ Programme of the European Union

# Table of Contents

**ACKNOWLEDGMENT**

This publication was prepared by the WiseFarmer project consortium during the summer of 2021, as part of the activities in Intellectual Output Five, led by SEASN. The content was contributed by each project partner, compiled by GAK, edited and graphically designed by WAN. The objective of the Inventarium is to summarize and share the main project results which bring new methods and innovations in adult education, in the context of developing farmers' digital skills, as well as to provide a solid base for dissemination in the follow-up phase and support the sustainability of the outcomes, not just in the project countries, but also at the wider EU level.



Co-funded by the
Erasmus+ Programme
of the European Union

# Project Summary

## WiseFarmer project – Connecting farm generations in the digital age

The direct aim of the project was to bring the younger and elder farm generations together in a common program for the exchange of knowledge, access to high quality learning opportunity, facilitating support and sustained collaboration for increased competence, from one side in the use of digital tools, from the other side the crucial farming practices based on local knowledge.

The primary target group consisted of smallholders and family farmers, where personal participation in the agricultural production is inevitable, the current level of skills and qualifications are generally low, both on the elder side - lacking digital skills, and the younger farmers - missing competency and experience in the practice of farming. Elderly farmers have local knowledge that is indispensable in the successful entrepreneurship at the farm level, while younger farmers are more advanced in the use of digital devices, but also lack their specific use in farming, as gaining local "slow" knowledge takes a considerable amount of time. The secondary target group at the local level were farm advisors, who work in the field and provide technical assistance for farmers. Their role was to facilitate the learning process built around the specific needs and problems of the farmers taking part.

The project was to develop innovative learning methodology in several layers. Peer-to-peer learning - as farmers main and most trusted source of information are other farmers - and knowledge co-creation can give the generations an opportunity to learn in pairs, and by doing problem solving oriented exercises, they circumvent existing obstacles mentoring each other, therefore the skills of using digital tools can be successfully transferred in the local context as they are connected and matched with local farmer knowledge.

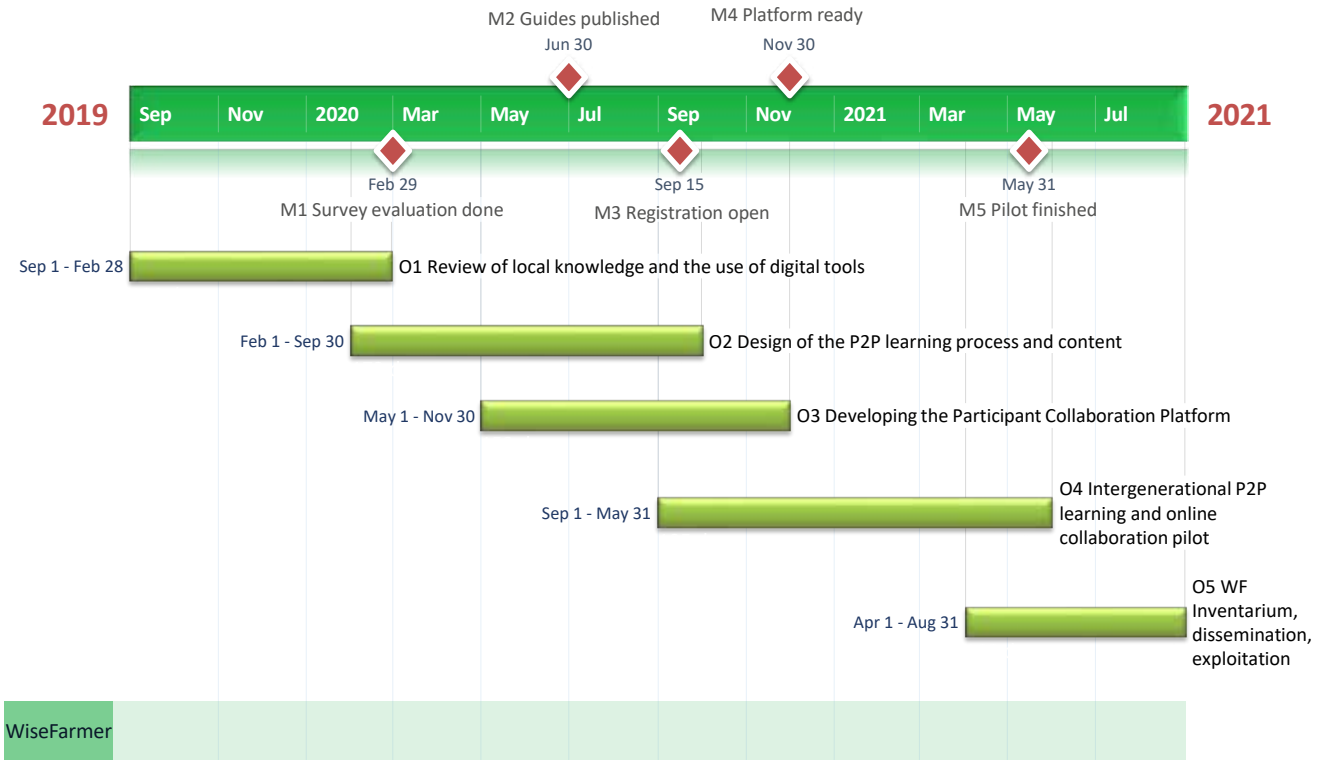
Given the importance of the local characteristics, starting from the exploration of needs, developing and conducting the training and continuing with sustained support, the collaborative - mentoring and facilitating - component of the overall process was crucial to glue all the necessary actions together. For this sake the project required the facilitation of accredited farm advisors who are already in the field, working for many years supporting farmers, being trusted, experienced, competent and neutral from business interests. In this way, the project could have a positive impact on agricultural knowledge systems as making better use of networks for informal knowledge exchange.

Project results demonstrate the viability of the approach and methodology, as one of the possible techniques to overcome crucial challenges in the agricultural and rural sectors. The experience can be utilized in a wider strategic context for policymaking, to cope with the abandonment of farming activity especially by young people, the succession of farming, attracting new entrants into agricultural activities, the introduction of digital innovations in a responsible and effective way, suitable for smallholders' and family farmers' needs.

**The project achieved its results by five intellectual outputs:**

- conducting regional needs analysis and knowledge assessment in every participating country,
- developing a methodology and content for the learning program, and matchmaking technique for the selection process of mentoring pairs,
- creating a collaboration platform that provides learning content and functions, collects good practices and displays new digital tools (relevant for the region) and supports communication features that enable constant share of ideas and knowledge, using mobile and desktop devices,
- implementing the pilot learning program in Serbia and Hungary,

## Project timeline




- extensively sharing project results using multiple channels, publishing this current handbook with the summary of the main activities and results of the WiseFramer project.

# Background

Smallholder and family farms dominate EU' s agriculture, as two-thirds of the 10 million farms are less than 5 ha. This proportion is going to be even higher if we take into account the accessing countries of South-East Europe. Nearly one-third of all active farmers in the EU are over 65, while only 5.6% are under 35 years of age. This phenomenon is described as the "greying of Europe's farmers". Smallholders' local knowledge, experience, tradition, attitude, mindset can be tremendous resource and obstacle at the same time.

The "wise farming" concept introduced and used by the project can be conceived in two dimensions: 1) the value of local experience in farming in general: a personal behavior where "The wise farmer learns from the experience of others" and as opposed to "The smart person who uses his mind and intelligence, the wise uses his experience and experiences of others to solve problems", and 2) thinking one step further the well-known term of "Smart Farming" (re. digital agriculture) to "Wise Farming", where the introduction of agriculture 4.0 tools are to be put into local context, to match experience, attitude, cultural habits, to validate usefulness not only at the level of business return but also taking care of social, environmental, sustainability and data ownership aspects.

# Innovative methodology

## WISEFARMER METHODOLOGY

During the development of the methodology all partners collaborated by providing their experience, proven techniques, lessons learned and reviewing the development process and the result. The foundations and the basic principles of the learning program were laid down by GAK (Coordinator) in the project proposal document.

Based on the concept, the Methodology document describes the mentoring and facilitation roles, tasks, and related ethic concerns and rules in detail, providing a strong methodological background to the following core activities of the project.

The WiseFarmer Methodology is a targeted selection of innovative learning methods and state-of-the-art technology, discussed in the document with relevant examples and references, which allows other stakeholders in different countries, regions and locations to exploit project results.

The Methodology is shared on the project website (www.wisefarmer.eu/results).

## Design and description of the learning methodology

As a first major task in the making of Intellectual Output 2, the project partnership carried out the design and description of the learning methodology which contains the process and the planning of the learning schedule with all the necessary elements for the successful implementation of the intergenerational peer-to-peer learning process: face-to-face workshops and online sessions, communication channels and tools to be used (interactive lessons, online platform, mobile apps), micro-exercises, templates. Accordingly, we have developed two different methodological documents, a WiseFarmer methodology, as well as a Guide for participants (farmers and facilitators).

# Results of survey

The content and exercises of the learning programme was to be developed using proven good practices and new digital tools, and based on the up-to-date assessment of the target group regarding their actual ICT skills and usage, and farming practices. In order to fulfil this needs assessment, a questionnaire was developed, as one of the main channels to well „hear the farmers' voice" and better tailor the WiseFarmer programme to the most actual needs of the target group.

In-depth interviews were conducted in every location before the questionnaires to fine tune them before the major data gathering process in October and November 2019. Being a qualitative data collection method, in-depth interviews helped the partner organizations to capture data about the behaviours, attitudes, perceptions of the farmers and the complex local knowledge-dynamics (for the interview guide, see Annex 1). Participants for the in-depth interviews were selected by snowball sampling (in many cases through the partner organisations' farm advisor connections) in both target groups, to ensure the selection of both young and senior farmers with a wider picture on local and regional issues.

One of the main lessons learnt from the preliminary research phase was, that at the start of the conversations, farmers usually all say "we have no problems, everything is fine", not thinking about urging need for innovations / ICTs, but when continue discussing, going deeper into details, digging up everyday challenges and mentioning examples, the situation changes. Based on this finding the choice lead to enriching the sections of digital solutions (and interest in them), farming problems in the questionnaire with as many options as possible with further additions for the pilot countries. The survey was conducted by the partner organisations of the project between December 2019 and early January 2020. Partners in different countries used different methods to reach the target audience, in order to gather as much and as relevant information as possible.

The same rule of thumb applied so that every partner had to take into account the regional profile and specificities of the agriculture, age groups, production profile, physical and economic size of the farms. In *Croatia,* two meetings were used for data collection in Krapina-Zagorje country. In *Greece*, the WiseFarmer survey was conducted in the Prefecture of Karditsa, located in Central Greece.

In *Hungary*, the advisory network of the GAK was used to reach farmers in Central and Eastern Hungary during the preparatory interviews. SZE targeted farms in the Model Farm Network of the Faculty, and also graduates and current students of the university who usually work as a family farmer.

In *Romania*, farmers from the Western Plain of Romania provided the answers face-to-face with the project's team members. In *Serbia*, IPN/ISAA approached farmers together with regional Public Agricultural Advisory Services in 3 dispersed regions (Smederevo – Belgrade vicinity), Jagodina (Central Serbia) and Prokuplje (Southern Serbia), with approximately equal proportion of respondents contacted. In *Slovakia*, the target group of addressed farmers were members of the Association of Young Farmers in Slovakia and Club of Agricultural Experts at the Slovak University of Agriculture in Nitra, and were located primary in the western part of Slovak Republic.

The data received from 265 responses from six countries were exported at the end of the collection period. Data cleansing and first level processing were executed by AUA, then this report was brought together by BUAS, with the contribution of all other partner organisations.

In addition to the main findings listed in the next chapter, the most interesting lessons from the survey are presented in more detail in the Annex at the end of this handbook.

# KEY TAKEAWAYS FROM THE REGIONAL SURVEY

- Almost 90 percent of the respondents are male, and 12 percent are female; 44 percent of the respondents are older than 45 years (11 percent are older than 60 years) and 56 percent are younger than 45 years (18 percent are younger than 30 years). More than half of the farms in the sample (54 percent) are small, 22 percent are medium and 24 are large farms. Both older and younger farmer generations and also mainly small and medium sized farms were reached by the project partners.
- The WiseFarmer approach may not only suit young farmers, as elder farmers can also have limited farming expertise therefore are in need of (local) agricultural knowledge.
- The most important priorities of farmers are farm profitability and farm sustainability, closely followed by personal living standards and work life balance – these priorities have almost the same level of importance in all partner countries. It is also important what farmers think about the most limiting resource in their farming activities. These findings helped project partners to build the WiseFarmer trainings around real priorities and limiting factors for farmers.
- Almost half of the respondents (45%) also provide help or services to other farmers as well. This is an important result to be taken into account related to readiness for collaboration, including the implementation of the WiseFarmer learning programme.
- Mobile phones are the most popular devices among farmers: 85 percent of the respondents use such devices (17 percent of them have a basic mobile phone without internet access and 83 percent own a smartphone). This gave a clear indication for the type of devices to be used in the WiseFarmer learning programme.
- With regards to the planning of the WiseFarmer learning programme, a concluding remark indicates that targeting the development of basic internet usage skills for farmers is not anymore an issue (like it was 10 years ago), as most of them already have certain experience, therefore the project – besides an introductory overview (to reach a common level) of basic skills - should rather focus on functions and content. Many farmers with low or basic skills have been using the internet for no more than five years, and most farmers with intermediate or low skills have this experience for over five years, but still have smaller or significant deficiencies in internet usage. These findings give us the message that the WiseFarmer project will help both fairly new internet users develop their skills and push frequent but restricted users up to the next level as well.
- Farmers say that digital technology can help them most in production (47%), and less in market access (25 percent) and administration (21 percent). Only a fraction of the respondents said ICTs can help their family and private life (6 percent). This is somehow contradicting the results from the first part of the survey where farmers indicated that they do not have problems with production, but market access and administration (and they also value work-life balance). One of the explanations could be that farmers associate ICTs with precision agriculture, which is strongly advertised by technology providers, and as it is many times used can be understood as synonym for smart/digital farming, farmers automatically think that these technologies are for production mainly. This result also promised a good opportunity for the WiseFarmer project to showcase and introduce good examples of using ICTs in the other areas.
- Farmers with agricultural education are more open to new ICT-solutions, and also use more complex ones. However, findings indicate that in certain practical applications while there is a greater general interest among farmers with agricultural education, the actual usage rate is higher among farmers without this kind of background. This tells us that applications which do not require advanced analytical skills can be widely adopted among farmers who actually need them.
- Elder farmers use farm management (farm logbook) software and especially applications for e-government more than younger farmers. These findings are broadly consistent with other general e-government research that tells us that the main users of digital government services are people between 40-60 years (usually people this age have the most cases relating to public administration). This can also be an important dimension of the WiseFarmer trainings. For certain cases, senior farmers can inform younger farmers more not only about local agriculture but also about public administration.

# Innovative results for learning

## Project platform


WiseFarmer
LEARNING PLATFORM

## IN THIS SECTION:

- Main components of the learning and collaboration platform
- Using mobile applications and devices
- Highlighted technologies set up and combined
- The WiseFarmer Knowledge Base - a repository of good practices using ICTs for smallholders and family farmers
- Harnessing the opportunities of interoperability

### Main entry points for farmers

https://www.wisefarmer.eu/

The WiseFarmer Knowledge Base
https://learn.wisefarmer.eu/kb

### Developing the Participant Collaboration Platform

We created the WiseFarmer online learning and collaboration management platform, as a combination and integration of various digital tools, to best support the actual needs and possibilities of participants of the pilot learning programme, as well as taking into attention the updated learning methodology, highlighting certain limitations but also opportunities, caused by the pandemic.

**The main components of the learning and collaboration platform were set up, according to the revised concept:**

- Learning management system, based on the technical framework of Drupal CMS (same as the main project website)
- User registration system
- WiseFarmer Knowledge Base (created as a new content type under Drupal)
- Opigno LMS as a Drupal module (for testing)
- Selection of mobile apps, suitable for interoperability with the learning platform
- Testing and setting up mobile apps and web applications according to the list suggested by the previous worksteps
- Developing data communication interfaces between selected apps and the WF learning platform
- Web-conferencing (video/audio chat) system tested and set up as found suitable for the project: Big Blue Button and Skype
- Because of the need of some level of system integration, we preferred the usage of Android platform, which was expected to be more open source and interoperable
- As the Survey showed, most farmers use Android devices requiring Google account, therefore the learning process was planned to be supported on Google tools as well

## Getting ready to work with mobile applications and devices!

- We selected the appropriate communication tools for chatting, video conferencing, online collaboration, with the ability of saving recordings, including activities (date, time, chat, audio, video, presentations, list of participants).
  - For the online meetings, the open source Big Blue Button was installed on the server of the coordinator (also implemented at St Istvan University) which seemed like a reasonable option, and was tested with good results in smaller groups.
  - For mobile communications, requiring shared screen, the BBB was not functional enough, therefore we recommended for the learners to use Skype.
- We selected and configured a Web to App solution, which provided the means of using web based applications in a familiar way, similarly to mobile applications.
- To support the problem solving oriented learning exercises, we ensured that some of the mobile apps can be combined with the project learning system, connected with the farm management system:
  - Creating projects, forms, using API of the field observation data collection mobile app.
  - Web map interface to upload and display log files (KML, CSV) created by the GPS tracking mobile application, processing and displaying data sent to URL on the server side.
- We also supported the setting up of the android devices (tablets) procured in the project with the applications mentioned above and below, as well as by providing written guidelines on the installation steps.

## We translated the OneSoil application

During the first part of the learning programme, we digitally tested several mobile apps with the more advanced farmer participants, which seemed to be useful for all learners in the next steps. The OneSoil app became one of our favourites, for its user-friendly interface, practical features and, last but not least, its free availability. However, there was one major obstacle: its Hungarian version, an important aspect for agricultural users, was not available.

The organisers and consultants of our project therefore decided to try to translate it ourselves. We assembled a small team of volunteers from the English speaking participants in our project, and using the professional online translation system provided by the developers, we managed to cope with thousands of words and phrases in a matter of weeks.

Co-funded by the Erasmus+ Programme of the European Union

# Five of our own good practices

**To support the learning of smart ICTs in farming, the coordinator has its own proven practices as well:**

1. Observing agricultural data at the field level using mobile app and device;

2. Tracking the motion of farm machinery by GPS logger and automation apps, displaying on real time online map, connected to farm management software;

3. Pest forecast insect pheromone trap combined with android device for remote monitoring;

4. IoT solution for tracking the position of grazing animal (beef cattle), monitoring temperature and other data with visualization in a web browser;

5. Using NDVI satellite data on parcel map to follow the status of vegetation of plantations and crops, connected to farm management software.

## Main digital tools, applications, technologies combined to support the learning process:

Drupal

OneSoil

GPSLogger for Android

epicollect5

Google Classroom

H5P

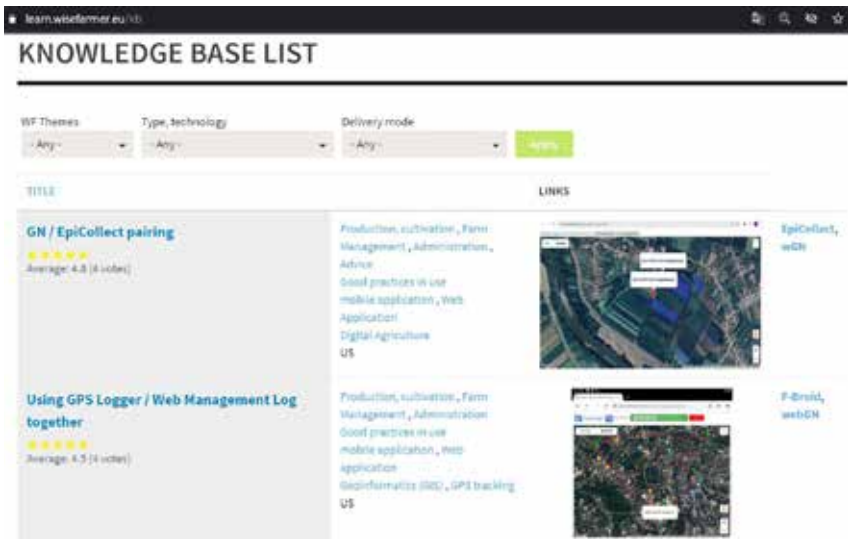
Pl@ntNet

webGN EU-Info

# THE WISEFARMER KNOWLEDGE BASE

## Repository of good practices using digital tools at the level of small and family farmers

The online learning platform accommodates a user-friendly interface to access practices and related exercises, to be applied during the pilot learning programme. The description of the entries is available in English, as well as in the languages of the piloting countries, Serbian and Hungarian.




## Filtering categories

- Based on the main language selector, visitors are presented only with the records of their own language
- WF Themes, according to the WF methodology (see Newsletter 2)
- Type of technology (GIS - GPS, EO - satellite data, IoT - sensors, etc.)
- Delivery mode (mobile app, web application, desktop software, etc)
- Business model (fully free, free and fee, part of a service, etc.)

The good practice result page includes the title, description, URL, download links, picture, multimedia files, embedding YouTube video, document attachments (such as a more detailed instruction for the certain exercise linked to the practice), and a H5P interactive (micro-) learning component, which can provide dozens of additional options for different content types. Users can also rate the practices by clicking on a simple 5-star widget, giving instant feedback.

## Harnessing opportunities of interoperability (by open data standards)

Several of the chosen mobile and web applications make it possible to access their data, recorded by the users, in different ways, by providing various levels of interoperability (file download, API, web-service, etc.).
In the case of our project it means, that we can connect those applications with the IT system of our learning platform, to automate some processes, reducing the amount of workload of data entry, integrating the best functionalities of the separate platforms, ect, in order to better demonstrate the advantages of using these tools and motivate our learners.

**Examples:**

- EpiCollect field data observation app - provides an API which we can use in the connected farm management system
- GPSLogger for Android - can send the recorded GPS coordinates to a URL (to be processed on the server side), and the saved files are also open format (KML, CSV, OpenGTS, GeoJSON, GPX)
- IrriSat weather based irrigation scheduling service - has a rest API for NDVI data and other satellite layers
- Onesoil - the field parcel boundaries can be downloaded, as well as the precision application files are available in open (KML, ISO XML) formats.

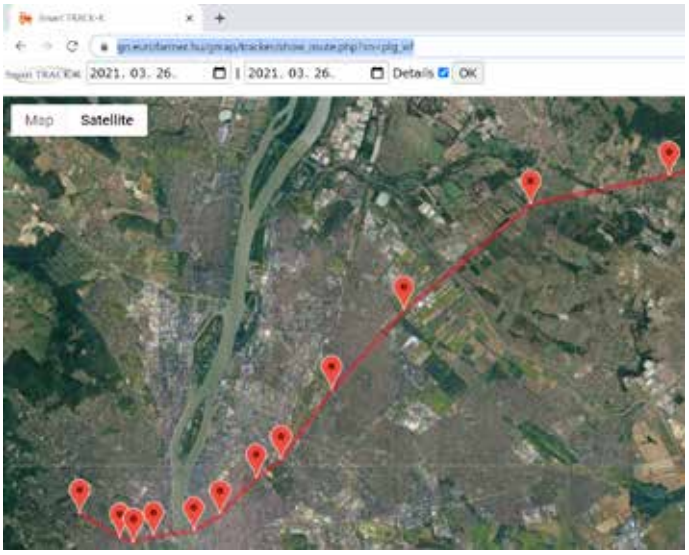
WeAreNet, leader of IO3, is member of the GODAN network.

GODAN Global Open Data for Agriculture & Nutrition

# Small technical innovations supporting the learning exercises

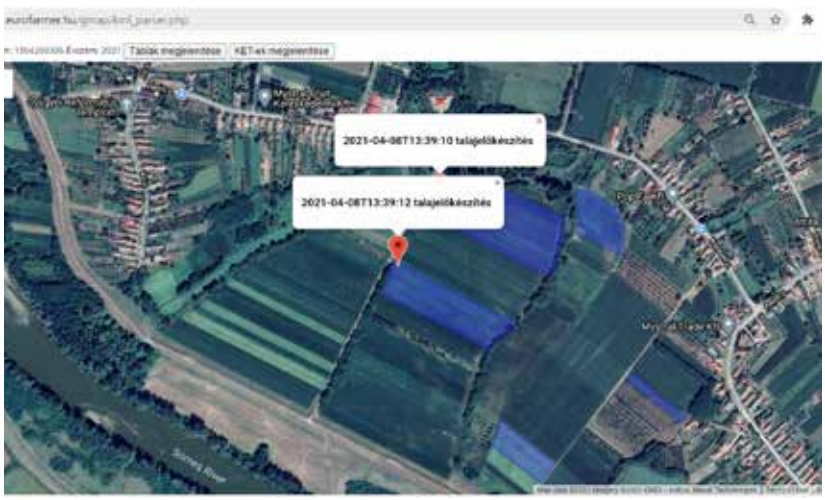
**The IT developers of WAN and GAK created several new functionalities to demonstrate good practices of interoperability between separate systems, to ensure more advanced user experience, and model real life situations faced by farmers during their work with ICTs.**

In case of the GPS Logger / Farm Logbook exercise, there wasn't available a ready solution to visualize the logged data on a map interface, therefore we developed a file upload utility, equally accepting KML and CSV formats (generated by the GPS Logger by its own proprietary structure), allowing to view the tracked marker points of movement with the date/time information on Google Map, as well as to download the result in standard KML. We also made it possible to work with the "send to URL" function of the app, by live server connection and map display.


To support the requested tasks of the EpiCollect / Farm Logbook exercise, we integrated the EpiCollect API (https://docs.epicollect.net/developers/api) in order to show the farm activities recorded by the app on the map interface of the farm logbook platform.





# Pilot learning programme

## WF Learning Programme Pilot in Serbia and Hungary

The main objective of our project was to develop and test a learning programme - between October 2020 and April 2021 - to better connect farmer generations in the digital age, appreciating and combining their traditions, attitudes and local experience, at the same time by assigning motivating, problem-solving oriented exercises. However, due to the pandemic (fully overlapping and hitting our learning interval), the pilot had to be implemented by a modified methodology as compared to the original design, but we tried to preserve and utilise all innovative elements and techniques as planned.

The main difference was the lack of opportunity to hold face-to-face, physical events (3 days at the beginning, 1-day midterm and 1-day closing), which would have been the basis of identifying and working in groups and pairs, nevertheless, we formed pairs by online communication, which was partially exercised during the programme.

We enjoyed having numerous creative and motivating moments, received a lot of encouragement and an overall positive feedback from our participants in both piloting countries during the learning process and the closing evaluation. New groups of farmers and advisors approached us with an interest to continue.

## IN THIS SECTION ABOUT THE LEANRING PROGRAMME:

- Methodology and programme of the pilot
- Map of implementation, participants in Serbia and Hungary
- Meet our Facilitators!
- Learning activities and feedback from Serbia
- Learner testimonials in Hungary
- Series of online presentations by ICT service providers
- The list of practical exercises for beginner farmers
- Using the learning platform

WiseFarmer

## The learning process

In October - November 2020 we launched the programme of the advanced group in Hungary, based on the open registration by interested participants. We organised weekly online sessions, and from December we started to invite guest presenters - developers of ICT services - and arranged our learning content around these good practices (also made part of the WF Knowledge Base). The purpose of this phase was not only to learn, but also to validate and select the best tools for farmers with basic digitial skills for the next steps. In parallel, the preparation of the beginner group was started as well.

In Hungary, participants received their tablets (10" Android Lenovo M10 LTE) with a guide of installing and running WiseFarmer chosen apps (Google accounts were set up as needed as well).
The actual learning process for most of the beginner farmers commenced in January 2021 (while some pairs started the programme already in the last month of 2020).

The learning in Serbia followed the process in Hungary by several weeks of delay, which allowed the filtering, adapting and refining the content by localised needs.

Co-funded by the Erasmus+ Programme of the European Union

## Getting ready for the pilot


Besides the methodological preparation and content development, the piloting countries also started the make steps to ensure the technical environment of the implementation of the learning test program (pilot).
In Hungary, the procurement of 30 android tablets was decided by the special opportunity of budget reallocation under the pandemic. The selected device became the Lenovo M10 LTE (with SIM card slot). This model seems as an optimal choice, based on its screen size, communication capabilities and mid-range quality and durability.

GAK has purchased (separately from the project) a drone (UAV), which is very much suitable for agricultural usage, and we were planning exercises when the face-to-face is possible, and the weather favourable (April-May 2021).

The developer of one of the main farm logbook system (EU-Info) has made an offer to support the WiseFarmer learners by providing free accounts and on demand software development linked to the exercises.

We also set up the BigBlueButton platform for communication, especially for online events.

# LEARNING CONTENT AND PROCESS DEVELOPMENT

## Call for learner participants (farmers)

### The following information was formulated for the open call:

**Key information for learner participants** (as of October 2020)

- Duration: October 2020 - 2021 April.
- Participation is free for farmers with approved registration.
- Venue: online (virtual), face-to-face meetings are planned for December 2020 and 2021 March.
- Because of the pandemic, the first planned face-to-face meeting will take place virtually in 2020 October.
- Technical platforms used: Web browser and android mobile applications.
- Farmers in lack of mobile device can apply for an android tablet from the project coordinator.
- Participants who successfully complete the learning programme will receive the certificate connected to the Erasmus + program and GAK / Szent István University.
- The farm advisors as “facilitators” assist in the accomplishment of tasks, practices, support the learning process .
- The participants will be provided free and open source tools and applications, in relation to the course exercises.

### Stages of the learning programme:

**I. Getting to know the learning environment and each other -** November - December 2020

- General mobile device (android / tablet) usage, setting up the Google account, finding the WiseFarmer folder, running the apps and trying to install new ones.
- Getting familiar with the communication tool and learning platform.
- Meet each other, share our good experiences of mobile and web applications, favourites, best practices, needs, ideas up to now.
- Basic internet skills, emails, online communication, search techniques, tips and tricks, etc.
- Getting familiar with the learning platform, the WiseFarmer Knowledge Base.

**II. Wise farming practices -** January-April 2021

- Based on the learner participant (farmer) registration form, the profile of learners is identified.
- According to this profile, they will be provided with practical (farming related), problem solving oriented exercises, which require the use of digital tools, applications.
- Several of the practice assignments will come from the experiences of the first phase, according to the characteristics and needs of participating farmers.
- The practical exercises are formulated in a way that farmers can use their own farm data, and therefore realize their benefits right away.
- The piloting project partners collected and/or developed a number of practical tools based on ICTs in advance, by good farm advisory experience, according to frequently encountered problems and needs, and the most sought after service activities.
- Exercises are typically performed using mobile apps and web applications running in a mobile browser. The initial set of applications will be installed on the allocated mobile devices, and their download list is provided separately.

# Presentation of the learner and facilitator participants

## The WiseFarmer Facilitator Network

**Five farm advisors in Hungary and 2 experts in Serbia served as facilitator to support the learning process of the farmers, primarily being their partners in the everyday as well.**

**Judit NAGY**, Southern Great Plain
For more than a decade, we have been growing organic elderberry, organic grapes and organic alfalfa on my own bio-farm, as well as making processed food from them, and we also run a rural tourism accommodation service. Forestry is part of our job as well. Based on this experience, I provide expert advice to farmers committed to organic farming and forestry in the areas of supportive administration, application preparation, and relationship with the authorities.

**Krisztina TOTH**, Central Hungary
In connection with my PhD degree, I researched the place, role and development possibilities of agricultural consulting. I organize educational programs primarily for farmers on digitalization, climate change, smart irrigation systems and precision farming. I am actively involved in university education and research in Gödöllő. As a project manager in an international project called EUREKA I am researching the possibility of transitioning to precision farming.

**Zoltan SZUDA**, Southern Great Plain
As a consultant, I primarily help farmers in the preparation and implementation of agricultural and rural development tenders. I also strive to produce reliable and high quality food in a sustainable way on my own farm. I deal with field crop production and fruit production. I process some of my own ingredients and sell them as a natural drink. As a consultant, I primarily help farmers in the preparation and implementation of agricultural and rural development tender.

**Tibor SZABO**, Southern Great Plain
I specialize in organic farming, agri-environmental management programs (VP-AKG), and farm administration. I have been working as an advisors since 2006. In 2018, I graduated as a plant protection engineer. I was a member of the advisory network operated by GAK during the previous period and I support the work of 60 farmers.

**Attila NAGY**, Central Hungary
I have been working as a registered farm advisor for a decade. I mainly assist farmers in their administrative tasks, such as keeping the farm management logbook, helping to create conditions for complying with legal and regulatory obligations, checking them, preparing for inspections, liaising with the authorities, and assisting farmers by submitting grants and writing applications.

**Jasmina FILIPOVIC**, Serbia

I have PhD in Biotechnical Sciences in the field of agroeconomic sciences, as well as a Master of Economics. I am Director and Advisor of the Farm Advisory Service in Jagodina. My main experience related to project in the thematic area are improving financial knowledge and records on agricultural holdings, supporting ecologically acceptable production of vegetables in a protected area and application of solarisation.

**Marko MANOJLOVIC**, Serbia

I graduated as Plant Protection Specialist from the Agricultural and Food School in Prokuplje. I work in the Agricultural Advisory and Expert Service Jagodina, improving financial knowledge and records on agricultural holdings, supporting ecologically acceptable production of vegetables in a protected area, and the application of solarisation in agroecological conditions of RS in order to biologically control soil pathogens of vegetables in a protected area.

**Goran Pavlović**, Serbia

I am the director of the Regional FAS office and a farm advisor for arable crops since 2004. I have a BSc in Arable Crops from the Faculty of Agriculture, Zemun, Belgrade University.

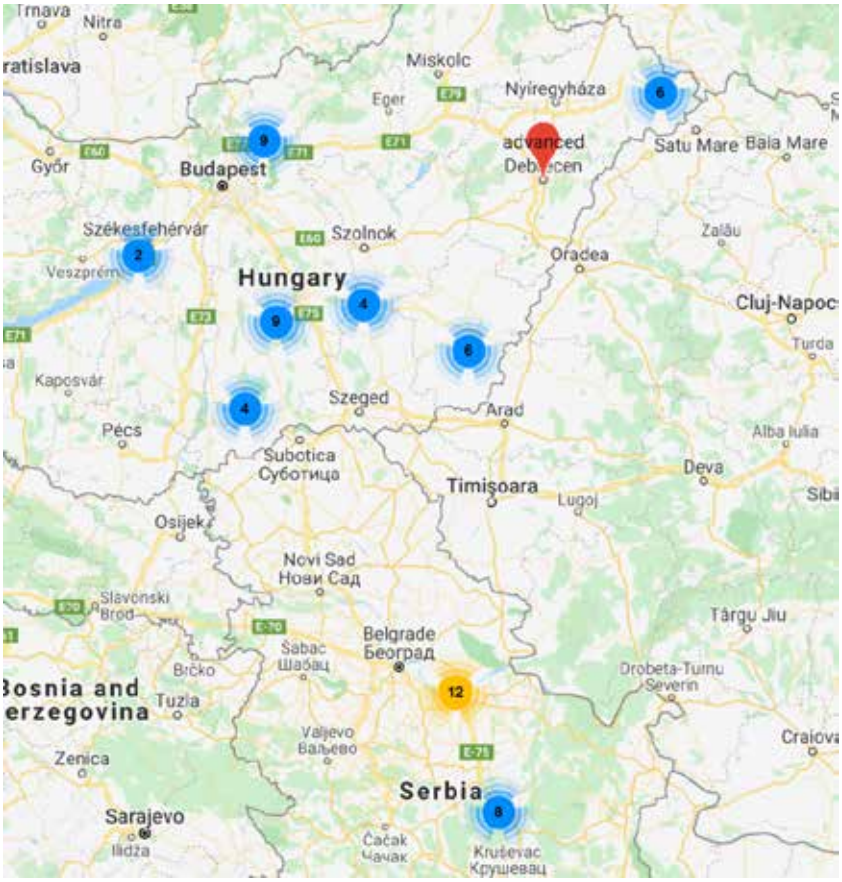
I participated in different projects, such as Farm management education, training of samplers for sampling natural seeds, validation of methods in laboratory practice, testing seed quality assurance in seed laboratories, education of advisors and individual agricultural producers in order to make them actively participate in the organized commodity exchange market, and mapping of invasive and economically harmful weeds.

**Goran Djordjević**, Serbia

I am a farm advisor for Fruit and Grapewine production at the regional FAS office in Smederevo. I have BSc in Fruit and Grapewine production from the Faculty of Agriculture, Zemun, Belgrade University. I have strong experience in fruit production in my own household. I also participated in different projects and was trained under the CECRA training modules for Communication skills.

# Learners represented several rural regions of Serbia and Hungary

In Serbia, participants were recruited from two main municipalities (Jagodina, Smederevo), while in Hungary, there were four main separate regions where the learners came from (Szabadbattyán, Kecskemét, Szeged, Szamosújlak).




The facilitators' locations were in close proximity to the learners in general, as most of them had a previously well-established relationship and collaboration with the farmers. They were able to communicate with each other on a daily base, by their traditional and newly learned digital channels.

In Hungary, we also had several participants joining from other places, as they registered to the open call, and had no prior connection to the facilitator network of the project. Most of them became the members of the advanced group, being able to keep contacts by virtual means.

## Facilitator Trainings held in Hungary

### 29. SEPTEMBER 2020. KECSKEMÉT

### 20. OCTOBER. 2020 MOSONMAGYARÓVÁR

The Hungarian partners implemented the training of facilitators in two steps and locations.

The first event was organized on 29 September 2020 in Kecskemét, at the demonstration and educational farm of the College of Horticulture.

In October it was followed in the West Hungary with the communication and digital facilitation training.


## Facilitator Training organized in Serbia

### 21. OCTOBER 2020. BELGRADE

The training of facilitators took place in Belgrade in the autumn of 2020 organized and led by Wisefarmer's Serbian partner, Institut za primenu nauke u poljoprivredi (IPN). During the all-day event, participants learned about the background of the project, and the Guide for Facilitators developed within the project. The topics of the second section were: Basics of conscious communication, conflict handling, customer relations and Facilitation of online events and the farminar approach. After the lunch break the WF e-learning and communication platform was presented and tested by the participants.

# SERIES OF ONLINE PRESENTATIONS BY ICT SERVICE PROVIDERS
## as part of the advanced farmers' programme (mainly)

From the second half of the first phase with advanced farmers, we started to organize presentations of developers of ICT tools, mobile applications, service providers etc. to our regular online events, later also inviting the beginner learners.

### 17 December 2020 – Meeting 07.

- Agromedium, a mobile application that contains the main data, license documents and characteristics of commercially available plant protection products and fertilizers approved in Hungary. https://agromedium.com
- Agrártitkár which provides several useful tools for farmers, most of them open source and free. http://agrartitkar.hu

### 21 January 2021 – Meeting 08.

- Precision farming research in animal husbandry, cooperation opportunities - OMKi Ecological Agricultural Research Institute. https://www.biokutatas.hu/hu/page/show/allattenyesztes)
- LoRa technology in agriculture. https://zane.hu/

### 10 February 2021 – Meeting 09.

- Field Calc soil nutrition planner software, which was designed by the parameters of humus, AL-P2O5 and AL-K2O to be modelled as a function of the most important soil properties influencing their uptake, taking into account the existing combinations of soil properties in Hungarian soil types. The nutrient requirements recommended by Field Calc are between the maximum and the balance principle. https://www.field-calc.com

### 25 February 2021 – Meeting 10.

- Precision management software, soil sampling, satellite and drone technology, data organization and analysis. https://agridron.com

### 03 March 2021 – Meeting 12.

- Grain monitoring system, GrainMonitor Kft. https://www.grainmonitor.net/
- Soil scanner, Csernozjom Kft. http://www.csernozjom.com/

### 08 April 2021 – Meeting 13.

- Developments and advantages of IoT services and applications in agriculture, SZE University
- Presentation of the Organic Farm Knowledge Platform, OMKi / FiBL

### 04 May 2021 – Meeting 14.

- Use of agricultural GIS data by the free QGIS software. Use of satellite vegetation maps, real colour maps - display, interpretation. Analysis of remote sensing data from organic farming. Evaluation of field life paths, detection of agrotechnical operations, observability of organic and conventional cultivation. Geoadat Kft.

# THE WISEFARMER LEARNING PROCESS WITH PRACTICAL EXERCISES (PHASE TWO)

## Practice-oriented and problem-solving exercises

The practice-oriented exercises were introduced to the participants by approximately 1 to 2 weeks' intervals in Hungary, implemented according to the list below. In each case there was requested a certain level of interactivity and feedback.

### FIRST HALF

#### 1. Email contact 2021.01.26.

As part of the first exercise we ensured that each participant has a working Google account and Gmail address, necessary to use the Android device and email communication during the learning process. This was supported by our facilitators, who helped the farmers, if necessary, to set up a new account. We asked all learners to send a simple "hello" message to our wisefarmer.eu@gmail.com, confirming that they are on board.

#### 2. Google form 2021.01.31.

We had a double fold purpose with this task, on one hand, assigning a simple practice of filling out and submitting a short web form, on the other hand, receiving relevant information about the learners' profile, regarding their main fields of interest and other specifics to be taken into account in the next steps.

#### 3. Scanning app 2021.02.04.

We selected the Office Lens, by its straightforward usage, localisation availability (both HU and SR), and supportive information at hand. We tried to demonstrate some of the most important tasks in using the device, downloading and installing a new application, and then already trying out a useful function: the scanning program which can help a lot in the future work with the farm advisors or the authorities, such as digitizing, sharing, sending paper-based official documents in electronic format.

#### 4. Farm Logbook sign-in 2021.02.09.

We asked participants to login with their provided user name and password to the Farm Logbook application: https://gn.eurofarmer.hu/login. Their optional task was to enter their Land Parcel Information System (MePAR) block data (eg based on e-Claim data or the MePAR system) and create a parcel inside the block specified in the previous step.

#### 5 G-NDVI 2021.02.19.

The exercise included the signing in to the Farm Logbook, according to the employed technique learned during the previous practice; creating land parcel block centre coordinate pairs in the Master Data / Block list section and accessing the Farming / Field page; by clicking on an icon to open the map view, and drawing a field; finally calling in and viewing the NDVI layers to check the vegetation index.
Doodle (side exercise) indicating time preference for an online meeting was carried out in parallel with this task.

#### 6. EpiCollect 2021.03.08.

The EpiCollect mobile app allowed learners to capture field-level observations (e.g., plant protection, damage, stress, etc.) with the tablet and then submit them to their advisor. They could easily take photos, audio and video recordings; the name of sender, time, and GPS coordinate of the data collection being generated automatically by the app, so it was possible to create the entry quickly and easily. Data collection also worked offline (without an internet connection), which could later be uploaded with an online connection.

#### 7. OneSoil 2021.03.12.

With this exercise we assigned a slightly more complex task to the learners, also to be accomplished it in pairs. The task started with the downloading and installing the OneSoil android app from Google Playstore. We notified each learner that if they had a previously installed version on their device, it should be updated, as the Hungarian version translated by the WiseFarmer project was just released at that time. Next steps were signing in, then creating field(s) drawing (s). There were two methods for this in the mobile app (selection with automatic delimitation, or/and manual drawing of boundary line). We recommended the learners to select their own farming area(s). There was a request to share field data with the learner pair and the wisefarmer.eu@gmail.com in CC. We also asked to create a field observation note on (at least) one of the field parcels that refers to some kind of agricultural activity (similar to the previous exercise: description, photo could be attached) and also to share it with the pair and the project.

## SECOND HALF

By early March 2021 we reached the half of the learning exercises, and as planned, after the first part of using email communication for assigning tasks and receiving feedbacks, we switched to Google Classroom, as each learner became confident using the Android platform (and as reconfirmed already, were acquainted with the Google ecosystem). Actually, the One-Soil exercise was assigned by both channels, bridging between the two methods.

Google Classroom

### 8. Enter the Google Classroom 2021.03.09.

In this exercise, we simply asked our participants to login to Google Classroom module, to make sure that they are on board, and aware, that the next steps of the learning process will be assigned through this platform (which we also supported by parallel email messages as needed).

### 9. PlantNet 2021.03.21.

Pl@ntNet

In this practice, learners were introduced to the PlantNet plant recognition mobile application on the one hand, and to taking a screenshot with the tablet on the other, the use of which (sending the screenshot by email) was part of the task. Knowing this can be practical in many other cases.

### 10. Test Quiz 2021.03.18.

We asked our learners to complete and return a test quiz in the Google Classroom, which included questions related to the applications learned in the previous exercises.

### 11. GPSLogger 2021.04.11.

In this task we introduced the mobile device as a tracking tool, basically logging the coordinates of the movement, so learners could track, retrieve and use the data for multiple purposes. For the exercise, we developed two new web map viewers that allowed participants to visualize log files (KML, CSV) saved on the tablet and uploaded to Google Map. The task consisted of four main parts, installing the app from an alternative source (not Google Playstore); motion logging (GPS Logging / tracking), uploading the logged file to GC; showing logged and saved files on Google Maps, uploading a screenshot in GC; saving and viewing logged location data on web application server (in real time, by online connection).

### 12. GN / EpiCollect pairing 2021.04.21.

In the next exercise, we paired two previously learned applications - the EpiCollect mobile app and the Farm Logbook. We asked learners to carry out the data recordings in their own area / at least one point of their own farm. We made a new form for EpiCollect, the function of which makes it easy to record what happens when an agrotechnical operation is performed on the field. Thanks to this new development using the EpiCollect API, the Farm Logbook was enabled to retrieve the recorded and submitted data real time from EpiCollect and display it on the Logbook map interface. Based on this, a reminder is created on the Logbook that can be a significant help in filling in more detailed log data afterwards.

### 13. Land announcements, ownership sheet 2021.05.30.

The following WiseFarmer exercise consisted of three parts, each of which could be done independently: 1) Search for land advertised for sale and lease; 2) E-utility - Cadastral overlay, topographic map display; 3) E-ownership sheet. The three parts could also be interpreted as three steps in a specific farmer's situation, during which we search for advertised lands, view them on a map interface, and then retrieve their documents. The task could be completed with any of the three sub-exercises, for which we asked learners to submit to the Google Classroom in the usual way. The practice was slightly different technically than before, because the interfaces required a web browser (e.g. Chrome on an android tablet / not a mobile application), and Part 2 and 3 required customer gateway access (account, login), which also helped learners to familiarise themselves with digital public administration services that require identification. .

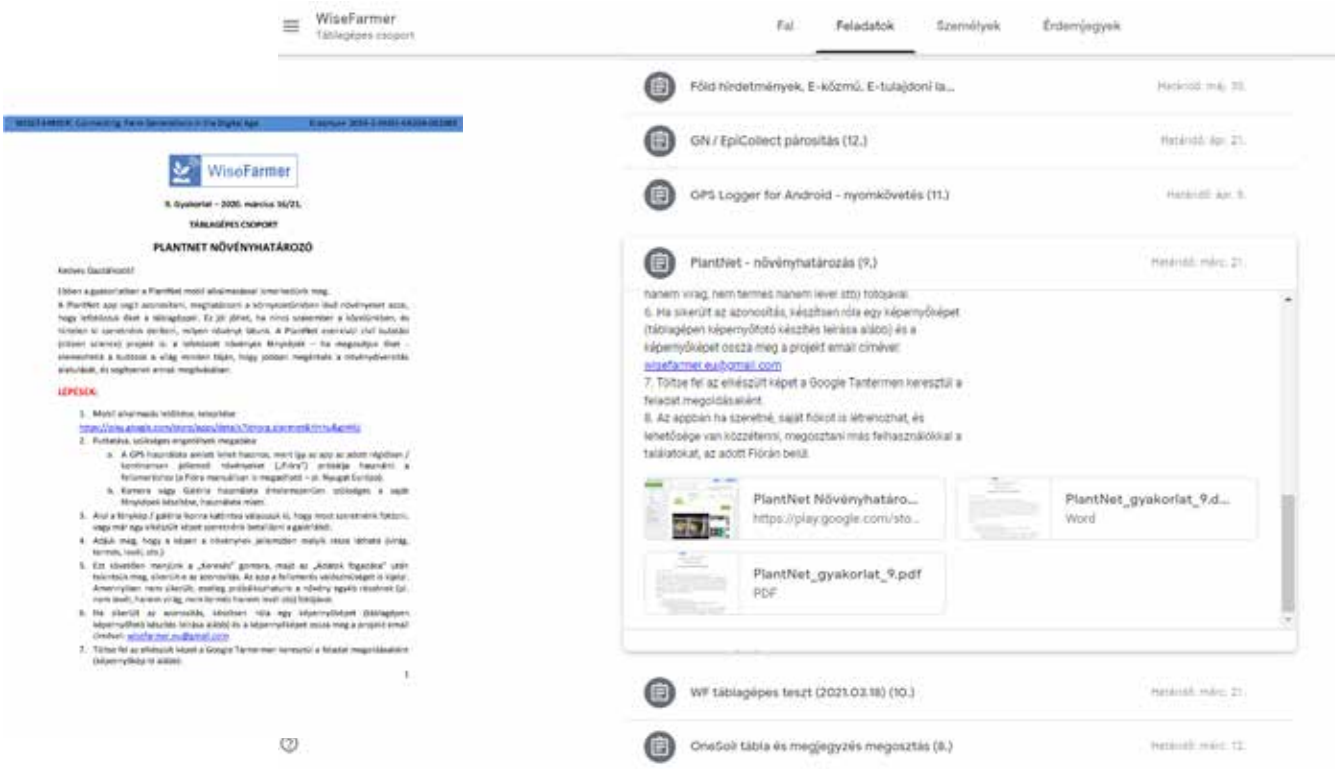
### 14. Closing questionnaire 2021.05.31.

Thanking for the participants' cooperation in the learning programme, we asked them to complete and return a short questionnaire providing feedback on good experiences, difficulties, comments and suggestions.

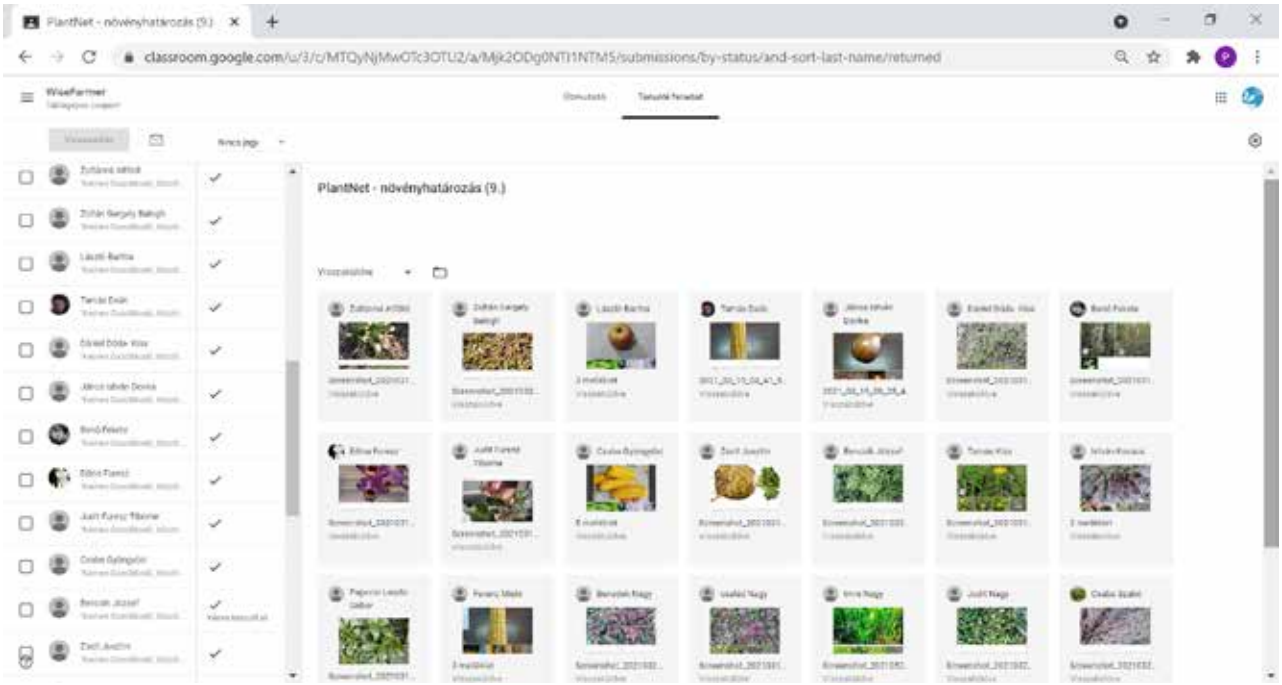
# Assigning tasks and receiving feedback using the learning platform

**From the second half of the learning programme we introduced the Google Classroom for the beginner farmer group, as by that time each participant become acquainted with the basics of the Google platform.**

Assigning tasks with descriptions, guides and deadlines:




Receiving feedback on task completion to one of the exercises (PlantNet):



# Our farmers and facilitators in work

# LEARNING ACTIVITIES IN SERBIA

## The process was adapted to the specific needs of farmer participants

### Importance of farm size and timing factors

Farmers in Serbia, due to smaller farm and parcel size, were more interested, for example, in market access and pesticide use than in precision agriculture.

Participants went through intensive, mostly first time experiences of using ICTs, in many different ways.
Inter-generational collaboration was a key element, since young farmers supporting older ones was substantial for the learning process initiation and implementation.

**Online collaboration experience showed that the following factors had impact on Intergenerational P2P learning and online collaboration:**

- good identification of knowledge and skill needs of both farmers and facilitators
- team and pair work is motivating for participants
- farmer's time is valuable, and they don't want to spend it on something not so useful
- schedule for working with farmers must be adapted to:
- farmers work time: exercises in the afternoon or evening
- weather conditions: exercises done when weather is bad for farmers field work
- respecting traditional holidays, exercises on non-working days, use of weekends for exercises
- providing materials (ppt, video-links, etc.) in advance and giving longer period for work in groups / pairs and responding
- keep multi-channel communication – use email, phone calls, viber..., to keep everyone informed.

After finishing first exercises, farmers became more open for new tools and topics. There is a need for continuous learning and training process on ICTs, for all: advisors, facilitators and farmers.

# WISEFARMER PILOT FEEDBACK FROM HUNGARY

**The positive feedback from our participants strengthened the confidence of the implementation during the period hampered by the restriction of physical meetings.**

ro**@tolna.net *Thank you for this series of events! Really great place.*

*I also thank you for everything you have done so far, what happened was very useful and motivating for us as well, we will definitely continue.*

fo**@gmail.com *Glad to have been part of it.*

na**@gmail.com ***The things I learned on the course help me a lot in my work.***

do**@gmail.com *Thank you very much for the opportunity to participate in the programme. I would like to apply the knowledge I have gained here in the future.*

# WISEFARMER PILOT FEEDBACK FROM SERBIA

## Projekat Mudri Farmer PSSS Jagodina

**The experiences of the participating farmers and advisors of PSSS Jagodina**

The project is designed according to the good working principle and despite the difficult circumstances due to the COVID 19 pandemic, good working conditions have been provided to farmers. They appreciated the co-operation and especially give a positive assessment of the continuity of work and improving the use of digital tools in agricultural production, which are very necessary and useful to them. All the exercises that were done, in their opinion, were good that everything was done successively and without much confusion in the work. They managed to master the basic techniques of working on a computer, tablet and mobile phone. The use of e-mail has greatly facilitated their communication and especially the use of viber, Facebook and other digital tools such as various useful portals on the Internet. In particular, they provide information on subsidies and assistance for farmers.

The workshops were very constructive, because with the help of the viber application, they were able to participate through a group calls and thus exchange experiences. In particular, we think it is important to note that it was easier for young farmers to master access to education and workshops because some have already encountered the Internet but older farmers have shown great interest, and with the help of younger ones quickly mastered the use of digital tools. Now they have their e-mail addresses and accounts on social networks, but most importantly, they can access all the information on Internet portals on their own. The general opinion of all of us on the Wise Farmer project is positive and we think that many more such projects in the field of agriculture are needed, which would primarily benefit farmers as the Wise Farmer project.

# Dissemination

## BUAS at Szarvas, HU


### 14 NOVEMBER 2019

**Dr. Cosmin Salasan (USAMVB Timisoara, Romania)**

Presenting Wisefarmer in his plennary “Bridging innovation and problems for small farms and agricultural households” .

## Project event in Croatia to facilitate farmer survey

### 9 JANUARY 2020

**SEASN, the Croatian partner of WiseFarmer project organized an information day for its national partners, inviting farmers, experts and the media.**

Without the use of digital technology, there is no development of agriculture, which was pointed out at the first project WiseFarmer workshop organized by the Network of Advisory Services of Southeast Europe-SEASN and the School Bedekovčina, which also hosted the lecture. The programme was attended by farmers, agricultural advisers, teachers and students from the agricultural sector.

The event provided a fine opportunity to collect further inputs for the WiseFarmer questionnaire too, as the participating farmers were very much interested in the project, the next steps and their possible involvement in the planned learnign activities.

**ABOUT SEASN**

The South Eastern Europe Advisory Service Network – SEASN - is association of agricultural advisory services, agricultural chambers, agricultural institutes, faculties and non-governmental organisations founded in 2015. SEASN Association’s headquarters is in Zagreb and it is operating on the territory of its members: Austria, Bulgaria, Croatia, Hungary, Kosovo, Macedonia, Montenegro, Romania, Serbia and Slovenia.. Public and private advisory services, advisors individuals as well as other agricultural institutions, non-governmental organisations and natural person working in agriculture and rural areas can become members.

# First official project publication

**WiseFarmer brochure is published for the use of project partners and other organisations interested about the main information of the project.**

The summary of project details describing the objectives, planned outputs, partners and timeilnes of the project in a consize leaflet, available in English, Hungarian and Serbian languages was made available in digital format.

**PLEASE SHARE THIS FILE FOR ALL INTERESTED STAKEHOLDERS:**

https://www.wisefarmer.eu/wf-brochure.pdf

.

## 5-6 FEBRUARY 2020

# Our project took part at the EIP-AGRI event in Spain

**Mihaly Csoto, e-agriculture researcher represented our project in Aranjuez at the EIP-AGRI seminar: New skills for digital farming.**

WiseFarmer project was introduced at the seminar organized by the agricultural European Innovation Partnership (EIP-AGRI) network of the European Commision.
The event aimed to contribute to the design and implementation of approaches and tools that can help farmers and farm advisers develop the skills they need in the face of the digital transition in agriculture..

> “ WiseFarmer intervention was provided during the session ‘Developing skills for digitalisation’, on Thursday morning, under the theme ‘Non-formal/informal education and training: from the classroom to the field with a focus on peer-to-peer learning’. The contributaion was made in the form of an interview, explaining especially how younger and elder farmers can work together to improve their digital skills.

**ABOUT THE EVENT:**
The seminar aimed to contribute to the design and implementation of approaches and tools that can help farmers and farm advisers develop the skills they need in the face of the digital transition in agriculture, especially exploring ways to connect European actors in the farming, advisory, educational and vocational training sectors to develop a strong support system for agricultural knowledge exchange and innovation.

*Farm advisors can play a crucial role as facilitators in intergenerational, peer-to-peer learning programmes organized for family farmers. "*

25 FEBRUARY 2020

## WiseFarmer concept introduced for Serbian farm advisors

**In accordance with the "Annual Advisory Plan for Agricultural Advisers and Farmers" for 2020, training for Module 14 - Digitization in Agriculture was held.**

Sladjan Stankovic, IPN representative of WiseFarmer project delivered a presentation on our project, highlighting the main concept and role of advisor.s The trainees were the advisors of the Agricultural Advisory and Expert Service from the whole territory of the Republic of Serbia (PSSS), and the representatives of the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, Provincial Secretariat of Agriculture of AP Vojvodina, professors of the Faculty of Agriculture, professors of secondary agricultural schools, representatives Serbian Chamber of Commerce and students of the Faculty of Agriculture, or about 300 experts in the field of agriculture.


FAO WEBINAR ABOUT COVID-19 RESPONSE

## SEASN presents WiseFarmer on FAO webinar

**During the "Extension and advisory services on the frontline of COVID-19 response for resilient and sustainable food systems" event**

Across the globe, the pandemic has generated extreme vulnerability in the agricultural sector, confronting governments with the multiple challenges of protecting human lives, and livelihoods, as well as, and ensuring sufficient food supplies and basic services for the most needy.

# MULTIPLIER EVENT 1 IN HUNGARY

## The programme aroused great interest among farm advisors


## 3 NOVEMBER 2020

**The online event was organized by Széchenyi István University**

The meeting was attended by **78 farm advisors** as well as other type of participants. The following topics were presented during the event:

- Background and overview of the WiseFarmer project - Dr. Gábor László Papócsi, GAK
- Results of the farmer survey - Mihály Csótó, WAN / GAK
- Consultants as facilitator - Dr. András Vér, SZE

## Multiplier event "starting pilot" at 2 locations in Serbia

## 20 NOVEMBER 2020

Multiplier events were focused on the preparation for the Recruitment of participants, mentor pairs and facilitators. During the Multiplier events in Serbia - starting pilot, participants who will be mentored in pairs were informed on WiseFarmer project tasks and goals, together with planned methodology and collaborative activities. The locations were the Farm Advisory Service in Jagodina (central Serbia) on 20. 11. 2020 and the Farm Advisory Service in Smederevo (near Belgrade) on 27 .11. 2020.therefore we anticipate good acceptance for the digital technologies as well.

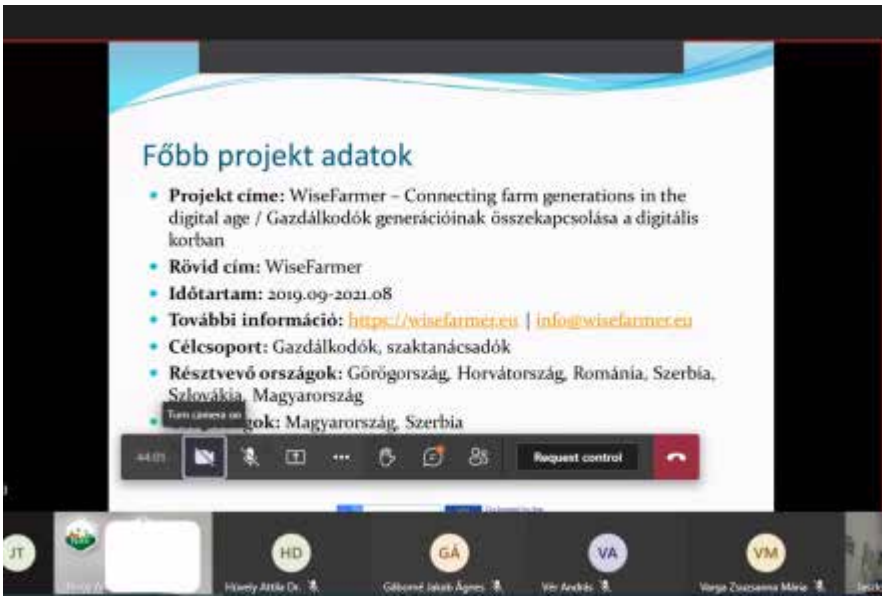
## APAJ, 01 JUNE 2021

After many months of online meetings, we had the opportunity to organize the 2nd Multiplier Event in Hungary on the first day of summer 2021 in the 'normal' way.The participating farm advisors and farmers of the location were given an overview of the project and the experiences of the pilot, and they were especially interested in some of the ICT tools used, including ones developed by the project.

# WiseFarmer pilot results shared with farm advisors in Hungary

## 17 JUN 2021

On 17 June 2021 we participated and presented WiseFarmer results at the event of the Hungarian Chamber of Agriculture titled 'The role of farm advisors in knowledge sharing, presentation of European trends through H2020 and Erasmus + projects', attracting nearly a hundred accredited farm advisors from Hungary. The meeting was organized online, and demonstarted several good project practices, including other Erasmus+ and H2020 activities, providing also an opportunity for building collaboration and finding synergies.




# Publication and presentation at the ESEE Conference and Journal

## 21 JUN 2021

Experts of our project partnership lead by AUA prepared a conference publication, for the occassion of the European Seminar on Extension and Education (ESEE) which is usually participated by a group of educators and advisors, holding a biennial conference and publishing a Journal on topics related to agricultural extension and education. This year it was organized between 21-23 June 2021 at Teagasc Ballyhaise Agricultural College, Cavan, Ireland and online. Website of the event: https://esee2021.ie/

# Multiplier Events in Serbia

## JUNE 2021

Two Multiplier Events were organized in Serbia, as the WiseFarmer project approached to it's successful finish. On June 16, 2021, the third Multiplier event was held in Jagodina, located in Central Serbia, with a group of Facilitators and 10 farmers (5 pairs) operating under the WiseFarmer project. The meeting was organized to bring together project participants, but also all other stakeholders, within the agricultural knowledge transfer system – farmers, local government representatives, researchers related to subject area or having experience in reagion. There were 32 participants at the meeting, mostly farmers, and representatives from 5 municipalities in this district.
The fourth multiplier event was held in Radmilovac, near Belgrade and Smederevo, at the Experimental Field of Faculty of Agriculture, Zemun, Belgrade. The most of participants at this ME were Agricultural Advisors from FAS Serbia, as well as farmers and researchers. Participants, 30 in total, were updated on the WF results and outcomes, after the first introduction to Farm Advisors in February 2020, at the Faculty of Agriculture. Participants of both events had a reflection on WF activities, results and future perspectives, but also information on development in digitalization in agriculture and other open questions and issues.

# Multiplier Event in Hungary

## 8 JULY 2021

The "WiseFarmer multiplier training" event was organised by the Faculty of Agriculture and Food Sciences of Széchenyi István University (SZE MÉK) in the form of a face-to-face meeting. The event was attended by advisors and village farmers of the Győr-Moson-Sopron County Branch office of the National Chamber of Agriculture. Main objective of the workshop was to disseminate information about the project in general and the results achieved so far. Accordingly to this, Dr András Vér presented in detail the Erasmus+ WiseFarmer project, the overall as well as the most recent results. This was followed by a consultancy role play and integrative group work with the participants. The training concluded with an informal discussion.

# Multiplier Event in Socodor, Romania

## 29 JULY 2021

The attendees left a positive feedback scoring at least 4 out of 5 on the satisfaction scale. The discussions before the start of the event revealed a high interest for the topic and were complemented during and after the presentation with further questions related to details and possibilities to adopt applications in their current farming practices. Of relative high interest was the possibility to interconnect applications in order to supplement the information and data for the upcoming decision-making processes as well as for different warning systems.

Remote sensing in both crop and animal production required extended discussions with examples and the interest shown indicates a high and immediate demand from farmers even bellow average size, when in vegetable production or specialised animal productions on free herds. An equally high interest was expressed by the consultants attending the multiplication event, all of them from private structures or freelancers, asking for details, links and references regarding the used applications and platforms.

A consistent session of questions and answers, paralleled by online web and mobile app demonstration was occasioned by the OneSoil introduction. The accessibility and the type of information provided were received with a high level of interest and the project-based localisation for Hungary now advertised on the website made things even more

attractive.

The impact of the multiplication event can be also read through the interest to join the second round of survey, most farmers completing the questionnaire on paper on the spot, others leaving with the online link. Another interesting aspect is represented by the relatively high attendance of the public local authorities, the mayor himself being present all along the event.

The Local Action Group staff also actively participated, some of the consultants as marked on the attendance list originating from the LAG. Their involvement along with a number of farmers clearly expressing the intention to continue the dissemination of the project activities and results towards other farmers from their communities can lead to further multiplication demonstrating the multiplying effect of the project.

## Multiplier Event in Croatia, 12 August 2021

The workshop in Klanjec had an excellent response with a total of 44 participants, with a comparison of the digitalization of agriculture in Croatia and Serbia and a presentation of WiseFarmer aims and results. The meeting was attended by a large number of agricultural advisors and representatives of local development agencies who provided strong support for this event and exchanged experiences with colleagues from Serbia and Slovenia. Two success stories were introduced in the use of milking robots and agrometeorological stations. Participants generally showed great interest in the topics, actively asking questions to the speakers. There was a continuous interaction between the farmers and agricultural advisors. At the end of the workshop, representatives of the media and agro-firms were given the floor to present their activities. Leaflets were distributed and a final questionnaire was filled out, which showed that participants rated the workshop and topics with very good scores, and with additional comments which were mostly requesting the presentation of results and tools in practice, and the desire to organize focus groups within the workshop. The good impact of the multiplier event can also be realized from the answers where participants expressed their desire to be invited for a next similar event. This workshop was international with three participants from Serbia and four from Slovenia, and clearly showed the need and interest in organizing as many such events as possible.

# Plan for exploitation, valorization and sustainability

The last Transnational Partnership Meeting was organized in Belgrade, Serbia on 26 and 27 August 2021. The event was hosted by IPN and attended by each partner of the project. The meeting's objectives were the presentation of IO4 results: "WiseFarmer learning pilot to connect farmers in the digital age" in Serbia and Hungary, the 2nd round of the Multiplier Events, the completion of remaining tasks for the implementation of IO5, the Inventarium Handbook, IPR Agreement, Plan for exploitation, valorisation and sustainability, as well as the preparation for the final reporting tasks.

During the meeting, partners provided their plans, how they intend to sustain and valorize the project outputs in the future, within their organisations, networks and other projects:

## Croatia

### SEASN

SEASN will use the project results and disseminate them in Horizon 2020 projects I2Connect and FAIRshare.
SEASN is is the initiator of a network of agrarian journalists and through that network will disseminate results in journals in the region.
SEASN will try to organize another workshop in Croatia but this time with access to the workshop as in the pilot countries of Serbia and Hungary.
SEASN is host of I2Connect and FAIRshare annual meeting this year in Terme Tuhelj (Croatia) where we will share WiseFarmer Inventarium Handbook to all participants (digital or in live, for around 250-300 participants).
We will try to share and implement some of the methodology learned in the project through all agricultural schools in Croatia.
SEASN will present a WiseFarmer digital manual on 12th GFRAS Annual Meeting (GAM 2021),entitled "Overcoming COVID-19: How Agroecology can Support Rural Advisory Service, Recovery and Stronger Value Chains",which will be organized by GFRAS and Institute for science application in agriculture, Belgrade - IPN (SEASN) and will take place in Belgrade, Serbia, 1 - 3 December, 2021.
SEASN will present a WiseFarmer digital manual on 3rd International conference – INNOVATION AND AGRIBUSINESS 26th of November 2021.ZAGREB, CROATIA

## Greece

### AUA

The project results will be presented at the 16th Conference of the Hellenic Association of Agricultural Economists (ETAGRO) on Sustainable Agriculture, Food Security and Climate Change. The conference will take place at the Agricultural University of Athens, Attica, Greece, 7-8th October, 2021. The website of the conference is http://etagro.gr/2021/. An extended abstract with the title: "DIGITAL SKILLS: THE GAP BETWEEN YOUNGER AND EXPERIENCED FARMERS IN S-E EUROPE'' has been submitted by the Greek team and accepted for oral presentation. The project results will be included in the course "Agricultural Extension", Agricultural University of Athens led by Prof. Alex Koutsouris, Director of the Laboratory of Agricultural Extension, Agricultural Systems & Rural Sociology. A summary note of the WISEFARMER project will be presented in the AUA magazine "PANORAMA". The methodology of the project will be proposed to be utilized in the framework of the Greek Common Agricultural Policy Strategic Plan.

# Hungary

## SZE

The Szechenyi University (SZE) will build on the WiseFarmer results in several ways after the end of the project. On one hand, we would like to continue the networking and cooperation between the partners established during the project, including the possible development of new projects or the organization of joint trainings, scientific and information events. On the other hand, we strongly want to build on the good practices, intellectual outputs, training methods and curricula developed during the WF project at future trainings and adult education / lifelong learning activities of the SZE MÉK faculty. The Faculty is actively involved in the so-called „Senior University", a live and online information program series for elderly people, where WF methodology can also be used well. Furthermore, SZE intends to use and build on the results of WF in its current and planned projects. Such are the ongoing SAM (Sustainable Ambrosia Management) and AgriNatur Interreg AT-HU projects, where we organize awareness and information events and trainings for different age groups (from school to senior age). WF materials prepared for the purpose of disseminating knowledge and training will remain available on the SZE MÉK website and on social media after the end of the project.

## GAK

GAK will use the project results in many other projects, some of them are already running (e.g. Rural Advisory Monitoring and Evaluation System linked with Precision Learning), while at the release date of this handbook at least 3 proposal development is in the pipeline with connection to WiseFarmer outputs. GAK, being founded and working as the farm advisory, adult education and demonstration farm unit of (now) MATE university, expects to take part in the national Digital Agriculture Academy programme and the agricultural digital innovation hub, which can benefit from our approach and experience reaching out and motivating small farmers for learning. MATE and FAO have been working by a signed Memorandum of Understanding that contains the tasks of digital agriculture, farm advisory and capacity development activities, where WiseFarmer methodologies can have a natural role. GAK proposed the concept and term of "wise farming" in 2018 following the event organized jointly by FAO and WeAreNet on SmallHolder Innovation Platform, then prepared and launched the WiseFarmer project, and now plans to continue with the theme not only by keeping the main results accessible online on the project website and knowledge base for many years, but also starting a new WiseFarming Blog on wisefarming.eu, where actual project partners could contribute firstly and mainly with original content (but being open to let in new authors too), sustaining, fostering, developing and demonstrating the concept and good practice examples.

# Romania

## BUAS

BUAS proceeds, beginning with the academic year 2021-2022, to the integration of the WiseFarmer methodology into the Agricultural extension subject as lectures and seminars complementary to the Methods and Knowledge Transfer part. The ongoing Banat Green Deal training series as part of a project financed by the Government of Baden Württemberg within the frame of the EUSDR has one module projected to be delivered in 2022 entirely dedicated to the WiseFarmer approach and methodology. The online module delivery is covered by the WiseFarmer project partners from Hungary, Romania, Serbia and Slovakia. The multiplication events will continue beyond the project end and the first targeted audience is represented by an association of young farmers form the Western Romania all native speakers of Hungarian language, enabling them to make a more intensive use of the WiseFarmer learning platform and

the experience accumulated during the implementation of the pilot phase of the project in Hungary. Publishing and disseminating the results, the findings and the lessons learnt from the project continues with the participation to the online "The 2021 Silk Road Agricultural Education and Research Cooperation Forum" delivering an online presentation and a paper for subsequent publication as well as an extended paper prepared for an indexed scientific journal. All other further dissemination opportunities will be used along the upcoming months, from farmer meetings to conferences.

## Serbia

### IPN

There are several ways and tools for the valorization and exploitation of WiseFarmer results in the near and mid-term future. On the education and training part, IPN will set up on-line training for farmers and advisors for digital skills, fully based on the WiseFarmer structure. Regarding the new challenges in training and education, based on WF project results and experiences, IPN will continue and upgrade to more farmer friendly tools, basically the most common and most used ones as seen during the project work (Youtube broadcasting, Viber video calls and group discussions). Digital communication, therefore, will be a kind of a regular training module for farmers and advisors, having a big impact on the increase of knowledge between generations, both advisors and farmers. Results and experiences from the WF project will be the basis for further research and publication in scientific and professional papers, related to agricultural extension, for different conferences (such as Agrosym) and/or research journals. Also the results of the surveys will be beneficial for decision makers, proposal writers and other stakeholders, when determining priorities in digitalization in agriculture. Sustainability of the WiseFarmer project will be achieved through systematic work of researchers in IPN including education and training (as an officially authorized organization by the Ministry of Agriculture), as well as through regular research activity. Future work will be continued at the farmer-advisor level tool, as a follow up of mentoring pairs working with facilitators, but from now on in a more efficient, more visual and more responsive manner. WiseFarmer project results will be also beneficial for the development of future projects, such as Climate Change in Agriculture training of FAO.

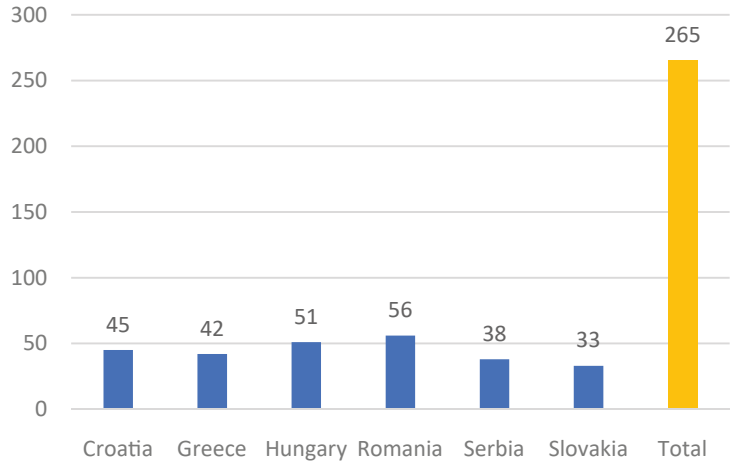
## Slovak Republic

### WAN

After the end of the project, WeAreNet would like to further develop the software tools that were created during the project. We would like to transform the project webpage www.wisefarmer.eu into a universal template used for other similar projects. Goal of this improvement is the easiest installation and setup of similar web pages in the future. During the installation we found a lot of small problems and created a universal solution which can improve speed and usability of project web pages. Opigno is a handy tool but we would like to open communication with the community behind the open source project and try to get feedback on how to improve translation management of Opigno modules. Goal of the improvement is to have Opigno translations fully manageable by administrators. Regarding the Knowledge Base (KB) we would like to collect feedback about its usability and try to prepare improvement of the functionality. Another step should be transformation KB into an independent online module for Drupal and usable for other similar purposes. Preparing printed versions of the Handbook gives us the possibility to transform source files into a template usable for similar type of brochures in the future.

# Annex

## Survey results

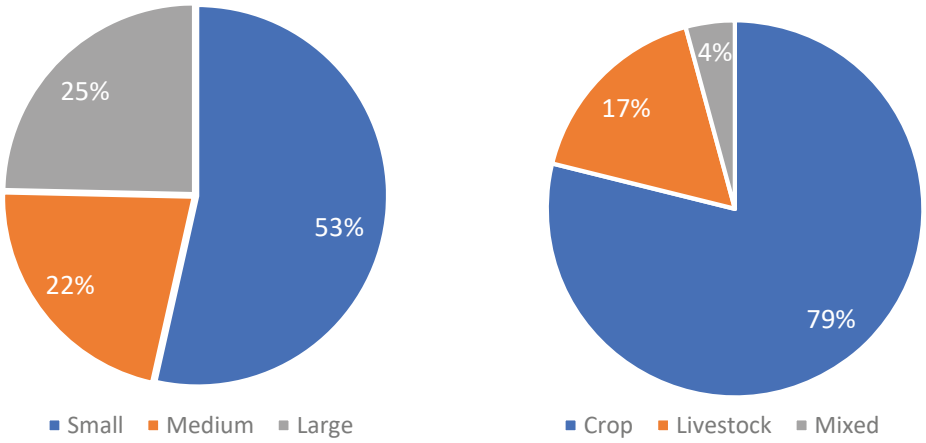



*Number of respondents by country*

Almost 90 percent of the respondents are male, and 12 percent are female; 44 percent of the respondents are older than 45 years (11 percent is older than 60 years) and 56 percent is younger than 45 years (18 percent is younger than 30 years) both older and younger farmer generations being reached.

Looking at the educational level of farmers, the majority completed upper secondary (27 percent) or certain post-secondary, but not tertiary education (18 percent). An unusual proportion of farmers (around 33 percent) with a degree is observed, but this is partly caused by the Slovak sub-sample (as the target group of addressed farmers were members of the Association of Young Farmers in Slovakia and Club of Agricultural Experts at the Slovak University of Agriculture in Nitra). The Romanian sub-sample also affects these results which are given by the larger share of younger respondents as almost 65% of the respondents have less than 45 years of age.

Only eleven percent of farmers completed any kind of formal education in the field of agriculture. More than half of the farms in the sample (54 percent) are small, 22 percent are medium and 24 are large farms (by the methodology to determine the size and type of the farms, see Annex 3). A large majority of the farms (79 percent) are producing crops, while 17 percent are livestock farms, and the remaining 4 percent of the farms are mixed farms (Figure 4).



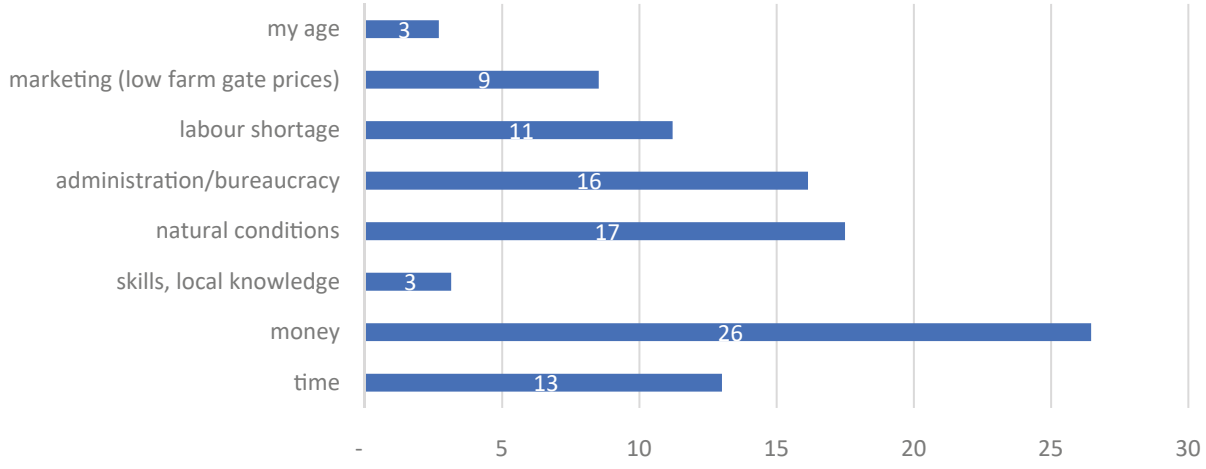

*The distribution of farm size and farm type in the sample*

# Farm experience and attitudes towards farming

The farming experience reflects the age structure of the sample, as one third of the farmers have more than 20 years of farming experience. However, there are many farmers with less than 10 years of expertise in the sample (around 20 percent of the sample consists of middle aged or elder farmers with less farming expertise than 10 years). The most important priorities of farmers are farm profitability and farm sustainability, closely followed by personal living standards and work life balance – these priorities have almost the same level of importance in all partner countries. This suggests that innovation and digital solutions that are helping these priorities can be adopted much more easily

| What is most important for you in farming? | Mean (Total) | Mean (Croatia) | Mean (Hungary) | Mean (Romania) | Mean (Serbia) | Mean (Slovakia) |
|---|---|---|---|---|---|---|
| Farm profitability | 2,81 (1.) | 2,45 (1.) | 4,57 (1.) | 2,50 (1.) | 2,39 (1.) | 1,50 (1.) |
| Farm sustainability | 3,51 (2.) | 3,00 (2.) | 4,76 (5.) | 3,68 (2.) | 3,72 (3.) | 1,76 (2.) |
| Personal living standard | 3,64 (3.) | 3,70 (3.) | 4,67 (2.) | 3,86 (3.) | 3,39 (2.) | 1,85 (4.) |
| Balance of family and work | 3,92 (4.) | 4,07 (4.) | 4,71 (4.) | 3,98 (4.) | 4,47 (4.) | 1,79 (3.) |
| Farming as a way of life | 4,45 (5.) | 4,68 (5.) | 4,61 (3.) | 5,18 (6.) | 4,86 (6.) | 2,16 (6.) |
| Environmental consciousness, preservation | 4,51 (6.) | 4,47 (6.) | 5,04 (7.) | 5,50 (7.) | 4,56 (5.) | 1,97 (5.) |
| Preserving tradition | 4,71 (7.) | 5,64 (7.) | 4,90 (6.) | 4,96 (5.) | 5,11 (7.) | 2,22 (7.) |

Closely related to priorities, farmers were asked how satisfied they are with their farm's economic results, their working conditions and their life quality. Observing the results indicates that if asked for general satisfaction, then farmers usually say they are 'somewhat satisfied' with their circumstances, only around 20 percent say they are very or somewhat dissatisfied with economic results and working conditions. It is rather important that almost 20 percent of the respondents are very satisfied with their personal life quality. It is also important what farmers think is the most limiting resource in their farming activities (Figure 6). Farmers mentioned money/financial resources for 26 percent, 17 percent indicated natural conditions and 16 percent said administration and bureaucracy is a limiting factor. Another limiting resource mentioned by more than 10 percent of the respondents was time (13 percent) and labour shortages (11 percent).




*Most limiting resources in farming (%)*

## Farming community and information sources used for farming

Farmers were asked about the size of their professional network. Half of the respondents said that they regularly discuss farming issues with 1 to 3 fellow farmers, and another 31 percent estimated this number between 4 and 10. For 16 percent of the farmers there is a regular companion of another 10 farmers or more, while only 3 percent are isolating themselves and not talking to anyone about farming issues.

The wider network of farmers (H*ow many people can you call for professional advice/help*) is showing a similar picture; 45% of the respondents provide help or services to other farmers as well (this number is 67 percent in Croatia). As farmer organisations are one of the most important places of knowledge transfer, farmers were asked about their participation in different (formal and informal groups). The results show that the majority of the farmers are not participating in any kind of organization. Only 45 percent belong to informal groups of friends and farmers, and only 10 percent of them meet regularly.

The numbers are much lower for official farmers clubs (10 percent membership), trade unions (25 percent membership) and cooperatives (10 percent membership). This result is underlined by the negative memories of the past regarding collectivization, cooperatives (from the times of socialism) in the project countries, and the reluctance of farmers for any kind of formal collaboration. It also justifies the project's aim to bring together generations in a local context for common problem solving and learning experience, based on more personal linkages, trust and solution-oriented methods.

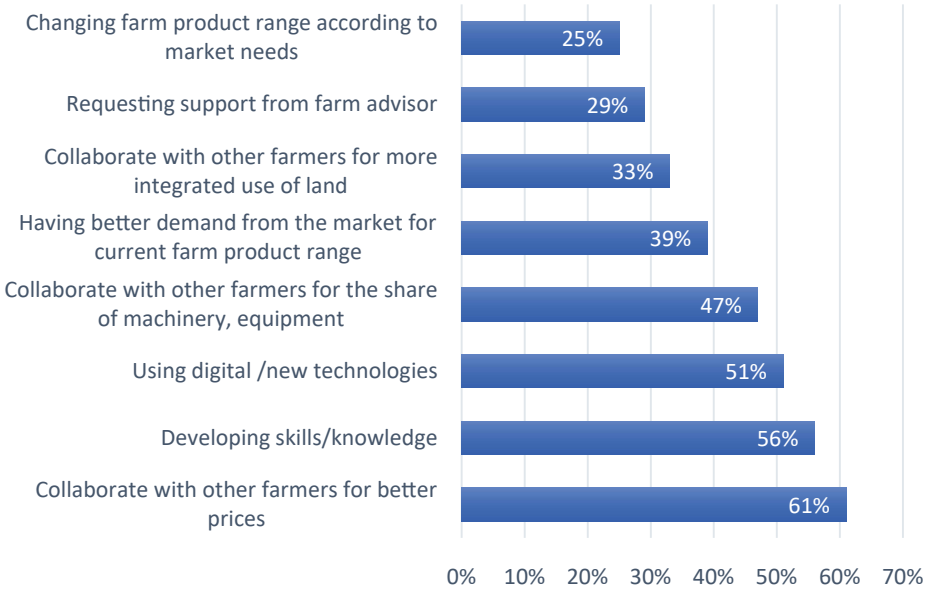
## Problems relating to farming, possible solutions and future plans

Farm-related issues were organised in three categories, and farmers were asked whether they are relevant and solved in their farm. An interesting finding of the survey is that if general questions were asked to farmers, they answer "everything is solved quite well", but going into the details and into more concrete processes, certain issues turn out to be not so well solved.

The main important and relevant problems that are not solved in relation to production are weather related damages and irrigation-related issues. In the field of market access, access to land and mainly selling farm produce (for a reasonable price) are the main unsolved issues (almost 80 percent of the farmers have problems selling their products). In terms of administration and farm management, the majority of the respondents indicated that they have problems dealing with legal issues and while corresponding with the government.

| *Farming-related issues by their importance* | **Not important, not relevant** | **Not solved** | **Not prop. solved** | **Well solved** | *Total* |
|---|---|---|---|---|---|
| **Production** | 0% | 12% | 35% | 53% | 100% |
| **Market access** | 2% | 10% | 53% | 34% | 100% |
| **Administration** | 3% | 11% | 41% | 45% | 100% |

Answering the question "What could make your farm more successful?", more than 50 percent of the farmers indicated that the collaboration with other farmers (that can help negotiate higher prices), developing their skills and using digital or new technologies would be their primary idea in order to make progress with their farm.

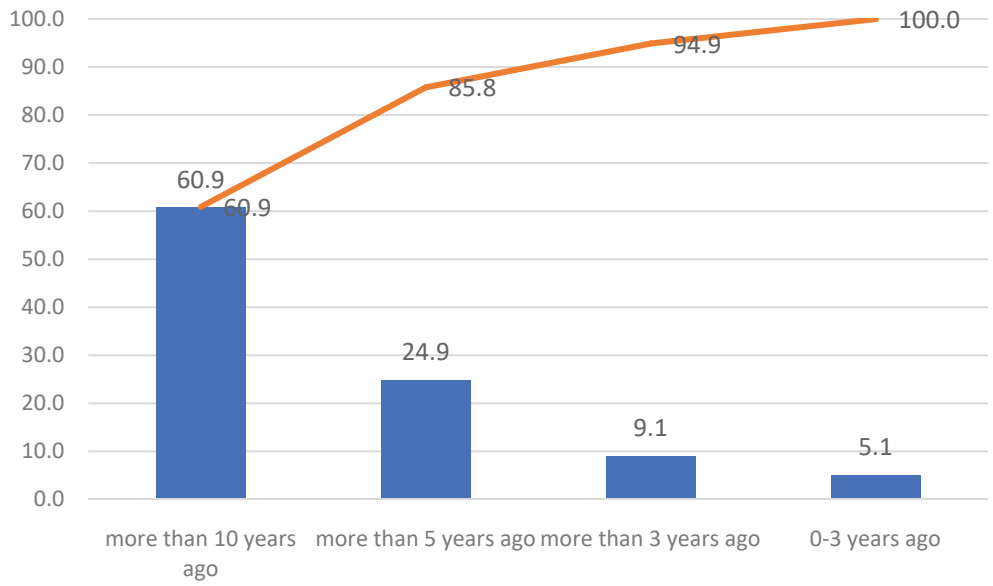



*Activities that could make the farm more successful*

The farmers' main priorities for the next five years are based around expanding their operations: buy new machinery and more land, and also try new, digital solutions in their farms. It is an important finding that only 6 percent of the respondents said that quit farming is an important or very important priority for them in the near future.

## Access to information and communication technologies

Mobile phones are the most popular devices among farmers: 85 percent of the respondents use such devices (17 percent of them have a basic mobile phone without internet access and 83 percent own a smartphone). Two third (66%) of the farmers are listening to the radio regularly and the same proportion of the respondents are using a desktop computer (62 percent) or a laptop (66 percent). One third of the farmers are using a tablet (37%), and 16 percent of them also use certain kinds of wearable technology, like a smartwatch. The large majority, 97 percent of the respondents, have access to the internet at home directly (or have someone in the household who does). The majority of the respondents use a certain kind of wireless connection (Wireless Mobile (74 percent) or WiFi (73%)), but around one third of the respondents also have fixed connection at home (DSL (21 percent) or Cable (30 percent)). Five percent of the farmers (possibly in more remote areas) use satellite connection, but on the contrary, 12 percent have fibre internet connection. Five percent of the respondents said they do not use the internet at all while 95 percent of the farmers use the internet. 15 percent use it only at home, while 80 percent use it elsewhere as well. The non-users and those who are not regular users of the internet were asked: do they think that they will use the internet on a (more) regular basis. Only 12 percent answered "No". The other 88 percent said that yes, or maybe if they get support or their circumstances would change favourably. These results show that there are only a few laggards among the farmers who choose not to be online. The main question is not whether the majority of farmers go online or not, but the quality and quantity of usage. This can also be seen in the answers to the question about how long ago the farmers first started using the Internet. Sixty percent began using the internet more than 10 years ago, and another 25 percent have been using the web for more than five years. On the one hand it means that the adoption of the internet is slowly reaching the saturation point, there are not so many on the wrong side of the digital divide. On the other hand, there are around 15-20 percent of the farmers who are relatively new users of the internet and need support in order to make most of the internet (and possibly using it for farming purposes more widely).




*The starting date of using the internet (%)*

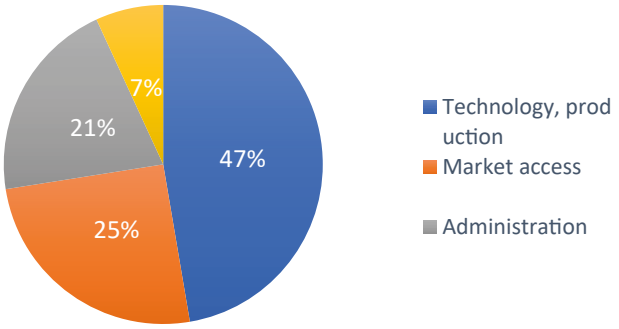
## Usage patterns of digital technologies

One of the main indicators of digital skills is the diversity of online activity. Farmers were asked about their usage of different online applications and services. The most regular activities (done at least once a week) are related to communication: more than two third of the respondents using the internet for sending and receiving emails (72 percent), for instant messaging (72 percent) and for social media (67 percent). Voice over the internet services is also popular (40 percent).

Besides communication, information gathering is also an important element of online activities, as 65 percent of the respondents read news, newspapers and magazines online, 51 percent look for news about, or events in their local area and 58 percent search for information about goods or services regularly. If the transactional services are screened, internet banking is the most popular (56 percent) which is not surprising as in rural areas this service significantly lowers transaction costs. It is worth mentioning that the use online media services (music (e.g. Spotify), tv (e.g. Netflix), video (e.g. YouTube)) is also high (53 percent), and the same proportion of farmers (51 percent) use features such as Maps or satellite navigation regularly. Farmers were requested to indicate if they do the listed online activities relating to their farm. In general, agricultural usage is lower than general purpose usage, but many services and applications are used frequently for farming.

More than one third of the farmers send and receive emails (52 percent), look for information about goods or services (40 percent), bank online (38 percent), download official forms (37 percent), buy things online (37 percent), read online news (33 percent) in relation to their farming activities.

Farmers say that digital technology can help them the most in production (47%), and less in market access (25 percent) and administration (21 percent). Only a fraction of the respondents said ICTs can help their family and private life (6 percent). The most straightforward advantage of ICTs for farmers is the possibility of finding information quickly (77 percent indicated this option), while other advantages (saving money, farm applications, staying touch with people) were mentioned roughly the same prevalence (between 38-45 percent).




*Areas where information and communication technologies (ICTs) can help farmers the most*

Farmers were asked about their usage and/or interest in different specific digital agriculture technologies. The main categories/applications show a similar pattern as around 20-24 percent of the farmers are not interested in the certain area, and another 20-25 percent is already using a certain kind of technology in that category, approximately half of the farmers are not using the technologies but they are interested to use it. Mobile apps are the most widely adopted technologies among the listed, as the farmers are facing the lowest barrier of entry when they begin to use the technology.

| *The usage and interest in agriculture-related applications and services* | **Not interes.** | **Not yet using, but interested** | **You are already using it** |
|---|---|---|---|
| **Precision agriculture (crop production)** | **24** | **56** | **20** |
| **Mobile apps** | **22** | **46** | **32** |
| **Farm management, planning and reporting** | **22** | **59** | **19** |
| **Market access** | **18** | **57** | **25** |
| **e-Government** | **28** | **47** | **25** |

One of the most important findings for the WiseFarmer project is how younger and elder farmers use various farm-related applications and are interested in them. It is a little bit surprising to see that there is no substantial difference (3-18 percent across age groups, but typically below 10 percent) in actual use between age groups (younger than 45 years and older than 45 years). This means that the innovative segment (around 20-25 percent, except mobile apps, where the number is higher due to lower barrier of entry) from both age groups have already adopted a certain kind of ICT-related farming solution. The real difference between the age groups is in the level of interest. Younger farmers are more interested in different farming technologies by around 20 percent than senior farmers. Within the older population, however, the general level of interest is still high: over 40 percent of elder farmers are open to use new technologies and applications.

For the definition and deeper examination of the digital skills of farmers, the Eurostat methodology was used. The same set of specific questions was asked from farmers on computer and internet skills as the ones used by Eurostat. According to the calculated indicator, more than half of the respondents (54 percent) surpassed basic digital skills, while the other "half" of the farmers have low (21 percent) or basic (19 percent) skills, and only six percent lacked digital ability. In the WiseFarmer project, the goal was to train people with low or basic skills and not absolute newcomers to the digital world. It is mirrored in the sample which represents the project's objectives, responses were gathered from both digitally skilled and not so professional farmers (who have a certain knowledge about digital services and are digitally literate to a certain level).

The survey findings verified one key pillar of the WiseFarmer project: elder farmers typically have lower digital skills. The few farmers without digital skills are all from the two older age groups, and 65 percent of the farmers with low skills are come from these two age groups. On the contrary, 73 percent of the respondents with above basic digital skills come from the two younger age groups (18-30 years and 31-45 years), and only six percent of farmers who are older than 60 years. In terms of farming experience, the difference is even greater: the farmers with more than 10 years of

farming experience are overrepresented among those farmers with no or low digital skills. It may mean that farmers with a more diverse professional background (other job experience besides farming) have more digital skills, because they have had more opportunities to work with ICTs earlier.

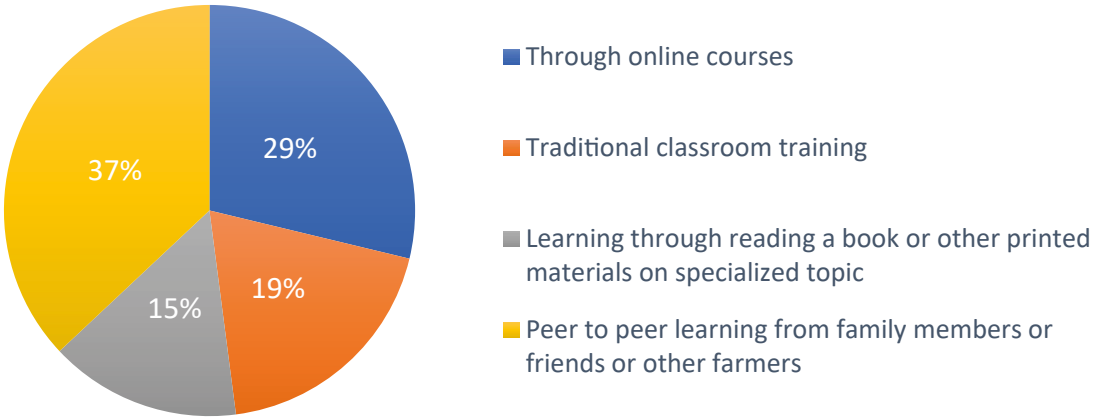
| *Level of digital skills/ Age group* | **18-30 years** | **31-45 years** | **46-60 years** | **more than 60 years** | *Total* |
|---|---|---|---|---|---|
| No skills | 0% | 0% | 53% | 47% | 100% |
| Low skills | 11% | 24% | 49% | 16% | 100% |
| Basic skills | 13% | 37% | 40% | 10% | 100% |
| Above basic skills | 25% | 48% | 22% | 6% | 100% |

*Digital skills by age groups*

In addition to the general indicator of skills, it is important to know what kind of activities the farmers do online. When indicator's four components / domains are observed a deeper insight into the farmers' digital life can be achieved. For over 75 percent of farmers, information and communication skills are above basic level. Distributing the findings means that the 21 percent of low-skill farmers are essentially online, but only checking their emails regularly or occasionally searching for information on websites and essentially doing nothing more as digital activity.

## Learning environment and digital skills development possibilities in the partner countries

Farmers were asked which is the most desired way of enhancing their digital skills. 29 percent replied that through online courses, 19 percent choose traditional classroom training, only 15 percent preferred books and printed materials and 37 indicated that through family members and other farmers.




*Farmers' preferred method of learning*

It should be noted that the current level of digital skills greatly affects the chosen method of learning.Farmers with no or low digital skills choose primarily conventional and peer to peer learning. Most respondents with above basic digital skills preferred online courses, while for farmers with basic skills suggested that peer to peer learning was the best way for them to improve their digital skills

| *Best way to improve your digital skills / Digital skills* | **No skills** | **Low skills** | **Basic skills** | **Above basic skills** |
|---|---|---|---|---|
| Through online courses | 0% | 16% | 21% | 39% |
| Traditional classroom training | 53% | 38% | 21% | 18% |
| Learning through reading a book or other printed materials on specialized topic | 7% | 16% | 21% | 14% |
| Peer to peer learning from family members or friends or other farmers | 40% | 29% | 37% | 29% |
| *Total* | 100% | 100% | 100% | 100% |

*Farmers' preferred way of learning by the level of digital skills*

## Project coordinator

GAK Education, Research and Innovation Nonprofit Ltd.

GAK Nonprofit Kft, 2103 Hungary, Pater K. u. 1.

Tel: +3628522940

Email: felnottkepzes@gak.hu

Web: www.gak.hu/en

## Project webpages

https://www.wisefarmer.eu
https://learn.wisefarmer.eu/

## Partners

BANAT'S UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE ¨KING MICHAEL Ist¨ of TIMISOARA - BUAS

SOUTH EASTERN EUROPE ADVISORY SERVICE NETWORK - SEASN

INSTITUTE FOR SCIENCE APPLICATION IN AGRICULTURE

SZECHENYI ISTVAN UNIVERSITY

AGRICULTURAL UNIVERSITY OF ATHENS

WeAreNet