

PROJECTS BROCHURE

The European Agricultural
Fund for Rural Development

BIOECONOMY

European Network for Rural Development

The European Network for Rural Development (ENRD) is the hub that connects rural development stakeholders throughout the European Union (EU). The ENRD contributes to the effective implementation of Member States' Rural Development Programmes (RDPs) by generating and sharing knowledge, as well as through facilitating information exchange and cooperation across rural Europe.

Each Member State has established a National Rural Network (NRN) that brings together the organisations and administrations involved in rural development. At EU level, the ENRD supports the networking of these NRNs, national administrations and European organisations.

Find out more on the *ENRD website* (<https://enrd.ec.europa.eu>)

The European Agricultural Fund for Rural Development (EAFRD)

The EAFRD Project Examples brochure forms part of a series of ENRD publications that help encourage information exchange. Each edition of the brochure features different types of projects that have received RDP co-finance from the EAFRD.

Past editions of the EAFRD Projects Brochure can be downloaded from the publications section of the ENRD website.⁽¹⁾ The ENRD collection of good projects and practices⁽²⁾ contains many additional examples of EAFRD assistance to rural development initiatives.

(1) <https://enrd.ec.europa.eu/publications/search>

(2) https://enrd.ec.europa.eu/projects-practice_en

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Managing editor: Neda Skakelj, Head of Unit, EC Directorate-General for Agriculture and Rural Development.

Editor: Elena Di Federico, Senior Editor, ENRD Contact Point.

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Key contributors:

Derek McGlynn, Tim Hudson, Lea T. Kvistgaard, Natasa Matulayova, Nils Lagerroth, Katalin Kolosy, Olga M.S. Conde Moreira, Valdis Kudins, Petri Rinne, María Coto Sauras, Perrine Marielle Deschelle, Joke Maes, Tomas Ratering, Silvia Baralla.

Layout: Benoit Goossens

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Introduction

The recent revision of the EU Bioeconomy Strategy clearly signals the strong policy ambition for Europe's renewable biological resources. The full deployment of the strategy will create and maintain many jobs in rural areas through the growing participation of primary producers in the bioeconomy value chain and diversification of economic activities. A sustainably-managed European bioeconomy will also make a significant contribution to the achievement of several of the United Nations Sustainable Development Goals (SDGs). Excitingly, the bioeconomy has a special resonance for rural areas.

This edition of the EAFRD Projects Brochure illustrates how the mainstreaming of the bioeconomy is being accelerated by Rural Development Programmes (RDPs) around Europe, leading to the production of sustainable food and feed, innovative bio-based products, renewable energy and other services.

As the European Commission notes, "We live in a world of limited resources. Global challenges like climate change, land and ecosystem degradation, coupled with a growing demand for food, feed and energy, force us to seek new ways of producing and consuming. A sustainable and circular bioeconomy contributes to addressing these challenges."⁽¹⁾

The 2018 EU Bioeconomy Strategy defines the bioeconomy as, "those parts of the economy that use renewable biological resources from land and sea – such as crops, forests, fish, animals and micro-organisms – to produce food, materials and energy."⁽²⁾

Today's European bioeconomy encompasses the agricultural, forestry, fisheries, food, bio-energy and bio-based product sectors. It has an annual turnover of 2.3 trillion euro and employs around 18 million people. It is estimated that bio-based industries could create up to one million green jobs by 2030, especially in rural and coastal areas⁽³⁾.

While it already represents a significant share of the EU economy, the strategy signals the potential for the bioeconomy to deliver more. More for the economy, more for society and more for the environment.

A sustainable bioeconomy, while it benefits everyone, has particular relevance for rural communities. The bioeconomy relies on biological resources (plants, animals, micro-organisms and derived biomass, including organic waste) that are mostly sourced or produced in rural areas. It involves primary producers of both agricultural and forest products. The processing and distribution of bio-based products – from food and feed to fuels and materials – creates new opportunities for processors, retailers and consumers particularly in rural areas, but also beyond.

The political momentum behind the bioeconomy is targeting: job creation and retention; reduced emissions and reduced dependence on fossil resources; a renewed and strengthened EU industrial base and

(1) Bioeconomy Factsheet, European Commission, 2018.

https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_actions_2018.pdf#view=fit&pagemode=none

(2) European Commission, DG Research and Innovation, <https://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy>

(3) https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_actions_2018.pdf#view=fit&pagemode=none



modernised primary production; and the restoration of ecosystems and enhanced biodiversity.

In practice there is not one single bioeconomy in Europe, but several adapted to local contexts and assets. In terms of rural development, the bioeconomy can encompass a broad range of sectors. It implies but is not limited to: land ecosystems and the services they provide; agriculture and forestry as primary production sectors that use and produce biological resources; and the processing and production of food, feed, bio-based products, energy and services. The fact that the processing of biomass is most efficiently done at source, reducing transport cost and associated GHG emissions, and the variety of agricultural by-products suitable as biomass, highlight the bioeconomy's strong economic potential for rural areas.

So, how can rural areas progress the development of the bioeconomy?

The European Agricultural Fund for Rural Development (EAFRD) provides great examples showing how it can be achieved in practice. The fund supports a broad range of rural bioeconomy projects as well as awareness-raising activities. This publication illustrates how RDPs are being deployed by Member States to provide pivotal investment that enables rural bioeconomy transformation.

This edition of the EAFRD Projects Brochure features projects that are helping to deliver a sustainable European bioeconomy, today. The examples are categorised into distinct sectors – food and feed (page 4), energy (page 8), bio-based products (page 14) and the environment (page 20) – as well as looking at how RDPs can be used to build awareness of the bioeconomy's potential for rural areas (page 24).

For those looking to learn more about the bioeconomy, a great place to start is the ENRD's Rural Bioeconomy Portal⁽⁴⁾, collecting relevant literature, useful contacts and inspiring examples of rural bioeconomy projects funded by the EAFRD and other European and national programmes. Also check-out the work of the ENRD's Thematic Group (TG) on Mainstreaming the Bioeconomy⁽⁵⁾ which, building on previous thematic work on water and soil management and resource efficiency, aims to encourage the development of sustainable bioeconomy value chains in rural areas.

Optimising the bioeconomy means not only significant new income streams for farmers and foresters, it will boost local rural economies through increased investment in skills, knowledge, innovation and new business models – as recommended in the Cork 2.0 Declaration⁽⁶⁾ of 2016.

The ENRD Contact Point Team

(4) https://enrd.ec.europa.eu/greening-rural-economy/bioeconomy/rural-bioeconomy-portal_en

(5) https://enrd.ec.europa.eu/enrd-thematic-work/greening-rural-economy/bioeconomy_en

(6) The Cork 2.0 declaration expresses key concerns of rural communities and possible policy responses, https://ec.europa.eu/agriculture/sites/agriculture/files/events/2016/rural-development/cork-declaration-2-0_en.pdf

1. Food and feed

Food production and farming are the dominant segments of the bioeconomy in terms of employment, turnover and value added⁽¹⁾. Many innovative projects are being supported by the European Agricultural Fund for Rural Development (EAFRD) that boost the long-term sustainability of the sector. These include projects that reuse waste, encourage more efficient resource use and that utilise innovative production processes to get more from less.

The need for resource-efficient circular economy principles to be applied across the whole food system and by consumers is widely acknowledged. For example, Food 2030 ⁽²⁾ – the EU research and innovation policy response to international policy developments such as the UN SDGs – highlights the role of nutrition, climate, circularity and innovation for food security priorities.

Environmentally sustainable food systems imply building 'climate smart' food systems adaptive to climate change, conserving natural resources and contributing to climate change mitigation. The implementation of resource-efficient circular economy principles across the whole food system will reduce the environmental footprint. Likewise, circularity implies that food losses and waste are minimised throughout society.

The EU Bioeconomy Strategy puts sustainability and circularity at its heart. It notes that food and farming systems are a fundamental part of the bioeconomy, but they urgently need to be transformed to become more sustainable, nutrition-sensitive, resilient and inclusive. The strategy is guiding the renewal and modernisation of primary production systems, the protection of the environment and the enhancing of biodiversity.

The strategy notes that a sustainable bioeconomy could turn bio-waste, residues and discards into valuable resources and create the innovations and incentives to help retailers and consumers cut food waste by 50 % by 2030.

The EAFRD is being used by EU Member States to meet the challenge and accelerate change. It helps farmers, processors and other rural entrepreneurs to improve the way food is cultivated and produced. It also seeks to support healthy, productive and biodiverse ecosystems. By boosting innovation and investment, new business models and value-added products, goods and services can be created leading to more and better jobs across rural communities and increasing farm competitiveness.

Alternative and more sustainable sources of protein for animal consumption are one way the bioeconomy can make a difference.

In Denmark, an EAFRD project (page 5) is using food waste to breed insects for animal feed.

New processing technologies can support the production of healthier food and higher added-value products, with positive impacts on rural value chains and the food industry.

A notable example is the Slovak project at page 6 where the EAFRD supported the production of higher-quality soybean meal.

(1) https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_actions_2018.pdf#view=fit&pagemode=none
(2) Food 2030, <https://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy&lib=food2030>



Breeding insects for animal feed in Denmark

Denmark's RDP helped a rural start-up to expand from a personal hobby to a successful business breeding insects on food waste. The project is now testing sustainable alternatives to resource-intensive animal feed crops.

Martin Dahl first started breeding insects to feed his lizards as a hobby from his home in Hjørring, northern Denmark. That was in 2009 and he soon found that his hobby exceeded his own needs so he set up the micro-enterprise MD ApS selling insects to local pet shops. This venture became so successful that he decided to increase his production and storage capacity by evolving his previous hobby into a high-tech agri-business.

The company MD ApS applied to Denmark's LAG NORD for LEADER funding from the EAFRD. Between 2015 and 2017, two consecutive projects allowed the company to equip some empty barn buildings with the production and storage facilities required to expand the insect business. New robot technology and novel breeding boxes made the production more efficient, while an environmentally friendly heating system created the ideal thermal conditions for insects. The beneficiary also invested in improved distribution facilities, advertising and an online shop.

Various insect species are now supplied to Danish zoos and pet stores, as well as private clients online. The overall profit of the company has steadily increased from €13 691 in 2014 to €97 852 in 2017, allowing three new full-time jobs to be created.

"I think it's impressive what you can get out of very little. A small portion of feed is actually enough to breed 2 000 crickets, which have a sales value on the market for me of €59."

Martin Dahl,
Manager of MD ApS

MD ApS is a circular economy enterprise that collects waste from other local agri-food companies and uses it to feed the insects. For instance, every week the company collects 200 kg of potatoes from a local food-processing plant which are not suitable for potato chips and would otherwise be transported to the local biogas plant. Both MD ApS and the potato chip producer gain in the process: the first does not need to buy 'good' potatoes for the insects and the latter saves on transportation costs to the biogas plant.

The company's vision is to turn waste products into economic and environmental successes. This is the first company in Denmark to use food waste to breed insects as animal feed, in buildings specifically designed for the purpose, reaching such a large-scale production.



© Martin Dahl, MD ApS

The project showed that insects may be a sustainable alternative to resource-intensive animal feed crops.

In parallel with the implementation of the second LEADER project, the company participated in a research project with the Danish Technological Institute, the Nature Agency, Hjørring Municipality and three other companies. The WICE (Waste, Insects and Circular Economy) project aimed to investigate the financial and environmental sustainability of the production of insect protein flour for mink feed. This research tested the production of larvae of Black Soldier Flies (*Hermetia illucens* and *Zophobas morio*) fed on organic household waste and concluded that larvae from Black Soldier Flies can very efficiently convert bio-waste into protein-rich animal feed. In one year, the Black Soldier Fly Larvae converted 1 400 kg of biomass into approximately 300 kg of insect biomass and 200 kg of insect manure, rich in phosphorus and suitable as fertiliser.

The WICE project also proved that the Black Soldier Fly Larvae do not consume any plastic residues found in the household waste, with the positive side-effect of isolating those remains suitable for burning in a biogas plant. This is promising, although currently insect breeding falls under the same national and EU legislation as breeding of domestic animals, which requires their feed to be 100 % plastic- and

animal product-free and thus makes insects bred on household waste unsuitable as feed for animals destined for human consumption.

"It is good for the environment if we use our resources more effectively. The WICE project shows that it is possible to re-process organic waste and use it as agricultural feed, for example. Insects may become a new, competitive food and potentially replace some of the traditional crops, which can then be used for other purposes."

Lars-Henrik Lau Heckmann,
Danish Technological Institute

Martin Dahl's company has now joined forces with another insect breeding company (Entomass) producing Black Soldier Fly Larvae fed on food waste from a controlled environment (including from the local food processing plant). They sell the larvae blanched and frozen, and the larvae are used as feed for fish, chickens and hens.

Further research is still needed to ensure that insect-based feed for domestic animals is safe for human consumption but the results so far are very promising. The project indicates high growth possibilities and it highlights the potential for sustainable diversification of Europe's bioeconomy through small-scale localised rural entrepreneurship.

Project Name	First project: Extension of insect production, storage capacity, advertising car, Webshop, access for lorries. Second project: Production of insect protein flour for animal feed based on new insect species.
Type of beneficiary	Micro-enterprise
Period	First project: 2015-2016 Second project: 2017
Funding	Total budget (2015-2016): € 18 044 EAFRD contribution: € 7 218 National / Regional contribution: € 1 804 Private contribution: € 9 022 Total budget (2017): € 76 905 EAFRD contribution: € 33 557 Private contribution: € 43 348
RDP Measure	M19.2 – Support for implementation of operations under the CLLD strategy
Further info	www.fodergrossisten.dk
Contact	Beandahl@gmail.com

Investing in quality processing of Slovakian soybean

Thanks to support from the EAFRD, a Slovak agricultural company purchased new technology to produce high-quality soybean oil and soybeans for animal feed. The project has strengthened the Slovak food industry, contributed to self-sufficiency in protein feed and created employment and technological innovation in rural areas.

Soybean is the fourth most cultivated crop in the world. It is an exceptional, and still cheap, source of proteins for human and animal consumption. Seed companies have genetically modified their products to improve their resistance to diseases and pests; however, in order to ensure food safety and avoid unacceptable effects on the environment Genetically Modified Organisms are subject to an extensive risk assessment before they could be authorized for feed/food use. However, there is a growing demand for healthy, natural food and, in this context, some consumers prefer to opt for GMO-free products.

No Slovak company was able to handle the processing of large amounts of soybean and the country needed to import around 100 000 tonnes of soybean meal a year.

Gamota Group, one of the biggest players in the Slovak agri-food sector, decided to invest in innovative production equipment and to become the main soybean meal producer in the country. The company applied to Slovakia's Rural Development Programme to help purchase new equipment to process GMO-free soybean without the addition of any chemicals.

The new equipment was installed in a production hall in the Male Straciny village (southern Slovakia). Reaching full operational capacity in December 2017, this new soybean processing line currently processes 60 000 tonnes of soybean per year, producing 7 200 tonnes of soybean oil and 52 800 tonnes of soybean meal for animal feed.

This soybean meal contains 7-9% of oil, higher than the imported soybean meal, which contains only 1-2% of oil and requires the addition of other oils to increase its fat content. Both the soybean oil and soybean expeller produced are of superior quality with unique nutritional values, higher digestibility and free of any chemical residual substances. Thus, the project has allowed Gamota JR. Ltd. to introduce a new product on the market, raising the quality of the Slovak feed industry and increasing the export potential of the Slovak agri-food industry.

In a rural area with an unemployment rate over 22%, the company already created eight new jobs and plans to create five to eight other jobs in the future.

“Through this project, we achieved the basic objectives of each business – profitability and growth – as well as other results: strengthening the competitiveness of the local processing and food industries and innovating the food and processing industries through new technologies and processes.”

Representative of Gamota JR Ltd.

The company organises meetings and workshops with farmers around Slovakia to develop close and long-term cooperation with both local soybean producers and end users. Thus, the producers can sell their entire production and the company is sure to have sufficient GMO-free, locally-produced raw material to process.

The company's innovative production technology was awarded a Certificate of Innovation by the National Agricultural and Food Centre - Technical and Testing Institute for Agriculture.

According to the beneficiary, the project has had several indirect benefits on the Slovak food and feed production. Slovak farmers are growing soybean seeds that give a higher added-value product with higher protein and oil content and the Slovak milk industry, poultry farmers and major retailers are increasing their offer of GMO-free products. Furthermore, a new certification system called Agrocert, Slovak Soya has been created to ensure the quality of soybean and feed production.

“With this project we create the conditions for the growth of the domestic production as well as its export and we directly support employment in rural areas in Slovakia.”

Representative of Gamota JR Ltd.

The need for imported soybean has decreased as a result of the project, with positive economic and environmental effects: the company has reduced both the costs and the CO₂ production connected to the transport of imported soybean. In the future, Gamota JR Ltd. aims to fulfil the entire domestic demand for soybean oil and meal with a high-quality domestic production.

Today Gamota sees the bioeconomy as a big opportunity and a logical next step in its business development. The company recently planted 217 ha of new organic nut orchards with the aim to obtain organic agriculture certification. The company is also developing a new project for soybean oil refining to produce soybean oil for the food industry.

Project Name	Technology for innovative processing of soybean
Type of beneficiary	SME
Period	2016-2017
Funding	Total budget: € 3 400 000 EAFRD contribution: € 750 000 National / Regional contribution: € 250 000 Private contribution: € 1 000 000 Other sources: € 1 400 000
RDP Measure	M4.2 – Support for investments in processing/marketing and/or development of agricultural products
Further info	www.gamotajr.com
Contact	antal@gtk.sk



© GAMOT JR s.r.o.

Processing locally produced soybeans into high quality products has positive economic and environmental effects.

2. Energy

Bioenergy is the EU's largest renewable energy source and it is expected to remain a vital component of the energy mix towards 2030. The European Agricultural Fund for Rural Development (EAFRD) is helping farmers, foresters and rural communities make the most of their biomass. Reducing dependence on non-renewable energy sources is key to the EU's energy and climate policy.

Bioenergy is renewable energy created from biomass – plant or animal material, such as manure, crop residues or wood, typically derived from by-products.

From a policy perspective, a stronger bio-based energy sector can accelerate the substitution of non-renewable resources in line with the EU's commitments under the Paris Agreement⁽¹⁾. It also aligns with the idea of the circular economy, a concept that underpins the EU Bioeconomy Strategy.

Rural Development policy is playing its part. The EAFRD helps make the circular economy a reality in rural areas by encouraging systems where, “the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised.”⁽²⁾

Bio-based energy production for district heating, national gas grids or transport not only provides good examples of how this policy is being implemented in practice. It also offers an additional source of revenue for farmers and foresters.

On page 9 you can read how the EAFRD helped a group of Swedish farmers expand the capacity of a biogas plant that transforms agricultural and community waste into renewable fuel, allowing them to seize a good business opportunity.

Before a new project begins, the potential for use of renewables and reduced greenhouse gas emissions should be fully considered.

In Belgium (page 10), the EAFRD supported a study into the viability of biogas production and the successive development of a biomethanation unit.

Biogas (or biomethanation) plants⁽³⁾, turning agricultural and organic waste into energy, offer farmers and rural communities sustainable and viable solutions to waste treatment. They provide low-cost and low-emission energy and can boost retention of soil nutrients within a territory, through re-use of bioenergy digestate, a nutrient-rich substance produced by anaerobic digestion that can be used as organic fertiliser.

In other words, the bioeconomy is about adding value to waste, by-products and resource flows. It offers solutions that increase the efficiency of water and nutrient utilisation, reduce the environmental impact of farming and minimise the exploitation of natural resources.

The Portuguese 'GOEfluentes' project (see page 12) is improving the management of animal nutrient flows not only to reduce losses, but to promote reuse, such as biogas production.

(1) The Paris Agreement, <https://unfccc.int/process#a0659cbd-3b30-4c05-a4f9-268f16e5dd6b>

(2) 'Closing the loop – An EU action plan for the Circular Economy', <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52015DC0614>

(3) In biogas plants (or units), organic material is microbiologically converted into biogas.



Swedish farmers adding value to agricultural waste

Biogas plants can produce renewable fuel and better fertilisers while offering interesting business opportunities. In Sweden, the EAFRD helped a group of farmers plan the set-up of a biogas plant and later expand its capacity.

In 2009, 12 farmers from the Alvesta municipality, in the Swedish county of Kronoberg, started to look at the possibility to turn the agricultural waste they produced into renewable energy. Through LEADER funding from the 2007-2013 Swedish RDP they commissioned a feasibility study for a biogas plant.

Based on the concrete proposal formulated by the feasibility study, in 2013 the farmers set up the Alvesta Biogas company and applied for funding from the County Administration Board to build a biogas plant and a biogas station. The works were completed and the production of biogas from manure started in 2015.

After just one year of activity it became clear that Alvesta Biogas had great potential. With just one compressor, however, the biogas plant could only

process a limited amount of manure. Furthermore, any technical issues with the processor could put the whole production on hold.

Thanks to new EAFRD co-finance, in 2015-2017 Alvesta Biogas could install a second compressor in the biogas plant. This increased and diversified the biogas plant's activities. The plant now processes not only manure, but also waste from a slaughterhouse and a syrup distillery. The biogas is sold at the local gas station, to the energy company EON and to the nearby town of Växjö to fuel its 44 public buses that run on biogas. The digestate left from the process goes back to the farmers and is an excellent fertiliser.

These EAFRD projects strengthened the collaboration of the Alvesta farmers, helping them improve the



© Alvesta Biogas

The Alvesta biogas plant processes manure, waste from a slaughterhouse and a syrup distillery. The biogas is sold at the local gas station, to an energy company and a nearby town.

contributions from agriculture to the environment and climate. It is helping diversify the local economy while also increasing farms' competitiveness by cutting the costs for the purchase of fertilisers, replaced by the digestate. In the future they aim to produce more biogas for vehicles and plan to increase the amount of manure processed in the plant by involving more farmers.

"To succeed in this kind of project you need some very committed people in the group, together with a good relationship of trust. All 12 farmers that were involved from the start are still involved in the owner group today."

Joakim Granefelt,
Alvesta Biogas spokesperson

Project Name	Alvesta Biogas
Type of beneficiary	Private company
Period	Feasibility study: 2009-2012 Expanding biogas plant capacity: 2015-2017
Funding	Total budget (2009-2012): € 78 000 EAFRD Funding: € 39 000 Public funding: € 19 000 Private contributions: € 20 000 Total budget (2015-2017): € 283 619 EAFRD contribution: € 46 060 National/regional contribution: € 67 388 Private contribution: € 170 171
RDP Measure	Axis 4 – LEADER (2007-2013 RDP) M6.4 – Support for investments in creation and development of non-agricultural activities (2014-2020 RDP)
Contact	Joakim Granefelt, Alvesta Biogas jgranefelt@gmail.com

Manure-fuelled biogas in rural Belgium

The EAFRD has helped a Belgian LAG in Wallonia to improve its know-how and support capacity for establishing manure-fuelled biogas units, as part of a coordinated regional Climate Action Plan.

Wallonia's Pays des Condruses area is located in Liège county and is home to some 30 000 inhabitants. Agriculture (60 %) and forestry (30 %) are the economic backbone of this rural region, which is dominated by cattle farms producing quality beef as well as large volumes of manure that needs to be safely managed. The local LEADER group saw the manure as a potential biogas power source and in 2007 they used their RDP funding to carry out a feasibility study project exploring possibilities for biogas units in their area.

Project actions included seminars and informative online publications targeting farmers and citizens, study trips and production of guidelines on how to apply dry digestion techniques. The LAG identified 19 potential sites that could accommodate biogas plants, and four biomethanation units were eventually set up.

The LAG's confidence in biogas continued and in 2014 a new LEADER project was launched to create a circular economy model based around one of the units, a biomethanation plant in Ochain. This new business called Ochain Energie started in 2017 and resulted in a 600 kW biogas unit. The LAG facilitated

the creation of a local citizen cooperative, Émissions Zéro⁽⁴⁾, which provided the major share of the initial investment (64 %) and still allows citizen participation in the project.

Since its launch, each year Ochain Energie transforms 20 000 tonnes of farming by-products (manure

(4) <https://www.emissions-zero.coop/page/biomethanisation>



The biogas unit in Ochain is connected to larger environmental initiatives.

© GAL Pays des Condruses



The project has had a strong community dimension in all its phases, from set-up to current operations.

and slurry – 65 % of the total), local green waste, agro-industrial waste and dedicated energy crops into gas, electricity, heat and digestate. The biogas unit supplies renewable electricity to 1 300 households and produces the equivalent of 500 000 litres of fuel thanks to the residual heat of the engine. It supplies heating to the local Château d'Ochain nursing home, a huge building hosting over a hundred occupants.

"Biogas is unique as it uses pollution to create sustainable common goods."

Grégory Racelle,
Manager of Ochain Energie

The circular economy business model set up by the Ochain biomethanation unit involves the whole community. Farmers bring their waste to the biogas unit and collect digestate to use instead of chemical fertilisers; this improves the soil and groundwater quality and reduces leaching. Using the renewable energy produced by the biogas unit, rather than fossil fuels, avoids the emission of more than 4 000 tonnes of CO₂ each year, while the digestate reduces the purchase of fertilisers whose production emits large quantities of greenhouse gases (CO₂ and N₂O).

"The benefits for the local area should be measured in flows: from manure as raw material, we create digestate allowing the production of mineral fertiliser, improving soil and preserving ground water quality."

Jean-François Pêcheur,
Manager LAG 'Pays des Condruses'

The Ochain biogas unit has created seven new jobs in the area. The project has had a strong community dimension in all its phases, from set-up to current operations: the LAG facilitates contacts between the different stakeholders involved (businesses, farmers, architects, engineers and administration) and created a community steering committee. The shared governance of the project is key to its success and constant dialogue ensures that challenges like smell, cartage and noise emissions can be discussed openly with all stakeholders, finding solutions and achieving consensus.

The biogas unit in Ochain is connected to a larger initiative. In 2012, the Walloon government launched an ambitious programme called POLLEC⁽⁵⁾ in order to coordinate the reduction of greenhouse gas emissions, in compliance with the Covenant of Mayors for climate and energy. In this context,

(5) Politique Locale Energie Climat – the third campaign was launched in 2016 and gathers more than 200 municipalities.
<https://energie.wallonie.be/fr/pollec.html?IDC=9178>

the LAG was tasked to coordinate the climate and energy strategies of its municipalities, as it already supported energy efficiency pilot projects during the former programming period, such as the creation of a hydropower dam which led to the creation of a citizens' cooperative in 2014⁽⁶⁾. Thus, in 2017 the LAG elaborated a local climate plan, the 'Plan Climat du Condroz'. Its vision is that by 2050, Pays des Condruces will be a 'positive energy territory' ('Territoire à énergie positive'), producing more energy than it needs for its own consumption. The biogas plant in Ochain is one of the initiatives aiming at reaching these climate goals.

Further to the previous projects, the LAG has successfully secured new EAFRD support for an 'Energy' project (2017-2021) that includes the set-up of other small biogas plants on farms as well as a second large plant. The project foresees also the analysis of Higher Heat and Compressed Natural Gas (CNG) production, and the increase of the capacity of the Ochain biomethanation unit.

Project Name	Biomethanation in Ochain (Wallonia, Belgium): a circular economy model supported by LEADER
Type of beneficiary	Local Action Group
Period	2014-2018
Project funding	Total budget: € 20 000 EAFRD contribution: € 7 740 National / Regional contribution: € 10 260 Other contributions: € 2 000
RDP Measure	M19.2 – Support for implementation of operations under the CLLD strategy
Further info	http://www.galcondruces.be/energie
Contact	Marc Wauthelet, GAL Pays de Condruces marc.wauthelet@galcondruces.be

Sustainable management of animal nutrient flows in Portugal

A Portuguese EIP Operational Group project is using the EAFRD to promote integrated approaches for reducing and reusing the nutrient flows generated by intensive animal production systems. Thus, the project aims to transform 'waste' into energy.

Animal production is often crucial for the sustainability of traditional agricultural systems. This is primarily due to the fact that the manure they produce still contains around 70 % of their food's original nutrients, and thus these can be reused to enrich farm soils. However, the intensification of animal breeding systems can cause a global loss of nutrients and negative environmental impacts when manure is excessive and not appropriately managed, as in the case of improper or accidental effluent discharges. The problem is particularly acute in areas with high concentrations of intensive livestock holdings.

Portugal's 'GOEfluentes' project started in 2018 as an EIP-AGRI Operational Group bringing together four research/educational institutions, three farmer associations and six agricultural enterprises. It aims to: create sustainable solutions to manure management issues; increase the efficiency of water and nutrient use; reduce the environmental impact of farming; and transform 'waste' into energy.

"The bioeconomy emerges as an opportunity with special relevance for rural areas and for agriculture, livestock and forestry, given the quantity and diversity of materials made available to the bio-industry."

Maria Custodia Correia,
National Rural Network, Portugal

The project aims to evaluate the environmental and economic impact of emerging solutions for nutrient flow management at farm level. It is developing a methodology for mapping and geo-referencing the production, collection, storage, recovery and re-use facilities of animal nutrient flows. The mapping will provide a systematic overview and help forecast production scenarios. The data collected about nutrient flow management feeds into Portugal's Emissions Inventory used to track progress against its emission targets.

Importantly, this EAFRD project also includes the installation of demonstration units for effluent

(6) <http://coopcec.be>



© GoEfluentes

The project aims to reduce the environmental impact of farming and transform 'waste' into energy.

management and valorisation as fertilisers and will develop biogas production models based on animal flows.

The project is also informing and involving different stakeholders through emission estimations, benchmarking, identification of specific mitigation options in each region and studies of different scenarios.

While the project will deliver tangible results mostly at its end, it is already fostering collaboration among local stakeholders. A digital platform signposts to relevant legislation, shares the knowledge generated by the project and will include a geo-referenced database.

Project Name	GOEfluentes
Type of beneficiary	Public research institute
Period	2018-2020
Project funding	Total budget: € 401 801 EAFRD contribution: € 265 189 National contribution: € 36 162 Private contribution: € 100 450
RDP Measure	M16.1 – Support for the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability
Further info	https://projects.iniav.pt/goefluentes/ EIP-AGRI project database: https://ec.europa.eu/eip/agriculture/en/find-connect/projects/goefluentes-efluentes-de-pecuaria
Contact	Olga Moreira, INIAV – Estação Zootécnica Nacional olga.moreira@iniav.pt

3. Enhanced bio-based products

Europe's diverse biomass is suitable for many uses, including very high-value, innovative ones. Capturing and retaining value in rural areas offers much potential for future growth. Rural Development Programmes (RDPs) are being calibrated to boost rural bioeconomy value chains.

The agriculture and forestry sectors have been creating value in the European economy for generation upon generation. Now in addition to their traditional roles, farmers and foresters find themselves at the centre of the European bioeconomy. They provide vast amounts of biological resources that already are being – or have the potential to be – converted into new, innovative products and are powering the move away from non-renewable materials and energy sources.

The goal of moving towards a carbon-neutral society – aligned with the European Commission's long-term 2050 strategy 'A Clean Planet for All'⁽¹⁾ as well as the EU Bioeconomy Strategy – implies replacing petrol-based and non-renewable materials with bio-based ones. This includes turning organic waste, residues of agricultural and forestry production and industrial processes, and food discards into valuable and safe bio-based products to meet the goals of the circular economy.

Current research and innovation work in Europe is focused on developing alternative products for very diverse sectors – from textiles through pharmaceuticals to construction. The growing demand for the bio-based raw materials needed by these new value chains offers opportunities for farmers, foresters and rural entrepreneurs to diversify their revenue sources and better manage risk.

In Latvia (page 15), the EAFRD helped a company based in a rural area develop hemp-based construction materials with high insulation performance.

Over the long term, a flourishing bioeconomy should contribute to creating more rural jobs and help stem – or even reverse – the outward flow of population seen in many rural regions.

In rural Finland, a start-up company producing a bio-composite based on wood fibre used EAFRD funding to study their business growth opportunities (see page 17). Their carefully planned investment created 20 new jobs in the region.

A sustainable rural bioeconomy depends on multiple factors, including the creation of resilient and local value chains that promote the circular use of biological resources. Understanding the specific bioeconomy profile of a given rural area will best determine the types of value that local rural biomass can provide.

The 'Quality Suber SL' project in Spain (see page 18) is contributing to local value chain development and fostering the sustainable management of Catalan cork oak forests by improving the purchasing, preparation and commercialisation processes of cork.

New approaches to value creation and business models that keep biomass local as long as possible and with as little loss as possible are particularly welcome. Over the long term, the aim should be to create interconnected sustainable local circular bioeconomies that come together to form a strong EU-wide circular bioeconomy.



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(1) https://ec.europa.eu/clima/policies/strategies/2050_en

Developing hemp-based construction materials in Latvia

A Latvian company used support from the EAFRD to produce innovative hemp-based construction materials. The project promoted bio-based innovation while supporting the sustainable management of natural rural resources.

Hemp-based products can have multiple applications, including in textiles, cosmetics and food production. The core of the hemp stem is the strongest and most durable part of the fibre. It can be used to produce allergen-free concrete with optimal thermal insulation and natural mould resistance.

In 2013 the Latvian construction material company VERTSS UP, Ltd decided to test the production of new hemp-based materials, using EAFRD support under LEADER for a project that diversified its production and assisted employment in the local rural area of the LAG Zied Zeme.

"Bio-construction from ecological materials, like hemp, is a good example of the need for entrepreneurs to look for the uniqueness of their products, their identity, unconventional solutions, which should also identify and make effective use of local resources."

LAG - Public Private Partnership Association "Zied Zeme"

EAFRD co-financed the purchase of new equipment needed to process raw hemp and produce hemp cement for building. The hemp concrete was used as the base material for wall blocks of monolith concrete (reinforced concrete cast with no joints other than construction joints). The product range was then extended to include hemp-based insulation materials for ceilings, roofs and cavity walls.

Customers' initial scepticism about the company's novel concrete product was won over by an effective information campaign about hemp concrete that included the construction of a demonstration house. This idea attracted a lot of positive press and social media attention because it was the first house of its kind in the Baltics.

Their initial experiment with hemp concrete has now become the company's core business. The hemp-based material production was taken up by another construction material company, Hemp Eco Systems Latvia, Ltd, belonging to the same owner.



© Kristaps Kalns

Hemp can be used to produce allergen-free concrete with optimal thermal insulation and natural mould resistance.

© Kristaps Kalns



These successful bio-based businesses created new full-time and seasonal jobs in the region and created a local value chain.

Currently Hemp Eco Systems Latvia, Ltd also produces lime plaster, lime paste and lime colours. It uses bio-based materials to build four to six houses per year for clients across the Baltic countries, Denmark, Austria and Switzerland.

These successful bio-based businesses created new full-time and seasonal jobs in the region and created a local value chain, sourcing the raw material from hemp growers and processors in the area.

Project Name	Bio construction from hemp
Type of beneficiary	Private SME
Period	2013-2014
Project funding	Total budget: € 19 496 RDP contribution: € 11 697 Private contribution: € 7 799
RDP Measure	Axis 4 – LEADER (2007-2013 RDP)
Further info	http://hempecosystems.lv
Contact	Uģis Pauriņš, Hemp Ecosystems Latvia ugis@hempecosystems.lv

Finnish bio-composites project boosts employment

A Finnish start-up used the EAFRD to explore the feasibility of new business opportunities for an innovative bio-composite. The project led to the creation of 20 new jobs.

Aqvacomp Ltd. is a start-up business based in Sastamala, southern Finland, that produces Aquacomp, an innovative type of bio-composite based on 70 % of wood fibres. This bio-based material is an ecological alternative to non-renewable fossil raw materials, fibreglass and talc. Easily customisable, it can be used for making a variety of products ranging from transport vehicles to toys and house furniture. It is particularly suitable for acoustic and haptic applications (i.e. linked to sound and touch).

This bio-composite has several environmental advantages: it is lighter than plastic, requiring less energy for transportation, and can be fully recycled six times without compromising its quality. The trees used to produce its core raw material input – wood – act as a carbon sink and the composite itself is biodegradable.

Following a successful experimental phase, the company decided to invest in a new production line to upscale the production. It would be the first of its kind and thus required a thorough feasibility study. The company made use of a new business support tool called 'investment feasibility study' available from the Finnish RDP and with the beneficiary receiving advice from its local LAG, Joutsenten Reitti. The support covered 50 % of the feasibility study costs, which included research, visits to potential equipment suppliers in several EU countries and considerable testing. The feasibility study findings identified the optimal combination of production machines for the large-scale bio-composite production line, considering both the technical quality and cost efficiency.

Based on these results, the company then made a large-scale investment with its own private funds to reinforce the capacity of the production line in Sastamala. Soon afterwards they decided to expand through another new factory in Rauma, a traditional wood-processing town around 90 kilometres from Sastamala, connecting the bio-composite production with an existing pulp mill. Overall, the investments created 20 new jobs in the region.

The ambitious investments led to new market developments, particularly in South-Korea and China, where giant companies like Samsung and Volvo are changing the plastic parts of their products to lighter, more durable and more environmentally-friendly biocomposite. Already in 2015 a big South-Korean plastic company also made a sizeable private investment in Aquacomp Ltd., boosting its development.

"We thank the Local LEADER Action Group for this cooperation opportunity. Without the business support our start-up company would have faced much higher risk of failure."

Jari Haapanen,
Aqvacomp manager



This bio-composite based on wood fibres is an ecological alternative to non-renewable fossil raw materials, fibreglass and talc.

Project Name	Biocomposite production line feasibility study
Type of beneficiary	SME
Period	2015-2017
Project funding	Total budget: € 17 933 EAFRD contribution: € 3 766 National/regional contribution: € 5 200 Private contribution: € 8 966
RDP Measure	M6.4 – Support for investments in creation and development of non-agricultural activities
Further info	www.aqvacomp.fi
Contact	Jari Haapanen, manager of Aquacomp Ltd. jari.haapanen@aqvacomp.fi

Reviving the traditional cork value chain in rural Spain

A group of forest owners in Catalonia, Spain, got together to revive the traditional cork industry. Through EAFRD funding they are implementing and promoting sustainable forest management and strengthening the local cork oak value chain.

In the last 20 years in Catalonia the cork industry has been declining, following the closing of key processing companies due to financial problems. Many jobs have been lost and, with only 50 % of the cork oak forests of the region properly managed, the risk of forest fires and other environmental problems is rising.

In line with Catalonia's strong cooperation traditions, a group of private forest owners decided to join forces and revive this traditional industry. They considered that joint management was the right approach for a region where forest estates are very fragmented.

Three organisations of forest owners and cork oak managers jointly set up Quality Suber SL, a company they collectively own and manage. This SME applied to the Catalanian RDP for funds from Measure 9 – Setting up of producer groups and organisations in the agriculture and forestry sectors. They considered that this Measure, encouraging new joint business initiatives, could generate different synergies among stakeholders and contribute to structuring the local value chain.

Their cooperation aims to improve the process of purchase, preparation and sale of the cork from Catalanian forests, and to promote the ecologically

and economically sustainable management of cork oak forests and related farms. It makes use of two regional legal instruments for forest management: the Technical Plans of Forest Management and Improvement for areas over 25 ha and the Simple Plans of Forest Management for areas of less than 20 ha.

Good forest management includes clearing, road repair, cork extraction and appropriate phytosanitary treatments. Quality Suber is spreading the principles of sustainable oak forest management throughout the region via its members – i.e. associations or cooperatives of forest owners. In 2016, Quality Suber obtained the first Chain of Custody certificate from PEFC (international Programme for Endorsement of Forest Certification), that guarantees the traceability of the product and facilitates the supply of certified cork to the market. To date, more than 70 % of Quality Suber's cork comes from PEFC-certified forests.

The Quality Suber company is contributing to structuring the local value chain, improving stakeholders' collaboration and increasing their market knowledge. The company buys at a competitive price from local private cork producers, who committed to provide at least 50 % of their production to the project for five years. Cork producers' active involvement in the value chain has been key to improve the management and classification of the product, which in turn has increased its market value.

The company promotes its cork through direct contacts, a website and the dissemination of studies on the characteristics and advantages of this type of cork. The volume of operations shows an average annual increase of over 5 % and new markets have opened in other regions and countries.

The project has gained the trust of both producers and customers, thanks to a policy of transparency in all processes. The actual production of cork has improved, particularly the drying and sanitary treatment operations, also thanks to new equipment purchased in 2017. Furthermore, as most of the Quality Suber's partners are associations or cooperatives, they reinvest most of the income in improving membership services.

Between 2016 and 2018, the company participated actively in several initiatives linked to innovation within the framework of the EIP-AGRI.



© Quality Suber

A group of private forest owners adopted a joint management approach to revive the traditional cork oak industry in Catalonia.



© Quality Suber

This project is spreading the principles of sustainable oak forest management throughout Catalonia.

“In Catalonia, cork producers have been working together for a long time. This too has contributed to the success of the project.”

Àlex Muñoz Sol,
Head of Forestry Aid Area,
Catalonia Managing Authority

At an average annual increase of 15 % in the number of associated producers (currently 61), the company counts today a total of over 18 000 ha. Most importantly, all the producers involved in Quality Suber are committed to the project and increasingly willing to do maintenance work such as thinning, improvement cuts, clearing and planting new trees.

“This is a forest with a future, with producers committed to sustainable forest management and responsible for their mountains.”

Joan Rovira,
Secretary general of CFC – Catalan Forestry Consortium

Quality Suber participates regularly in projects for the protection of cork and the cork oak forests. These include the project GO BIOCORK (EIP-AGRI Operational Group), which aims to find natural solutions for the control of plagues of the coleopterous *Coraebus Undatus* (a cork pest), as well as the regional project GO TCA which studies new procedures for the early detection of TCA (Tricoloroanisol, a cork disease) at forest-farm level.

Project Name	Quality Suber SL
Type of beneficiary	Social enterprise
Period	2013-2018
Project funding	Total budget: € 299 386 EAFRD contribution: € 128 736 National / Regional contribution: € 170 650
RDP Measure	M9 – Setting up of producer groups and organisations in the agriculture and forestry sectors
Further info	https://www.qualitysuber.com/es/
Contact	Joan Rovira, Quality Suber joan.rovira@forestal.cat

4. Bioeconomy and environmental sustainability

For rural areas, the EU's bioeconomy policy is about providing sustainable economic opportunities while enhancing environmental performance, thus helping to dissociate growth from ecosystem degradation. Managing society's natural resources sustainably is more important than ever in the context of increasing environmental pressures and biodiversity loss.

The EU Bioeconomy Strategy emphasises that value should be generated along the three pillars of sustainability. Biomass production and management is expected to provide economic benefits, be environmentally sustainable and have a positive social impact on various stakeholder groups, and especially for rural communities.

In supporting the development of the bioeconomy in rural areas, Rural Development Programmes (RDPs) carefully calibrate the balance between the land and forest uses, ecological limits, and the livelihoods and well-being of local populations.

In this way, while supporting the use of biomass for food and feed (see page 4), bioenergy (see page 8) or innovative new product development (see page 14), the long-term environmental and social impact is also being considered when the EAFRD and national funds are being deployed. For example, forest management practices that are being supported not only need to take into account the value of harvested wood and the renewal of stocks, but also the upkeep of the services the forest provides, which includes habitats for various species and valuable access to nature opportunities for local populations and tourists.

A multidimensional view of the bioeconomy is being mainstreamed by the EAFRD.

On page 21 you can read about a Belgian project using a participative methodology to develop an integrated approach to the conservation and management of hedgerows. Local farmers, ecologists and policy-makers came together to develop an area-specific vision for hedgerows considering their historic, ecological and economic aspects.

A sustainable bioeconomy must value natural resources, diminish environmental pressures and increase the use of sustainable renewable products, restore and enhance ecosystems' functions and biodiversity. It will also make a significant contribution to the achievement of several of the UN SDGs.

Although the agricultural sector has been able to increase its productivity while cutting fertiliser use and greenhouse gas emissions, it remains a significant source of methane and nitrous oxide emissions.

In the Czech Republic (see page 23), the EAFRD is supporting collaboration between an agricultural holding and a research company. The project is improving the management of manure, enhancing soil quality and reducing the use of inorganic fertilisers. The aim is to improve the hydrological conditions of the soil, to mitigate soil erosion and to increase the amount of organic matter in the soil.



© Joke Maes – RLKGN

A community approach to managing Belgian hedgerows

Hedgerows have historically been a cultural feature of European rural landscapes – but they are increasingly neglected. In Flanders (Belgium), the EAFRD is helping two rural communities re-think and revive their hedgerow management, bringing benefits for biodiversity and the climate while also launching a new local bioeconomy value chain.

Traditionally used as fences and plot boundaries, hedgerows are also a source of firewood and provide shelter, food and habitat corridors for insects, birds and small mammals. Since the 1960s, however, changing habitats and landscape management approaches have led to the neglect of hedgerows. The remaining ones have grown into rows of tree, which provide shelter to fewer animal species compared to the historical, well-managed and regularly cropped hedgerows.

In the Campine region, a rural area near Antwerp, in Flanders (Belgium), the NGO Regionaal Landschap Kleine en Grote Nete (RLKGN) decided to set up a project aiming at recovering the existing hedgerows and training farmers to exploit their environmental and economic potential. Funding from the Flemish RDP enabled the NGO to coach and support 25 farmers and two municipalities, Olen and Kasterlee, to rethink and resume their hedgerow management.

The project used a participative methodology, involving local farmers, environmentalists, local and regional policy-makers in developing a common vision for the hedgerows through regular meetings. Local farmers were coached and supported to resume managing the hedgerows on their farms. The project organised workshops and meetings to share the lessons learned with farmers and administrations from the entire Campine region.

The project helped to plant approximately two kilometres of new hedgerows and managed three kilometres of historical hedgerow networks.

“Many hedgerows in our landscape were neglected for decades, often resulting in frustrations among farmers as well as among nature conservationists. This project highlighted the common interest of all parties in renewed and sustainable coppicing management, taking into account all functions of the landscape elements: farming, biodiversity, landscape heritage, climate, tourism, and others.”

Guy Van de Perre,
Municipal officer for agriculture of Kasterlee



© Joke Maes – RLKGN

Traditionally used as fences and plot boundaries, hedgerows are also a source of firewood and provide shelter, food and habitat corridors for insects, birds and small mammals.

© Joke Maes – RLKGN



The project used a participative methodology, involving local farmers, environmentalists, local and regional policy-makers in developing a common vision for the hedgerows.

The project merges scientific knowledge about hedgerows, their practical advantages for farmers (e.g. organic matter from leaf fall, shade) and their often-neglected roles for local ecosystems (e.g. habitats for plant and animal species, carbon sequestration capacity). 'Hedgerows' succeeded in bringing together stakeholders who use and appreciate the landscape in different ways and therefore had to learn to understand each other's perspectives and values.

"The beauty of this project lies in the synergy between the different sectors. The project does not merely search for compromises between rural development and environmental goals. Instead, the valorisation of hedgerows delivers real benefits for farming, climate, biodiversity, as well as landscape."

Bas Van der Veken,
Coordinator of Regionaal Landschap
Kleine en Grote Nete

By coaching local farmers and the municipalities, the project promoted the use of wood from hedgerows (instead of full-grown trees) as a source of bioenergy to heat public buildings and provide hot water for six dairy farms. Bioenergy from hedgerow wood produces approximately 500 tonnes of biomass per year, reducing the local CO₂ emissions by approximately 400 tonnes.

"We use woodchips for heating of the stable, the milk for the calves, our home and our holiday farm house. The woodchips are locally produced. This way, we do not only use a sustainable energy source, but we are also happy to support local contractors and landscape management in our region."

Els Breackmans,
local farmer

Positive results from this EAFRD project motivated the local farmers' committee to set up a biomass network which led to two new projects: 'Campine Energy Wood', supporting sustainable local landscape management to produce wood chips for boilers, and 'iLandscape', developing and testing a new software for the optimisation and yield estimation of landscape management.

Project Name	Hedgerows: natural capital for agriculture, nature and landscape
Type of beneficiary	NGO
Period	2016–2018
Project funding	Total budget: €80602 EAFRD contribution: €52 391 Private contribution: €12 090 Other contributions: €16 120
RDP Measure	M19 – Support for LEADER local development (CLLD)
Further info	https://www.rlkgn.be/projecten/landschap-en-erfgoed/houtkanten/leader-houtkanten/6086
Contact	Bas Van der Veken, Regionaal Landschap Kleine en Grote Nete bas.vanderveken@rlkgn.be

Combating soil degradation in the Czech Republic

The EAFRD is supporting collaboration between Czech farmers and researchers to combat soil degradation through more sustainable farming practices. Positive environmental and economic results are expected.

The ZAS (agricultural joint stock company) Mezihájí, located in Kněžice, in the Czech Vysočina region, cultivates about 1 130 hectares of land, mostly heavy 'Černožem' soil. The prolonged use of heavy machinery caused soil compaction and declining yields. To face this challenge, the agricultural company decided to collaborate with Agrovýzkum Rapotín s.r.o., an agricultural research company.

The EAFRD offered a great opportunity for the cooperation between the two companies. The project aims to introduce new technologies for collecting and storing organic matter and balancing its distribution in the soil layers to improve water retention.

The farm selected and purchased the most appropriate machinery for soil treatment and manure management and provided training to its farm staff in the use of the new machines. It also revised its crop cultivation plans and is monitoring the outcomes on selected field blocks, adjusting operations as needed. Increased yields from the effects of improved soil preparation are expected already in the 2020 harvest.

The new soil management practices tested through the project shall be fully integrated by ZAS Mezihájí in 2019-2020 and will need to be adopted for at least a decade to have a concrete effect on soil quality. Over the long term, the project will increase and stabilise the organic matter content in local soils, averting their degradation trends and improving the yield and the quality of crops, including fodder crops for cattle. Thus, the project will deliver both environmental benefits and improve farm profitability.



© ZAS Mezihájí

In the long term, the project will deliver both environmental benefits and improve farm profitability.

The two organisations are proud of their fruitful collaboration and have recently also applied for funding from the research programme of the Technology Agency of the Czech Republic (TAČR). Their joint research project on the introduction of intercropping for soil improvements started in May 2019.

"Cooperative projects, particularly those bringing together producers, scientist and advisors, can move beyond the simple modernisation of technology towards much broader possibilities to improve the sustainability of agriculture while maintaining, or even increasing, productivity. It is crucial that farmers seek innovative approaches that are appropriate to their particular soil and climatic conditions."

Representative of ZAS Mezihájí

Project Name	Technological innovations in the Agricultural Joint Stock Company (ZAS) Mezihájí
Type of beneficiary	Farming company and research institute
Period	2017-2020
Project funding	Total budget: €913 082 EAFRD contribution: €187 110 National / Regional contribution: €190 890 Private contribution: €378 000 Other contributions: €157 082
RDP Measure	M16.2 – Support for pilot projects and for the development of new products, practices, processes and technologies
Further info	https://www.vuchs.cz/agrovyzkum-rapotin/index.php
Contact	Hana Kubešková, ZAS Mezihájí zas. mezihaji@tiscali.cz Jana Mikisková, Agrovýzkum Rapotín jana.mikiskova@vuchs.cz

5. Awareness raising and knowledge transfer

Rural development practitioners are working to raise awareness, create engagement and develop the new skills needed to power the bioeconomy. They can rely on support from the European Agricultural Fund for Rural Development (EAFRD) for initiatives that boost local buy-in, build capacity or otherwise seek to build momentum behind the mainstreaming of the bioeconomy.

The public consultation undertaken in 2017 on the Roadmap for the Communication updating the European Bioeconomy Strategy indicated that increasing public awareness and knowledge about all areas of the bioeconomy was a major issue. The January 2019 meeting of the ENRD Thematic Group on Mainstreaming the Bioeconomy⁽¹⁾, confirmed that this remains an on-going challenge.

The bioeconomy straddles many sectors and many stakeholders. Some stakeholders are local entrepreneurs or small-scale primary producers. Others can be industrial-scale users of biomass. A diverse range of scientific and technological skills needs to come together for product innovation and development.

Networks using participatory approaches can help join the dots. The agricultural European Innovation Partnership (EIP-AGRI) brings a range of diverse stakeholders together. It gathers those having a shared interest in sustainable farming and forestry that 'achieves more and better from less'.

The EIP-AGRI 'SmartGas' project in Italy (see page 25) is a good example of the way EAFRD support can build local buy-in and promote the innovation that a sustainable bioeconomy depends on.

It brings farmers, academics, agricultural experts and the national biogas consortium together in a project aiming to increase the carbon sequestration in farmland soils through a more efficient use of digestate and soil tillage techniques.

Inclusive processes are helping bridge and reinforce synergies between otherwise atomised stakeholders – from foresters and farmers to local entrepreneurs, academic organisations, public authorities and civil

society. Facilitating knowledge exchange can lead to great results. And it all begins with raising awareness.

In Finland, an agricultural advisory service used EAFRD funding to advise rural companies in the Oulu region about the opportunities offered by the bioeconomy (page 26).

Rural enterprises and villages discovered opportunities to increase collaboration around new bio-based business models, products and ecosystem services. The project is generating change by inspiring collaboration, the creation of short supply chains for food and the development of high added-value products.

Similar projects reinforce the importance of local buy-in. The inclusion of local actors helps make innovation sustainable. Once aware of its potential, rural entrepreneurs will seize the opportunities the bioeconomy offers them. This dynamic is a catalyst for innovation and stimulates actors at all levels to identify new opportunities for rural development.

Sharing good examples, identifying local 'champions' and developing communication initiatives about the benefits will help get more people onboard and accelerate the mainstreaming of the bioeconomy in rural areas.



(1) Second ENRD Thematic Group on Mainstreaming the Bioeconomy, https://enrd.ec.europa.eu/news-events/events/2nd-meeting-thematic-group-mainstreaming-bioeconomy_en

Biogas to increase the sustainability of Italian farming

A consortium of agricultural and biogas stakeholders is using the EAFRD to tackle climate change and greenhouse gas emissions through an economically and environmentally sustainable use of agricultural inputs and energy. The project is raising the awareness of the climate mitigation possibilities offered by farming.

The project SMARTGAS brings together six farms, Confagricoltura Toscana (the regional farmers' association), a university, the national biogas consortium and the regional institution for technical assistance to agriculture. The project started in 2019 as an EIP-AGRI Operational Group with the aim to implement a bottom-up approach linking farmers' needs to research and knowledge transfer and private sector needs.

The project's short/medium term objective is to increase the carbon sequestration in farmland soils through a more efficient use of digestate and tillage techniques in cropping systems producing food, feed and bioenergy.

The farmers involved in the project are implementing various practices and techniques, including conservative and minimum tillage, sub-superficial distribution of the digestate, digestate microfiltration, combined use of double-crops, cover-crops and catch-crops and of conventional and alternative multiannual species. The first field tests will be evaluated in early 2020. The project features a high level of cooperation and interaction among partners – public and private organisations – working with a common vision. The project also includes information and training activities for the farmers directly involved as well as the sharing of knowledge with other farmers in the region through workshops, farm visits and written information materials.

Overall, the project is raising farmers' awareness about the contribution of agriculture to climate objectives and the beneficiaries are positive that this initiative could reach out to a larger group of farmers and agricultural stakeholders. In the longer term, the project aims also to test and validate new agricultural techniques to support the consolidation of the agricultural biogas sector in Tuscany and in other regions.

"It is necessary to give value to biomass in energy and climate strategies, not only by using by-products and waste but also by giving value to energy crops. We need a scientific, not an ideological approach, and a sustainable model for soil use through management systems that increase soil productivity."

Massimiliano Giansanti,
President of Confagricoltura



This project is raising farmers' awareness about the contribution of agriculture to climate objectives.

© Istituto di Scienze della Vita - Scuola Superiore Sant'Anna

Project Name	SMARTGAS – Farming with biogas to reduce the carbon footprint, increase sustainability and build resilience to climate change in cropping systems
Type of beneficiary	Consortium of farmers' association, university, farms, private training and consulting agencies
Period	2019-2021
Project funding	Total budget: € 291 772 EAFRD contribution: € 260 706 Private contribution: € 31 066
RDP Measure	M01 – Knowledge transfer and information activities M16.1 – Support for the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability
Further info	EIP-AGRI project database: https://ec.europa.eu/eip/agriculture/en/find-connect/projects/biogas-intelligente-coltivare-con-biogas-ridurre www.smartgastoscana.it
Contact	Martina Pirani, Confagricoltura Toscana fedtosca@confagricoltura.it Federico Dragoni, Scuola Superiore Sant'Anna federico.dragoni@santannapisa.it

Stimulating new bioeconomy initiatives in rural Finland

An EAFRD project developed the understanding of what bioeconomy could mean in the Oulu LEADER region, in Finland, and what concrete opportunities it offers the territory. The project inspired 55 new bioeconomy initiatives in the region.

Oulu is part of the Northern Ostrobothnia region in Finland, which has a specific regional Bioeconomy Strategy for the period 2015-2020 (linked with interest for bioeconomy, in particular rural biogas production, which has recently grown thanks to the launch of biofuel production for transport in Oulu.

The Oulu LEADER region is characterised by vast rural areas surrounding the big urban centre of Oulu. This setting favours the development of short urban-rural linkages for food distribution and provision of nature-based services. The dynamic villages of the region also present an opportunity for local businesses and circular economy models.

Considering this context, the local development NGOs ProAgria Oulu and Oulun Maa- ja kotitalousnaiset decided to set up a project to raise awareness about bioeconomy business opportunities eligible for EAFRD support. The Finnish Bioeconomy Strategy estimates that bioeconomy may create 100 000 new jobs in

Finland, which are crucial for the viability of its scarcely populated rural territories.

The LAG drew down funding from the training Measure of the Finnish RDP to support their initiative. The project, running from 2016 to 2019, organised 117 information and advisory activities targeting rural entrepreneurs – both actual and potential entrepreneurs – and all local actors linked to the regional bioeconomy. The activities took place in different villages across the Oulu LEADER region. Knowledge transfer was accompanied by business consultancy and information on investment planning and funding opportunities, thus moving from more general information sharing to tailored consultancy for businesses. The information activities attracted over 2 120 regional actors and representatives of local villages interested in new business development and cooperation models.

All information was tailored to the specific characteristics of the region and the topics of interest

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This project organised 117 information activities, attracting over 2 120 rural stakeholders interested in the business opportunities offered by the bioeconomy.

to the local rural enterprises. Topics spanned from rural bioeconomy models, rural tourism, leisure and well-being services to branding strategies for rural landscapes and collaboration models for rural enterprises; from circular economy, biogas, forest bioeconomy, natural agricultural products and local food to digitalisation.

The project invested a lot in on- and off-line communications, thus reaching a larger and more diverse audience.

The project increased the general awareness and understanding of what bioeconomy could mean in this region and what concrete opportunities it offers. Rural enterprises and villages discovered opportunities to increase collaboration around new bio-based business models, products and services, increasing their economic and environmental sustainability through the use and re-use of local natural resources. The project also promoted new cooperation models between entrepreneurs and local administrations in the region.

"It is so important that these projects give hope for the future to the rural people. In addition to agriculture it is also crucial to develop other rural businesses and renewable energy sources."

Project participant

Promoting local production and supply chains was central in the approach, with the objective of reducing transport and related emissions and promoting circularity. Another objective was to promote local high-value raw materials: examples included how to establish certified organic collection areas of wild herbs and berries and local processing of non-wood forest products (NWFP) by using local energy sources to run the drying equipment.

The project also focused on the sustainable use of renewable natural resources, aiming at optimising resource efficiency coupled with the highest possible added value of products and services. The project underlined the principles of sustainable development to guarantee the continuity of the economic activities and preserve the environmental and cultural heritage. As part of the bioeconomy, the activities emphasised ecosystem services, such as carbon sequestration, clean water and leisure opportunities offered by natural environments.

Following this series of awareness-raising projects, 55 small rural enterprises started new bioeconomy-related initiatives to develop their businesses; 19 enterprises received advice on investments or funding opportunities related to the bioeconomy; 17 enterprises started planning bioeconomy-related investments and 10 of them have already applied for financing, including from the EAFRD. In addition, five new enterprises have been created and five more are about to be launched.

The project beneficiaries are particularly proud of the high interest generated by the project and the information events among the target group; all the events were organised as planned and none of them had to be cancelled. In their view, the best result was the continuity between the dissemination of information and the actual investments by local companies, which are the concrete, long-term legacy of the project.

"We want to be one of the case studies featured in the project newsletters!"

Managing Director of a local food processing company

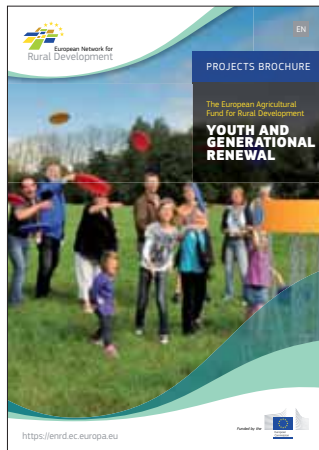
Project Name	The Oulu Region Bioeconomy LEADER Tour
Type of beneficiary	NGO
Period	2016-2019
Project funding	Total budget: € 180 000 EAFRD contribution: € 75 600 National/regional contribution: € 68 400 Municipal contribution: € 36 000
RDP Measure	M1.2 – Support for demonstration activities and information actions
Further info	https://www.proagriaoulu.fi/fi/biotalousleader/
Contact	Taimi Mahosenaho, ProAgria Oulu and Oulun Maa- ja kotitalousnaiset taimi.mahosenaho@maajakotitalousnaiset.fi

PREVIOUS EAFRD PROJECTS BROCHURES

Further inspiring examples of EAFRD-supported rural development projects can be found in previous editions of the EAFRD Projects Brochure. Each edition highlights successful project examples on a particular rural development theme.

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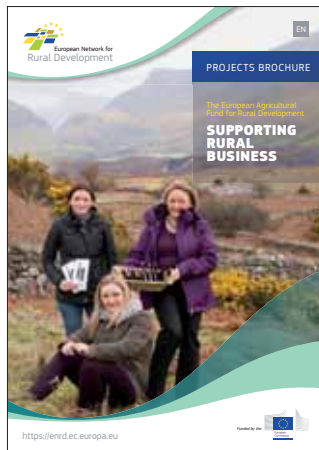
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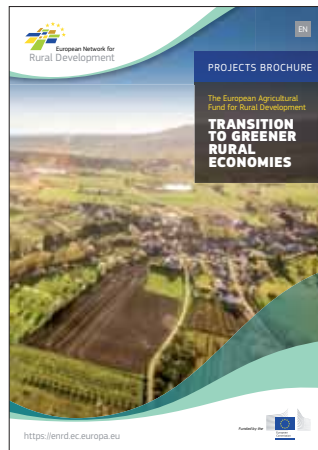
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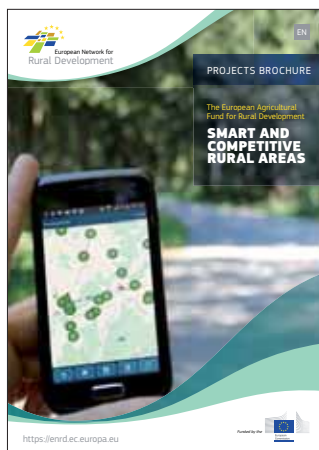
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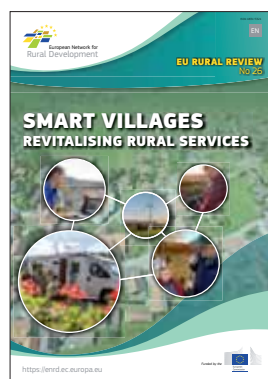
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The *EU Rural Review* is the ENRD's principal thematic publication. It presents the latest knowledge and understanding of a particular topic relevant to rural development in Europe. Themes range from rural entrepreneurship and food quality to climate change and social inclusion. It is published twice a year in six EU languages (EN, FR, DE, ES, IT, PL).

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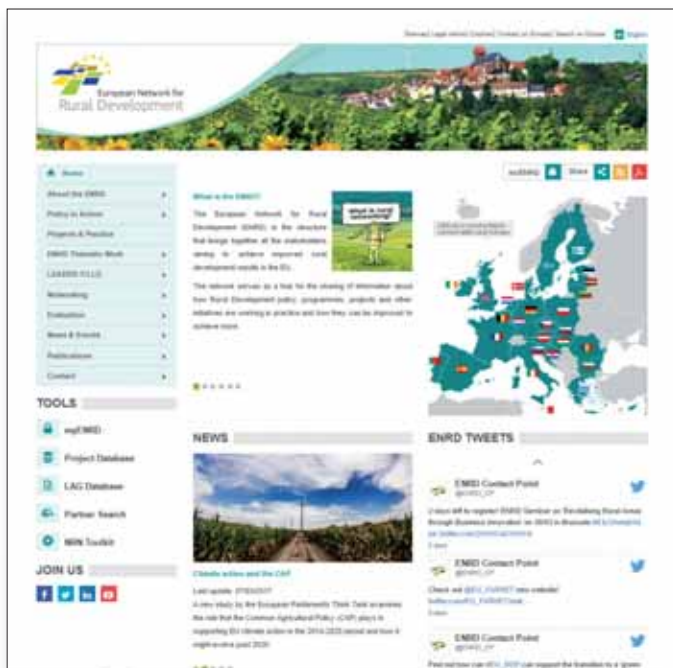
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BELGIQUE/BELGIË
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