Support Facility for Innovation & Knowledge exchange
EIP-AGRI

EU CAP Network cross-visit

'Irrigation - optimising water use practices in annual (and perennial) crops'

Project presentations

7-8 May 2025 – Thessaloniki, Greece

Funded by the European Union

Host project

Project title: Irrisma - Smart system of reduced inputs in agriculture and irrigation water management

Country, Region: Thessaloniki, Greece

Start and end date of the project: 5/12/2022 - 31/5/2025

Project objectives: The Irrisma project focuses on sustainable water management for low-input agriculture in areas under significant environmental pressure, such as Lake Koroneia. Its main objective is to reduce water and energy consumption, mitigate over-pumping, and improve water quality while lowering production costs.

Project activities:

Activities include implementing precision irrigation systems, monitoring groundwater levels, minimizing water losses, and guiding farmers with tailored advice. These measures aim to protect vital water resources, enhance environmental sustainability, and support efficient agricultural practices.

The Irrisma project includes farmers in its partnership through the Producers' Group "Agrotikes Epichiriseis Kavalariou" Their role involves providing access to their fields for implementing and testing the precision irrigation systems. They actively participate in applying sustainable water management practices, monitoring groundwater levels, and sharing data for system evaluation. Additionally, they contribute to the project's dissemination by demonstrating its benefits to the broader farming community.

Challenges tackled by the project:
The waters of the application area (included in Natura & Ramsar protected areas) receive a significant form of pressure from the continuous withdrawals of surface and underground water bodies, to meet the needs of people for various uses.

Specifically, in the wider region, the prohibitive measures that apply to water uses are known due to the shrinking of the volume and surface of Lake Koroneia, which also affects the underground water bodies, which make the underground aquifers in a regime of over-pumping and quality degradation. Given the obligation of the producers to place a meter on the supply of the wells, pricing of the use of the water they irrigate and the imposition on it of environmental costs and the cost of depletion of the natural resource, the cost of producing the products will increase significantly, taking into account cumulatively also the cost of energy for pumping and applying irrigation water to crops.

Project results /innovative solutions found:

Precision Irrigation Technology: Demonstration of advanced irrigation systems and sensors installed on pilot fields, showcasing real-time monitoring of soil moisture, salinity, and water usage.

Groundwater Monitoring: Presentation of groundwater level and flow monitoring data to illustrate the reduction in over-pumping and aquifer depletion.

Water and Energy Savings: Results quantifying reduced water consumption and lower energy costs from optimized irrigation practices.

Software Tools: Demonstration of user-friendly irrigation planning software that integrates climatic, soil, and water data for efficient decision-making.

Environmental Benefits: Impact assessments showing improved sustainability in Lake Koroneia's surrounding areas due to reduced water pressure and better resource management.

Project related website(s), social media, videos, press articles, other communication materials

https://irrisma.gr/en

Participating representatives

- *Georgiou Pantazis*, research manager, Aristotle University of Thessaloniki, Faculty of Agriculture, Forestry and Natural environment, School of Agriculture.
- *Charalampos Petkoglou*, Advisor for farmers/ foresters; Innovation support agent, Ergoplanning – Brain trust consulting.

Participating project

Project title: SisRice - Automated services for the management of rice irrigation using in-field sensors

Country, Region: Thessaloniki, Greece

Start and end date of the project: 5/12/2022 - 31/5/2025

Project objectives:

The SisRice project focuses on addressing salinity issues in rice cultivation, particularly in coastal areas, through advanced water management. Its primary objective is to optimize irrigation practices by implementing automated in-field sensors that monitor salinity and water levels in real time.

SISRICE with the application of sensors and an automated information system is expected to ensure better water management and lead to a reduction of approximately 10% of water consumed/year.

Project activities:

Activities include installing autonomous sensors, using GSM communication for data transmission, and providing rice farmers with real-time insights via a user-friendly platform. These innovations aim to reduce water consumption, minimize environmental impact, and improve rice yields and quality.

Challenges tackled by the project:

Salinity is one of the most important problems in rice cultivation, especially in coastal areas. It is due to the lack of moisture, the increased evaporation of soil moisture due to high temperatures and the irrational use of boreholes. As a result, seawater enters the water table and increases the concentration of salts in the paddy fields. If the salinity exceeds the limit of 3dS/m it causes inhibition of photosynthesis, chlorination and reduction of yields. To eliminate these adverse effects there are two practices: a) crop rotation with a much reduced yield and b) the continuous channeling of irrigation water to the rice fields (the most widespread) in order to wash away the salt, which due to its solubility easily moves towards the drainage channels.

Nowadays the identification of the salinity problem is done either empirically by visual diagnosis or by the use of electrical conductivity measuring instruments by the producers. The result is that it is done either late, since the salt has already reached toxic levels, or incorrectly even when there is no reason (chlorosis due to N deficiency). This practice results in the necessity of constant monitoring of the fields (increasing the movements of the producers) and many times the consumption of large amounts of water for no reason. This brings about effects, such as reducing production and environmental due to water wastage, increases energy consumption, increases production costs and also the environmental footprint of rice.

Project results /innovative solutions found:

Automated Salinity and Water Monitoring System: Demonstration of installed in-field sensors providing real-time data on salinity and water levels, accessible via a user-friendly digital platform.

Water Management Optimization: Data showcasing reduced water consumption (approximately 10% annually) and improved irrigation practices, minimizing environmental impact.

Salinity Control: Comparative results between traditional and smart irrigation methods, highlighting reduced salinity levels in pilot fields.

Enhanced Crop Yield and Quality: Presentation of increased rice yields and improved quality metrics achieved through optimized irrigation.

Economic Benefits: Insights into cost savings on water, energy, and production expenses.

Pilot Field Visit: On-site observation of the system's functionality and integration into everyday farming practices, offering practical knowledge.

Project related website(s), social media, videos, press articles, other communication materials

https://sisrice.gr/en

Participating representatives

- *Dimitrios Katsantonis*, research manager, Institute of Plant Breeding and Genetic Resources (IPGRB)
- *Marios Karagiovannidis,* Responsible for the automation and technical aspects of the smart irrigation solution, including the installation and operation of the system in the farmers' fields, ensuring their needs and feedback were fully integrated into the technical implementation. ERGOPLANNING– Brain trust consulting, ELGO-DIMITRA - representing IA-AGRO.

Further information in Annex.

Participating project

Project title: Evaluation of the efficiency of the water and energy in hydro-agricultural schemes (AGIR)

Country, Region: Portugal

Start and end date of the project: 01/07/2017 – 31/01/2021

Project objectives:
To develop a system to evaluate the efficiency of water and energy use in hydro-agricultural schemes.

Activities to develop new methods and tools to improve water and energy efficiencies at farm scales, ensuring adequate solutions towards more sustainable practices. It is expected the knowledge and skills acquired by stakeholders allows the achievement of best irrigation practices.

Project activities:
AGIR project partners developed assessment systems for water and energy efficiency in agricultural water transport, distribution networks and irrigation systems. The project was focused on the study of pilot cases of three hydro-agricultural developments: Odivelas, Vigia (both in Alentejo) and Vale do Sorraia (in Ribatejo). At the agricultural plot level, critical intervention factors were identified to provide practical recommendations.

Challenges tackled by the project:
The evaluation of water use efficiency has been aimed at in some studies. The approach to methodologies and indicators has been mainly carried out at the level of technical-economic interconnection and in environmental, social and governance issues. However, these approaches look at only one part of the problem, they address pressure systems separately and free surface systems, and there is no system view. It should be noted that these infrastructures should be seen as a system, since each asset does not guarantee the service individually.

In terms of inefficiencies, they are known in part and only in terms of physical losses, and there is no standardization in the processing of data or in the composition of indicators. The only indicators that exist focus only on physical losses. The very notion of apparent losses is not assimilated by the management entities of agricultural systems.

Now that there is the cost of energy associated with water systems, the need to account for losses is even greater. However, there is no system for Hydro-Agricultural Projects at national, or international level, which allows the evaluation of good practices and the efficiency of the use of water and energy and that supports planned and sustained decision-making.

To respond to this need, there is now the opportunity to develop a specific evaluation system for Hydro-Agricultural Developments, which will be based on the current advancement of knowledge and will integrate several existing research sources, with

a particular focus on the work already developed at the level of urban water systems. a sector in which very important milestones have been achieved in recent years.

Project results /innovative solutions found:
The project AGIR proposed a new simulation model to support decision-making in selecting, designing and managing pressurized irrigation systems. Consistently, the tool provides a suitable solution involving the main parameters and reference values (i.e. system design and scheduling, soil, topography, meteorological, and vegetation cover) required for a qualitative and robust methodological approach with classes of values. This innovative user-friendly tool gives stakeholders an effective procedure to run and evaluate irrigation installations to reduce the occurrence of water losses.

Project related website(s), social media, videos, press articles, other communication materials
https://inovacao.rederural.gov.pt/2/59-agir-avaliacao-da-eficiencia-da-agua-e-energia-em-aproveitamentos-hidroagricolas
https://www.fenareg.pt/agir-sistema-de-avaliacao-da-eficiencia-do-uso-da-agua-e-da-energia-em-aproveitamentos-hidroagricolas/
https://www.iniav.pt/divulgacao/noticias-iniav/4190-guia-tecnico-orientacoes-sobre-praticas-de-regadio-na-exploracao-agricola

Participating representatives
- *Paulo Luz*, researcher, INIAV Research organisation

Participating project

Project title: Sustainable water cycle network for irrigation of starch potato

Country, Region: Germany, Bavaria

Start and end date of the project: 01/04/2024 – 31/12/2024

Project objectives:
The project tackles water scarcity in Eastern Bavaria by bringing together farmers, governments, and scientists to create a sustainable local water cycle. Through real-time data collection from sensor-equipped wells and weather stations, stakeholders gain new insights into water extraction, recharge, and climatic factors. This collaboration enables transparent and quicker permitting, reduces bureaucracy, and fosters innovative, community-based water reuse methods. A stakeholder network ensures scalable, sustainable, practical practices that protect and rehabilitate agriculture and groundwater.

Project activities:

- Real-time data collection from sensor-equipped wells and weather stations
- Use of collaboration strategy

Challenges tackled by the project:

Climate change is increasing the need for artificial irrigation in agriculture. Increased precipitation extremes (long dry periods interrupted by heavy rainfall) lead to an impairment of local groundwater recharge. Agriculture is particularly affected by this because the soil can no longer fully absorb the heavy rainfall after long dry periods and an increasing proportion of the rainwater quickly runs off on the surface instead of being stored in the groundwater.
Our agricultural area is experiencing now what other wide swaths of central Europe will be experiencing soon due to climate change. We feel it is critical to get the conversation started on what central Europe can learn from southern Europe, which has dealt with water scarcity for decades, and offer our expertise on sustainable water management and high-precision agriculture.

Findings show that changing rainfall patterns, increasing water demand, and bureaucratic hurdles create uncertainty in agricultural irrigation. At the same time, water reuse offers untapped potential for more efficient resource use.

Project results /innovative solutions found:
The project has established key foundations for sustainable water management in Eastern Bavaria.

Key project results include cartographic analyses of water availability and the use of new sensor technology. These led to the development of a digital monitoring system for tracking water flows, enabling data-driven decision-making for authorities. Progress

was also made in planning a regional stakeholder association to promote water reuse and sustainable management.

For farmers and municipalities, this creates new opportunities: better irrigation planning, optimized permit processes, and stakeholder representation. Based on these insights, water reuse must become a key element of future water management in the Gäuboden region

Project related website(s), social media, videos, press articles, other communication materials

https://farmtastic.consulting/de/eip-projekte/

Participating representatives

- *Annette Dietmaier*, Advisor on technical, economic, environmental and/or social dimensions for farmers/ foresters, farmtastic consulting GmbH, Advisory organisation

Participating project

Project title: SUPERIRRI- Surface irrigation optimization in traditional crops of stable meadows and rice for groundwater protection

Country, Region: Italy, Emilia-Romagna

Start and end date of the project: 01/01/2023 - 04/08/2024

Project objectives:
The project aims to promote adaptation to climate change and to prevent and minimize the damage caused by water scarcity phenomena by managing water in rice fields and stable meadows through the automation and optimization of submersion and flow irrigation systems, supported by the Irriframe DSS.

The SuperIrri project aims to automate and optimize water management in rice fields and polyphite meadows in Emilia-Romagna, enhancing the sustainability and quality of local agricultural products (Parmigiano Reggiano DOP, Riso del Delta del Po IGP). Specific objectives include:

- Climate change adaptation through the automation of submerged and surface irrigation systems using the IRRIFRAME platform, preventing damage from poor water management.
- Reduction of nutrient leaching by studying nitrate and irrigation water movement in the soil to protect surface and groundwater bodies.
- Weed control using low-impact agronomic and irrigation techniques to minimize herbicide use.
- Maximization of carbon-sink effects, estimating the carbon accumulation potential in soil through specific analyses and calibrated models.

Project activities:

The automation and optimization of submersion and flow irrigation systems, supported by the Irriframe DSS.

Challenges tackled by the project:

Surface irrigation remains almost unchanged in permanent grassland and rice crops, located in Emilia-Romagna mainly in the provinces of Piacenza, Parma and Reggio-Emilia for permanent grassland and Ferrara for rice. Here, over the centuries, permanent meadow and rice cultivations have developed and consolidated with their related excellent supply chains, today protected by designations of origin (Parmigiano Reggiano DOP, Riso del delta del Po IGP).

The scarcity of water resources and the ever-increasing frequency of extreme events risk compromising the economic and environmental sustainability of these agricultural systems. On the one hand, drought leads to production declines in both qualitative and quantitative terms, as well as reducing the formation of humid ecosystems in the areas. In Emilia-Romagna, as in many Italian regions, surface irrigation methods (submersion

and flow) currently occupy about 15% of regional irrigation systems, having been progressively abandoned in favor of more efficient systems.

Project results /innovative solutions found:
The use of automation systems for surface irrigation artifacts combined with sensors placed in the field has contributed to the qualitative and quantitative improvement of surface and subsurface water bodies, while at the same time being economically sustainable for the agricultural entrepreneur. In detail, the monitoring and automation systems implemented in the project have allowed to:

- reduce the phenomena of runoff or leaching of nutrients contained in the soil towards receiving water bodies
- achieve significant savings in irrigation water, with an average reduction of 15-20% of the volumes of water used;
- reduce the use of herbicide treatments thanks to more efficient and timely agronomic and irrigation management;
- allow a reduction in the commitment of manual work in the company's hydraulic maneuvers;
- allow the obtaining of forage production with good yields and quality characteristics.

Project related website(s), social media, videos, press articles, other communication materials
https://www.consorziocer.it/progetti/superirri-2759/

Participating representatives
- *Marco Romagnoli*, agronomist, Consorzio di Bonifica di Secondo Grado per il Canale Emiliano Romagnolo

Participating project

Project title: RicEnviFlow - Irrigation water management in rice crop to meet the environmentally minimum river flow

Country, Region: Greece, Thessaloniki

Start and end date of the project: 22/02/2023-31/07/2025

Project objectives:

RicEnviFlow investigates the effect of irrigation water usually applied in rice crops to optimize water use and maintain crop yield and quality. Also, this work aims to improve the water flow conditions in the riverbed of Axios (Greece) to meet the environmentally minimum river flow, through irrigation water saving in rice fields, considering that the yield and quality of agricultural products are kept at a similar level. To achieve the above, this research includes applying and evaluating three irrigation scenarios in a rice field and assessing the water flow that ends in the estuary using a water management model.

Project activities:

A research field of 8.2 ha was divided into three subplots to evaluate the three irrigation scenarios over two growing seasons (2023 and 2024): in the first one (subplot A), irrigation is applied according to the local agricultural practices of Thessaloniki plain, while in the other two subplots B and C, the annual irrigation water is reduced to 75% and 50%, respectively. Application of reduced irrigation water in the rice field shows that reducing the amount of irrigation water, even by half, has no significant impact on crop yield. The yield decrease did not exceed 7% remaining at levels similar to the average production in the area. In addition, the quality of the product was examined through laboratory assays and revealed that no significant differences in the physical characteristics of the rice product (length/width, weight) exist.

Challenges tackled by the project:

The river deltas are ecologically significant areas, as they host valuable flora and fauna. However, increasing water withdrawals from the hydrological basins of rivers to meet the water needs of economic activities (agriculture, industry, etc.) inevitably lead to a reduction in the available amount of water that ends up in the deltas of the rivers, resulting in the alteration or even destruction of their ecosystems.

Considering the pressure that water bodies are under, proper management of irrigation water is deemed necessary to improve the ecological situation in the river deltas. Irrigated agriculture is the largest water consumer in our country, with significant environmental impacts.

A characteristic example is the reduction of flow at the mouth of the Axios River, which is largely caused by the use of water to meet irrigation needs. One of the crops that requires large amounts of water for its full development and maximization of its yield is

rice, which in the plain of Thessaloniki is irrigated with about 2-3 thousand cubic meters of water per acre.

Taking into account that several thousand acres of rice are irrigated from the waters of the Axios River, the importance of saving irrigation water in rice cultivation and the benefits that result from securing additional quantities of water to satisfy the minimum environmental flow at the mouth of the river, especially in a protected area like the Axios Delta, becomes immediately apparent.

The necessity to find a solution for water reduction becomes even more urgent due to the expected increase in temperature in the coming decades due to climate change. The new conditions that will be created are expected to put even more pressure on the already environmentally degraded ecosystems, as the evapotranspiration of crops and consequently their irrigation needs will increase.

Project results /innovative solutions found:

Overall, an analysis of the net farm income and the application of the water resources management model illustrate that reducing irrigation water can be a viable strategy for conserving water without compromising rice production.

Project related website(s), social media, videos, press articles, other communication materials

https://ricenviflow.gr/
https://www.facebook.com/people/RicEnviflow/61553109068610/
https://gr.linkedin.com/in/ricenviflow-project-6b0b2a29a

Participating representatives

- *Charalampos Doulgeris, Principal Researcher, Soil & Water Resources Institute - Hellenic Agricultural Organization 'DIMITRA'*
- *Nikoleta Papastamkou, Research assistant, Soil & Water Resources Institute - Hellenic Agricultural Organization 'DIMITRA'*

Participating project

Project title: Economic and technical performance of agricultural inputs using activated biochar in vegetable crops in the Nicosia region

Country, Region: Cyprus

Start and end date of the project: 13/04/2021 - 31/07/2024

Project objectives:
The aim of this project is to develop a new cultivation practice through which existing common cultivation practices in Cypriot agriculture will be strengthened and improved. The main element of the new cultivation practice was chosen to be the activated biochar produced in Cyprus, through an innovative process of pyrolysis of woody tissues such as recycled forest timber, reeds and agriculture waste streams. Biochar is a product intended to be used in various crops to improve and enhance their economic and technical parameters it's also occupies an important position in the research and development of innovative approaches concerning the optimization of agricultural production and environmental management

This was achieved through the development of a modern, resource-efficient and competitive agricultural practice, using the addition of activated biochar to the soil, which has many environmental and agronomic benefits.

Specifically, activated biochar had the greatest impact on the water holding capacity of the soil, the optimization of the soils' physical structure and the availability of both organic and inorganic sources of nutrients and moisture to the plants.

Project activities:
- Project Management
- Dissemination and Communication
- Planning and development of a new agricultural practice
- Field applications
- Processing results and creating a database
- Long-term strategic planning

Challenges tackled by the project:
The problem of the climate crisis that led to the degradation and loss of the necessary resources for the primary production of agricultural products, thus addressing a real existential threat to Europe and the world. The project, being fully aligned with the provisions of the 'European Green Deal', from the moment of its conception, succeeded in demonstrating the increased degree of sustainability of a farm that uses a modern, resource-efficient new farming practice, while activating a new soil process. The use of biochar not only improved the soil, upgrading its fertility, but also made the crops more efficient with better quality products within the market framework using less water, subsequently chemical fertilisers, while introducing at the same time the concept

of on-field monitoring of critical agronomic parameters regarding irrigation efficiency and optimization.

Project results / innovative solutions found: Activated biochar as a low input agriculture practise.

During the two years of the project, the new agricultural practice was developed through innovative work in the pilot plots, using specific methods and application rates of activated biochar according to a targeted design to improve and enhance the existing common agricultural practices of the participating partner Cypriot producers. This design preceded the applications in the selected pilot plots, adapting all necessary agronomic activities to the extent required and applying newer ones in order to achieve the project objectives.

By achieving the above, the project has led to a potential reduction in the amount of irrigation water required, a reduction in the energy used to carry out cultivation activities, a reduction in the use of chemical fertilisers and pesticides to promote vegetation and increased production. Finally, it has been possible to demonstrate the positive contribution of activated biochar use to environmental processes, promoting sustainable agriculture as a way of producing healthy food by reducing the environmental impact and water footprint of the agricultural ecosystem.

The extension of the project's activities, both within the OG itself and outside the OG to other innovative projects carried out at European level, validated the effectiveness of the dissemination and communication activities carried out within the project's activities and, beyond that, the correctness of the partners' selection and their declared ability to carry out the project from the outset.

Furthermore, the OG case is part of the HORIZON EUROPE project, AQUAGRI-KNOW: Maximizing the impact of EIP-AGRI Operational Groups for efficient water management on-farm – Unleashing practical knowledge and farmer-friendly resources. In this project we promote the establishment and enhancement of knowledge amplification across borders through a dedicated AQUAGRIKNOW Ambassador Programme.

Project related website(s), social media, videos, press articles, other communication materials:
www.oliver.cy
https://www.facebook.com/olivernicosiavegs

Participating representatives
Nicos Larkos, Innovation support agent and/ or innovation broker; Researcher, Agrotech Innovations Ltd, Innovation Support Service

Participating project

Project title: GO ACCESO (Accessibility to Eco regimes (eco-schemes) with optimized solutions)

Country, Region: Spain

Start and end date of the project: 01/05/2024 – 01/05/2027

Project objectives:

- Incentivizing the adoption of eco-schemes
- Assess economic, social, and environmental impact
- Validate eco-schemes for pest control
- Analyse synergies between eco-schemes
- Knowledge transfer to producers

Project activities:

In different crops in Spain available water quantity is a major constraint besides plagues and diseases.

GOS ACCESO addresses the promotion of eco-regimes through a multifactorial analysis of various practices proposed in four crops with very different agronomic challenges, and for which agronomic applications included in the catalogue of eco-regimes combined with precision agriculture and digitalization are selected. The test plots will be parameterized with a range of agronomic, economic and environmental indicators, which will be measured before undertaking the actions and at the end of each of the execution campaigns.

The "GOS ACCESO" project aims to carry out trials on several crops (Industrial Tomato, Persimmon (caquí), Pear and Corn) to evaluate and demonstrate that eco regimes integrating various sustainable and agroecological practices can improve agricultural productivity, plant health. soil and the resilience of crops to challenges such as climate change and restrictions on the use of agrochemicals. GOS ACCESO addresses the promotion of eco-schemes through a multifactorial analysis of various practices proposed in four crops with very different agronomic challenges, and for which agronomic applications included in the catalogue of eco-schemes combined with precision agriculture and digitalization are selected. The test plots will be parameterized with a range of agronomic, economic and environmental indicators, which will be measured before undertaking the actions and at the end of each of the execution campaigns. A key tool is the use of sensors,

Challenges tackled by the project:

The actions designed for this project aim to contribute to addressing the following needs:

- Encourage the adoption of Ecoschemes: Ecoschemes offer palpable opportunities for more sustainable and environmentally friendly agriculture. By

encouraging its voluntary adoption, a balance can be achieved between agricultural production and the conservation of natural resources. This opens the door to agroecological benefits, while allowing farmers to receive adequate compensation for their commitment to sustainability, even if they are not bound by the implementation of the CAP.

- Validate the ability of eco-schemes to include environmental services in agricultural management systems: Ecoschemes have the potential to offer various ecosystem services such as alternative methods of pest control, reducing the need for pesticides, mitigating or reversing the impact of agriculture in biodiversity and positively impact the fertility and health of the soil. Validating their effectiveness by comparing them with conventional methods is imperative to induce their widespread adoption and ensure that the quality of agricultural products is maintained, improving the safety of agriculture.
- The GOS-ACCESO project helps farmers maximize the benefits of EU funding by showcasing best practices for adopting eco-schemes efficiently. By leveraging real-world case studies and data-driven insights, it provides farmers with practical guidance on optimizing their environmental and economic performance. The project highlights innovative and successful approaches to sustainable farming, enabling easier adoption of eco-schemes with proven results. Through knowledge-sharing and digital tools, GOS-ACCESO supports farmers in making informed decisions that align with both EU sustainability goals and their own profitability. This approach ensures that farmers can confidently implement eco-schemes in a way that enhances their agricultural practices and financial outcomes.

Project results (so far) /innovative solutions found:
In all the plots, the cover crops have been implemented. The cover crop selection follows agronomic criteria to produce further benefits for the phytosanitary and productive conditions of the main crop. Main crops are yet to be produced.

Project related website(s), social media, videos, press articles, other communication materials
https://grupooperativoacceso.eu/

Participating representatives

- J*avier Arizmendi*, Advisor on technical, economic, environmental and/or social dimensions for farmers/ foresters, ZERYA Producciones sin Residuos S.L., Advisory organisation (on technical, economic, environmental and/or social

See more information in Annex.

Participating project

Project title: WassKli - Water storage and operating strategy for adaptation to climate change

Country, Region: Germany, Lower-Saxony

Start and end date of the project: 01/07/2024 – 30/06/2027

Project objectives:
Our goal is to create a guideline for farmers in Lower Saxony to help them overcome drought periods caused by climate change in the future. The fundamental intention is to protect agriculture in Lower Saxony from periods of drought caused by climate change and to avoid the associated yield losses by providing recommendations for water management concepts.

Project activities:

The 'WassKli' research project is focussing on different areas. On one hand, this involves the development of concepts for water storage in natural and artificial reservoirs and, on the other, the evaluation of the use of alternative water resources, e.g. drainage water or cleaned water from sewage treatment plants.

In summary:

- Determination of the potential of alternative water resources for agricultural irrigation
- Identification of water quality requirements and cleaning measures for agriculture
- Dimensioning of a water storage tank
- Development of an optimized operating concept for the use of stored water volumes for field irrigation

The results of the project will be compiled in a practical guideline for irrigation.

Challenges tackled by the project:
The increasing competition for the available water resources between drinking water supply, agricultural irrigation and sufficient water for the natural balance makes it necessary to make more comprehensive use of the possibilities of water retention in the landscape and in the soil as well as the possible savings potentials in the use of water. This is all the more important because the situation will become even worse due to climate change, while at the same time the demand for food will increase continuously due to the development of the world population, without the agricultural land being able to be increased accordingly. For agriculture, the focus is particularly on water retention and the needs-based control of irrigation. It is important for people and nature that sufficient water of good quality is also available in the future, free of harmful ingredients.

Project results /innovative solutions found:
Even though we are still in the early stages of our research we have gained valuable insights into the challenges of constructing water storage systems—both in terms of engineering and legal requirements. Additionally, we are gaining a deeper understanding of the obstacles farmers face regarding agricultural irrigation in Lower Saxony.

Project related website(s), social media, videos, press articles, other communication materials
https://wasser-suderburg.de/wasskli/

Participating representatives

- *Maurice Dedolf*, researcher, Institut für nachhaltige Bewässerung und Wasserwirtschaft im ländlichen Raum (INBW), research organisation
- *Felix Schmidt*, researcher, Institut für nachhaltige Bewässerung und Wasserwirtschaft im ländlichen Raum (INBW), research organisation

Participating project

Project title: SAMM_IRO: Smart Monitoring Modules for Irrigation & Phitosanitary Management in Olive Growing

Country, Region: Spain, Andalusia

Start and end date of the project: 01/01/2024-30/06/2025

Project objectives:
The main objective of the SAMM_IRO Operational Group is to provide the Andalusian olive sector with intelligent crop monitoring solutions based on IoT, BigData and AI, which allow optimising the phytosanitary and irrigation management of olive groves. Based on these smart modules, Decision Support Systems (DSS) will be developed for olive growers to ensure that decision-making in this area is automated and as objective as possible, considering the vast amount of data obtained by the aforementioned sensor networks.

Project activities:
- Scientific and Technical Literature Review
- Identification of User Needs and Definition of the System Requirements
- Design of different components of an optimised IoT sensor network for comprehensive monitoring of crop development and deployment of this IoT network on the planned test farms.
- Building of a BigData and development of Fundamental Analytics
- Advanced Analytics and Predictive Modelling
- Construction of the Knowledge Dissemination component
- Integration of former components and using prototype for crop monitoring in operational environments throughout the agricultural year
- Evaluation activities
- 9 Dissemination activities of project and project outcomes

Challenges tackled by the project:
- Lack of information about main AgTech solutions among olive growers
- Poor data strategies among software providers
- Poor K-dissemination tools

Project results /innovative solutions found:
Identification/quantification of main factors that prevent or encourage the use of these AgTech tools by small and medium farmers and how these solutions are right now helping farmers

Project related website(s), social media, videos, press articles, other communication materials

http://www.sammiro.es/

- **Spotify:** Samm_iro@aeptic.es

Link: https://open.spotify.com/user/31nwcaeicsc7gq2rkiefmqmibbp4

- **Spreaker:** Samm_iro@aeptic.es

Link: https://www.spreaker.com/podcast/proyecto-sammiro--6158957

- **Ivoox:** Samm_iro@aeptic.es

- **YouTube:** Samm_iro@aeptic.es

Link: https://www.youtube.com/@Samm_iro

- **X(Twitter):**

Cuenta: @samm_iro
Samm_iro@aeptic.es
Link: https://x.com/samm_iro

- **LinkedIN:**

Link: https://www.linkedin.com/company/proyecto-samm-iro

Participating representatives

- J*oaquin M. Fernández*, Innovation support agent and/ or innovation broker; IT expert and/or technology developer, Irdetec Consulting y Asesoría, Innovation Support Service

Participating project

Project title: UMOLA

Country, Region: Poland

Start and end date of the project: 01.01.2023-30.04.2025

Project objectives:
Umola focuses on integrating LED lighting with precision irrigation to enhance water efficiency and plant resilience.

Project activities:

We investigate how light spectrum adjustments impact plant transpiration rates, water retention, and nutrient mobility in both annual and perennial crops. By analyzing photosynthetic activity under different lighting conditions, we aim to develop energy-efficient growth models that reduce water demand without compromising yield. Our research integrates soil moisture monitoring, LED-enhanced water use efficiency, and remote sensing technologies, providing a data-driven approach to irrigation management for sustainable farming.

Our team is responsible for researching how LED lighting impacts plant water use efficiency and integrating these findings with precision irrigation strategies. In Umola, we analyze how different light spectra influence transpiration, root development, and soil moisture retention. We also work on data-driven approaches to optimize irrigation schedules, ensuring water-efficient crop production. Our role involves conducting trials, analyzing results, and refining techniques to support sustainable water management in agriculture.

Challenges tackled by the project:
Scientific research clearly suggests the need for both the reduction of fungicides used and their residues in harvested crops and soil. The topic of the development of resistance to fungicides and the reduction of the scale of this phenomenon is also very often taken up by the topics of scientific research. Moreover, scientific studies clearly suggest that the appropriate use of fungicides can significantly reduce losses during storage of harvested crops, due to the much lower disease pressure in this area. It is worth mentioning that the latest strategy of the European Union, the European Green Deal, significantly emphasizes the reduction of the resources used for plant protection products, the greening of production and the reduction of the impact on the natural environment. The use of new methods of reducing the use of plant protection products is suggested not only by the results of scientific research, but also by the strategies of states and public organizations that rely on this research.

Project results /innovative solutions found:
Umola has demonstrated that adjusting LED light spectra can significantly influence water use efficiency in crops. Early findings indicate that specific light wavelengths enhance root system development, leading to better water uptake and reduced irrigation needs. Trials on perennial and annual crops show that optimized lighting reduces excessive transpiration, helping plants retain moisture longer. Additionally, integrating soil moisture sensors with LED-driven growth models has improved irrigation scheduling, minimizing water waste while maintaining yield stability. Further testing continues to refine precision water-saving strategies.

Project related website(s), social media, videos, press articles, other communication materials
http://uprawahydroponiczna.pl/

Participating representatives

- *Kamil Wojtaś*, Farmer/farm manager or farm worker, Agrowe Team Leader of Innovation Specialist
- *Antonina Zajączkowska*, Advisor on technical, economic, environmental and/or social dimensions for farmers/ foresters, Agrowe Innovation Specialist

Participating project

Project title: Automation and economic viability of irrigation in olive growing

Country, Region: Slovenia

Start and end date of the project: 15/11/ 2019 – 15/11/2022

Project objectives:
Several studies have shown that olive tree irrigation is an appropriate countermeasure to climate change. Because of the lack of knowledge and fear of economic inviolability, olive growers rarely opt install an irrigation system. By transferring research results into practice while simultaneously evaluating economic viability, a wider range of olive groves will have knowledge and tools to evaluate the justification of irrigation and establish an automated irrigation system in the plantation.

Project activities:

- Coordination and Management.
- Realization of 3 training events (water resources, automation equipment, response of olive trees to drought)
- Measurement - monitoring environment parameters, plant condition, crop quality and quantity, management of financial assets on 7 agricultural holdings
- Implementation at 7 locations of a practical test of automated irrigation
- Economic feasibility analysis and elaboration of a basic viability calculating model for olive trees irrigation
- Dissemination of results (excursion, practical demonstrations, creation of reference material, media statements, social network divulgation, professional articles and conferences)

Challenges tackled by the project:
Climate change has necessitated a paradigm shift in agricultural practices, compelling researchers and farmers to adapt to the evolving needs of traditionally grown crops. Alterations in annual rainfall patterns have intensified droughts, putting stress on once-drought-resistant plants like olives. Despite Slovenia experiencing relatively high yearly precipitation compared to other olive-growing regions, the water runoff, coupled with dry and increasingly hot months, has exacerbated drought conditions.

Project results /innovative solutions found:
In collaboration with our project partners, we have successfully developed an advanced irrigation system that leverages real-time monitoring of soil water status levels to regulate water usage efficiently. To ensure uninterrupted functionality, every irrigated location has been fitted with a solar panel and a reliable battery system, guaranteeing a continuous power supply. The heart of our system lies in the soil moisture levels, serving as the primary regulator for irrigation. We've established lower and upper thresholds, acting as triggers to initiate or conclude irrigation cycles. The system continuously monitors the average soil moisture from the four sensors, automatically activating water valves and commencing irrigation if the average falls

below the lower threshold. Irrigation continues until levels surpass the upper threshold, ensuring an efficient and automated process.
This system empowers farmers by enabling them to apply the precise amount of water at the right time, thereby minimizing water wastage and maximizing resource efficiency.

Project related website(s), social media, videos, press articles, other communication materials
https://www.zrs-kp.si/podstrani-projektov/avtomatizacija-in-ekonomska-upravicenost-namakanja-v-oljkarstvu/

Participating representatives

- M*aja Podgornik*, researcher, Institute for Oliveculture ZNANSTVENO-RAZISKOVALNO SREDIŠCE KOPER, research organisation