

# IT-ARGF

## Innovative Training - Augmented Reality for Green Food

Project. Reference no. 2021-1-MK01-KA220-VET-000025293

### Final report for VET educators Project result 2



НАЦИОНАЛНА АГЕНЦИЈА  
ЗА ЕВРОПСКИ ОБРАЗОВНИ  
ПРОГРАМИ И МОБИЛНОСТ

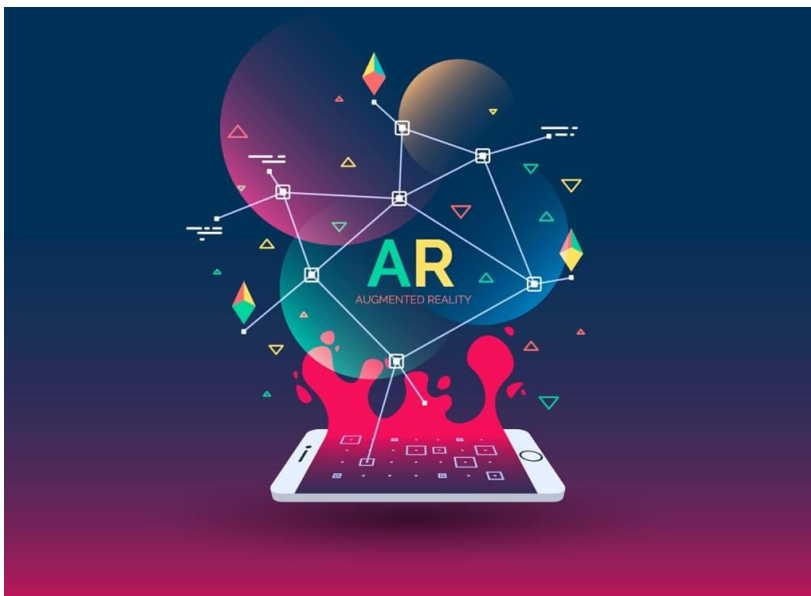


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## Project result 2

### Final report for VET educators



Innovative Training-Augmented Reality for Green Food " (IT-ARGF) project, is created to educate farmers in order to prevent farmland biodiversity disappearing and maximize crops capacity by providing tools and knowledge through technology. The project aims at piloting innovative vet curricula providing vet in the field of organic food production with comprehensive competences (knowledge and skills) as well as an innovative technological instrument to enhance biodiversity conservation and performances in the agricultural sector.

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All of the participant countries are crucial in agriculture, but they share the same problems; farmers have a lack of access to information and trained intermediate staff. In recent years, farmers have become a silent mass, with low levels of education, inadequate working conditions, unable to voice their problems, unable to organize, and unable to organize agricultural organizations. If we look closer by country to the main stakeholders, institutions, Vet providers, organizations, and networks of each country we can see the similarity.

Project partners made a desk research that identifies relevant literature, documents, statistics and data on biodiversity and augmented reality for green food. Also they identified the key stakeholders in the ecosystem of their country (policy makers at any layer of governance, agencies devoted to the promotion of agriculture and biodiversity and/or industry associations, VET/educational providers, civil society, academia and research community, etc.)

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## Main stakeholders, institutions, Vet providers, organizations, networks

### Hungary

Government institutions, ministries and specialised institutions under their supervision provide the basis for some training orientations. A recurring problem in the training work of these ministries and institutions is the lack of information exchange with end-user farmers. In addition to the Ministry of Agriculture, the Ministry of the Interior and the Ministry of Culture and Innovation, our research has identified all government ministries and their support institutions as being targeted in practice. In the field of organisations and networks, the National Chamber of Agriculture, NAK, the Herman Ottó Institute Nonprofit Ltd.

### Turkey

There are many farmer foundations/associations that offer training and support. TEMA, the Turkish Foundation for Combating Erosion, Reforestation and the Protection of Natural Habitats, is a foundation whose *raison d'être* is to protect and preserve life, that is, the earth. The primary goal of the Foundation is to explain to the nation, its representatives, political parties and governments, public and private organizations, educational institutions, and media organs the causes and dire consequences of soil erosion and the danger of our country becoming a desert.

### The Republic of North Macedonia

Involvement of stakeholders establishes links between planning process and implementation; enables access to high number of required information and knowledge; increases public awareness; builds consensus and maximum harmonization of the policy for issues concerning biological diversity conservation. The Convention identifies five main groups of stakeholders: state institutions (different ministries, agencies, etc.), scientific communities, non-governmental organizations, private sector and local communities.

### Spain

Vilatorta, which is now a center of general education, with agriculture taking second place. At the Quirós Agricultural Institute, religious training is also offered in addition to agricultural training, which in comparison with the past allows us to see that the teaching is not strictly agricultural.

### Greece

These are the main institutions: Ministry of Environment, Energy and Climate Change, University of Agriculture, World Food and Agriculture Organization, Hellenic Agricultural Organization, WWF Hellas, Arktouros, Greenpeace, Hellenic Society for Environment and Culture, Hellenic Society for Nature Conservation, Mediterranean SOS Network

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## Main stakeholders, institutions, Vet providers, organizations, networks

### Hungary

The general aim of farmers associations and federations is to protect farmers' economic, social and cultural interests and to work towards improving conditions on the production market. In order to achieve this goal, farmers associations cooperate with national and international NGOs, government institutions at local and national level, as well as with organisations in the fields of education and business. The oldest organisation for farmer cooperation is the HANGYA Cooperatives (Hungarian Association of Producer Sales and Service Organisations/Cooperatives - HANGYA).

### Turkey

There are many associations of farmers. STURKISH FARMERS' UNION is an association that aims to contribute to the production of over three million farmer partners, together with all Farmers' Union Employees, by providing them with all kinds of needs to be used in their agricultural activities and to serve Turkish Agriculture and the country's economy. ÇİFTÇİ-SEN is the Farmers' Union. It strives to improve the working and living conditions of all farmers and producers

### The Republic of North Macedonia

There are several associations of farmers. The overall objectives of the associations are to protect the economic, social and cultural interests of farmers and to work to improve the conditions of the production market. To achieve this goal, farmers associations cooperates with national and international NGOs, government institutions at local and national level, as well as with entities in the field of education and business, which contribute and influence the conditions for development of sustainable and profitable agricultural production, conditions necessary for development in rural areas and the quality of life of farmers.

### Spain

Agricultural organizations and associations are very common in Spain. These are usually called cooperatives and are based on the union of numerous autonomous organizations or individuals engaged in agricultural work. Below are some of the organizations located in the autonomous community of Andalusia in southern Spain:

- Cooperativa agro-alimentaria Faeca.
- Cooperativa San Sebastián.
- Cooperativa Ciudad de Jaén.

### Greece

These are the main institutions: Ministry of Environment, Energy and Climate Change, University of Agriculture, World Food and Agriculture Organization, Hellenic Agricultural Organization, WWF Hellas, Arktouros, Greenpeace, Hellenic Society for Environment and Culture, Hellenic Society for Nature Conservation, Mediterranean SOS Network.

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## Findings from questionnaires - Hungary

These areas are strategically developed by the Hungarian governmental legislation in line with EU directives.

Neither farmers nor trainers make sufficient use of the potential of involving existing partnerships.

Sustainable farming and food production is the result of the embedding of relevant EU directives and regulations.

However, there is less activity on the part of farmers beyond the acquisition of the knowledge and practical activities that are essential to meet their obligations.

In the field of education and training, knowledge on these topics is also general.

There are training materials available online, as well as online and e-learning training, but their development is essential to meet the growing demand.



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## Findings from questionnaires - Hungary

The majority of training institutions have the necessary facilities to develop a training programme on sustainability.

However, a surprisingly high proportion of trainers are not familiar with the concept of AR and only 8% have ever used an AR system.

Most of the training is delivered through what can be described as traditional presentations using simple ICT tools.

It can be concluded that training providers need to modernise their curriculum in order to meet the needs and challenges of farmers.

The majority of trainers believe that systemic changes are needed.

The majority of trainers believe that systemic changes are needed in order for the country to comply with EU standards and move towards the goals it has developed itself.



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## Findings from questionnaires - Turkey

Sustainable farming techniques are familiarized within the population. However, it still needs adjustments to achieve its purpose.

Generally, the existing institutional framework for biological diversity conservation and sustainable use is centralized in governmental institutions.

Digitalization of agriculture, biodiversity, food supply and distribution channels are already in use.

However, digital transformation for food systems has some drawbacks, such as low literacy, increased digital differentiation, lack of investment, legal issues related to data security and protection. Adoption of digital technologies requires some time.

Most of the trainings for farmers are organized and financed from associations in the frame of some projects but is not enough.

Maybe this is due to the fact that the trainings only financed from the project it is insufficient for all farmers and maybe the country should make a strategy for continuous trainings for farmers.





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## Findings from questionnaires - The Republic of North Macedonia

None of the farmers that were included in the survey have ever used any kind of AR application.

Only about 16% are informed or have heard about the use of AR for education or training. Furthermore, from the survey we can see that farmers are not using technology in their daily farming process.

83% did not have any training in regards to sustainable food production

Even though most of them are part of some agriculture association or agriculture network the number of farmers that do not have any experience and knowledge on agricultural practices and agro-environmental schemes in the EU is huge.

Educators' things that farmers are not interested to attend trainings for upgrading their knowledge.

According to the educators declared that training providers do not have an institutional support from relevant state institutions in order to modernize and change the curriculum according to the trends and farmer needs.



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## Findings from questionnaires - Spain

80% of the farmers that were asked have never participated in any activity or training program.

80% of the farmers that were asked have never participated in any activity or training program on nature protection in agriculture, only the 20% of them did.

70% of the farmers know or have been informed about AR.

70% of the farmers know or have been informed about AR and furthermore, 100% of them have used AR at some point. In fact, 80% of them are able to talk about and give some examples of the use of AR for education or training in our country

All of them are aware of ecological agriculture

All of them are aware of ecological agriculture, just 50% know the meaning or the concept of biodiversity and only 10% know the meaning of permaculture.



# Final report for VET educators

## Findings from questionnaires - Greece

The educators that were contacted recognized the need for changes and digitalization of the curriculum.

The current curriculum follows the rules of the EU, but in some parts needs changes.

60% feels that they do not have the necessary support.

60% feels that they do not have the necessary support to develop a sustainability training program, 30% feel supported, while 10% are not sure.

90% know about Augmented Reality

But, only 70% have used some applications referred to as AR. 60% are familiar with the applications that are mainly introduced in Greece.



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## Findings from questionnaires - Greece

45% of the farmers had the support to develop sustainable food production.

Only 45% of the farmers thought that their properties had the support to develop sustainable food production.

67% have participated in capacity building programs.

67% have participated in capacity building programs about nature protection in agriculture and 64% of the farmers knew what Augmented Reality is. We have to add that when it comes to action, only 31,5% used any kind of AR application before.

86 % were NOT informed or have heard about the use of AR for education or training.

86 % were NOT informed or have heard about the use of AR for education or training. Also, from the survey we can see that farmers are not using technology in their daily farming process food production.



# Final report for VET educators

## Target group need analysis

### Hungary

The main body is the Ministry of Agriculture and Forestry, but there are many farmer foundations/associations that offer training and support as well such as the Turkish Foundation for Combating Erosion, Reforestation and the Protection of Natural Habitats (TEMA) is a foundation that aims to create a sensitive, conscious and effective public opinion against environmental problems, especially erosion.

### Turkey

The main stakeholders of the study are the farmers themselves, whose needs, requirements and opportunities vary from sector to sector. However, Hungarian government institutions, ministries and specialized institutions face difficulties in aligning with EU directives, government concepts and strategies, and lack of information exchange with end-user farmers.

### The Republic of North Macedonia

There are organizations providing training and learning, but the financial support is coming from international donors on a temporary basis. The Convention has identified five main groups of stakeholders: state institutions, scientific communities, non-governmental organizations, private sector and local communities. The National Extension Agency (NEA) and the Ministry of Agriculture are a group of providers of T&E supported by the government.

### Spain

The modernization of agrarian training has led to the opening of rural training centers such as the Practical School of Agriculture of Caldas de Montbui, Spanish universities and technical schools offer a large number of titles for the training of young people. Development programmes are implemented by different communities of Spain to promote rural development.

### Greece

ELGO DIMITRA is a public sector that provides training to farmers. It is the main agricultural training mechanism of the HYPAAT, with the mission of organizing and supporting professional education and training of those employed in the agricultural sector.

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The challenges and vision for sustainable organic food and farming systems in each country are similar.

## Hungary

The main challenges are in food production and supply, and farming, and their uptake and development. It should be noted that, as production processes, these activities involve human intervention in the natural environment to produce food, and that the main challenge is therefore to raise awareness among farmers and consumers.

## Turkey

Need for amendments in laws and regulations, Lack of equivalence between the EU and national organic agriculture legislation, Lack of equivalence between national legislation and international standards such as National Organic Program (NOP) and Japanese Agricultural Standard (JAS), Deficiencies in inspection infrastructure, Informality, Market shortage, lack of balanced development of domestic and foreign markets, Inadequate level of specialization and in-service trainings, and so on.

## The Republic of North Macedonia

Government bodies led by MoEPP and MES are in the leadership in biological diversity protection through development of guidelines, strategies and regulations, but it is also important that those are accepted and implemented by all other sectors, primarily by business sector, industry, agricultural, forestry and energy sectors, as well as wider public.

## Spain

Spanish government currently follows the EU regulations regarding the visions of organic food and farming systems. Also, the Spanish Plant Protection Business Association (AEPLA) represents the manufacturers of plant protection products in Spain and advocates research and development in this sector to help the agricultural sector move forward and to overcome the challenges that the Spanish agriculture are currently facing.

## Greece

Challenges and visions are covered by EU organic rules. European Union rules on organic farming cover agricultural products, including aquaculture products and yeasts. They govern all stages of the production process, from seeds to the final processed food making sure there are no problems.

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## Digital Learning instruments and opportunities

### Hungary

The situation and strategic vision of digital learning and education in agriculture are outlined in the National Digitalisation Strategy 2022-2030 (NDS), which follows the National Infocommunication Strategy, and in the Digital Agricultural Strategy of Hungary (DAS), which is in line with this strategy and the new CAP strategy starting from 2023.

### Turkey

Most of the digital learning websites, apps, platforms are provided by the Ministry of Agriculture and Forestry but there are also other national kurumlar that provide education to farmers. Some Turkish learning materials available online are the 'agriculture forest academy', which hosts everything about agriculture, and is a new Distance Education System. In this way, it aims to provide training and information to farmers and producers in all areas of agricultural production. With the Distance Education System, farmers can watch live broadcast lectures on the Ministry's online television.

### The Republic of North Macedonia

There are no official learning materials online for biodiversity programs/curriculum or any agricultural non-formal education in the field of nature protection. All implemented programs are international in the frame of some International projects and other activities implemented by NGOs or agricultural associations with limited time of availability of the materials. There is no sustainability of the projects. Maybe all of this is a result of the lack of digital skills of the farmers.

### Spain

The Biodiversity Foundation (Fundación Biodiversidad) that is offered by the Spanish government with the mission to contribute to reversing the loss of biodiversity. This means that it is necessary to take action in different fields at the same time in order to preserve healthy ecosystems, to restore damaged ecosystems, to promote the sustainable use of biodiversity and to stop what is causing this damage.

### Greece

The Minister of Rural Development and Food has already instructed his colleagues and the agencies involved to look at the issue of education and training of farmers from the beginning. This will further help the workers in the primary sector, who mostly know about crops, with the knowledge being passed down from father to son, unable to keep pace with new technologies. In Greece it is also available the Skills for Future Farmers, a platform that provides training programs on Organic Agriculture, Rural Development Program 2014-2020, Agricultural Markets, Farm Management, Bio-Economy and ICT in Agriculture.

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## Digital Learning instruments and opportunities

Each country of the project partners has described the used mentoring instruments and strategies in their country. Measuring each country's organic production system, questioning its action plan and practices for organic food production provides a reflection of each country to the readers.

### **Some of the best ways in which augmented reality can be used for learning about organic food are:**

- Identifying organic food,
- Visualisation of production processes,
- Carbon footprint education

In general, augmented reality, by allowing users to interact with virtual information and visualisations in real time, helps to improve understanding and informed decision-making on organic food.

There is therefore a wide range of e-learning materials available in the five countries participating in the project, including videos, manuals, courses and online training programmes. In general, these materials are designed to help farmers and food producers improve their farming practices and protect biodiversity. Spain and Hungary appear to have a broader and more developed offer in this area, with specific courses and programmes for different agricultural sub-sectors. Countries also have different approaches to best practices in food production and biodiversity conservation.



01	Principle	The objectives of management of land, water and living resources are a matter of societal choice.
02	Principle	Management should be decentralized to the lowest appropriate level.
03	Principle	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
04	Principle	Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context.
05	Principle	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

06	Principle	Ecosystems must be managed within the limits of their functioning.
07	Principle	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
08	Principle	Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
09	Principle	Management must recognize that change is inevitable.
10	Principle	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

11

Principle

The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

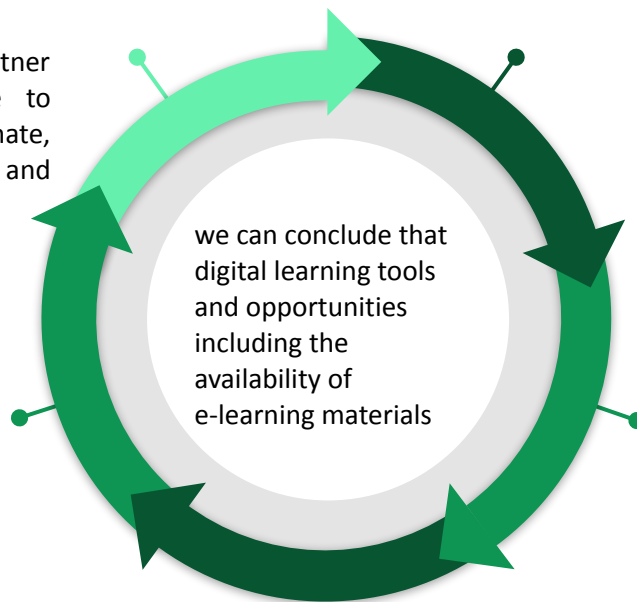
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Principle

The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Variations between partner countries may be due to factors such as climate, natural resources and government policies.

In the field of food production and biodiversity conservation vary significantly between the countries **Hungary, Greece, Turkey, North Macedonia and Spain,**



**Spain and Hungary** appear to have a broader and more developed offer in this area, with specific courses and programmes for different agricultural sub-sectors.

**North Macedonia** has developed a certification system for organic products, while **Greece** has a strong focus on organic olive and olive oil production. **Hungary and Spain** have a wide variety of agricultural crops and sub-sectors, which is reflected in the diversity of their online training materials.

# Final report for VET educators

## Challenges and vision for sustainable organic food and farming systems

Sustainable organic food production and organic farming are a vital part of preservation, food production and supply, and farming, and their uptake and development are essential for a well-functioning, safe and sustainable economy and society.

Sustainable agriculture means farming using sustainable methods based on an understanding of the ecosystem. The main objective of such farms is to meet our textile and food needs without compromising the capacity to meet the needs of future generations.

Young population is the most important because it is the easiest to incorporate ecological knowledge, skills and attitudes in them which can later grow into ecological lifestyle with adequate level of environmental awareness.

We need to move beyond small-scale marketing and make organic food and affordable products from organic farming part of the everyday offer.

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## Conclusions

Human activities have an impact on natural regions, and the preservation of biodiversity and the production of organic food are linked. The ultimate goal is to boost knowledge and abilities in the fields of organic food production and improve biodiversity through collaborative action.

Cooperatives and farmers' cooperatives are essential for the empowerment of agriculture in Greece, Turkey, Hungary, Spain and North Macedonia.

Farmers need to be educated to prevent farmland biodiversity disappearing and maximize crops capacity by providing tools and knowledge through technology. The lack of training in the biodiversity sector is a major issue, and there is a need for system-based change .

Digital learning tools and opportunities including the availability of e-learning materials, online training and best practices in the field of food production and biodiversity conservation vary significantly between the countries Hungary, Greece, Turkey, North Macedonia and Spain.

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