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AGRICULTURE & INNOVATION

# Sustainable livestock farming

Innovation for farm resilience and profitability



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This brochure was produced within the framework of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI), which was launched by the European Commission to promote innovation in the agricultural and forestry sectors and to better connect research and practice.

This brochure contains case studies of Operational Groups and other innovative projects, connected to the topics of four EIP-AGRI Focus Groups, on 'grazing for carbon', 'reducing livestock emissions', 'permanent grassland' and 'robust and resilient dairy production systems'. All Focus Group results can be found online via [www.eip-agri.eu](http://www.eip-agri.eu).







## ► Opportunities from sustainable livestock management

Livestock farmers are facing a number of challenges today. Demands for a lower impact on the environment, especially reducing greenhouse gas emissions, for more animal welfare and for less intensive production need to be balanced with a stable production and a good income. While there are challenges for livestock farmers, there are also many opportunities to increase the resilience and profitability of their farms.

Sustainable pasture management can offer ways to provide good feed to dairy cattle, help reduce livestock emissions, build up and store carbon in the soil, help mitigate the effects of climate change, and much more. Digitisation and decision support tools can support farmers in better managing their livestock, for instance for more resource- and cost-efficiency.

*This brochure highlights a number of themes and opportunities where improved livestock and grassland management systems can support farmers in tackling challenges in the field. It features inspiring cases of Operational Groups and other innovative projects that are exploring solutions for more sustainable and resilient livestock farming with a focus on cattle, and examples of successful collaboration and knowledge exchange.*





Rob Richmond participated in the EIP-AGRI Focus Group 'Grazing for carbon'. Read the main findings in the factsheet or in the full report [on the EIP-AGRI website](#).

## ► Grazing for carbon

Grasslands have enormous potential for storing carbon (C) in the soil. Carbon sequestration improves soil health, makes soils more resilient to extreme weather events, contributes to climate change mitigation and can benefit pasture quality. In sustainable livestock grazing systems, the key challenge is to find the best type of management to combine animal production with soil ecosystem services such as carbon storage, nutrient cycling and biodiversity.



### Grazing management with a heart for soil health

Since 2005, dairy farmer Rob Richmond has been managing his pastures with a focus on building soil carbon. His efforts are paying off in the form of more resilient soils and more pasture growth.

Rob runs an organic dairy farm with 300 dairy cows on 200 ha of farmland in the Cotswolds, UK. His grazing practices have helped him improve the organic matter levels in his soils. He uses the method of strip grazing, which confines the cattle to a limited area of grazing land for a short period, giving the animals a fresh allocation of pasture each day. "For this grazing system you need good planning and a good infrastructure", Rob explains, "but by moving the cows more frequently the grass can regrow more quickly and it is grazed more efficiently." Rob's biodiverse herbal pastures can grow deeper roots and help feed the soil. The increased leaf area builds organic matter and helps store carbon in the soil. "I don't use mineral fertiliser", Rob says, "and in autumn I use composted manure that feeds the soil microbes when there is little grass growth. This helps rebuild soil reserves."

Rob's grazing practices have produced more pasture year on year. His pastures are now more resilient to drought and to wet conditions, and carbon sequestration contributes to climate change mitigation and adaptation. Rob states: "Soil is your capital. You need to grow it, not spend it. Learning to manage these pastures for organic milk production and soil quality building has been a steep learning curve. But I see that my pastures are now producing better in extreme weather conditions. I hope my approach can inspire farms all over Europe."

**Follow Rob on Twitter:** [@herbalpastures](#)







Find all results from the EIP-AGRI Focus Group 'Reducing livestock emissions' [on the EIP-AGRI website](#).



## ► Marketing pasture while reducing emissions

Livestock production significantly contributes to ammonia and greenhouse gas emissions, specifically methane. Adopting grazing methods that let cows graze optimally can contribute directly to lowering livestock emissions. In addition, there is a growing interest in precision livestock farming, measuring methods, and digital tools that can support farmers in lowering, monitoring or managing farm emissions.




### In- or outside? A digital tool to monitor grazing cows

The 'Grazing cow monitor' project has developed a collar that uses GPS tracking to monitor the location of individual cows. The tool clearly indicates how much time a cow spends indoors or outdoors. "The monitor gives farmers digital proof that their cows have spent a sufficient amount of time grazing outdoors", says coordinator Stephanie Van Weyenberg of project partner ILVO. "It can therefore help make their administrative tasks easier, but it also allows farmers to label and market their milk as pasture milk."

Giving cows access to pastures provides them with fresh grass to eat and can help maintain a healthy soil ecosystem. Outdoor grazing can also help to reduce ammonia emissions from livestock. When the cows spend less time in the stables, this lowers the chance of faeces reacting with urine and producing ammonia. Keeping track of their cows' pasture time is one of the options for farmers in Flanders and the Netherlands to prove that they are taking measures to lower ammonia emissions.

Farmers can see the results on a dashboard, which they can easily access on their computer or smartphone. "We have tested the monitor at farms in Belgium and the Netherlands", Stephanie continues, "and we highly value the feedback we get from farmers. The technology is developed in close collaboration with them. They let us know what their needs and expectations are. If they experience that for instance the sensor's sample rate affects battery life too much, the technology provider will take this up and adjust the technology. We hope to reach a high number of European farmers with this technology."

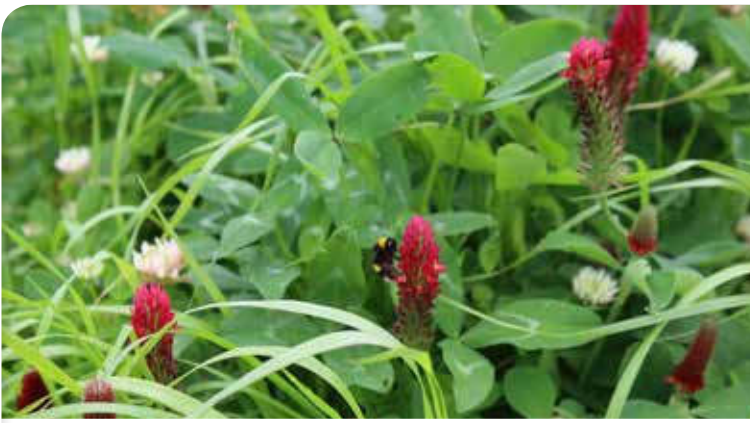
**More information:** <https://www.iof2020.eu/trials/dairy/grazing-cow-monitor>



This project is one of the use cases in multi-actor project Internet of Food and Farm 2020 (IoF2020), which stimulates the adoption of Internet of Things technologies in European farming and food chains to strengthen competitiveness and sustainability.

**Find out more:** <https://www.iof2020.eu/>





Find inspiration and results from the EIP-AGRI Focus Group 'Permanent grassland' on the [EIP-AGRI website](#), including a summarising [factsheet](#), and the [full report](#).

## ► Strategies for managing permanent pasture

Permanent grasslands offer many benefits for biodiversity, ecosystem services such as carbon sequestration, and animal health. Sustainable management strategies can help to maximise these benefits, for instance by matching grassland production with livestock needs. Digital measuring and decision support tools can help increase resource efficiency and optimise grass production. Differentiating grass-based products such as meat, milk and cheese, can help create higher market value for farmers. Exchanging knowledge is key for increasing profitability, productivity and sustainability for European permanent pastures.



### Happy grazing! Biodiverse pastures for quality milk

What impact does quality grass feed have on milk yield and on the quality of the milk that is produced? This question is explored by the Portuguese Operational Group 'Sustainable pastures', based in the Azores. The project has been running trials with biodiverse, protein-rich pastures, both perennial pastures and grasslands harvested for silage. "We want to test the impact of differences in soil, grassland composition, and resistance to water stress and altitude on milk yield and milk quality", project coordinator Eduardo Vasconcelos explains. The pastures that were installed contain 30% more legumes. "The results show that when the cows have access to a pasture that is rich in legumes, they produce an additional milk yield of 8%. We still need more trials to measure the impact of a changed diet on the quality of the milk that the cows produce."

Installing leguminous crops can help reduce the application of synthetic fertilisers and the need for imported feed materials, downsizing the farm's carbon footprint. The milk from these pastures can benefit the farmer with a higher milk price. Dairy farmers have been involved from the start. "We've been working closely together with dairy farmers and farmers' associations in testing different pasture types and their effect on milk yield and milk quality. The farmers that are involved are welcoming systems that can help them produce more milk. We definitely see a growing demand from producers for legumes and legume-rich pastures. We will keep looking for a good perennial grass to find a mix with the best results." To share and demonstrate the results in practice, the project is planning to set up support systems, including training, for producers.

**More information** [in the EIP-AGRI database](#)



## ► Robust and resilient dairy farming

Dairy farms are currently faced with economic and environmental challenges, such as volatile prices, extreme weather events, and market demands for more animal-friendly production systems. Improving grazing management can lead to happier cows that produce quality milk with a better price for the farmer. Exchanging experiences can help farmers make their own farms more robust and resilient.



### Inspiration across borders: Dutch dairy farmers visit Irish farms

The Dutch Operational Group 'Maximum milk from grass' is exploring business systems where grazing pasture plays a central role, and where as much quality milk as possible is produced with pasture grass. In August 2018, 7 organic dairy farmers, 1 cheese maker and 1 adviser visited a number of dairy farms in the South-West of Ireland to see what's happening across European borders.

Coordinator Harm De Vries: "The farms that we visited focus on offering as much grass as possible to the cows. They work with a system of strip grazing and early spring calving, which support a high grass intake, resulting in low production costs. Because of the favourable climate, the cows are grazing the most part of the year. We focus more on herbaceous pastures, and getting a maximum of milk from our pastures. Our cows generally don't spend as much time grazing outside. We may have a higher cost through additional feeding and different

stable infrastructures, but we gain a good, constant production.

While it's not affordable to change a production system overnight, it was extremely interesting to experience the way different management systems are being run. Knowledge exchange is valuable for everyone involved in agriculture, especially within the EU. We can learn a lot from each other."

**More information** on the [Maximum milk from grass website](#) or in the [EIP-AGRI database](#)

The EIP-AGRI Focus Group 'Robust and resilient dairy production systems' explored challenges and solutions for dairy farmers. Find all results [on the EIP-AGRI website](#).

**Horizon 2020 thematic networks** connect farmers, Operational Groups and other innovative projects and networks across the EU to stimulate knowledge exchange:

- **EuroDairy** supports practice-based innovation in dairy farming: [www.eurodairy.eu](http://www.eurodairy.eu)
- **4D4F** improves decision making on dairy farms based on sensor-generated data: [www.4d4f.eu](http://www.4d4f.eu)

See the latest [overview of all thematic networks](#).

Discover all Operational Groups in the [EIP-AGRI database](#) or on the [interactive map](#).



## SUSTAINABLE LIVESTOCK FARMING Innovation for farm resilience and profitability



### Good pasture management

