



CORDIS Results Pack on **agroecology**

A thematic collection of innovative EU-funded research results

October 2021

Transitioning toward sustainable, climate and ecosystem-friendly farming and food systems



Research and
Innovation

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Editorial

Transitioning toward sustainable, climate and ecosystem-friendly farming and food systems

Farming in Europe has been transformed over the last 70 years by policies, technologies and practices that sought to guarantee a stable supply of affordable food. But success has come at the cost of mounting environmental degradation. This CORDIS Results Pack highlights 11 EU-funded research projects that demonstrate the potential of more sustainable alternatives.

A holistic approach that supports sustainable agricultural production while maintaining robust stewardship of the environment, agroecology works with nature and ecosystem services, increasing the resilience and diversity of farms, and holds the potential to drive a full transformation of farming and food systems.

Agroecology has implications for a span of agricultural practices, from breeds and varieties used, to soil management practices and crop diversification strategies, integration in value chains, and business models that can sustain locally adapted practices and provide greater market opportunities for farmers and consumers. Examples of farming practices implementing agroecological principles are organic farming, agroforestry and mixed farming.

Agroecology has the potential to become a fundamental tool for the EU in its effort to promote a sustainable farming sector that respects planetary boundaries and is able to respond to changing needs of society both in terms of sustainable and healthy diets and with regard to the environmental and climate issues related to primary production.

Research and innovation in this area is opening up new opportunities in farming systems, making it possible to use ecosystem services to benefit sustainable and resilient land use systems without jeopardising profitability of the farming activity.

Agroecology has been identified as a practice that can be supported through the eco-schemes under the first pillar of the Common Agricultural Policy (CAP). It has also been singled out as one of the sustainable farming practices that can help achieve the targets of the EU Green Deal and its related Farm to Fork and Biodiversity strategies. Under Horizon 2020, the EU has funded several research projects dedicated to advancing agroecological research. These projects are contributing to an increased understanding of the practical implementation of ecological and low-input farming practices, along with their environmental, climate and social benefits.

These advances will be further boosted in Horizon Europe, under which the Commission has proposed a candidate European partnership on 'Accelerating farming systems transition: agroecology living labs and research infrastructures'. If successful, the overarching goal of this candidate partnership would be to tap into the potential of agroecology and of local innovation to accelerate the transition towards sustainable, climate- and ecosystem-friendly farming systems in Europe.

Beyond informing the definition of upcoming research and innovation actions under Horizon Europe and helping to create synergies between Horizon 2020 projects and the proposed candidate European partnership on agroecology, this CORDIS Results Pack on Agroecology aims to feed into key ongoing processes such as the reform of the CAP, where it can provide useful knowledge for the preparation and evaluation of the CAP Strategic Plans and the design of eco-schemes. Moreover, the EU recently adopted its new Action Plan for the development of organic production, for which research in agroecology will be an important enabler.

Ultimately, the Results Pack seeks to mobilise stakeholders to work together to scale up this promising research area by showcasing what has already been achieved by EU-funded research and innovation actions.

Sowing diversity, reaping sustainability: why Europe needs more ‘diverfarmers’

Diversifying their cropping systems and optimising the use of resources can help farmers solve the conundrum of how to stay profitable while meeting environmental commitments.

Many EU farmers are at a crossroads: environmental threats and revenue loss resulting from unsustainable production models are forcing them to rethink their cropping systems.

The EU-funded project Diverfarming (Crop diversification and low-input farming across Europe: from practitioners engagement and ecosystems services to increased revenues





and chain organisation) is providing them with the data, tools and support they need to adopt more productive, resource-efficient practices. Chief among these is crop diversification, a core aspect of agroecology.

“Agriculture based on intensive mechanisation, excessive use of external inputs and monocultures has resulted in soil degradation, reduced biodiversity and increased economic risk for European farmers,” says Raúl Zornoza Belmonte, soil science researcher at the Technical University of Cartagena in Spain and Diverfarming project coordinator. “Crop diversification and an optimised use of resources provide more sustainable alternatives.”

Diversification could unlock a number of concrete benefits for farmers and the rural environment. It can prevent soil erosion, increase soil fertility, and enhance soil carbon sequestration while reducing the use of pesticides, fertilisers and heavy machinery.

Greater diversity also has the potential to increase productivity and increase the resilience of farming systems, not only economically but also in the face of climate change. Together, these aspects could contribute to greater profitability, while helping to mitigate climate change and fostering increased biodiversity, as well as increasing the delivery of ecosystem services from farming.

Tailor-made solutions

The project team’s research highlights that in order to effectively deliver these benefits, changes need to be implemented across agricultural value chains and tailored to the specific characteristics of each region. This context specificity is another key tenet of agroecology.

We aim to develop a leading European decision support tool for selecting the most suitable diversified cropping systems under different scenarios.

These include climatic and soil conditions, socioeconomic and cultural factors as well as technical constraints. The project focuses on the unique characteristics of six European regions: Mediterranean North and South, Atlantic Central, Continental, Pannonian and Boreal. Diverfarming is currently assessing real benefits and practical limitations, barriers and drawbacks linked to diversified cropping systems using low-input agricultural practices tailor-made for each region.

The project works directly with farmers in these regions. “To involve farmers and local stakeholders in the development of a paradigm shift in European agriculture and incorporate their local knowledge, we have established a network of diverfarmers for co-creation, co-learning and co-innovation,” Zornoza Belmonte adds.

Innovation is central to agroecology, and so to the work of Diverfarming. The team has designed a prototype for machinery that improves soil tillage, which will cut labour costs, fuel consumption and greenhouse gas emissions, reduce soil erosion and facilitate cover crop management. The prototype is currently in the final stages of development and scheduled for launch in December 2021.

Informed decisions

The team is also working on an interactive tool which will help farmers choose the diversified cropping system and sustainable practices best suited to their specific conditions.

Zornoza Belmonte explains: “We aim to develop a leading European decision support tool for selecting the most suitable diversified cropping systems under different scenarios to increase production and sustainability, taking into account all steps of the value chain. Its multilingual interface will ensure easy access and widespread use across Europe.”

The tool will aggregate data on various aspects ranging from soil to value chain properties to create models enabling agribusinesses to make informed choices.

Other Diverfarming outputs will include guidelines for sustainable diversified cropping systems, a protocol for their correct implementation, and a toolbox, as well as a white paper providing scientific evidence for supporting relevant policies. To take the results of the project further, Diverfarming joined the European Crop Diversification Cluster which aims to share knowledge on this topic and increase the impact of crop diversification research across Europe.

PROJECT

Diverfarming – Crop diversification and low-input farming across Europe: from practitioners engagement and ecosystems services to increased revenues and chain organisation

COORDINATED BY

Technical University of Cartagena in Spain

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/728003

PROJECT WEBSITE

diverfarming.eu



How cooperative crops can boost sustainable farming

By planting a mixture of crops, farmers can increase productivity while also decreasing the need for harmful pesticides.

A growing population means more mouths to feed, demanding that we increase agricultural productivity. According to United Nations estimates, the world population could hit nearly 9.7 billion by 2050. Feeding these people would require a 60% increase in agricultural production.

This is not simply a matter of growing more food. “First and foremost, there’s the question of how climate change will impact crops and growing seasons in the coming years,” says Alison Karley, an agroecology researcher at the James Hutton Institute. “Farmers also need to develop new ways to



© Alison Karley

grow more crops more sustainably, which means using less fertiliser, fewer pesticides, and relying more on crop diversity.”

Although at first glance this may seem like ‘mission impossible’, one EU-funded project is taking a team approach towards finding a possible solution.

Through the DIVERSify (Designing InnoVative plant teams for Ecosystem Resilience and agricultural Sustainability) project, a group of international researchers, farmers and other stakeholders have developed new ways to optimise productivity using plant teams. “Instead of planting a single type of crop, plant team cropping is an approach to farming that advocates crop diversification,” explains Karley, who serves as the project coordinator. “Our goal was to demonstrate how using a mixture of compatible crops not only increases productivity, but also decreases the need for chemicals and thus supports a more sustainable agriculture.”

The benefits of mixing it up

To start, researchers focused their efforts on understanding the potential benefits plant teams could bring to farming. Working directly with farmers in Europe and Africa, they identified best practices and challenges in plant team cropping, and trialled crop mixtures across different locations.

“Our trials showed that mixtures suppress weeds, require less fertiliser, and often have fewer pests and diseases, all of which contribute to improved crop production without the need for chemicals,” remarks Karley. “Mixtures also increase habitat diversity, providing much-needed resources for pollinators and the natural enemies of pests, which are essential for an agroecosystem to function.”

The project also concluded that due to more efficient resource use, plant teams have the potential to produce more yield than if each crop is grown separately.

Making the transition to plant teams

Despite these benefits, change is never easy and plant teams represent a very different way of cropping. To help farmers understand the benefits and necessity of making the transition to plant teams, the project developed several useful tools.

For example, farmers can utilise the CropMIXER tool for advice on crop combinations, management and inputs, and the InfoHub guide for further technical information.

The project has also facilitated a network where farmers and other stakeholders can share information and learn from each other. “A number of pioneering farmers, already using plant teams, have shared their knowledge and experiences and were instrumental in influencing others to give these new concepts a try,” says Karley.

Paving the way for future research

The DIVERSify project succeeded in demonstrating the vast potential of plant team cropping. “Our research shows that optimised plant team cropping diversifies the crop and the farming system, leading to increased productivity, greater agrobiodiversity, and more sustainable farming,” concludes Karley. “Our work paves the way for future research on sustainable cropping and food production.”



Farmers also need to develop new ways to grow more crops more sustainably, which means using less fertiliser, fewer pesticides, and relying more on crop diversity.

Although the DIVERSify project is now finished, researchers continue to build on its activities and results. Partners are currently researching plant team breeding and working with farmers to build value chains around plant team products.

PROJECT

DIVERSify – Designing InnoVative plant teams for Ecosystem Resilience and agricultural Sustainability

COORDINATED BY

James Hutton Institute in the United Kingdom

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

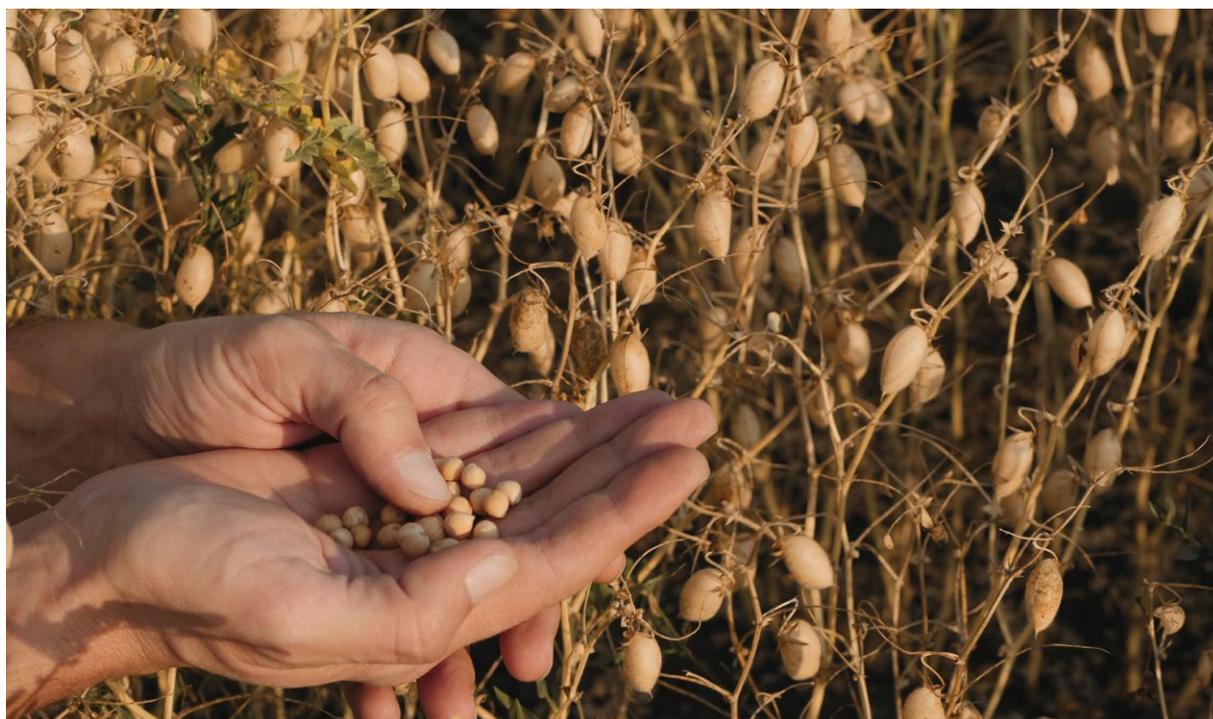
cordis.europa.eu/project/id/727284

PROJECT WEBSITE

plant-teams.org

Supporting the production and use of grain legumes

Research is providing the data needed to help Europe transition towards more sustainable plant protein production. The EU-funded Legumes Translated project is gathering that knowledge and turning it into practical action.



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Wheat and other cereals reign supreme in Europe compared to other crop types, such as protein crops. This means that the EU must import a large amount of plant protein that is mainly used for feeding purposes.

Donal Murphy-Bokern, a researcher focused on improving the use of natural resources in agriculture, says the key to breaking this circle of unsustainability is crop diversification.

“Legume crops such as soybeans, faba beans and peas fix nitrogen from the air and are thus a source of natural fertiliser,” says Murphy-Bokern, highlighting their value to agroecological

systems. “Furthermore, because they are protein-rich, legumes are a sustainable source of nutrition, especially protein, for both humans and livestock.”

With the support of the EU-funded Legumes Translated (Translating knowledge for legume-based farming for feed and food systems) project, Murphy-Bokern and his colleagues are working to help Europe transition towards more sustainable plant protein production. As a thematic network the project connects subject matter experts and researchers from across Europe who, together, share knowledge, discover new insights and produce actionable results.

Practical data to support decision-making

With the goal of providing practical data that can support decision-making, the project has already delivered several important results. For example, it analysed the whole-farm impact of introducing legumes into cropping systems.

“The insight of our members reminds us that it is not enough for legume-based products to be successful in consumer markets,” remarks Murphy-Bokern. “The legume crops themselves must be efficient and competitive within farms.”

Furthermore, by analysing data gathered from whole cropping systems from real farms, partners found, for instance, that the faba bean is an economically viable option when planted in the water-retentive soils typical of north-western Europe, whereas soybeans are more economically viable in south-eastern Europe.

“This means that the expansion of these crops in these regions can continue at relatively low cost to the taxpayer,” explains Murphy-Bokern.

Murphy-Bokern goes on to explain that in many other regions, the production of cereals remains very competitive, making it more challenging for farmers to grow legumes as part of a move towards more sustainable systems. “Here, more public support is needed if farms are to diversify into producing legume crops,” he adds.

Providing this much-needed support is the Legume Hub.



Legumes Translated is about empowering decision makers – from farmers to policymakers.

Improving legume-based value chains

“Legumes Translated is about empowering decision makers – from farmers to policymakers, with knowledge to improve legume-based value chains,” says Murphy-Bokern. “As a community for sharing knowledge and understanding, the Legume Hub brings together all stakeholders working to develop more sustainable food systems.”

Led by the European Legume Hub Association and implemented by Donau Soja, the Hub is a one-stop shop for timely, scientifically validated and comprehensive information for anyone – scientists, plant breeders and farmers – interested in improving legume production in Europe.

“Our hope is to position the Hub as an attractive, self-publishing platform for all things legumes – the ResearchGate or Wikipedia of legumes if you will,” concludes Murphy-Bokern. “If we achieve this, then our work will have an impact well beyond the project itself.”

PROJECT

Legumes Translated – Translating knowledge for legume-based farming for feed and food systems

COORDINATED BY

Thünen Institute in Germany

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/817634

PROJECT WEBSITE

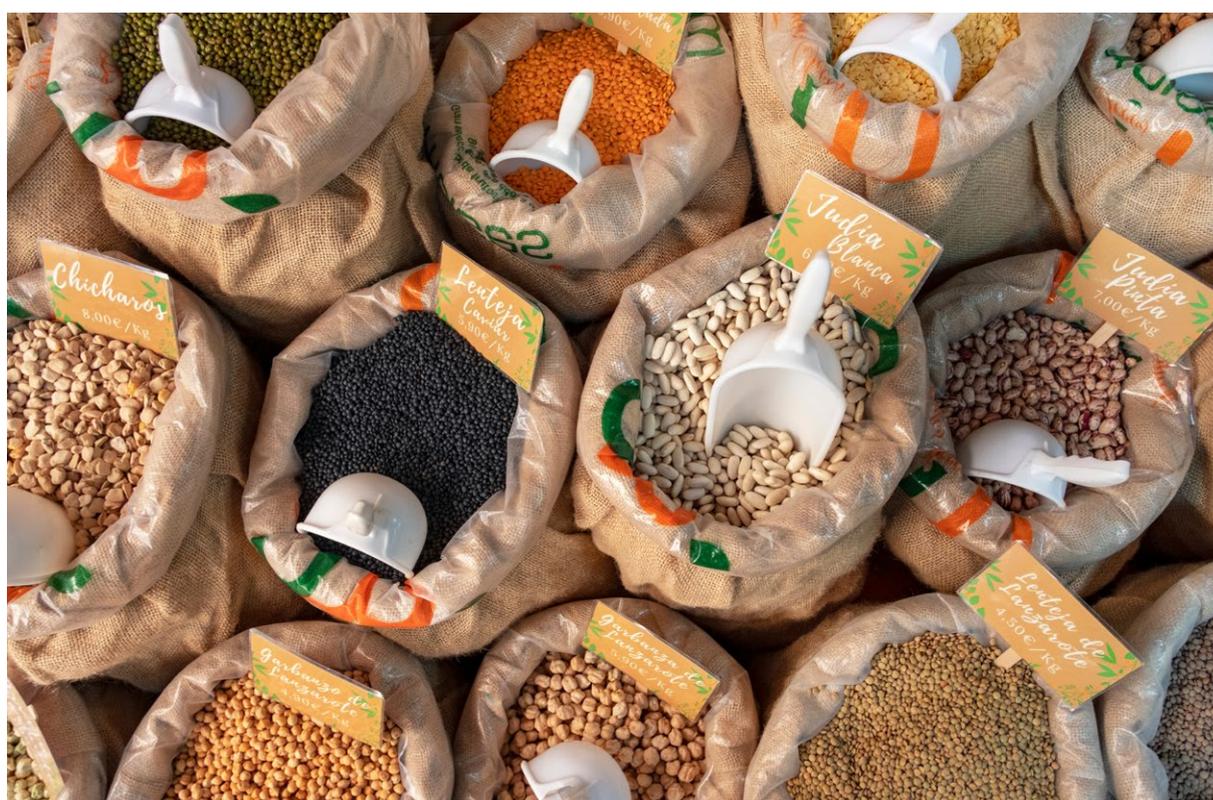
legumestranslated.eu



Set pulses racing: how farmers can meet consumers' growing appetite for legumes

Consumer appetite for legumes is opening up new prospects for EU farmers. An EU-funded project has gathered practical information and know-how to help growers explore the potential of this trend.

Green lentils from Le Puy, Greek Fava Santorini beans – legumes are trending in Europe, and for good reason. Concerns related to health, climate change, protection of natural resources and animal welfare are driving the demand for plant protein as an



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alternative to meat. Grain legumes, which include soya beans and pulses such as peas, faba beans, lentils and chickpeas, are a key source of plant protein for human consumption. However, in the EU, the size of this market remains small compared to other regions.

The EU-funded LEGVALUE (Fostering sustainable legume-based farming systems and agri-feed and food chains in the EU) project is helping farmers make full use of this trend by compiling

information needed to seize these new opportunities, and enabling farmers to make informed decisions on whether or not and how to introduce legumes on their farms.

“We are sharing knowledge and know-how to boost the development of legume

production and use in Europe,” explains Frédéric Muel, research manager at Terres Inovia, the agricultural institute which coordinated the project. “Our key objective is to help farmers make legumes profitable in their cropping system.”



A good driver for legume crops today is that consumers ask for more local food.

Local tastes

The project gathered a wide range of stakeholders with the aim of piecing together a 360 degree view covering all aspects that are relevant for farmers. These include insights on where best to grow legumes, which environmental impacts to address, which quality requirements exist, and information on value chains, price-setting mechanisms, and market developments.

There are three different levels to consider: how to introduce legumes in the cropping system, how to organise the value chain, and how to position the new offering on the market. “A good driver today is that consumers ask for more local food. This can help us organise a value chain at the local level, which is more profitable for farmers,” Muel notes.

Market prices for grain legumes are often linked to the feed market, where profit margins are lower. One concrete recommendation to farmers on this point is to negotiate the price contractually before sowing: “We need to aim for fair added-value sharing across the value chain.”

Decision support

One of the key outputs of LEGVALUE is the prototype of a decision support system to be launched in France next year. Farmers will be able to receive tailor-made recommendations on the optimal legume species for their farming systems, by entering information on their local geographic context. The system, which will be made available through the LEGVALUE website, will continuously be updated with additional data with a view to expanding it to other European countries.

The most challenging aspect of the project has been the development of a comprehensive database quantifying the benefits achievable at farm level for different types of legumes. “For instance, we still compare the value of different crops at farm level only based on margin. However, legumes can also help increase the yield of the following crop,” Muel says. Due to a lack of available research and data, this analysis is still work in progress.

The team is currently working with other partners towards the creation of a European Legume Innovation Network, which will build on the results of LEGVALUE and facilitate knowledge-sharing in this field. The project is also providing policy recommendations to contribute to the development of more sustainable food systems in Europe.

PROJECT

LEGVALUE – Fostering sustainable legume-based farming systems and agri-feed and food chains in the EU

COORDINATED BY

Terres Inovia in France

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/727672

PROJECT WEBSITE

legvalue.eu



Quantifying the ecological practices that can make farming more sustainable

With the aim of improving agriculture's carbon footprint, new research is examining the benefits and challenges of adopting best practices in ecological farming.



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Agriculture accounts for 13 % of the EU's total greenhouse gas emissions. Ecosystem-based farming puts a priority on low-impact land management and maintaining biodiversity, and can make an important contribution to achieving our climate goals.

"Ecological practices are low-input or environmentally friendly practices," explains Laure Latruffe, a researcher at INRAE, France's National Research Institute for Agriculture, Food and Environment. "As such, ecological practices can help achieve sustainable farming."



Ecological practices are low-input or environmentally friendly practices. As such, ecological practices can help achieve sustainable farming.

With the support of the EU-funded LIFT (Low-Input Farming and Territories – Integrating knowledge for improving ecosystem-based farming) project, Latruffe is leading an effort to better understand the potential benefits of ecological farming and how best to promote its uptake.

“The project is taking a comprehensive approach in order to cover the widest range of ecological practices possible,” adds Latruffe. “This includes such existing nomenclatures as organic and agroecological farming, along with identifying potentially new approaches.”

Driving ecological farming

The overall goal of the project is to identify and understand the main drivers behind the development of ecological farming. The project also aims to assess the sustainability of ecological practices.

To do this, researchers are conducting over 30 case studies across Europe, each focusing on different approaches within different contexts. There are case studies being conducted on everything from arable, livestock and mixed farming to such specialisations as dairy, beef cattle, cereals, fruit and vegetables, orchards and olives, to name a few.

“These case studies reflect the enormous variety in the EU’s agricultural sector, not only in crop type, but also in the many different socio-economic and environmental conditions that impact the sector,” remarks Latruffe.

Supporting EU priorities

Although still in their early stages, Latruffe is confident that the case studies will help inform and support EU priorities relating to promoting sustainable agriculture.

“The case studies have already allowed us to elaborate on different farm typologies, which classify farms having similar ecological practices,” notes Latruffe.

Using these typologies, researchers will develop several user-friendly tools, including one that can assign farms to ecological types. The project also plans to develop an adoption tool for projecting how various ecological farming practices could be adopted in a specific region or country. Furthermore, work is being done to launch a massive open online course, or MOOC, on using LIFT’s methods and results.

“Our research and results will provide a complete picture of ecological farming – including benefits and challenges – as compared to more conventional approaches to agriculture,” concludes Latruffe. “In doing so, we will identify critical paths forward for adopting best practices in sustainable agriculture.”

PROJECT

LIFT – Low-Input Farming and Territories – Integrating knowledge for improving ecosystem-based farming

COORDINATED BY

National Research Institute for Agriculture, Food and Environment in France

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/770747

PROJECT WEBSITE

lift-h2020.eu



Seeds of change: a systems-based approach to plant breeding

The LIVESEED project investigated how crop breeders and seed producers can combine best practices from across the industry to increase the availability and quality of organic seeds. The results will help meet the EU's ambitious targets for organic agriculture.

Under the Farm to Fork strategy, the European Commission has set a target for at least 25 % of agricultural land in the EU to be under organic farming by 2030. This is an important element of the European Green Deal.



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Achieving this goal will require the development and dissemination of new organic cultivars, and the EU-funded LIVESEED (Improve performance of organic agriculture by boosting organic seed and plant breeding efforts across Europe) project sought to support this by tackling the issue of organic seed availability and quality from a variety of angles, from market aspects through to regulation.

Launched in 2017, the project brought together 48 organisations from 18 European countries, including plant researchers, crop breeders, seed producers, organic associations and retailers.

New approaches

One of the researchers involved is Edwin Nuijten, a plant scientist at De Beersche Hoeve in the Netherlands, who led a part of the workplan that focused on how different breeding approaches can support and strengthen each other. "Breeding is not only about producing the best plant for the best field, it's also a process, we need to take into account also the social aspects," he says.

LIVESEED's goal was to combine the best elements of different plant breeding approaches. The consortium identified four specific approaches, referred to as ecosystem-based, community-based, trait-based and corporate-based.

Ecosystem-based approaches examine how a crop interacts with and can contribute to the surrounding environment. Community-based approaches have a strong connection between the breeder and growers, seeking to maximise societal value to them.

Trait-based approaches pursue broader societal benefits by improving specific traits, such as increasing the concentration

of essential vitamins in crops, while corporate-based approaches seek to maximise profit and minimise costs.

"These are all value-driven but their values are different," adds Nuijten. "This is not to say that some values are better than others, but to ask how we can connect them so that they strengthen each other, and improve ecological and social resilience."

Knowledge platform

The consortium gathered information on breeding techniques and published a number of research papers. More than 800 organic farmers were consulted on various aspects related to plant breeding and seed markets, and LIVESEED contributed to the expansion of the Organic Farm Knowledge Platform with a dedicated section on these themes.

The LIVESEED project also developed a router database at the EU scale which enables seed suppliers to enter offers into other national databases with a single entry. The team is now working on the implementation of their findings, drafting guidelines for implementing a combined breeding approach.

The situation is acute, as developing new crop varieties is a slow process, and breeders must act now to prepare for agricultural challenges in the future, such as tighter restrictions on pesticide use and a changing climate.



It's often said that organic food is too expensive, but you could say that conventional food is too cheap.

In addition, notes Nuijten, farmers and consumers are threatened by dysfunction in the plant breeding and seed market. “When you look at conventional breeding, two or three companies dominate the market of each fruit and vegetable. If one company terminates its breeding programme, farmers are wholly dependent on the other. Even for conventional agriculture the situation is not sustainable,” he explains.

“Organic seed and plant breeding can provide an opportunity to think about more sustainable breeding approaches. We need to develop many more new alternatives, so this resource is useful for all farmers,” says Nuijten. “It’s often said that organic food is too expensive, but you could say that conventional food is too cheap – take hidden costs into account and a different picture emerges.”

PROJECT

LIVESEED – Improve performance of organic agriculture by boosting organic seed and plant breeding efforts across Europe

COORDINATED BY

International Federation of Organic Agriculture Movements – European Union Regional Group in Sweden

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/727230

PROJECT WEBSITE

liveseed.eu



Sharing knowledge and techniques across Europe's organic farms

The EU meat and dairy industry relies heavily on imported soybean products for animal feed. A unique information database is helping organic farmers move toward 100 % organic feed.



© Pencil case, Shutterstock

Every year, the EU imports around 14 million tonnes of soybean to feed chicken, cattle and pigs. This presents a particular challenge for organic producers, who wish to avoid the environmental and sustainability issues associated with foreign soy production, such as tropical

deforestation. The EU-funded OK-Net EcoFeed (Organic Knowledge Network on Monogastric Animal Feed) project investigated alternative sources of high-protein animal feed that will help make Europe less dependent on imported protein for feed.

Seminal ideas

“We’re spreading innovation across Europe,” says project coordinator Ambra De Simone. “We’re focused on building up a network of stakeholders, collecting existing knowledge, and highlighting those solutions that might be useful across regions.”

The project, coordinated by the International Federation of Organic Agriculture Movements – European Union Regional Group (IFOAM Organics Europe), brought together a consortium of 18 partners across 12 countries. These include feed processors, farmers, research institutes, universities and advisory agencies.

During the previous EU-funded project, OK-Net Arable, hundreds of pages of material were produced and made accessible to farmers in the Organic Farm Knowledge (OFK) platform, identifying potential solutions to increase their harvest. “Bridging to animal feed was the obvious next thing to do,” adds De Simone.

The OFK platform facilitates user-friendly access to a wide range of practical tools and resources including audio, books, reports, leaflets, guidelines and videos, and promotes knowledge exchange among farmers, farm advisers and scientists. During OK-Net EcoFeed the platform was expanded to include material on sustainable feed.

“One of the main things to do was to find out what was working in one region and adapting it somehow to make it work in another region,” explains De Simone. “The first part was collecting all the systems out there. Then researchers investigated those that could potentially be applied to different areas.”

Serving suggestions

The project carried out 18 field trials on alternative feeds, involving more than 9 000 chickens and 1 000 pigs. “A major problem in organic is protein availability,” adds De Simone. “Most feed is soy-based, and not sustainable for organic; we tried to find alternative sources of protein.”

This included *Camelina sativa*, an oilseed crop related to flax, which was investigated by researchers at the Italian Association for Organic Agriculture (AIAB). In Spain, Ecovalia used protein-rich brewer’s yeast as a feed supplement for pigs.

The consortium also developed a ration planning tool, an Excel-based app which allows farmers to calculate their own feed requirements based on the breed of animals they have, their stage of growth, and what sort of feed they are using. “This is the only free software that adequately meets the needs of organic animal producers,” says De Simone. “Calculations are independent of the feeding industry and are adapted to specific organic farming conditions.”

The group is now seeking additional funding for the further development and maintenance of the OFK platform, which contains details on more than 2 000 farming solutions. “It started with arable cropping and feed, but there are many other projects joining,” concludes De Simone. “We have ambitions to be the leading EU platform for exchanging knowledge on organic.”



*We have ambitions
to be the leading
EU platform for
exchanging knowledge
on organic.*

PROJECT

OK-Net EcoFeed – Organic Knowledge Network on Monogastric Animal Feed

COORDINATED BY

International Federation of Organic Agriculture Movements – European Union Regional Group in Sweden

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/773911

PROJECT WEBSITE

ok-net-ecofeed.eu



Growing sustainable agriculture through local legumes

To become more sustainable, Europe must diversify its agri-food systems. According to one EU project, this starts with promoting the cultivation and consumption of home-grown legumes.

Food systems have a substantial carbon footprint, accounting for one third of greenhouse gas emissions globally. As such, there is an urgency for the sector to become more sustainable.

Tiny legumes could make a big difference. “Most of agriculture’s emissions come from livestock, such as cows and pigs, and the use of synthetic nitrogen-based fertilisers,”



says Pietro Iannetta, an agroecologist at the James Hutton Institute. "Legumes, on the other hand, are a sustainable source of nutrition, for both food and feed, that can also be used as a natural nitrogen fertiliser."

Unfortunately, even though there is a high demand for legumes in Europe, the vast majority are imported, mainly as soybeans and for animal feed. They also often originate from clear-cut rainforest regions.

"To protect its nutritional security and environmental well-being, and to promote the shift towards healthier diets, Europe needs to diversify its agri-food systems by promoting home-grown legumes," explains Iannetta.

Achieving this requires increased cooperation among the many actors in the agri-food sector – cooperation that is being partially driven by the EU-funded TRUE (Transition paths to sustainable legume-based systems in Europe) project.

Towards a more sustainable system

At the heart of the project is a desire to make more sustainable, home-grown legume-based agri-food systems a reality. "The know-how, desire and demand for such systems exists," remarks Iannetta, who coordinates the project. "TRUE helps connect and empower the relevant stakeholders and, through innovation and cooperation, identify and realise the best paths towards creating these sustainable systems."



Legumes are a sustainable source of nutrition, for both food and feed, that can also be used as a natural nitrogen fertiliser.

Although still a work-in-progress, the project has made significant headway. It has identified the key barriers and opportunities and developed useful tools for all actors of the value chain. These include life cycle analysis tools and a decision support system called 'Pathfinder' that represents the first value-chain-wide sustainability assessment tool for businesses.

TRUE has launched several innovative products, such as the fully commercialised Nàdar Gin, which uses peas to make 'climate-positive' gin and high-protein co-products. The project has also established its own trademark, CoolBeans®, and has authored several scientific articles, policy briefs and reports. It has even published its own legume recipe books!

Beyond TRUE

The project has played an important role in establishing several continent-wide initiatives. One of them is the Legume Innovation Network (LIN).

Done in collaboration with the EU-funded LEGVALUE project, the LIN aims to connect legume-focused businesses and NGOs to support sustainable commercial development within Europe. The TRUE project is also playing a role in the Crop Diversification Cluster (CDC), which brings together partner organisations from Europe to increase the impact of crop diversification research and encourage the uptake of innovative diversification measures.

"These two initiatives ensure that the work we started during the TRUE project will have an ongoing and lasting impact," notes Iannetta. "My hope is that these initiatives leverage the momentum initiated by TRUE and continue to stimulate the innovation that will come to define sustainable agriculture."

The project is currently promoting its tools, methods and strategies, which could carry over into new legume-focused projects.

PROJECT

TRUE – Transition paths to sustainable legume-based systems in Europe

COORDINATED BY

James Hutton Institute in the United Kingdom

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/727973

PROJECT WEBSITE

true-project.eu



Many agroecological futures are possible in Europe

New research demonstrates how sustainable farming not only benefits the environment but also empowers farmers and rural communities.



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For most of history, agriculture was a local affair, with farmers producing only enough food to feed their family or to support the local community. But with industrialisation, urbanisation and a growing population, farming became increasingly intensive. While this achieved lower costs and increased production, these achievements were often made at the expense of the environment.

Now, as the world grapples with the effects of climate change, there is an urgent need to rebalance our agricultural system with the right mix of sustainability and productivity. "In this sense, increasing the implementation of agroecological approaches is fundamental to ensuring sustainable food production in the future," says Gerald Schwarz, a researcher at the Thünen Institute of Farm Economics.



Increasing the implementation of agroecological approaches is fundamental to ensuring sustainable food production in the future.

Helping to strike this balance is the EU-funded UNISECO (Understanding and improving the sustainability of agro-ecological farming systems in the EU) project. “Our aim was to strengthen the sustainability of European farming systems through co-constructing improved strategies and incentives for transitions towards agroecological farming,” explains Schwarz, who coordinated the project.

Agroecology applies ecological concepts to farming. In particular, it promotes a type of farming that works to mitigate climate change, minimise agriculture’s impact on wildlife and nature, and empower farmers and communities to benefit from sustainability.

Tailoring solutions to local needs

According to Schwarz, the project’s main goal was to identify a portfolio of actions and policies for the transition to agroecology. “We wanted to provide concrete evidence of how farming can help Europe tackle the challenges of climate change and biodiversity loss while also enabling sustainable food production and promoting vibrant rural economies,” he notes.

To do this, researchers conducted case studies in 15 different European countries, each of which involved a different socio-economic, environmental and cultural context. Researchers also studied how the large-scale implementation of agroecological practices would impact both local farm economies and the European food system.

The UNISECO project found that there is no ‘one-size-fits-all’ solution for transitioning to sustainable farming. Instead, agroecology works best when tailored to local needs. “Our research showed that many agroecological futures are possible in Europe and, when embedded within wider changes in the food system, do not compromise our food security,” adds Schwarz.

The project also showed how agroecology can benefit the environment by, for example, increasing species and habitat diversity. “Agroecology can also help mitigate climate change and improve our ability to adapt to its impact by promoting, for

instance, humus formation and carbon sequestration in woody biomass,” remarks Schwarz.

Empowering rural communities

In addition to demonstrating the environmental benefits of agroecology, the project also worked to share knowledge about the economic opportunities of sustainable farming via a science-society-policy dialogue.

“If agroecology is to succeed, we need to increase the capacity of local actors,” says Schwarz. “Although this starts with the farmer, it also needs to include landowners and other actors in rural communities and value chains.”

Here, the project highlighted collaboration between farmers in such areas as shared storage, processing and marketing, and demonstrated community-level value chains that linked farmers with local restaurants, schools and retailers.

“With more ‘skin in the game’, farmers have a direct connection to the success of the farming systems,” adds Schwarz. “They also stand to benefit more, thus ensuring that agroecological systems can grow with limited public support.”

Although the project itself is now finished, farmers and other stakeholders can continue to leverage the wealth of knowledge that UNISECO produced via the Agro-Ecological Knowledge Hub.

PROJECT

UNISECO – Understanding and improving the sustainability of agro-ecological farming systems in the EU

COORDINATED BY

Thünen Institute in Germany

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/773901

PROJECT WEBSITE

uniseco-project.eu



Nurturing the growth and development of the organic sector

The EU Green Deal sets a target for 25 % of agricultural land to be organic by 2030. Meeting this ambitious goal demands continuous research and innovation in sustainable food production. The CORE Organic Cofund is helping to drive this transition by increasing cooperation between international research activities.

Delivering on the EU's ambitions for sustainable food production and healthier diets requires more than simply turning over land to organic farming. Developing more

sustainable organic food systems means improving farming practices and food processing systems, and creating innovative value chains.



However, publicly funded research into organic food systems in Europe is often driven by small research communities, fragmented both geographically and institutionally. To increase the impact of this research, a joint effort is needed. For over a decade, CORE Organic partners have been working to address the most important challenges along the organic value chains through European Research Area Networks.

The CORE Organic Cofund (Coordination of European Transnational Research in Organic Food and Farming Systems Cofund) project network now totals 26 partners from 19 countries. By increasing innovation potential, knowledge accessibility, alignment of national research and international outreach, the partners aim to support the growing demand for organic products, support the development of organic farming regulations, and subsequently boost healthier diets, trade and job creation. Supported projects are also driving increased competitiveness of European agriculture in local and global markets.

Coordinated by Aarhus University in Denmark, the consortium issued a joint call for innovations that could support a sustainable food systems approach and growth of the organic sector in Europe, and overall an increased understanding of the specificities of ecological farming approaches. Twelve projects were awarded a total of EUR 15 million. These include, for example, SureVeg, which explores strip-cropping and recycling of waste as the basis for biodiverse and resource-efficient intensive vegetable production, FreeBirds, a project to improve chicken

health and environmental problems in free-range production, and ProOrg, which seeks to develop a Code of Practice for organic food processing.

With the programme running until May 2022, CORE Organic continues to monitor the funded projects, offering assistance with stakeholder involvement and dissemination in order to secure high impact of the research efforts.

PROJECT

CORE Organic Cofund – Coordination of European Transnational Research in Organic Food and Farming Systems Cofund

COORDINATED BY

Aarhus University in Denmark

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/727495

PROJECT WEBSITE

projects.au.dk/coreorganiccofund/



How variety can be the spice of life for EU farms

Europe's agricultural success has come at the cost of a reliance on a small number of high-yielding crops, supported by high inputs of fertilisers and pesticides.

Diversifying the crops we grow can support the ecological processes necessary to preserve biodiversity and ensure healthier and more sustainable diets.

The industrialisation of agriculture, with the corresponding focus on ever greater economic efficiency, has driven farmers to focus on an ever smaller variety of crops that rely on the intensive use of external inputs. Crop production is often characterised by short rotations, or monocultures, which are still perceived as

cheaper and more efficient than the more ecological alternatives. However, these lead to a high incidence of pests and diseases, greater pollution and soil erosion, and loss of soil fertility and biodiversity, together with a higher vulnerability to unforeseen events related to climate or markets.



The goal of the EU-funded DiverIMPACTS (Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability) project is to achieve the full potential of diversification of cropping systems. An intelligent application of diverse cropping can deliver a raft of benefits, including a reduction in the use of fertilisers and pesticides, greater food security and a reliable supply of agricultural products for feed, energy and industrial uses, coupled with a greater provision of ecosystem services, and an increased efficiency of energy and resource use.

DiverIMPACTS is supporting these goals by assessing the performance of crop diversification schemes such as rotation, intercropping and multiple cropping in 10 field experiments held in Belgium, France, Germany, Italy, the Netherlands, Sweden, and Switzerland. The project, coordinated by the National Research Institute for Agriculture, Food and Environment in France, also provides 25 multi-actor case studies with key enablers and innovations that remove existing barriers and help deliver the benefits of crop diversification at a farm, value chain and territory level.

Gathering together farmers and farmer organisations, advisory services, cooperatives, logistic providers, scientists, industry, and representatives of civil society in a multi-actor approach, the

project also makes recommendations to policymakers on how to facilitate the coordination of all relevant actors within the value chain. It is scheduled to conclude in May 2022.

PROJECT

DiverIMPACTS – Diversification through Rotation, Intercropping, Multiple cropping, Promoted with Actors and value-Chains Towards Sustainability

COORDINATED BY

National Research Institute for Agriculture, Food and Environment in France

FUNDED UNDER

Horizon 2020-FOOD

CORDIS FACTSHEET

cordis.europa.eu/project/id/727482

PROJECT WEBSITE

diverimpacts.net



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RESULTS PACK ON PLANT HEALTH – NEW EDITION

This new edition of the CORDIS Results Pack on Plant Health features 12 EU-funded projects that stand at the forefront of research and innovation activities addressing sustainable protection of plants.



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