



LIVING LAB CATALOGUE

**Sustainable digitalisation
in agriculture**

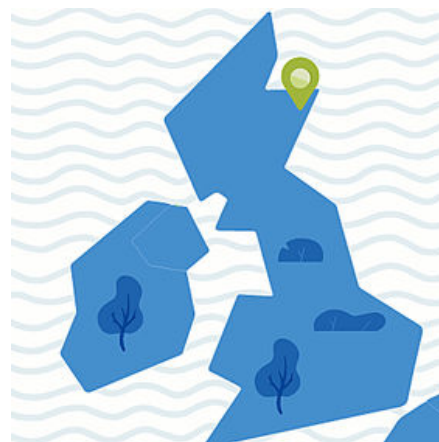




Remote rural farming communities

ABOUT THE LIVING LAB

The **Scottish Living Lab (LL)** is working with small- and medium-sized farms and their supporter organisations to understand **how digital platforms and tools impact farming** and other activities such as farm shops, tourist accommodation and educational events. The LL is exploring digital tools and platforms (e.g. social media, selling platforms) and creating a supportive environment for **knowledge exchange and peer-to-peer learning**. The aim is to **boost capacity** of these small and medium-sized farms to take advantage of digital resources in a way which fits with their values and everyday practices.



📍 Moray and Aberdeenshire, Scotland

🎯 Objectives and impact

- Promote **knowledge sharing** between LL actors in relation to digital platforms and other relevant digital tools.
- Support **skills development and training** through workshops, training events and an online platform for peer-to-peer learning between members of the LL.
- Demonstrate the **potential of digital platforms** through in-person and virtual demonstration events with the Demo Farm.



Problem to be solved

Farmers in the Scottish case study are situated in rural and remote rural settings. They face challenges including **distance to markets, issues with digital connectivity, access to digital skills support and the impacts of climate change**, etc. Although they currently use digital platforms to some extent (including social media), **the use of digital platforms could be increased** to address some of the challenges faced.



Description of the Focal Action Situation and its related activities

Farmers in the Scottish LL face **economic, social and environmental challenges**. These farmers can harness the power of digital tools and platforms to:

- support and improve sustainable agricultural practices
- enhance diversification activities, reaching broader audiences and markets
- access mental health support
- develop community relations
- raise public awareness of farming issues, thereby strengthening their resilience.



Technology and level of development

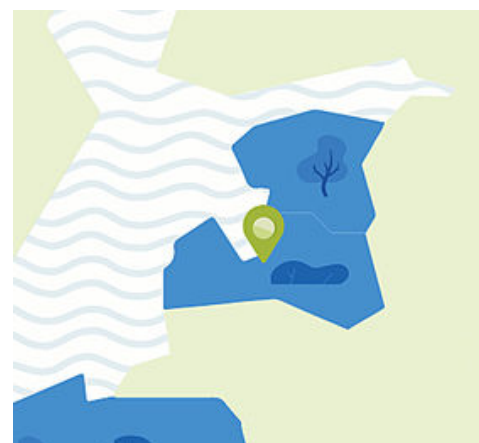
- Optimising the use of popular platforms (e.g. *Facebook, Instagram, YouTube, selling platforms such as Open Food Network, Go Rural*) and exploring emerging or lesser-known platforms with potential
- Demo farm activities include building a 3D video-based virtual tour and testing digital tools such as QR codes for farm visits



Grassland management in Latvia

ABOUT THE LIVING LAB

Grasslands hold an important role in Latvian cultural identity, yet less than 1% of semi-natural grasslands remain. They are also vital for the organic, grass-fed meat industry with subsidies offered for fertilising with legume plants. However, monitoring biodiversity in semi-natural grasslands and clover content in improved grasslands is time-consuming, while satellite imagery has neither the resolution nor the flexibility of timing needed. To address this, the **Latvian LL** is using drones to **capture the data the farmers need to make management decisions**, including percentage, clover content, extent of expansive species, tree cover and thermal images. Using established **data gathering techniques and algorithm learning** where needed, the goal is to assess whether this approach is a practical and cost-effective solution for farmers.



Vidzeme region, Latvia

Objectives and impact

- Develop **data gathering techniques** needed by the Latvian farmers
- Find cost-effective ways of **providing the data** in collaboration with drone operators from the Estonian University of Life Sciences.

Problem to be solved

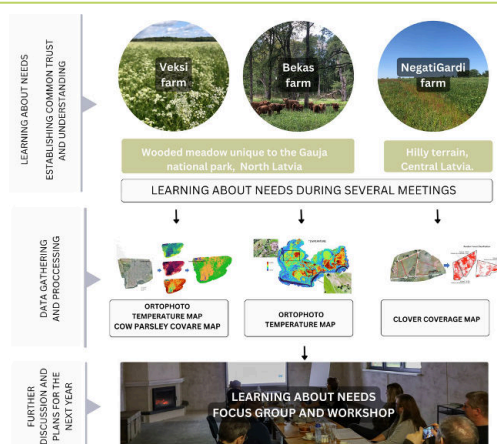
The Latvian Living Lab seeks to improve the **monitoring of biodiversity** in semi-natural grasslands and **track clover distribution** in improved grasslands to aid landowners develop their maintenance plans.

Description of the Focal Action Situation and its related activities

The project monitors expansive and invasive plant species, wildlife damage, thermal data, tree-canopy cover and percentage clover in semi-natural grasslands and improved grasslands.

Technology and level of development

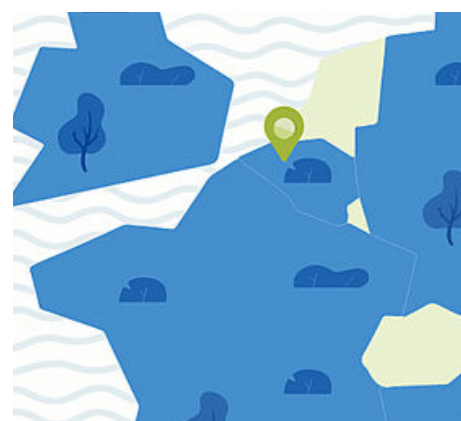
The LL uses **drones** to measure various parameters using known data gathering techniques (thermal and orthophotos) and **machine learning** to measure previously unrecorded parameters (such as, specific genera of species, Trifolium and Anthriscus).



Agrifood Technology

ABOUT THE LIVING LAB

The Living Lab Agrifood Technology is located in Merelbeke, close to Ghent. It is ILVO's Living Lab that helps farmers, companies and the whole agricultural sector **innovate agri-food processes**. The objective is to make processes from horticulture, arable farming, livestock farming and food processing more **sustainable and efficient**. The LL's expertise is mechanisation, automation, prototyping, sensor technology and digitalisation in agri-food. The LL uses a cycle of design, prototyping and field testing to obtain **practice-relevant solutions**, with **demonstrations** playing a key role. In order to arrive at market-ready technological innovations, relevant **stakeholders** are involved in this development process wherever possible.



East Flanders, Belgium



Objectives and impact

With the use of digital solutions, the LL wants to contribute to more **sustainable and efficient cultivation** of arable crops. **The reduced use of chemical products** will minimise the agricultural impact on the environment and improve the public opinion on agriculture. By providing the tools to farmers to only spray when it's needed, **the cost of treatments will be lower** and a significant amount of **time can be saved**.



Problem to be solved

Under the Farm to Fork strategy, part of the European Green Deal, the EU has set a target of a **50% reduction** in the overall use of **chemical plant protection products by 2030**. The Agrifood Technology Living Lab wants to help reach these goals by developing tools to **reduce the use of plant protection products** by spraying more precise through ultra-high resolution RGB on **drones combined with AI models**.



Description of the Focal Action Situation and its related activities

The LL Agrifood technology works on **arable production** and use digital technologies to **reduce the use of crop protection products** through **site-specific spraying**.

The stakeholders interact to test **ultra-high spatial resolution RGB on drones and AI models**, task map generation and label tools for weeds, **disease and pest detection** in commercial farms of arable crops. The LL focuses on **technological innovation**.



Technology and level of development

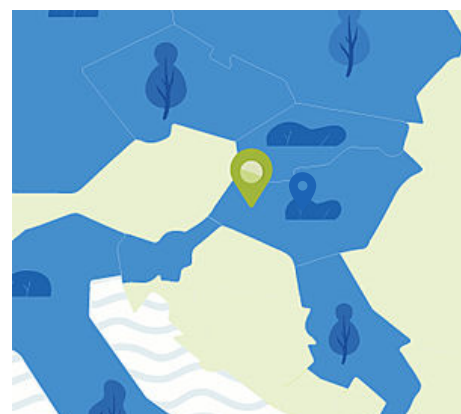
We will demonstrate the use of ultra-high resolution images on drones and A.I. to **detect weeds, diseases and pests in arable crops**. In addition, we will demonstrate **site-specific spraying** using **task maps** resulting from these drone images.



Innovative Soil Scanner technology for sustainable farming

ABOUT THE LIVING LAB

The **Living Lab in Hungary** is run by Szechenyi Istvan University in the **Transdanubian region**, where the landscape and agriculture is diverse. The LL operates across various farm types, from small to large, and diverse soil conditions. The aim of the lab is to test the practical applicability of an **innovative soil scanner system** (hardware, software, web-based platform, mobile application) for **soil nutrient management advisory**. The technology being tested seeks to enable farmers to analyse the nutrients in the soil in a quick, affordable and reliable method to **optimise their nutrient management and crop production**. Actors involved in the LL include farmers, advisors, researchers, technology providers, young and female farmers, female entrepreneurs, integrators, input suppliers and policymakers.



Transdanubian Region, Hungary



Objectives and impact

The LL aims to test **innovative soil scanner for sustainable farming** through four years of local trials, and expanding with input from soil experts, advisors, and researchers. The goal is to promote **data-driven decision-making** with user-friendly tool for broader accessibility. On-site soil analysis enables real-time and site-specific data, helping to reduce fertiliser use, enhance cost-effectiveness, and minimise environmental impact.



Problem to be solved

Non-site-specific application of fertilisers on agricultural land can cause **environmental stress**, **inappropriate nutrient distribution** in the soil and **economic damage** to farmers. As older generations of farmers tend to be afraid of new technology, the LL aims to shift the traditional '*we've always done it this way*' approach in nutrient management by introducing an **innovative, easy to use soil scanner system**.



Description of the Focal Action Situation and its related activities

In the Hungarian case study, farmers in the Transdanubian region rely on traditional nutrient management practices, leading to **increased costs** and **environmental damage**. Digital technologies provide instant, site-specific soil nutrient data, enabling farmers to implement **evidence-based strategies for optimal fertilisation** on both small and large farms. This approach minimises environmental impact by facilitating real-time, site-specific decision-making.



Technology and level of development

The LL is **testing the practical applicability of an innovative soil scanner** for sustainable agriculture, integrating a NIR sensor, mobile data upload to the cloud, and a mobile app. The **system analyses soil data**, offering **nutrient management advice** for more sustainable farming practices.

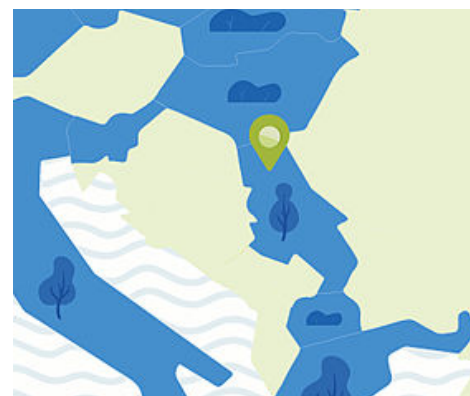




Greenhouse smart sensor laboratory

ABOUT THE LIVING LAB

Greenhouse production in Serbia still lags behind in the adoption of digital solutions, leading to high input consumption, lower profits and increased labor demand for farmers. Introducing **smart sensor technologies** aims to achieve optimal, efficient and sustainable agricultural production. These sensors enable farmers to remotely monitor key greenhouse parameters, such as air temperature and humidity, soil temperature and humidity and leaf wetness. With real-time access to this data, farmers can make timely decisions and take appropriate action. Ultimately, this will **optimise greenhouse conditions, increase the yield and quality of the product, and improve farmer's overall quality of life.**



Vojvodina Province Region, Serbia



Objectives and impact

- **Reduce the use of water** and **enhancing effectiveness** of agricultural production
- **Increase yield** while preventing damage and plant stress induced by low or high temperatures in greenhouses
- **Monitor soil nutrients** for fertilisation prescription
- **Increase profitability** by lowering input investments
- **Enhance farmer's welfare.**



Problem to be solved

The farmers at greenhouse farms still mainly **rely on traditional methods** and their experience in making the decision related to the production. This results in **high consumption of inputs, lower profits** and increased labor demand, **negatively impacting farmer's time and welfare.** Introduction of digital solutions aims to achieve optimal, efficient and sustainable agricultural production.



Description of the Focal Action Situation and its related activities

The LL includes a pool of stakeholders with different professional and personal background, working together to analyse current state of the Focal Action Situation through SESF methodology. The LL is installing all technical equipment needed to be tested at selected demo greenhouse farm, located in the village of Kovilj. The demo farm focuses on **greenhouse production** of radish, eggplant, kohlrabi for a multinational supermarket chain, using **sensors** to provide farmers with valuable and timely data about their vegetable greenhouse production.



Technology and level of development

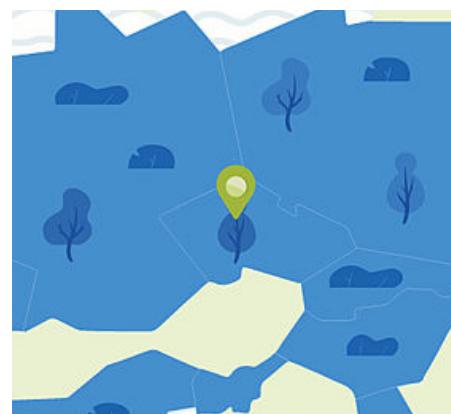
The lab uses several types of **sensors for monitoring conditions** (moisture, temperature, pH, CO₂, PAR) in the greenhouse. Sensors will be powered by communication module which will, at the same time, **upload measurement data to a digital platform**, AgroSense, that provides **support to farmers** for planning of the agricultural activities.



Automation of orchard management

ABOUT THE LIVING LAB

The Czech Living Lab focuses on the use of **digital technologies for orchard management** to increase the volume and efficiency of fruit harvesting. It also focuses on overall **production management** and facilitating **reporting obligations**. This is a lab with a variety of stakeholders including representatives of small and large fruit farms, Ministry of Agriculture, Fruit Growers' Union of the Czech Republic, and technology experts. The lab currently has **one demo farm that aims to install, evaluate and test various types of sensors** for crop protection, remote control of the irrigation system, frost and pollination monitoring and end-user application for the farmer. The LL is also planning to have a **demo farm with advanced technology** already installed.



Central Bohemia, Czech Republic



Objectives and impact

The main objective is to **improve the time efficiency** of farming practices, depending on the type of fruit and the environmental situation, to **increase the production** while **reducing costs** and **reducing the negative impact on the environment**, such as using water and fertilisers sparingly and reducing the use of pesticides, and **alleviating the reporting burden**.



Problem to be solved

Small orchard farms usually do not collect accurate sensor data, and large farms often measure with inaccurate sensors. In some cases, the problem is the **lack of spectrum or volume of data measured** (in terms of time and geography). Where data exists, the **lack of effective data processing and decision support tools** for agronomic interventions and agro management is a major problem.



Description of the Focal Action Situation and its related activities

Farmers, members of non-profit organisations, policymakers and agricultural advisors are working with technology suppliers and researchers to evaluate technologies that will help small orchard farms establish **automation of irrigation** and **monitoring of climatic conditions in the orchard**. Simultaneously, the LL seeks to achieve **savings in water and pesticide use**, and **reduction of the impact of adverse weather on crops**.



Technology and level of development

The LL focuses on **technological innovation in orchard management** using various sensors, weather monitoring stations as well as very advanced and complex **digital systems providing data processing and decision support tools**.



Smart Villages Network

ABOUT THE LIVING LAB

The Smart Villages Network connects farmers, researchers, technology solution providers, and government representatives. Over the years, they have cooperated and engaged in various projects and initiatives that complement and enrich each other, with a clear focus on **cultivating a smarter and more sustainable future for rural communities**. Together, they co-create sustainable solutions, leveraging the benefits of technological advancements. The LL's primary focus involves harnessing **IoT technology** in wine and honey production through co-creation, prototyping, testing, and scaling up innovations.



 Slovenia



Objectives and impact

- Improve the **economic efficiency** of the farms (20% decrease in plant protection costs, 500 EUR savings/1ha per season)
- Reduce the **environmental impact** (water management, fungicide management, etc.)
- Enhance positive **social impact** by ensuring sustainable business in rural areas (involvement of young people, better jobs opportunities, time saved on manual inspections, etc.)



Problem to be solved

To address **connectivity challenges** and **diverse microclimates within vineyards**, the LL aims to identify optimal IoT infrastructure for winemakers. Additionally, the LL established a **demo IoT beehive environment**, fostering research and innovation in beekeeping solutions.



Description of the Focal Action Situation and its related activities

The lab is leveraging **digital technology** and transforming viticulture and honey production. By integrating IoT solutions, it strives to enhance **sustainability across environmental, economic, and social dimensions**, ensuring a holistic impact on agricultural practices.



Technology and level of development

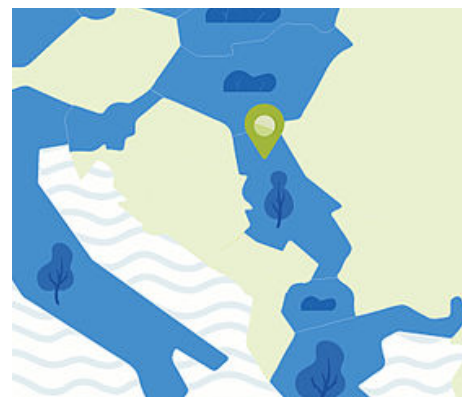
The LL employs **IoT and LoRaWAN technology** for a resilient infrastructure addressing **connectivity issues, rugged terrain, and diverse microclimates** in the same vineyard. Deploying microclimate, soil moisture, rain, and leaf wetness sensors across Doppler winery, the system transmits data to a dashboard, ensuring continuous availability and informed decision-making (TRL 7).



RAMAS

ABOUT THE LIVING LAB

RAMAS (Remote Agricultural Monitoring and Advisory System) is a Living Lab in **North Macedonia**, developed by AgFutura Technologies to support decision-making in agricultural production, through **advisory services** that are based on a large amount of information obtained directly from the field, from each phase of agricultural production at most appropriate time. The LL has developed a demo farm in the Ovche Pole valley for the **improvement of agricultural production systems**. The expected benefits are improved production, enhanced and timely decision-making, increased traceability of data, energy efficiency, and optimisation of processes.



Ovche Pole, North Macedonia



Objectives and impact

- Develop a model for a **centralised advisory system** for support and improvement of agricultural production systems
- **Strengthen communication** between farmers and advisors
- Optimise the use of **agricultural inputs and processes**
- Increase **effectiveness in decision-making**
- Improved farm **accountancy**
- **Collect and categorise agro-technical operation data.**



Problem to be solved

- **Limited professional support** for farmers
- **Lack of farm accountancy and agro-technical operation data**
- **Non-optimised agricultural production** due to input and process management
- **Energy inefficiency** in farming operations.



Description of the Focal Action Situation and its related activities

The LL works on barley, corn, and hazelnut farming, using **digital technologies** to provide professional support in agricultural production, and improve the advisor-farmer collaboration.

The **main objective** is to test farm accountancy forms, communication processes, and a user-friendly dashboard incorporating earth observation technologies. The **focus is on technological innovation, collecting data for tailored advice.**



Technology and level of development

The LL is developing a centralised platform for **collecting data from Earth observation and environmental monitoring technologies**, used by experts and advisors for delivering tailored advice. The data circulates in **two data streams: upstream** (field data) and **downstream** (advisory). RAMAS is developed as a **semi-functional web application**.



Almería AgroEcology

ABOUT THE LIVING LAB

The Living Lab is located in the province of Almería, in the southeast of Spain, in Andalusia. Almería covers an area of 8 774 km², and the farm is in the coastal region of the province, along the Mediterranean Sea. The demo farm is a **greenhouse** of 0.2 ha, however, representative of Almería's extensive greenhouse agriculture, which covers 31,614 hectares and is primarily composed of small family farms. The **interoperability and integration of technologies** allows to be more **sustainable with local resources** which has a direct effect on the **economic profitability** of greenhouse production, as well as **social and economic stability** for small farmers integrated in the European supply chains.



Almería, Andalucía, Spain



Objectives and impact

The data integration solution and lack of interoperability opens the door to more **efficient resource management and real-time industry monitoring**. It aims to improve food production sustainability - economically, environmentally, and socially - by offering improved technologies to develop and create **resilience in the local agricultural sector** and to create **dignified employment** and ensure **equitable wealth distribution** within the system.



Problem to be solved

The lack of interoperability leads to **incompatibility between different technological systems**, which hinders wide adoption by the sector, the use of different technologies and data acquisition. There is currently a **need for integration of heterogeneous data from different sources**. This lack of interoperability hinders the management and optimisation of resources. Proper integration allows for more sustainable natural resource management techniques to ensure food security and a clean and healthy environment.



Description of the Focal Action Situation and its related activities

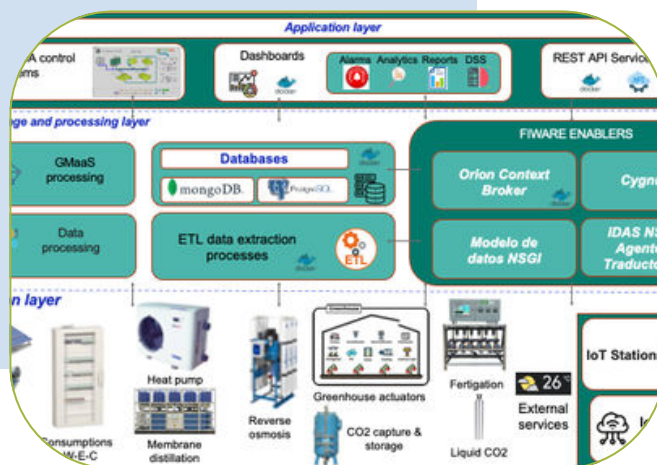
To **alleviate the problems arising from the lack of interoperability**, the activities to be carried out by the LL are:

- Workshops, demonstrations, interviews to interact with stakeholders.
- Pilot testing to collect consistent data and scale the solution to commercial farms and markets.
- Dissemination, communication, and training activities to different value chain's actors.
- Developing collaborations.



Technology and level of development

This solution proposes the **integration of sensors and actuators in a centralised platform** based on European IoT standard FIWARE for data management. The basis for data integration and interoperability is currently at a high TRL, but the system optimisation scheme is still under development. It is important to develop an optimised framework for control and management of resource generation, storage, reuse and use.



Artificial irrigation management system

ABOUT THE LIVING LAB

The goal of the Slovak Living Lab (LL) is to create, evaluate and test an application for agronomists that will enable the automatic determination of the irrigation dose. To achieve this goal, we will start from a combination of data obtained from measurements from sensors, irrigation systems, from databases of the physiological need for individual irrigation doses for a specific plant, data on environmental factors that are on the company's server, and available scientific knowledge. In the first step, the existing data will be analysed, then the datasets that Living Lab will need for further analysis will be defined. In the third step, an algorithms will be designed to help the manager determine the irrigation dose.



 Slovakia



Objectives and impact

In the case of artificial irrigation of agricultural crops, the automatic control of the pivot irrigation systems is relatively well mastered. On the other hand, the amount of applied irrigation dose depends on the experience and decision of the agronomist.

The goal of the Slovak Living Lab is to find a solution that eliminates the subjective decision-making of the operator - agronomist to the greatest extent possible.



Problem to be solved

Trends in the field of irrigation focus on increasing the quality of work and reducing water consumption.

The amount of water a crop uses is affected by a number of factors, including soil water availability, rainfall during the growing season, stages of crop growth, crop rooting depth, and environmental factors including the amount of sunlight, humidity, temperature, and wind speed.



Description of the Focal Action Situation and its related activities

Algorithms for determining the irrigation dose for agronomists will work based on:

- Devices for measuring soil moisture placed at the depth where the decisive part of the active plant roots is located.
- Standard curves for leaves per plant and soil moisture for individual irrigation doses for the plant according to the phenophase.
- Environmental factors, including the amount of solar radiation, atmospheric precipitation, humidity, temperature and wind speed.



Technology and level of development

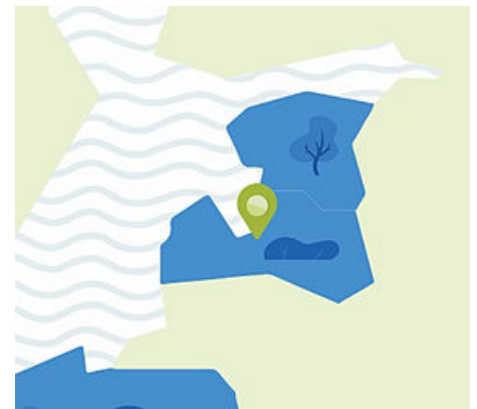
The combination of real time data from new sensors, scientific knowledge from databases of the physiological need for individual irrigation doses for a specific plant and data on environmental factors that are on the company's server allow the manager/agronomist to determine the correct irrigation dose.



Living Lab Latvia

ABOUT THE LIVING LAB

The CODECS Living Lab (LL) in Latvia aims to strengthen the market position of beef farmers that practise environmentally friendly farming methods. Specifically, the Living Lab in Latvia engages with a network of farms across Latvia that seek to combine their efforts under the umbrella brand Grassland Product Label (*Pļava* in Latvian). This brand is currently being developed by the Latvian Fund for Nature (an environmental NGO), and the brand will specialise in products from semi-natural grasslands characterised by high biodiversity. The Living Lab is coordinated by Zemnieku Saeima (practice partner) and Baltic Studies Centre (research partner).



Latvia



Objectives and impact

The objective of the Living Lab is to develop a digital solution that would allow specialised farmers (i) whose farms are on semi-natural grasslands characterised by high biodiversity and (ii) who follow strict environmental regulations to communicate the characteristics of their farms and products (beef in particular). The solution will allow farmers to deliver their message and enhance their market position.



Problem to be solved

The problem that the Living Lab will tackle is the precarious market position of local beef cattle farmers. This will be done by improving consumer awareness of beef production in Latvia and providing access to information in a user-friendly manner, which will make it easier for producers who follow high production standards to justify the premium they demand for their products.



Description of the Focal Action Situation and its related activities

There is a need to strengthen the interaction between different actors involved in the agricultural marketing ecosystem, such as farmers, advisors, NGOs, and public organisations. This will improve the efficiency of local resource systems and can enable farmers to make use of digital marketing solutions and improve their market position.



Technology and level of development

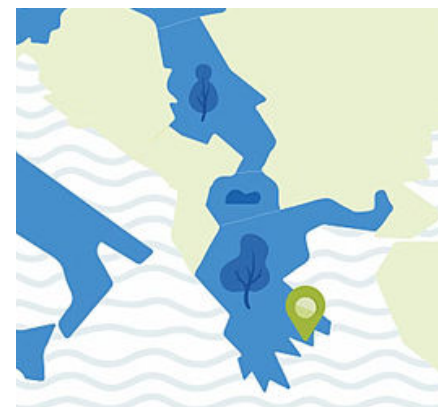
The Living Lab will primarily focus on finding a marketing application for the GEO map environment maintained by the practice partner. This tool will be further developed in conjunction with the Grassland Product Label.





The organic vineyard of the Agricultural University of Athens farm in Spata

ABOUT THE LIVING LAB



Region of Attica, Greece

The experimental field is the organic vineyard of the Agricultural University of Athens farm located in a peri-urban area close to the city of Athens (Spata, Attica region). The vineyard has 2.0 m row spacing with 1.6 m spacing of vines along the row to result in a density of 3125 vines per ha. Within the demo farm, UAV spraying experiments take place throughout the summer, to identify the optimal operational parameters for drone spraying in vineyards, based on standardised procedures and measurements (i.e. ISO standards), aiming to collect data on drone spraying efficiency (canopy droplet deposition, coverage, and penetration) and environmental impact (ground residue and spraying drift).



Objectives and impact

The Living Lab (LL) aims to:

- Assess the drone spraying settings and operations.
- Identify optimal spraying parameters and create a methodological guide for optimal drone spraying applications.
- Test and assess the application approaches.
- Examine socio-economic and environmental impacts.
- Develop business and governance models.
- Identify risks and develop mitigation strategies.



Problem to be solved

The Greek Living Lab aims to assess and analyse the best drone spraying configurations for field use, to compare them with conventional spraying machinery like terrestrial boom and mist sprayers, and to evaluate their spraying quality. In addition, the Living Lab intends to identify the inherent risks of using drones for spraying and address them through the development of novel mitigation strategies, enabling safe and eco-friendly drone-based plant protection applications.



Description of the Focal Action Situation and its related activities

The Greek Living Lab is working on vineyard spraying and crop protection, using advanced digital technologies to enhance the productivity, profitability, and sustainability of European agriculture. The LL is collaborating with agricultural chemicals entities, cultivators, and UAV manufacturers in trials with spraying drones equipped with GIS, ecological detectors, and IoT stations to amass qualitative data on the spraying applications and droplet displacement (spraying drift).



Technology and level of development

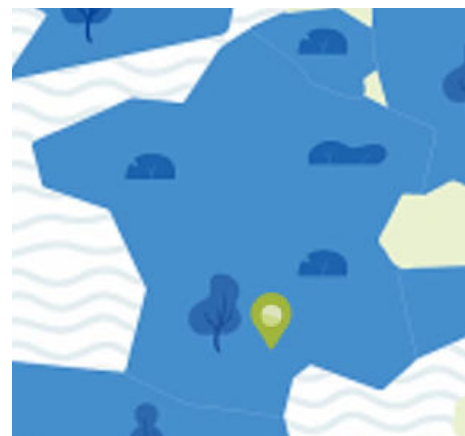
Spraying UAVs use digital technologies like GIS for flight planning, IoT for weather monitoring, LiDAR for altitude adjustments, and vision systems for obstacle avoidance. Data is analysed using image analysis or laboratory retrieval for spraying displacement assessment.



Occitanum - Open Lab Viticulture

ABOUT THE LIVING LAB

The **Occitanum Open Lab Viticulture Living Lab (LL)** is located in the Tarn valley, in the Occitanie region, right in the heart of the Gaillacois vineyards. This site is one of 7 Open Labs in the **Occitanum** project, whose ambition is to provide digital tools and services to facilitate the agroecological transition of the region's agricultural sectors. On the OL VITI 81 site, a **community of practice** has been created, bringing together a diversity of local stakeholders (Cooperatives, farmers, advisors, service and equipment providers), researchers, facilitators and public players, to implement an open innovation approach anchored in the territory. Since 2021, the players have set up innovative projects, starting from the needs expressed by producers, to identify digital technologies that will enable them to reach new milestones in their **agro-ecological transition**. The solutions are then co-constructed with ag-techs, and their costs and benefits assessed under real conditions of use.



Tarn, Occitanie, France



Objectives and impact

The aim is to show that by adopting a Living Lab approach, the targeted impacts will be maximised. The aim is to co-construct the conditions for open, multi-partner innovation at the service of transitions (digital, agro-ecological) by creating spaces for cooperation between stakeholders. This should enable farmers to create value, contribute to healthy, local food and participate in the development of the regional digital economy.



Problem to be solved

The Occitanum LL addresses two major issues, namely the reduction of inputs and adaptation to climate change. Digital technologies should make it possible to adapt technical itineraries and allow to preserve the tipicality of the wines while protecting the environment through improved fertiliseer use efficiency.



Precision fertilisation strategy

Fertilising a vineyard plot is a key stage in the growing cycle. It helps maintain soil balance and grape yield. Over time, maintaining good availability of elements in the soil is a complex task as soils are rarely structurally homogeneous. To ensure successful fertilisation, one has to understand the sources of the plot's heterogeneity, look at its history and observe the pedoclimatic context. Fertilisation can therefore be managed according to the principles of precision viticulture: **measure, decide, act**.



Technology and level of development

The digital solution includes several digital bricks, which are **already available and used**:

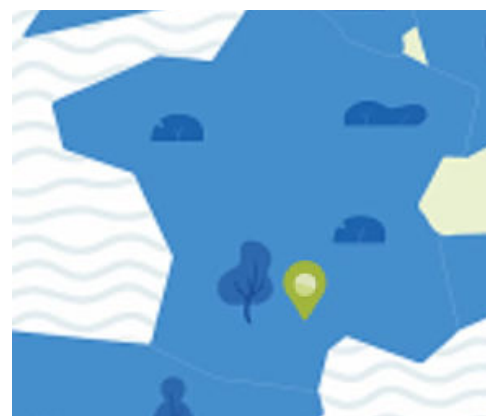
- **MEASURE**: A first module for the acquisition of vineyard images (satellite or aerial) to produce vigour maps (NDVI based).
- **DECIDE**: An user-friendly interface to delimit zones of management of nitrogen fertilisation.
- **ACT**: A modulation device on board of the tractor for variable rate application.



Occitanum - OL SHEEP

ABOUT THE LIVING LAB

The Occitanum OL SHEEP Living Lab is located in the departement of Aveyron in the Occitanie region, right in the heart of the Roquefort PDO production area. This site is one of 7 Open Labs in the Occitanum project, whose ambition is to provide digital tools and services to facilitate the agroecological transition of the region's agricultural sectors, for instance Livestock in this Living Lab (LL). On the OL SHEEP 12 site, a community of practice has been gathered, bringing together a diversity of local stakeholders, researchers, facilitators and public bodies, to implement an open innovation approach anchored in the territory. Together, they focus on the identification and test of innovative technologies along the value chain to improve the welfare of the small ruminants. The activities conducted in this Living Lab implicates a pilot farm and 7 commercial farms willing to test the technologies.



Aveyron, Occitanie, France

Objectives and impact

The objective is to show that by adopting a Living Lab approach, the targeted impacts of implementing innovations will be maximised. The aim is to co-construct the conditions for open, multi-partner innovation at the service of transitions (digital, agro-ecological) by creating spaces for cooperation between stakeholders. This should enable farmers to create value, contribute to healthy, local food and participate in the development of the regional digital economy.

Problem to be solved

This Living Lab addresses the issue of **animal welfare** in the small ruminant sector. The aim is to mobilise simple, low-cost digital technologies to build and monitor animal welfare indicators, particularly for dairy sheep in the Roquefort sector. The Living Lab will focus on welfare issues such as nutrition and health for early warning systems.

Monitoring daily milk production and climatic environment

Precision Livestock Farming has not yet been applied in species where animals are considered to have a lower individual value or with less economic interest, as is the case in small ruminants such as sheep, or in extensive management systems. PLF can help the breeder to identify animal welfare and health problems earlier in order to accelerate decision and action (target treatments, help in decision-making on technical choices for the herd, in particular on feed, hydration, reproduction, housing conditions in the shed, etc.). The test of different digital solutions will generate data on daily basis in order to create relevant indicators.



Technology and level of development

Connected individual milk meters for dairy sheep allow farmers to accurately and efficiently monitor the milk production of each animal. Each sheep is equipped with a connected milk meter that is installed on the milking machine, typically attached to the milking hoses and are capable of measuring the amount of milk that passes through during milking.

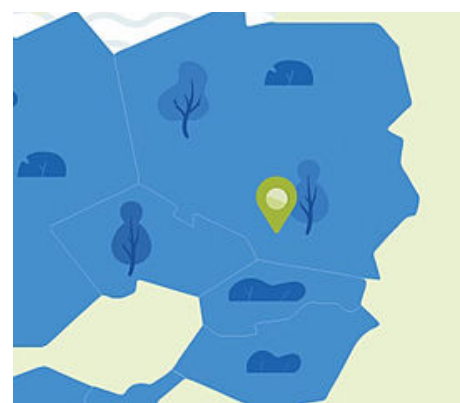
The milk meter measures the quantity of milk produced by each sheep in real-time using flow sensors (usually infrared) that record the volume of milk passing through the system. The collected data can include not only the quantity of milk but also its temperature and conductivity, which are potential indicators of the sheep's health.

APPETIT LIVING LAB

ABOUT THE LIVING LAB

The APPETIT LIVING LAB in Poland is piloting novel short food chain solutions to scale local markets for locally-produced food by deploying digital technologies enabled via the APPETIT platform.

Working with initiators and organisers in 4 locations across Poland, APPETIT seeks to provide, customise and automate 'intermediary services' essential for connecting many producers to many consumers directly to one another. The ambition is to configure virtual and physical market-places as producer-consumer arrangements without intermediaries - than can be replicated across Poland.



Poland



Objectives and impact

The objective of piloting the APPETIT platform is for participating producers and consumers in the 4 local market locations to access and provide 'intermediary services' to enable their local market to grow as a self-organising short food chain. The platform seeks to augment & support different organizational arrangements, as well as peer-to-peer learning and support by creating a self-organising digital ecosystem.



Problem to be solved

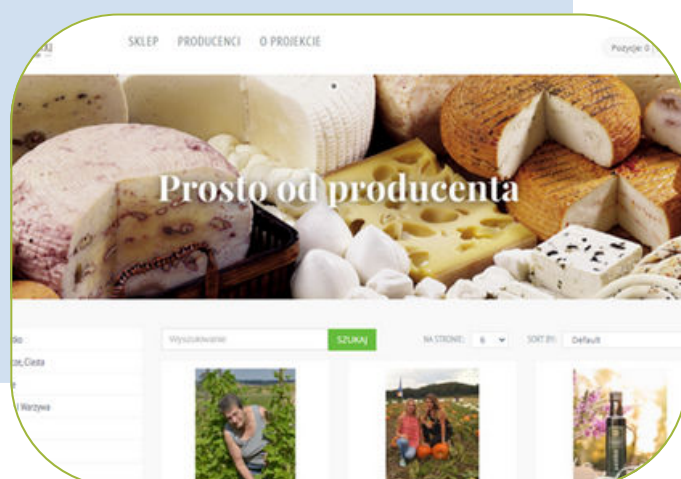
How to replace conventional external intermediaries connecting producers and consumers with IT-enabled intermediary services provided by local market stakeholders, including producers and consumers. The need is for (self) organising arrangements that increase the numbers of producers and consumers involved, the range of products offered for sale and increase sales volumes, while reducing transaction cost for participating producers and consumers.



Description of the Focal Action Situation and its related activities

Poland's 1.3 mln farms are mostly small/part-time. They represent a resource & opportunity for local food markets. The need is for an interactive-and-adaptive pathway for engaging small-scale food producers, consumers and rural development stakeholders in growing local markets for locally produced food.

Activities focus on co-creating collaborative arrangements for IT-enabled sharing economy functionalities for strengthening, replicating and growing local food markets.



Technology and level of development

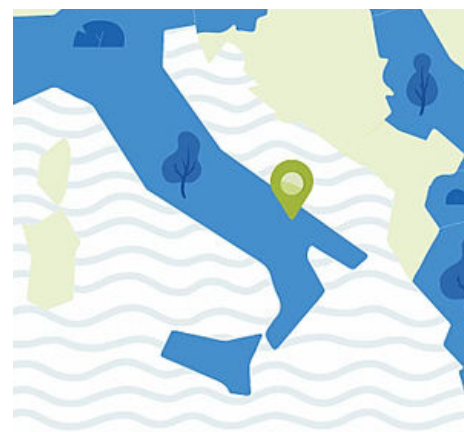
APPETIT is a prototype software platform designed to establish a digital ecosystem that supports both virtual and physical marketplaces. It offers bespoke functionalities tailored to specific local contexts, addressing the distinct roles, sales processes, and requirements of food producers, consumers, market organisers, promoters, regulators, lawmakers, and other stakeholders.



Consorzio Pecorino Toscano

ABOUT THE LIVING LAB

The **Consortium for the Protection of Pecorino Toscano DOP** includes 223 breeders across 18 dairy factories, supporting a pecorino cheese supply chain in southern Tuscany that combines tradition with innovation through close farmer-researcher collaboration over the past decade. The **demo farm** is part of the Caseificio Sociale di Manciano cooperative dairy in Maremma, involving stakeholders like farmers, advisors, researchers, the Consortium, and Caseificio di Manciano. This dairy cooperative comprises about 150 farms, each averaging 250 sheep on 70 hectares. The Manciano landscape features hilly terrain along the Albegna and Fiora rivers, with a Mediterranean climate—mild, wet winters and dry summers. Loamy to clay-loam soils allow grazing from autumn to spring, though summer heat can increase stress for the sheep.



Grosseto, Tuscany Region, Italy



Objectives and impact

Expected benefits include reduced paperwork, the ability for the dairy to estimate milk quantity and quality in advance, and greater efficiency in advisors' work, such as the ability to keep track of events (such as pregnancies, births, deaths, illnesses...). The idea is to help make farmers' work easier and possibly attractive to younger generations. Finally Increase efficiency of cheese making and sheep management, as well as welfare monitoring.



Problem to be solved

The main problem is the reduction in the number of sheep farmers each year, and thus the reduction in milk for cheese production (Pecorino Toscano DOP). Confirmed also by the data, this decrease entails a reduction in the production of Pecorino Toscano PDO, and from the point of view of the territory, a change in the agricultural landscape and a decrease in the presence of farmers in the Maremma area already characterised by low population density.



Description of the Focal Action Situation and its related activities

Facilitate farmers in the data collection of data related to farm processes and use such data in order to improve the quality of production, the quality of work and life of farmers, the visibility of the farm and the animal health and welfare. The idea is to start from more present and well-equipped advisory services in the area. At this time, a FMIS is being tested by the advisors in the area, aiming at integrating both milk and animal data (e.g., pregnancies, births, deaths, diseases, etc.).



Technology and level of development

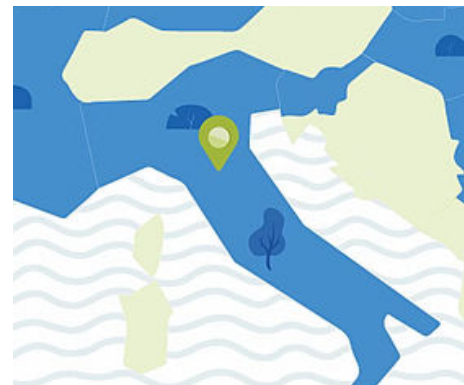
Development of a farm management information system (FMIS) for decision support that integrates new and existing databases managed by different actors. The FMIS is based on a web services architecture consisting of an internal database for backup management, external databases from different sources, a mobile application, and a web dashboard.



Organic Table Grape

ABOUT THE LIVING LAB

The Living Lab (LL) is located in Castellaneta Marina near the sea and in Taranto Province in the Apulia Region (South Italy). The area mainly specializes in Mediterranean fruit production such as table grapes, citrus, and stone fruit due to its favourable climatic conditions. Many farms are converted to organic farming, and the area represents the most important region for this production at the European level (more than 4000 hectares). Most of the product is oriented to export. The value of production is very high compared to other regional areas.



Apulia Region, Italy



Objectives and impact

Organic Table Grape Living Lab wants to achieve benefits both at farm and at community level such as:

- Provide the farmer with tools capable of managing the means of production, reducing water costs and increasing the quality of production.
- Contribute to the reduction of the use of Plant Protection Products to achieve the Green deal strategy.
- Increasing the awareness of public opinion on organic farming.



Problem to be solved

- Increase the quality and quantity of table grape production while reducing qualitative and quantitative pressure on soil and water resources.
- Costs of technologies especially for large farms together with the absence of a public wide monitoring system.
- Improved software development with a co-creation process.



Description of the Focal Action Situation and its related activities

How can we increase the quality and quantity of table grape production while reducing the qualitative and quantitative pressure on soil and water resources?

Is it possible to have eco-sustainable, short-cycle production with precise quality standards?



Technology and level of development

The use of field-level sensors interconnected and communicating with a DSS to improve the yield and quality of organic table production, reducing labor intensity and production costs. Several farmers have already adopted IoT technologies, but the results obtained should be better highlighted and usability should be stimulated for a broader spectrum of adopters.



Cloughjordan Food Hub

ABOUT THE LIVING LAB

The Living Lab is located in the Enterprise Centre in Cloughjordan Ecovillage, in a rural region in the midlands of Ireland. The intention of the lab is to support the development of local and regional food sovereignty. We do this through the development of digital routes to market and a facility developing a community food processing kitchen. Our location brings together a number of social and environmental initiatives including Cultivate a National sustainability NGO, WeCreate Fab Lab, a digital fabrication lab, Sustainable Projects Ireland, a charity which manages the ecovillage and Cloughjordan Community Farm Ireland's first and largest example of Community Supported Agriculture (CSA), which feeds 100 people through a subscription model with local, organic, seasonal vegetables. The surrounding region is a low populated area, with a predominance of dairy farms.



Tipperary, Ireland



Objectives and impact

At the farm level we expect the benefits to include reduced waste - and the saving of time and energy (no need to stand all day on a market stall). We also intend to make the case for a food processing initiative based on excess produce identified through the project. At a community level we would like to see increased food security as diverse shorter supply chains are less vulnerable to shocks and the invigoration of the local economy.



Problem to be solved

Rural areas suffer from a lack of facilities which results in a number of interrelated problems. Producers have difficulty accessing markets and consumers lack access to healthy local food. Local economies suffer from people accessing out of town large markets further reducing investment in local facilities and lengthening supply chains. The lack of models for locally owned food production tools and infrastructure further exacerbates the problem.



Description of the Focal Action Situation and its related activities

Reliability and resilience of local short supply chains. How can local suppliers ensure reliable service to customers and avoid sporadic supply which puts unnecessary burden on the goodwill of customers to make choices at an opportunity cost when other suppliers can fulfill their needs. Clear real time data on the availability of produce, demand response for customer orders and well planned distribution schedules are being assessed and can be supported through digital marketplaces and farm mapping.



Technology and level of development

An open-source digital platform designed as an online marketplace for farm produce. The platform integrates open-source farm mapping software to capture both produce and provenance data. While the technology has been operational on a small scale for approximately a year, adoption has so far been limited. To effectively evaluate its potential impact, there is now a need to broaden its reach and encourage wider engagement.



LIT OUESTEREL

ABOUT THE LIVING LAB

The Living Lab is located in the Enterprise Centre in Cloughjordan Ecovillage, in a rural region in the midlands of Ireland. The intention of the lab is to support the development of local and regional food sovereignty. We do this through the development of digital routes to market and a facility developing a community food processing kitchen. Our location brings together a number of social and environmental initiatives including Cultivate a National sustainability NGO, WeCreate Fab Lab, a digital fabrication lab, Sustainable Projects Ireland, a charity which manages the ecovillage and Cloughjordan Community Farm Ireland's first and largest example of Community Supported Agriculture (CSA), which feeds 100 people through a subscription model with local, organic, seasonal vegetables. The surrounding region is a low populated area, with a predominance of dairy farms.



France



Objectives and impact

- Carry out co-construction operations based on collective intelligence and aimed at testing and developing solutions and innovations, including technological ones.
- Rely on a hunt for innovations to identify new knowledge and tools contributing to animal well-being and better breeder's working conditions.
- Raise awareness of different actors by developing training, dissemination, and communication actions (workshops, peer-to-peer learning events, etc.)



Problem to be solved

Digitalisation in pig farms is evolving, and the use of connected tools is increasing. However, the multiplicity of management boards and the need to some time register the same data twice in different software make this digitalisation a bit inefficient. So, there is a need to facilitate data registration and sharing.



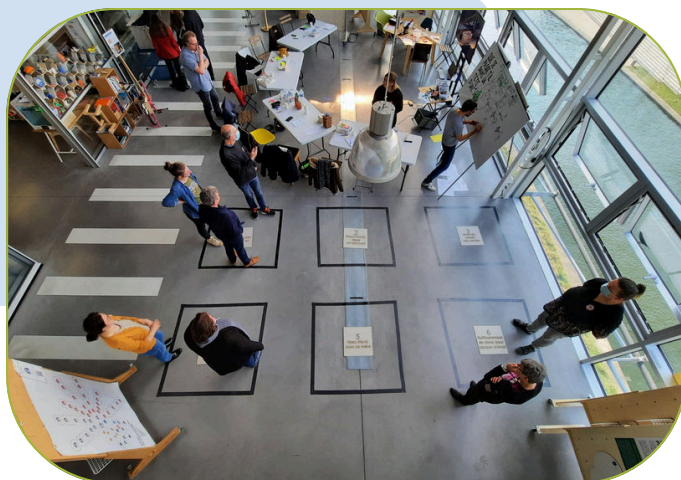
Description of the Focal Action Situation and its related activities

In this Living Lab, different actors such as farmers, advisors, technology providers, and technicians, interact to test a platform linking farm and equipment data. The aim is to facilitate data sharing between equipment and management software. Later on, it can ease farm management and traceability and reinforce food safety and quality control from farm to consumer.



Technology and level of development

PigLink is a platform for sharing standardised data between authorised partners of pig farmers, using web API's. At the start, Farmers register themselves on the platform, and describe the structural elements of their farm (buildings, rooms, pens), each identified by a unique "PigLink number". Then farmers link their equipment registered by data manufacturers to the structural elements of their farms. Once it is set up, data users (farmers or technology manufacturers) can ask PigLink for data from a given field (feed, ventilation, water, ...) of the farm.





CODECS (maximising the CO-benefits of agricultural Digitalisation through conducive digital ECoSystems) is a four year Horizon Europe project that gathers 33 partners all around Europe and which is coordinated by the University of Pisa.



www.horizoncodecs.eu