RURALITIES - CLIMATE SMART, ECOSYSTEM-ENHANCING AND KNOWLEDGE-BASED RURAL EXPERTISE AND TRAINING CENTRES

PRACTICE ABSTRACTS – FIRST VERSION

D4.14

WP4 – BEACON: measures to maximize impact, visibility and synergies

Horizon Europe Grant agreement: 101060876

31/March/2024 by Gabor Mester (PEDAL)
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1 ABSTRACT

The project 'Climate smart, ecosystem-enhancing and knowledge-based rural expertise and training centers' (RURALITIES) delivers an ecosystem-enhancing and climate action driven expertise and learning framework organized in hubs e.g., the 'RURALITIES', comprising a series of innovative methodologies with the learner at its core, supported by a comprehensive network of living labs, and a digital platform combining the internet and wireless technologies, to assist engage, connect and empower actors. This is done via a multi-point approach e.g., multi-actors, multi-disciplines, multi-systems, multi-scale, multi-sectors, and multilevel.

RURALITIES is rooted in the recruitment, preparation, training and coaching of 1.000+ facilitators for a variety of tasks (e.g., trainers, facilitators, role models, hub coordinators, etc.), and who play a significant role in creating the matrix and the platform upon which the learning framework is built, develops, and evolves. RURALITIES proposes to ideate, implement, futureproof, validate and deliver the expertise and learning centers via real-scale practicing in 6 simplified rural socio-ecological systems (SIMSES) e.g., demonstrators, 2 in Italy, 1 in the United- Kingdom (UK), 1 in Slovenia, 1 in Spain and 1 in Romania. RURALITIES coordinates identified actions of local, regional authorities in supports of rural innovation in regions and economic sectors where rural innovators are not yet engaged in a relevant network.

RURALITIES coordinates identified SIMSES networks promoting rural innovation solutions whilst establishing innovative multipoint 'RURALITIES Hubs' of expertise and training on rural innovation. This is done via coordinating action for the managing authorities and regional bodies influencing regional and national policy instruments in Italy, the UK, Slovenia, Spain and in Romania.

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51	AP	ASPI	ASPIRE-IGEN GROUP LIMITED	UK
52	AP	EW	CONSERVATION EDUCATION AND RESEARCH TRUST	UK

ACRONYMS

Acronym	Description
EIP-AGRI	European Innovation Partnership on Agriculture
EC	European Commission
SIMSES	Simplified Socio-ecological Systems
WP	Work Package

2 INTRODUCTION

2.1 Purpose and Scope

The innovative knowledge derived from RURALITIES project is destined to make a significant contribution to the agricultural sector, specifically through integration with the **European Innovation Partnership on Agriculture (EIP-AGRI)** framework. By channeling the findings and insights into the EIP-AGRI website, the project aims for widespread dissemination among practitioners, ensuring that the advancements reached are accessible and utilizable at the grassroots level. Additionally, to ensure that this knowledge is not just disseminated but also practical and user-friendly, end-user material is crafted into concise, digestible summaries following the EIP's established format for "practice abstracts." From the outset, with the current deliverable, project details will be systematically shared with the EIP-AGRI platform, promoting transparency and immediate utility. Aiming for a comprehensive knowledge transfer, the project sets a clear target: the production of 20 practice abstracts by its conclusion. This structured approach underscores the project's commitment to real-world applicability and its crucial role within the RURALITIES initiative, emphasizing the importance of bridging research and practice in the agricultural sector. The current document delivers the first set of 10 practices abstracts and describes its production.

2.2 Document structure

The RURALITIES Practice Abstracts – first version has the following structure:

- **Chapter 1 and 2** offer an initial overview of the background within which this report was developed, along with its objectives and organization.
- **Chapter 3** provides 10 practice abstracts developed by project partners.
- **Chapter 4** concludes on the next steps and on the further dissemination of these results.

The document is precisely designed to not only highlight the key content and essential insights of these practices but also to provide a comprehensive overview of their application and relevance. Additionally, for enhanced accessibility and reference, the standalone PDF version of these practices has been included as ANNEX 1. This inclusion serves to complement the main text, offering readers a detailed, in-depth look at the practices in a format that is easy to distribute, share, and refer to. The integration of the PDF as an annex ensures that the document is self-contained, providing all necessary information in one cohesive package, thereby facilitating a better understanding and application of the practices outlined.

3 PRACTICES ABSTRACT 1ST BATCH

The deliverable lead, PEDAL, was tasked with the responsibility of compiling information from various partners (UNIZG, RRAP, CTIC, ASIN, UNIM, INAG). After a careful selection process, ten best practices were identified. The respective partners then provided the content for each of these practices. To streamline data collection and integration, PEDAL developed a template designed to align with the common EIP-AGRI Excel format, which will be utilized for transferring the information upon the formal approval of D4.14 by the European Commission (EC).

In executing this task, several key steps were undertaken. Initially, the process involved the identification of innovative practices that could contribute significantly to the agricultural sector. Following this, the structuring of the abstracts was carried out in accordance with EIP-AGRI guidelines.

The finalization step was crucial in refining the content. This phase involved a thorough review to ensure that the abstracts were clear, concise, and relevant to the target audience, which includes farmers, advisors, and other stakeholders within the agricultural sector. The aim was to ensure that the final output was not only informative but also accessible to those directly involved in agricultural practices and fits to the EIP-AGRI common format.

3.1 Green Biofertilizers with 3in1 Effect (UNIZG)

Creating biopolymer microparticles encapsulating bioactive components derived from natural sources with a 3-in-1 effect (enhanced plant nutrition, protection, and time-release mechanism) is an innovative approach to sustainable agriculture. This method aims to decrease the reliance on synthetic agrochemicals while simultaneously boosting the production of secondary plant metabolites.

This can be achieved with:

1. **Selection of Bioactive Components** – extracts, essential oils, plant extracts rich in phytochemicals, and beneficial microorganisms like mycorrhizae or rhizobacteria.
2. **Encapsulation in Biopolymer Microparticles**: chitosan, alginate, or gelatin.
3. **Incorporation of Time-Release Mechanism**: Integrate a time-release mechanism within the biopolymer matrix to ensure gradual and sustained release of the bioactive compounds over an extended period.
4. **Characterization and Evaluation**: Characterize the biopolymer microparticles for morphology, size distribution, encapsulation efficiency, and release profile.
5. **Field Trials and Validation**: Conduct field trials to assess the performance of the biopolymer microparticles under real agricultural conditions. Monitor parameters such as crop yield, quality, pest infestation, and disease incidence. Tests are made on the fileds of Faculty of Agriculture.
6. **Scaling Up and Commercialization**: Scale up the production of biopolymer microparticles and optimize manufacturing processes for large-scale deployment.

With these steps, we develop biopolymer microparticles encapsulating bioactive components with a 3-in-1 effect, contributing to sustainable agriculture by reducing agrochemical usage and enhancing plant health and productivity.

3.2 Extraction of bioactive components as a new way of plant protection (UNIZG)

Extracting bioactive components from plants for plant protection is an innovative approach that leverages natural compounds to defend plants against pests, diseases, and environmental stressors.

How extracts are gaining attention:

1. **Natural Defense Mechanisms**: Plants produce a variety of compounds as part of their defense mechanisms against pests and diseases. These compounds, known as phytochemicals, can include alkaloids, phenolics, terpenoids, and flavonoids. Many of these compounds have bioactive properties that can deter pests or inhibit the growth of pathogens.

2. **Bioactive Compound Extraction**: Bioactive compounds can be extracted from plants using various methods such as solvent extraction, steam distillation, supercritical fluid extraction, and maceration. These techniques allow for the isolation and concentration of specific compounds with pesticidal or antimicrobial properties.

3. **Targeted Pest Control**: Once extracted, these bioactive compounds can be formulated into botanical pesticides or biopesticides. Unlike synthetic pesticides, which can have harmful effects on non-target organisms and the environment, botanical pesticides derived from plant extracts are often safer and more environmentally friendly.

4. **Reduced Environmental Impact**: Using plant-derived biopesticides can help reduce the environmental impact associated with conventional pesticide use. These biopesticides are often biodegradable and pose fewer risks to beneficial insects, birds, and mammals.

5. **Resistance Management**: Biopesticides derived from plant extracts can also play a role in resistance management. Pests are less likely to develop resistance to botanical pesticides compared to synthetic chemicals, as the complex mixture of compounds in plant extracts can act on multiple targets within the pest's physiology.

6. **Synergistic Effects**: Plant extracts may also exhibit synergistic effects when used in combination with other control methods such as biological control agents or cultural practices, enhancing overall pest management strategies.

7. **Market Demand for Natural Products**: With increasing consumer demand for organic and sustainably produced foods, there is a growing market for plant-based pest management solutions. Extracting bioactive compounds from plants aligns well with this trend, providing growers with effective alternatives to synthetic chemicals.

8. **Challenges and Research Areas**: While the use of plant extracts for pest management holds promise, there are challenges such as standardization of extracts, optimizing formulations for stability and efficacy, and scaling up production. Research in these areas is ongoing to further develop and refine plant-based pest management strategies.

Overall, the extraction of bioactive components from plants represents a promising approach to plant protection that combines traditional knowledge with modern technology to create sustainable and environmentally friendly solutions for agriculture.

3.3 SRIP HRANA and Smart specialization platform Smart sensors for Agri-food partnership (RRAP)

Overall, the extraction of bioactive components from plants represents a promising approach to plant protection that combines traditional knowledge with modern technology to create sustainable and environmentally friendly solutions for agriculture.

SRIP HRANA is a significant organization in Slovenia focused on the agro-food sector. It stands for "Strategic Research and Innovation Partnership for Food." This organization plays a crucial role in guiding the agro-food system and value chains to ensure sustainable food production and processing with high quality and traceability. SRIP HRANA serves as a central platform for various stakeholders including agricultural holdings, enterprises, associations, research institutions, and investors. The focus of SRIP HRANA is to promote food chain organization, animal welfare, risk management, and sustainable practices within the food industry. It aims to enhance the quality of food production and processing while emphasizing traceability and innovation in the sector.

The Smart Sensors for Agri-food partnership operates within the framework of SRIP HRANA, focusing on fostering a symbiotic ecosystem between agri-food and technology clusters, digital solution providers, research institutions, and stakeholders. This partnership aims to accelerate digital innovation within food processing companies, enhance sustainability, and build resilience in the agri-food industry by developing and implementing tailored digital solutions to address specific challenges faced by these companies.

By establishing a platform that connects agri-food clusters with technology providers and stakeholders, the Smart Sensors for Agri-food partnership simplifies access to cutting-edge digitalization technologies, creates Living Labs for testing and training, and fosters collaboration to integrate Industry 5.0 technologies across the broader agri-food industry landscape.

3.4 Climate Simulator to study crops adaptation through IoT sensorization (CTIC)

Climate change is one of the main concerns for agricultural practices, an economic activity highly dependent on weather conditions. At CTIC Rural Tech there is an infrastructure focused on the

development of Agriculture 4.0 projects from the perspective of climate research and the development of digital technologies (software and hardware).

This infrastructure is made up of three independent simulators in which different weather conditions can be simultaneously reproduced. In this sense, climate stress experiments can be performed with different types of crops to study their adaptation/resistance degree to future climate scenarios.

This is possible thanks to IoT technology and the LoRaWAN sensor network that allows controlling many variables such as temperature, humidity, radiation, ventilation, irrigation, CO_2 concentration. Furthermore, real-time monitoring of the state of crops using IoT technology allows the design of more efficient and sustainable management practices, optimizing available resources.

3.5 Smart sensorization of agricultural farming (CTIC)

This demonstrator is based on application of agriculture 4.0 solutions (sensory + IoT) to monitor small agricultural farms in the Peón Valley through environmental and soil sensor deployment.

Environmental (temperature, humidity, precipitation) and soil (temperature, humidity, conductivity, pH, NPK concentration) data are collected by IoT sensors connected to the LoRaWAN network. Then these data are analysed using IA models and displayed to end-users by an app. The information obtained by this system is very useful for small farmers, who will be able to know the evolution of crops in real time, adjust different variables (acidity, nutrients, irrigation...), thus improving crop quality and quantity. Moreover, the information can be used to prevent and combat pests that occur under certain agro climatic conditions.

This will serve as a reference for small farms in the Valley in order to carry out efficient resource management depending on soil state and plant requirements, as well as accurately estimate the sowing and harvest calendar based on the climatic conditions of the place and year. All this data facilitates agricultural decision making, and thus farm efficiency.

3.6 Green Infrastructure in the agricultural landscape - habitat rich cultivation (UNIM)

The decreasing biodiversity is a general conflict in our cultural landscapes. Beside extensive cultivation methods rich, not fragmented green infrastructure is the precondition for preserving, developing biodiversity in the cultural landscape. A very important reason for the lack of habitats of agricultural land is the lack of landscape elements providing links, hiding and nesting places for animals associated with the agricultural landscape. In our abstract we collected possible spaces for maintaining, developing green infrastructure in the farmland. For green infrastructure development priority target areas include

- strips 50 m wide adjacent to watercourses,
- land margins (10 m)
- arable land steeper than 17 %,
- arable land at risk of erosion,

- arable land affected by inland water,
- land of low soil quality,
- roadside strips arable land (2x20m wide),
- Natura 2000 protected arable land,
- arable land at risk of deflation,
- existing and potential field borders eligible for greening (20 m wide),
- treeless arable land around landfills, material extraction sites,
- underground water quality protection areas and
- treeless arable land next to settlements (100 m wide),
- gaps of ecological corridors (Figure 1).

Non-linear, woody elements can also be useful, as groups of trees, bushes, and solitary trees can serve as hiding places for songbirds and nest opportunities for species feeding on fields.

In case of establishment of new rows of trees or forest strips, native species corresponding to natural conditions are preferred. Wind resistance is also a consideration. Considering the spread of birds can be supported by using bird-friendly mixture species, these can be fruit-bearing trees or shrubs, or species that attract insects. The presence of berry shrubs is therefore essential for the winter nutrition of songbirds. Establishing grass fields also serves the interests of wildlife – especially in field borders a patch of lawn or hiding strips.

3.7 GO CAVALE: Innovative Strategies for Foal Meat Production (ASIN)

The basis of this project is to valorize the foal meat and its benefits, by improving knowledge of the nutritional characteristics of meat and its derivatives. Thus, the main objective pursued was the improvement of the equine meat value chain, specifically quality foal meat, to increase its demand and consumption, in addition to developing strategies that improve the productivity and profitability of livestock farms for meat equine. This main objective can be broken down into the following points:

- Improvement of the equine meat value chain by valorizing the quality of foal meat.
- Strategies to improve the productivity and profitability of equine meat livestock farms.
- Know the consumer's perception in relation to foal meat and identify strategies to improve its image.
- Improved knowledge of carcass conformation, meat characteristics and the development of derivatives and innovative products based on foal meat.
- Transfer of knowledge and dissemination of results obtained.

The **main results achieved** in this work were:

I. Determination of the population growth curve in foals for “Marismeña” and “the Asturian mountain horse” breeds and determination of the optimal timing for their sale or slaughter.

II. Study the consumer perception in relation to foal meat, as well as the identification of strategies to improve its image and consumption.
III. Development of innovative meat derivatives based on foal meat and characterization of culinary treatments to enhance their value.
IV. Study the economic situation of horse breeding farms for meat production.
V. Characterization of the carcass and cutting of the foal: classification of carcasses, development of cutting and preparation of the sampling
VI. Microbiological, nutritional and sensory evaluation of foal meat and meat derivatives and culinary processes developed.

3.8 RESUPEQ: Valorization of whey from small cheese farmers (ASIN)

Whey is classified as a highly polluting waste. The discharge of whey leads to serious water and environmental contamination problems, endangering the physical and chemical structure of the soil, reducing crop yield as well as aquatic life due to the consumption of oxygen dissolved in the water. On the other hand, **whey is a product having high energy and nutritional quality**, so it should not be named as waste as it is commonly treated.

The **main objective** of the project was the development of strategies for using whey for human nutrition by developing new products without the need for large investments, eliminating the environmental problem and generating new sources of income.

The work of this project focused mainly on **three possible product lines**:

- Whey-based drinks
- Development of dairy products using whey in their composition
- Snacks and other products (jellies, etc.)

The **main results achieved** are summarized in the following points:

1) Establish the protocols for the pre-treatments required on the whey to ensure that its suitability for use in human nutrition is guaranteed, at both a hygienic and nutritional level.
2) Development of whey-based drinks such as refreshing, energizing, isotonic, etc.
3) Development of dairy products, which may be fermented drinks (such as shaken and drinkable yogurts, new whey-based fermented drinks, etc.) as well as firm yogurts, puddings and other dairy desserts such as rice pudding.
4) Development of other types of products such as snacks and jellies.

3.9 Toolbox enhances customer experience of short food supply chain entrepreneurs (INAG)

Farmers and horticulturists selling their products in the short food supply chain need to tailor their offerings to the needs of local consumers. Actively improving the 'customer journey' enhances customer experience and makes producers more successful and resilient against competition.

Inagro, together with its partner Vives, strengthened the on-farm sales management. Over 80 visits by mystery shoppers provided insights into the experiences and purchasing behaviour of consumers in non-urban environments in West-Flanders in Belgium. Their tips and experiences highlighted important steps in the purchasing process (from searching for online information, to visiting the store, to consuming at home). Inagro, Vives, and the producers collaborated on these initiatives in a co-creative manner and captured the tips and tricks in practical and short information sheets, webinars, testimonials, and self-studies. The topics are highly diverse: store layout, social media planning, digital payments, street promotion, cash register systems, organizing visits behind the scenes, etc.

This ready-made material is freely available online and is at the core of the service provided to short food supply chain products. The toolbox is continuously updated and expanded. Discover the toolbox and elevate your short food supply chain to the next level.

3.10 WaterRadar – connection supply and demand of water (INAG)

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Without water, there is no life. During times of scarcity, farmers look for irrigation water to

ensure good crop production. Through recent innovations, alternative water sources have become available for the farmers, as a solution for the recuring water scarcity in Flanders during summer. The waterRadar is a tool providing information on the (potential) available water sources such as recovered irrigation water from food processing industry and domestic wastewater and how close these are to your farm and fields. Also, the legal status of using these waters is summarized on this web page. In this way, the connection between supply and demand is facilitated. Additionally, farmers can ask Inagro for advise on how to capture rainwater, extract groundwater, and use surface water. Also, personal advise on legal barriers and economic trade-offs is provided on demand during a water audit.

The WaterRadar was developed within the VLAIO LA project 'Irrigation 2.0: When where what water?', and currently further developed.

4 CONCLUSIONS AND WAY FORWARD

The document titled **RURALITIES D4.14 – Practice Abstracts – first version** is set to be expanded and supplemented with additional content. Specifically, this expansion will take the form of another deliverable known as **D4.15 – Practice Abstracts – final version**, scheduled for M51. The responsibility for the production and delivery of this forthcoming report has been assigned to PEDAL. This new deliverable is expected to enhance the original by including an additional set of 10 practice abstracts, thereby broadening the scope and depth of the material covered.

The practice abstracts have been carefully developed to function as independent PDF documents, a format chosen to ensure their utility across various dissemination channels. This design approach aims to maximize their accessibility and ease of use for a broad audience. Following the receipt of final approval from the EC, these valuable resources are slated for broad dissemination amongst the project partners and other stakeholders according to D4.1 Dissemination and Communication Plan, facilitating widespread knowledge sharing and collaboration. As of the present moment, while awaiting final EC endorsement, a provisional draft version of these documents has been made available for initial review and feedback. This preview can be found in the 'Resources' section of the RURALITIES website, allowing stakeholders early access to the material and the opportunity to engage with the content ahead of official release.

5 Annex 1 – RURALITIES Practice Abstracts – First version

Ruralities

Practice Abstract 1

eip-agri
AGRICULTURE & INNOVATION

Green Biofertilizers with 3in1 Effect

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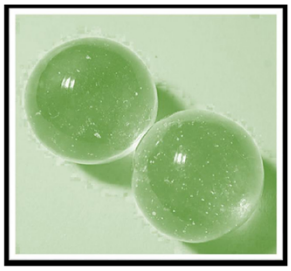

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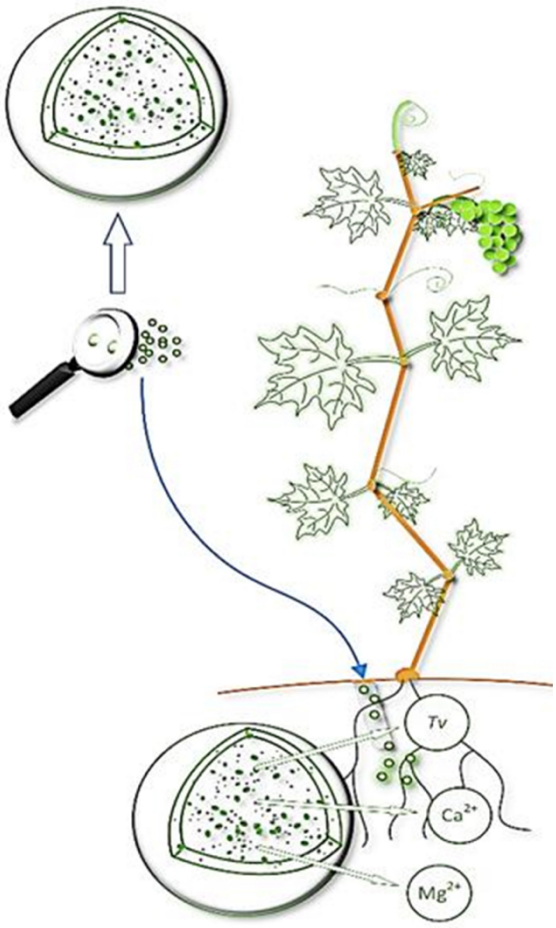

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Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement no 101060876. UK participants in Horizon Europe Project RURALITIES are supported by UKRI grant numbers: 10051963 The Highlands and Islands Transport Partnership and 10050988 Earthwatch Europe.

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Extraction of bioactive components as a new way of plant protection

Extracting bioactive components from plants for plant protection is an innovative approach that leverages natural compounds to defend plants against pests, diseases, and environmental stressors. How extracts gaining attention:

1. **Natural Defense Mechanisms:** Plants produce a variety of compounds as part of their defense mechanisms against pests and diseases. These compounds, known as phytochemicals, can include alkaloids, phenolics, terpenoids, and flavonoids. Many of these compounds have bioactive properties that can deter pests or inhibit the growth of pathogens.

2. **Bioactive Compound Extraction:** Bioactive compounds can be extracted from plants using various methods such as solvent extraction, steam distillation, supercritical fluid extraction, and maceration. These techniques allow for the isolation and concentration of specific compounds with pesticidal or antimicrobial properties.

3. **Targeted Pest Control:** Once extracted, these bioactive compounds can be formulated into botanical pesticides or biopesticides. Unlike synthetic pesticides, which can have harmful effects on non-target organisms and the environment, botanical pesticides derived from plant extracts are often safer and more environmentally friendly.

4. **Reduced Environmental Impact:** Using plant-derived biopesticides can help reduce the environmental impact associated with conventional pesticide use. These biopesticides are often biodegradable and pose fewer risks to beneficial insects, birds, and mammals.

5. **Resistance Management:** Biopesticides derived from plant extracts can also play a role in resistance management. Pests are less likely to develop resistance to botanical pesticides compared to synthetic chemicals, as the complex mixture of compounds in plant extracts can act on multiple targets within the pest's physiology.

6. **Synergistic Effects:** Plant extracts may also exhibit synergistic effects when used in combination with other control methods such as biological control agents or cultural practices, enhancing overall pest management strategies.

7. **Market Demand for Natural Products:** With increasing consumer demand for organic and sustainably produced foods, there is a growing market for plant-based pest management solutions. Extracting bioactive compounds from plants aligns well with this trend, providing growers with effective alternatives to synthetic chemicals.

8. **Challenges and Research Areas:** While the use of plant extracts for pest management holds promise, there are challenges such as standardization of extracts, optimizing formulations for stability and efficacy, and scaling up production. Research in these areas is ongoing to further develop and refine plant-based pest management strategies.

Overall, the extraction of bioactive components from plants represents a promising approach to plant protection that combines traditional knowledge with modern technology to create sustainable and environmentally friendly solutions for agriculture.

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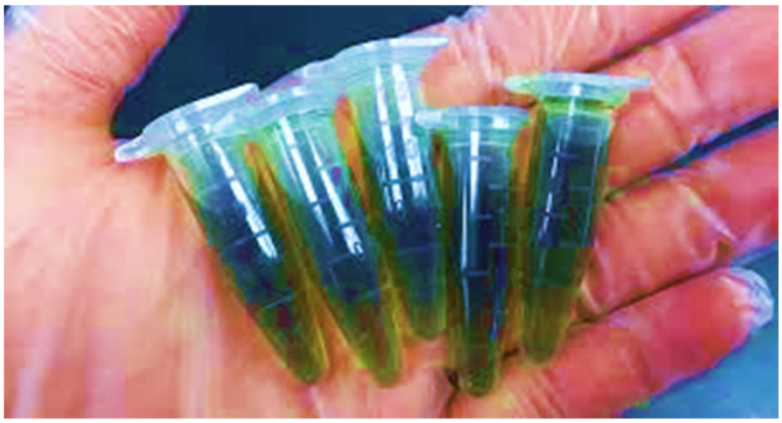

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SRIP HRANA and Smart specialization platform Smart sensors for Agri-food partnership

SRIP HRANA is a significant organization in Slovenia focused on the agro-food sector. It stands for "Strategic Research and Innovation Partnership for Food." This organization plays a crucial role in guiding the agro-food system and value chains to ensure sustainable food production and processing with high quality and traceability. SRIP HRANA serves as a central platform for various stakeholders including agricultural holdings, enterprises, associations, research institutions, and investors. The focus of SRIP HRANA is to promote food chain organization, animal welfare, risk management, and sustainable practices within the food industry. It aims to enhance the quality of food production and processing while emphasizing traceability and innovation in the sector.

The Smart Sensors for Agri-food partnership operates within the framework of SRIP HRANA, focusing on fostering a symbiotic ecosystem between agri-food and technology clusters, digital solution providers, research institutions, and stakeholders. This partnership aims to accelerate digital innovation within food processing companies, enhance sustainability, and build resilience in the agri-food industry by developing and implementing tailored digital solutions to address specific challenges faced by these companies. By establishing a platform that connects agri-food clusters with technology providers and stakeholders, the Smart Sensors for Agri-food partnership simplifies access to cutting-edge digitalization technologies, creates Living Labs for testing and training, and fosters collaboration to integrate Industry 5.0 technologies across the broader agri-food industry landscape.

Citations:
[1] https://www.gzs.si/srip-hrana/vsebina/English/About-SRIP-HRANA
[2] https://ss4af.com/partners/srip-hrana
[3] https://www.gzs.si/Portals/220/Vsebine/SRIP%20HRANA/SRIP%20HRANA_ang_key%20informations%20and%20facts.pdf
[4] https://www.en-hrana.org

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Links

Web page: https://www.gzs.si/srip-hrana/vsebina/english
PDF presentation: https://www.gzs.si/Portals/220/about%20SRIP%20HRANA.pdf

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Climate Simulator to study crops adaptation through IoT sensorization

Climate change is one of the main concerns for agricultural practices, an economic activity highly dependent on weather conditions. At CTIC Rural Tech there is an infrastructure focused on the development of Agriculture 4.0 projects from the perspective of climate research and the development of digital technologies (software and hardware).

This infrastructure is made up of three independent simulators in which different weather conditions can be simultaneously reproduced. In this sense, climate stress experiments can be performed with different types of crops to study their adaptation/resistance degree to future climate scenarios.

This is possible thanks to IoT technology and the LoRaWAN sensor network that allows controlling many variables such as temperature, humidity, radiation, ventilation, irrigation, CO2 concentration. Furthermore, real-time monitoring of the state of crops using IoT technology allows the design of more efficient and sustainable management practices, optimizing available resources.

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Links

https://www.youtube.com/watch?v=pk0_L9DQX98
https://www.fundacionctic.org/es/ctic-ruraltech

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Smart sensorization of agricultural farming

This demonstrator is based on application of agriculture 4.0 solutions (sensory + IoT) to monitor small agricultural farms in the Peón Valley through environmental and soil sensor deployment.

Environmental (temperature, humidity, precipitation) and soil (temperature, humidity, conductivity, pH, NPK concentration) data are collected by IoT sensors connected to the LoRaWAN network. Then these data are analysed using IA models and displayed to end-users by an app. The information obtained by this system is very useful for small farmers, who will be able to know the evolution of crops in real time, adjust different variables (acidity, nutrients, irrigation...), thus improving crop quality and quantity. Moreover, the information can be used to prevent and combat pests that occur under certain agro climatic conditions.

This will serve as a reference for small farms in the Valley in order to carry out efficient resource management depending on soil state and plant requirements, as well as accurately estimate the sowing and harvest calendar based on the climatic conditions of the place and year. All this data facilitates agricultural decision making, and thus farm efficiency.

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Links

Include any relevant photos, diagrams, or links to videos or websites.
https://www.youtube.com/watch?v=pc8gz61GV7M
https://www.youtube.com/watch?v=FvScuvsrJUQ
https://www.fundacionctic.org/es/ctic-ruraltech

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Green Infrastructure in the agricultural landscape - habitat rich cultivation

The decreasing biodiversity is a general conflict in our cultural landscapes. Beside extensive cultivation methods rich, not fragmented green infrastructure is the precondition for preserving, developing biodiversity in the cultural landscape. A very important reason for the lack of habitats of agricultural land is the lack of landscape elements providing links, hiding and nesting places for animals associated with the agricultural landscape. In our abstract we collected possible spaces for maintaining, developing green infrastructure in the farmland. For green infrastructure development priority target areas include

- strips 50 m wide adjacent to watercourses,
- land margins (10 m)
- arable land steeper than 17 %,
- arable land at risk of erosion,
- arable land affected by inland water,
- land of low soil quality,
- roadside strips arable land (2x20m wide),
- Natura 2000 protected arable land,
- arable land at risk of deflation,
- existing and potential field borders eligible for greening (20 m wide),
- treeless arable land around landfills, material extraction sites,
- underground water quality protection areas and
- treeless arable land next to settlements (100 m wide),
- gaps of ecological corridors (Figure 1).

Non-linear, woody elements can also be useful, as groups of trees, bushes, and solitary trees can serve as hiding places for songbirds and nest opportunities for species feeding on fields.
In case of establishment of new rows of trees or forest strips, native species corresponding to natural conditions are preferred. Wind resistance is also a consideration. Considering the spread of birds can be supported by using bird-friendly mixture species, these can be fruit-bearing trees or shrubs, or species that attract insects. The presence of berry shrubs is therefore essential for the winter nutrition of songbirds. Establishing grass fields also serves the interests of wildlife – especially in field borders a patch of lawn or hiding strips.

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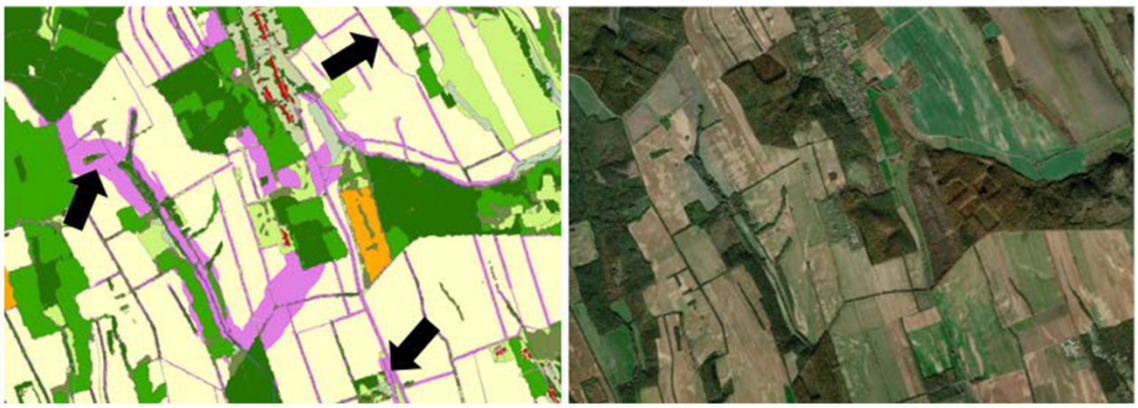

Figure 1. Priority area for green infrastructure development for improving connectivity in agricultural landscape. Planting shrubs, forest belt marked by purple in the maps connects fragmented ecological corridors

Figure 2. Low lying meadows along the river Drau (Photo: Zsolt Szilvácsku)

Figure 3. Wooden strip along the channel in Hanság in the agricultural landscape improving the ecological corridor function of the watercourse (Photo: Zsolt Szilvácsku)

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Figure 4. Small forest patch between arable fields serving as stepping stone habitat (Photo: Zsolt Szilvácsku)

Figure 5. Meadow with trees (Photo: Edina Dancsokné Fóris)

Figure 6. Mosaic structured landscape with varied cultivation providing habitat, migration roots for wildlife.

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GO CAVALE: Innovative Strategies for Foal Meat Production

The basis of this project is to valorize the foal meat and its benefits, by improving knowledge of the nutritional characteristics of meat and its derivatives. Thus, the **main objective** pursued was the improvement of the equine meat value chain, specifically quality foal meat, to increase its demand and consumption, in addition to developing strategies that improve the productivity and profitability of livestock farms for meat equine. This main objective can be broken down into the following points:

- Improvement of the equine meat value chain by valorizing the quality of foal meat.
- Strategies to improve the productivity and profitability of equine meat livestock farms.
- Know the consumer's perception in relation to foal meat and identify strategies to improve its image.
- Improved knowledge of carcass conformation, meat characteristics and the development of derivatives and innovative products based on foal meat.
- Transfer of knowledge and dissemination of results obtained.

The **main results achieved** in this work were:

I. Determination of the population growth curve in foals for "Marismeña" and "the Asturian mountain horse" breeds and determination of the optimal timing for their sale or slaughter.
II. Study the consumer perception in relation to foal meat, as well as the identification of strategies to improve its image and consumption.
III. Development of innovative meat derivatives based on foal meat and characterization of culinary treatments to enhance their value.
IV. Study the economic situation of horse breeding farms for meat production.
V. Characterization of the carcass and cutting of the foal: classification of carcasses, development of cutting and preparation of the sampling
VI. Microbiological, nutritional and sensory evaluation of foal meat and meat derivatives and culinary processes developed.

This project has received funding from the following entities:

Unión Europea
Fondo Europeo Agrícola de Desarrollo Rural
Europa invierte en las zonas rurales

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, PESCA, Y ALIMENTACIÓN

PNDR
Programa Nacional de Desarrollo Rural 2014-2020

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Links
Video: https://www.youtube.com/watch?v=qBF6Eu8sYco

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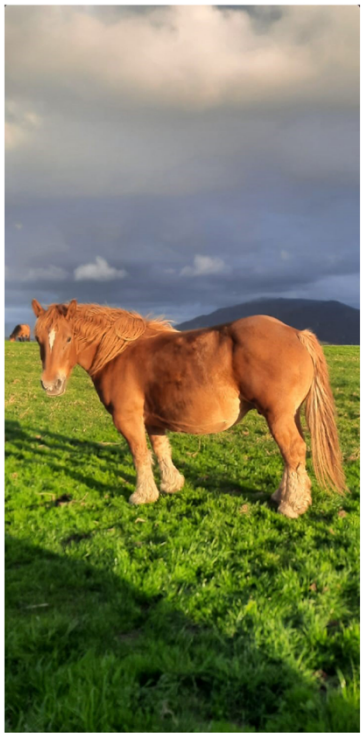

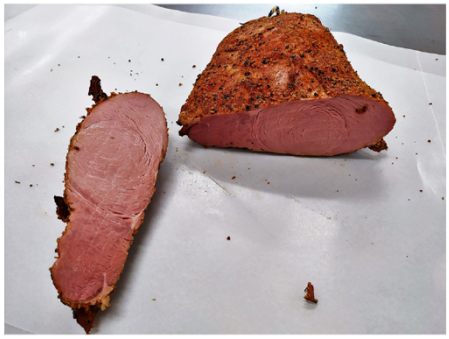

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RESUPEQ: VALORIZATION OF WHEY FROM SMALL CHEESE FARMS

Whey is classified as a highly polluting waste. The discharge of whey leads to serious water and environmental contamination problems, endangering the physical and chemical structure of the soil, reducing crop yield as well as aquatic life due to the consumption of oxygen dissolved in the water. On the other hand, **whey is a product having high energy and nutritional quality,** so it should not be named as waste as it is commonly treated.

The **main objective** of the project was the development of strategies for using whey for human nutrition by developing new products without the need for large investments, eliminating the environmental problem and generating new sources of income.

The work of this project focused mainly on **three possible product lines:**

- Whey-based drinks
- Development of dairy products using whey in their composition
- Snacks and other products (jellies, etc.)

The **main results achieved** are summarized in the following points:

1) Establish the protocols for the pre-treatments required on the whey to ensure that its suitability for use in human nutrition is guaranteed, at both a hygienic and nutritional level.
2) Development of whey-based drinks such as refreshing, energizing, isotonic, etc.
3) Development of dairy products, which may be fermented drinks (such as shaken and drinkable yogurts, new whey-based fermented drinks, etc.) as well as firm yogurts, puddings and other dairy desserts such as rice pudding.
4) Development of other types of products such as snacks and jellies.

This project has been funded by the following entities:

Unión Europea
Fondo Europeo Agrícola de Desarrollo Rural
Europa invierte en las zonas rurales

Gobierno de España
Ministerio de Agricultura, Pesca y Alimentación

Gobierno del Principado de Asturias
Consejería de Desarrollo Rural, Agroganadería y Pesca

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Links
Video: https://www.youtube.com/watch?v=WLAvBpqRmmc

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Toolbox enhances customer experience of short food supply chain entrepreneurs

Farmers and horticulturists selling their products in the short food supply chain need to tailor their offerings to the needs of local consumers. Actively improving the 'customer journey' enhances customer experience and makes producers more successful and resilient against competition.

Inagro, together with its partner Vives, strengthened the on-farm sales management. Over 80 visits by mystery shoppers provided insights into the experiences and purchasing behavior of consumers in non-urban environments in West-Flanders in Belgium. Their tips and experiences highlighted important steps in the purchasing process (from searching for online information, to visiting the store, to consuming at home). Inagro, Vives, and the producers collaborated on these initiatives in a co-creative manner and captured the tips and tricks in practical and short information sheets, webinars, testimonials, and self-studies. The topics are highly diverse: store layout, social media planning, digital payments, street promotion, cash register systems, organizing visits behind the scenes, etc.

This ready-made material is freely available online and is at the core of the service provided to short food supply chain products. The toolbox is continuously updated and expanded. Discover the toolbox and elevate your short food supply chain to the next level!

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Provide contact details for further information (name, address, email, phone).

Visuals and Links

- url Toolbox: www.inagro.be/korteketentoolbox
- Inspiration guide based on visits of mystery shoppers Inspiratiegids voor hoevewinkels (adobe.com)
- example of video from the toolbox: Farmer Business+: Customer Journey stap 3: Winkelinrichting en/of automaten (youtube.com)
- example of info sheet (link + screenshot): Fiche Verbindend communiceren met klanten en medewerkers.pdf (inagro.be)

inspiratie voor korteketenproducenten

VERBINDEND COMMUNICEREN MET KLANTEN EN MEDEWERKERS

Verbindende communicatie of geweldloze communicatie is de kunst van het duidelijk en respectvol communiceren met elkaar. Beide partijen voelen zich begrepen en gehoord. Centraal hierbij staat het respect hebben voor elkaar en elkaars grenzen.

win-win voor jou en de klant

- Door actief te luisteren en empathisch te zijn kom je te weten wat de klant echt wil en nodig heeft. Dit stelt je in staat om je producten, diensten en communicatiestrategieën hierop af te stemmen.
- Door open te staan voor feedback, kun je sneller problemen aanpakken en oplossen, waardoor de klanttevredenheid stijgt.
- Tevreden klanten zijn eerder geneigd om positief over je hoevewinkel te praten en deze aan te bevelen aan anderen.
- Het geeft je voldoening dat het respectvol behandelen van klanten bijdraagt aan het succes van je bedrijf.

Verbindend communiceren in 4 stappen

Het is belangrijk om steeds vooraf bij jezelf na te gaan wat er aan de hand is, hoe je je voelt en wat je nodig hebt. Probeer empathisch te luisteren naar de ander en op een respectvolle manier duidelijk te maken wat je van je klant verlangt.

Om verbindend en assertief te communiceren, kun je gebruikmaken van vier bouwstenen:

1 **Waarneming**

Begin met het delen van de neutrale feiten. Wat is er concreet gebeurd of wat is er aan de hand?
Bijvoorbeeld: *"De klant wil een ijstaart kopen maar houdt geen rekening met de uiterste besteldatum".*

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WaterRadar – connection supply and demand of water

Without water, there is no life. During times of scarcity, farmers look for irrigation water to ensure good crop production. Through recent innovations, alternative water sources have become available for the farmers, as a solution for the recuring water scarcity in Flanders during summer. The waterRadar is a tool providing information on the (potential) available water sources such as recovered irrigation water from food processing industry and domestic wastewater and how close these are to your farm and fields. Also, the legal status of using these waters is summarized on this web page. In this way, the connection between supply and demand is facilitated. Additionally, farmers can ask Inagro for advise on how to capture rainwater, extract groundwater, and use surface water. Also, personal advise on legal barriers and economic trade-offs is provided on demand during a water audit.

The WaterRadar was developed within the VLAIO LA project 'Irrigation 2.0: When where what water?', and currently further deployed by the partners below.

AGENTSCHAP INNOVEREN & ONDERNEMEN | Vlaanderen is ondernemen | vito | ILVO

inagro | VLAKWA

1650 characters maximum. Summarize key findings or recommendations in an easily digestible format. Aim for clarity and brevity. Please, provide the text in English and in your native language too.

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Dries Mergaert, water broker Inagro België (00 32 51 14 03 62, dries.mergaert@inagro.be)

Visuals and Links

- url water radar: https://waterradar.be/#/map
- Overview page of potential water sources: https://inagro.be/themas/water/welke- alternatieve-waterbronnen-kan-ik-aanwenden-op-mijn-bedrijf
- example of video from the toolbox: https://youtu.be/MxCLeI3ingU
- brochure: https://subsite.inagro.be/DNN_DropZone/Publicaties/329/Folder_alternatievewat erbronnen.pdf
- Image:

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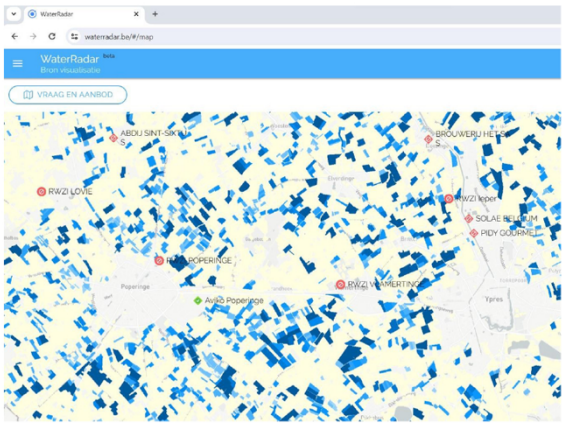

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