



AgriTech Solutions: Innovating VET for Sustainable Agriculture
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AgriTech Solutions: Innovative SSO for Sustainable Agriculture
2024-1-RS01-KA210-VET-000244168

REPORT

From the implementation of an activity for the needs of the project

Professional consultations

Engaged teachers: Stefanovski Saso, Milosheva Zaklina, Jovanova Kristina, Doncheva Milica, Nikolov Efremcho, Slavkovic Sonja

Location: Kumanovo, Sveti Nikole, Skopje, Strumica, Kavadarci, Valandovo, Veles

Experts/organizations: ZZ "STUBA", TD DZP KLECHOVCE DOOEL, ADUT GVN, AG FUTURA Technologies, „KAV KOMERC AND AGRO KAV KOMERC", COMPANY „STOJCHEVI and WINERY ARBESKA", INDIVIDUAL FARMER MARJAN TANCHEV, LISA – KOM KAVADARCI, INDIVIDUAL FARMER STEFAN STOJCHEV, AGRIJA DOOEL, Individual farmers groups and individuals, IZ Branko Atanasov, Livestock farm, Tatjana Mladenovska, graduate agricultural engineer

Topic/area: Renewable energy sources, Sustainable agricultural practices, Organic agriculture, Precision agriculture, Agricultural technologies

Short description

In the period from March to July 2025, several expert consultations were conducted with various agricultural entities and companies from the regions of Kumanovo, Sveti Nikole, Skopje, Strumica, Kavadarci, Valandovo, Veles, aimed at the application of innovative and sustainable practices in agriculture.

ZZ STUBA (village of Studena Bara) was involved in two consultations:

For **Renewable Energy Sources**, where solutions such as solar energy, biomass and geothermal energy for greenhouse tomato production were considered and peppers;

And for **the Application of modern agricultural technologies**, with an emphasis on automated greenhouses, digital sensors, drones, biological protection and LED lighting.

TD DZP Klechovce DOOEL hosted a consultation dedicated to **Sustainable Agricultural Practices**, where crop rotation, organic fertilization, reduced use of chemicals, efficient water use and soil conservation were emphasized.



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ADUT GVN LLC shared its experiences in the field of **Organic Agriculture**, especially in the organic production of herbs and vegetables, following strict principles of natural protection, timely harvesting and ecological packaging.

AG FUTURA Technologies from Skopje conducted a consultation on **Precision Agriculture**, highlighting the benefits of using GPS, drones, sensors, automated mechanization, and smart applications for optimal management of agricultural resources.

These consultations represent a significant contribution to building competencies for modern, technologically advanced and environmentally sustainable agriculture.

KAV KOMERC AND AGRO KAV KOMERC, both companies of one owner, were involved in two consultations:

For **Renewable Energy Sources**, where solutions such as solar energy were considered, through the installation of panels to produce electricity for the operation of refrigerators for receiving, storing and storing table grape varieties, which the agricultural company itself has at its disposal, which, through its own transport, enables export outside the country and the sale of agricultural products on foreign markets, production of biomass from other agricultural products that, when sorting the fruits and vegetables from the refrigerator, could also be used.

compost;

And for **the application of modern agricultural technologies**, with an emphasis on automated and state-of-the-art intensive vineyards, installation of digital sensors, drones, biological protection and LED lighting.

The company "STOJCHEVI and WINERY ARABESKA" hosted a wine consultation, visit and tasting of quality red and white wines, dedicated to **Sustainable Agricultural Practices**. The company emphasized two components: production and sale of high-quality wines with an organic label and development of wine tourism and the second component development of rural tourism in the village of Sopot where the vineyards are located together with the family winery which is duly registered for production, sale of wines and wine rural tourism.

REGISTERED INDIVIDUAL AGRICULTURAL PRODUCER MARJAN TANCHEV from the village of Balinci, Valandovo shared his experiences in the field of **Organic Agriculture**, especially in the organic production of CAPRIMA pepper variety and vegetables, following strict principles of natural biological protection with natural extracts, timely harvesting and ecological packaging.

LISA – KOM, Kavadarci conducted a consultation on **Precision Agriculture**, highlighting the benefits of using GPS, drones, sensors, automated mechanization and smart applications for optimal management of agricultural resources.



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REGISTERED INDIVIDUAL FARMER - STEFAN STOJCHEV from the village of Sopot, Kavadarci, emphasized that the use of new technology in agriculture, or rather the use of the new automatic grape picker or automatic grape harvester, is an excellent way to increase efficiency, productivity and reduce costs associated with hiring hired labor during grape harvesting.

IZ Branko Atanasov shared his experiences in the field of **organic agriculture**, especially in organic strawberry production, following strict principles of natural protection, timely harvesting and ecological packaging.

A livestock farm joined the consultation on **the Application of Modern Agricultural Technologies**, highlighting the benefits of using drones, food sensors, automated mechanization, and smart applications for optimal management of agricultural resources.

In the Aquaponics at SUGS "Braka Miladinovci" Skopje, expert consultations were conducted with the responsible teacher Tatjana Mladenovska, who is responsible and leads the production in aquaponics.

Consultations with the responsible teacher were conducted for:

- Precision agricultural production (automatic management of aquaponics)
- Sustainable agricultural practices (water conservation, rainwater harvesting, - Organic production (organic production of horticultural crops)
- Renewable energy sources (installation of solar panels).

Proposal for improving the representation of sustainable agricultural practices, precision agriculture, organic agriculture, renewable energy sources and the use of technology in agriculture in the curricula of the qualification

Integration of topics into existing courses

Sustainable agriculture should be included through topics of crop rotation, composting, integrated conservation, biodiversity, and climate adaptive practices.

Climate adaptive practices in agriculture are practices and technologies that enable farmers to adapt to the consequences of climate change – such as droughts, extreme temperatures, unpredictable rainfall, erosion, or the emergence of new pests and diseases. The aim of these practices is to maintain production and yields despite climate challenges, reduce risk and damage to crops and livestock, and increase the resilience of agricultural systems.

Examples of climate adaptive practices:



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1. Changing the sowing and harvesting calendar. Sowing crops earlier or later, according to the new weather patterns.
2. Selection of resistant varieties and hybrids. Varieties that are more resistant to drought, high temperatures, pests or diseases.
3. Shading and protection of crops. Use of agrotextiles or shade nets for protection from heat and hail.
4. Conservation tillage. Minimal tillage, with the aim of retaining moisture and preventing erosion.
5. Mulching. Covering the soil with organic material to retain moisture and temperature.
6. High efficiency irrigation systems. Drip irrigation for optimal use of water.
7. Sowing cover crops. Crops that protect the soil from erosion and improve its structure.
8. Agroforestry. A combination of agriculture and tree planting for microclimatic stability and shading.
9. Crop rotation and polycultures. Reducing the risk of diseases, pests and improving fertility.
10. Rainwater collection and storage. Rainwater collection installations for use in dry periods.

These practices are the basis for "climate resilience of agriculture" and are increasingly important in modern curricula and agrarian policies.

Organic agriculture should be incorporated into the curriculum through special modules, with practical examples, certification standards, methods of preparing organic soil and biological protection.

Precision agriculture should be introduced through mechanization and ICT courses in agriculture – studying the use of sensors, drones, data analysis software, and GPS/GIS systems.

Renewable energy sources in the agricultural sector should be covered in "Energy in Agriculture" or "Mechanization", with a focus on solar panels, biogas, geothermal systems and their practical application.

Modern technologies (artificial intelligence, automation, digital applications) should be studied through a new or renewed subject "Intelligent Agriculture".

Introduction of elective and project activities

To develop elective courses or sections in secondary vocational schools, dedicated to each of these areas.



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Students to create "Project Tasks" related to the installation of solar systems, the creation of maps with GPS/GIS, the modeling of sustainable farms, the creation of organic preparations etc.

Practical teaching and fieldwork

Connecting with local agricultural farms that use sustainable or precision technologies, for practical training of students.

Visits to organic farms, greenhouses with automated systems, facilities with solar and geothermal solutions.

Organizing "Exercises" for measuring soil parameters with sensors, using drones, or making organic preparations.

Cross-curricular integration

Connecting topics with Informatics, Ecology, Physics and Chemistry, through real-world applications: photovoltaic energy calculations, soil and water quality analysis, digital maps.

Training of teaching staff

Organizing trainings and seminars for teachers on new technologies, organic production and renewable energy sources.

Involving experts and companies from the sector in educational workshops.

Updating textbooks and curricula

Revising existing curricula to include these topics in accordance with contemporary trends and European practices.

Development of new textbooks, digital materials and videos covering innovative agricultural practices.

