FOOD & BIODIVERSITY

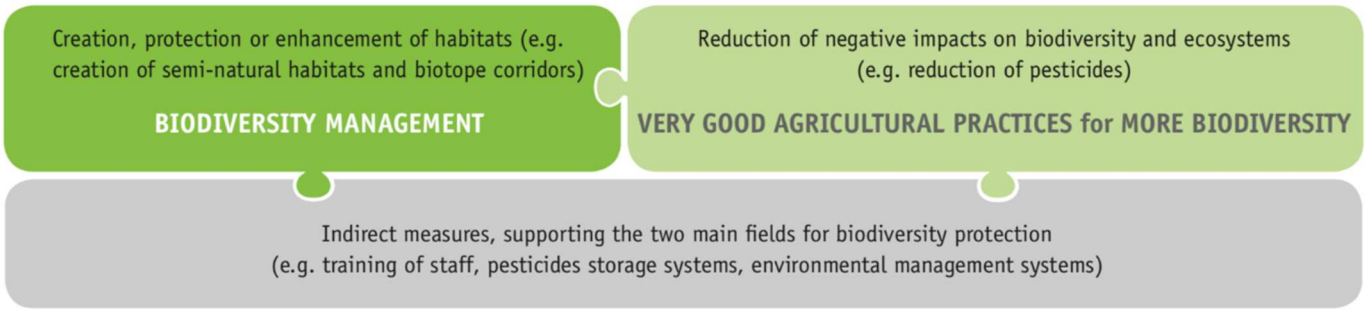
Implementation of biodiversity measures

Experience of dairy pilot farms in France

Content

1. Introduction

The LIFE Food & Biodiversity project supports food standards and food companies to develop efficient biodiversity measures and to implement them in their pool of criteria or sourcing guidelines.
In this paper on the German cereal pilots in the LIFE Project, we provide information on our experiences gained in the cereal pilot projects in Germany in terms of implementation of recommended biodiversity measures. All pilots within the project were subject to a specific biodiversity consultation and measures were put in place that are based on the two pillars for biodiversity-friendly agriculture: Biodiversity Management and Very Good Agricultural Practices (figure below).



This publication targets agents who assess the implementation of requirements regarding cultivation methods (standard advisors, cooperatives, suppliers). We wish to communicate the challenges we experienced in our pilot projects and point out the observed benefits of the measures, as well as the pitfalls and related cost. This may be taken as a guide to avoid similar pitfalls and to enhance the benefit for biodiversity.

2. The Pilot Projects

Within the LIFE Food & Biodiversity project, "Recommendations to improve biodiversity protection in policy and criteria of food standards and sourcing requirements of food companies and retailers" were published. This Guideline includes a catalogue of measures to enhance biodiversity, out of which farmers may chose actions to enhance their farming practices. All of the measures were tested over the years by different stakeholders in different projects and proved their benefits for biodiversity. To further deepen our understanding on their regional effects on biodiversity, some measures were taken up by crop specific pilots in Spain, Portugal, France and Germany.
In France, the dairy cooperative Jeune Montagne and 3 farms participated to the pilot project. The milk production is 15 millions of liters from 76 farms and the AOP cheese Laguiole production is 750 tons. Aubrac plateau is localised at a central part of France in the southern Massif Central.

A local breed called Aubrac is used for its milk and meat quality. Endangered in the 70's, the breed has been preserved thanks to a group of passionate farmers. Today, Aubrac breed is a very important symbol for the region. The dairy herd are mainly composed of Simmental breed which is well adapted to the territory and that presents great milk properties for producing cheese (interesting ratio protein / fat matter). Farmers work hard to preserve Aubrac breed for milk production.

A PDO (protected designation of origin) cheese called Laguiole is produced by the dairy cooperative **Jeune Montagne**. The PDO area covers the whole Aubrac territory.

Aubrac :
The Aubrac, a large basaltic plateau in middle mountains between 1000 and 1500 m above sea level. It extends over 2500 sq. km (250,000 ha) with six inhabitants per sq. km. The Aubrac plateau straddles three departments (Aveyron, Cantal and Lozère) and two regions (Occitanie and Auvergne-Rhône-Alpes).

Aubrac plateau hosts a very diversified flora and fauna.
The area includes an important number of peatlands, which hosts a very specialized flora.
The main environmental considerations are:

- risks of land degradation with grazing abondonment
- overgrazing or fodder production intensification on open lawn
- risks of euthrophication for water course (with fertilizer use or liming)
- water course pollution with pesticide use
- early mowing
- losing natural hedgerows, group of trees, bush and river side vegetation

slash and burn for wetlands.

The table below gives an overview about the actions that were implemented by the French dairy pilot farms.
The aim of this publication is to give an overview about the actions taken, the lessons learned, the benefits for biodiversity and the challenges faced during implementation. In this document, we focus on a few measures.

Action	Pilots that applied measures		
	Farm 1 (Borie Haute)	Farm 2 (Cestriere)	Farm 3 (Valadier)
Product Integrated Actions			
Local breed preservation (Aubrac for milk production)	√	√	√
Maintenance of traditional grazing	√	√ A plot is managed with specific biodiversity preservation issues (ecopastoral management plan)	√ Summer grazing in the high Aubrac plateau
Late harvest	√ From 15th of may (2017) to 1st of July (2020) 10 % of permanent grasslands		
Crop diversification and crop rotation	√ 10 ha of cereals to feed cows and produce straw		
Centrifugal mowing	√	√	√
Reduced tillage	√	√	√
Reduction of concentrates quantities	√ 292 g / l to 130 g / l		
Increase concentrate autonomy	√ 70 % to 77 %	√ Project: production of legumes / cereals mix	
Reduction of pesticides on cereals	√ No more herbicide and no insecticide	Concentrates are bought	Concentrates are bought
GMO free (link to the PDO specifications)	√ Oil cake French origin	√	√
Protection of water bodies	√	√	√
Landscape elements			
Bocage management plan / Multistrate hedges implementation and management	√ Density of 92m of hedgerows and forest hedges per ha of UAA. 165 m of bushy hedges, 424 m of multi-strate hedges. Wood chips is produced from hedgerows for energy	√ Density of 55m of hedgerows and forest hedges per ha of UAA	√ Density of 32m of hedgerows end forest hedges per ha of productive grasslands and 298 ha of summer pastures
Stone wall management	√	√	√
Late harvest	√	√	√
Wetland management	√	√	√

Action	Pilots that applied measures	Action	Pilots that applied measures
Nesting aids birds (Tyto alba): regulation of pest (vole)	5 raptor perch Project: implementation in 2021	Project : implementation in 2021	
Traditionnal orchards implementation	√ 2 ha		
Socio-economic actions			
Biodiversity monitoring	√ Work with the LPO (Birdlife)	√ Work with the LPO (Birdlife)	

Example of stone wall that has been rehabilited

Preserved wetland

Natural pasture and landscape elements preservation

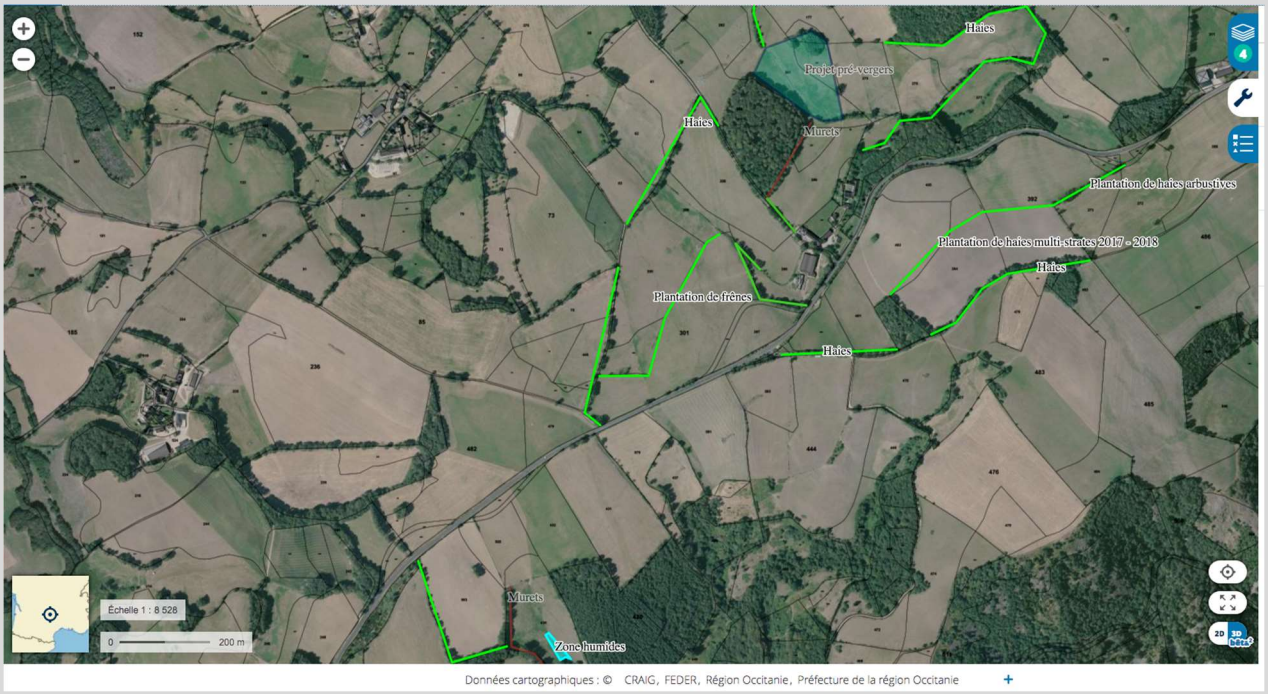
Table 1 Strengths and weaknesses of dairy farming system (Aubrac region)

Strenghts	Weaknesses
• Low input farming system • Low livestock density (0,6 to 1,1 LU / ha of forage surface) • Diversified permanent grassland • Summer pasture management • Low use of chemical fertilisers • No or low use of pesticides • High density of bocage • Implementation of traditional orchards • Low use of antibiotics and antiparasitics (use of alternative methods)	• Pesticide use on cereals (but at a low level) • Purchase of concentrates • Quite high concentrate consumption / animal / day (130 to 350 g concentrates /liter) • Old drainage of wetland (restoration) • Landscape elements discontinuity

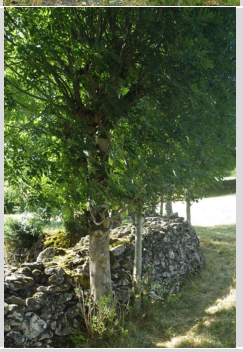
2.1. Bocage management plan

Multi-strate hedges and ash tree hedges provide multifunctional services. It provide habitat and winter quarters for beneficials and other wild animals and contribute to key ecosystem services (water regulation, wind protection,…). They are precious for animal shadow and well-being. Hedges are also valorized for animal litter and energy production (wood chip). Multi-layered structure of hedges (sol, herb, shrub, tree) facilitates a potential high species diversity. The ash leaves are also used for forage for heifers. High density of semi natural elements and a good connectivity between them contribute to preserve a high varieties of species (e.g. such as bird species: royal milan, hoopoe,…).

More information on semi-natural elements can be found in the Action Factsheets for advisors, auditors or quality managers, which describe the measures in detail and give insights in their correct management and implementation.



Map of semi-natural habitats (La Borie Haute, 2020)
Between 2017 and 2019, this farm has implemented 165 m of bushy hedges, 424 m of multi-strate hedges and several lines of ash tree.

	Multi-strate hedges have been implemented in autumn 2018. Protection has been implementing (not visible on the picture). Composition with autochthonous species: ash, hazel, holly, blackthorn, hawthorn, oak (Quercus robur L), buckthorn, …
	Ash pruning every 4 to 5 year (La Serre). Branch management is very time consuming. Ash pruning should be done with a cutter bar. This tool is producing a proper pruning adapted to ash preservation (limitation of pest risks).

2.1.1. Benefits and experiences

Farmer´s concerns

1. Time needed for implementing new hedges
2. Cost
3. Choice of autochtonous species

Costs

It depends of the species you chose to implement. In France, local communities give subsidies to farmers for hedges implementation.

Minimum cost to implement a hedge (certified plants, protection, mulching) is about 15-20 €/linear meter (workload of planting not included).
The main cost is about the certified plants and the fruit tree choice (from 0.9 € to 13.5€/tree for fruit tree).

According AFAC-Agroforesteries, the average management cost is about 3,32 €/linear meter for a manual management (with a basket and a chainsaw) and about 0,23 €/linear meter for cutter bar management.

Additional cost for Label Haie could be proposed to advisors, people in charge of implementing and manage hedges:

- Training session for bocage management plan and label Haie : 1,2 day / farmer
- Performing a bocage management plan: 2,4 day / farmer
- Performing a pre-labeling audit: 1 day / farmer

Focus on "Label Haie"

In France, the annual disappearance of 11;500 km of hedges in France is a direct cause of the collapse of biodiversity and the amplification of climatic accidents visible in our territories. Aware of the importance of saving bocage because of the multitude of ecological services provided by hedgerows, farmers have created a label to provide a framework for good hedge management practices and their enhancement by sustainable and local suppliers: the "Label Haie".
Its official launch took place on 4 October 2019, at the Ministry of Ecological and Solidarity Transition, in partnership with AFAC-Agroforesteries.
For the first time, this standard provides a framework for the mobilization of wood outside forests. It requires a **traceability system to guarantee the local origin of wood as well as it is a sustainable resource provided without overexploitation**. By certifying the hedgerow-wood sector, supplied by the farmers who manage their hedgerows, the label helps to give an **economical value** to the wood from the hedgerows and to favour local wood supply chain in the territories.

This label is an additional tool proposed to the farmers, wood managers to better know the ecological functioning of the hedgerows related to adapted farming practices, through a technical monitoring at the bottom of the hedgerows, in a continuous approach with a first stage of pre-labeling (a visit, assessment and bocage management plan). To be able to enter into the label, 100% of mandatory basic indicators must be achieved in the first level; then at the end of 6 years, 100% of the indicators of the level 2 must be met; at the end of 10 years, 80% of the indicators of the level 3 must be met.

2.1.2. Auditing Tips

The auditor can check the following quality aspects of hedges:

- Multi-strate hedges: minimum 3 to 4 m width
- Hedge consisting of > 5 native species
- Representation of 3 strata : grass, shrub and tree element
- Flower and fruit resources distributed along the year
- Works (pruning, re-planting,…) should be avoided during sensitive periods for biodiversity usually in spring during the breeding season.

2.1.3. Lessons learned and recommendations

Hedgerows are permanent and complex structures distributed along the perimeter of fields or dividing them. From the ecological point of view, the more complex these structures are, the more ecological habitats they hold, and therefore the more they contribute to biodiversity.

Work to implement new hedges should continue in order to improve connectivity between landscape elements. A natural growth vegetation allows to completed the landscape network easily on discontinuous parts.

Preserve brambles on particular areas can increase quickly the fauna attractivity (e.g. berries for bird).

The measure is costly with important implication of the farmer for the implementation. In order to choose well the autochthonous species, it is good to be advised by a naturalist organisation.

2.1.4. Quick Note

In general, multi-strate hedges can be described as follows:

Cost **Benefit for biodiversity** **complexity of implementation and management**

„Cost“ relates to the monetary and time expenses caused by the measure.
“Benefit for Biodiversity” symbolizes the positive effect of a measure for biodiversity.
“Complexity of implementation and management” describes the amount of work related to the implementation and the maintenance of a measure.
This scale is meant to compare the different actions with each other regardless of the area on which the actions are usually applied (e.g. dead wood is piled on a few m², whereas a flower strip is sown on a few ha).

2.2. Late harvest and centrifugal mowing

The first mowing period can be on the same period as :

- reproduction of bird species that are soil nesting dependant
- reproduction of mammals
- beginning of the vegetal cycle of plant species.

A late harvest can be tested on some corners during several years in order to increase species richness. With the technics of centrifugal mowing, fauna species get the opportunity to find another suitable habitat. Centrifugal mowing will allow to preserve fauna that are linked to permanent or temporary pasture for nesting or food.
Tractor speed should be limited to < 12 km/h and for the 1st and the last 4 lines, speed should be limited to 5 km/h.

2.2.1. Benefits and experiences

Farmer´s concerns

- Yield (late harvest can have impact yield)

Costs
No specific cost
No specific material

Some subsidies could be provided by Agri-Environmental Climate Measures that range between 133 €/ha/year to 300 €/ha/year according to the nature (wetland) and location of the grassland.

2.2.2. Auditing Tips

- Late harvest: date should be defined depending on the pedoclimatic conditions and the flora /fauna issues. In France, the period that should be avoided ideally is 20th April – 15th July.
- Refuge area: some corners can be a good way to test the practice.

2.2.3. Lessons learned and recommendations

May and June are often the main month for bird reproduction, particularly for bird that are soil nesting dependant species. In July, young birds are almost all able to fly.
In order to improve biodiversity protection, mowing can be either delayed or some corners are not mowed.

2.2.4. Quick Note

In general, late harvest can be described as follows:

Cost	**Benefit for biodiversity**	**complexity of implementation and management**
		

2.3. Implementation of traditional orchards

Orchard meadows are planted with fruit trees (70 to 80 trees / hectares), especially apple trees, generally managed without pesticides or chemical fertilizers. The average yield is around 10 tons of apples per hectare, producing 6 000 liters of cider or apple juice but also five tons of dry grass matter, or 5 000 liters of milk.

Traditional orchards can provide multifunctional and key services : they comprise a wide range of microhabitats (herbaceous plants, buds, flowers and fruits, cavities, deadwood and bark) because of their structural diversity. Ecological gradients are a result of climate conditions (humid, dry, sunny, shady, windy or sheltered) and farming practices (whether or not reaping takes place). They have therefore become a refuge for declining or endangered species. The diversity of species (insectivorous birds, bats and auxiliary insects) makes it possible to maintain the biological stability of the habitats, which is the principal advantage of orchard meadows. Populations of pests feeding on leaves (aphids), buds and especially fruits (caterpillars, etc.) remain small thanks to the presence of numerous antagonists. Hardy varieties are also resistant to most fungi. The production of fruit in these orchards is undeniably smaller than in intensive orchards, but this is offset by the quality achieved and by the production of forage and often of honey.

2.2.1 Benefits and experiences

Farmer´s concerns

- Priority to the management of existing fruit trees
- High economical benefits with apple juice (3€/l)
- Priority to collective approach for apple juice production

Costs

Cost could be very variable according to the nature of the projects (relative to species choice and tree density). We proposed some indicative prices:

- Year 1: for planting, material and cost of advice + monitoring: between 15 and 40 €/ tree (fruit trees are more expensive than other trees and material dedicated to grazing of these traditional orchards is also expensive)
- Year > 2: for management of these areas: between 0,5 to 1 €/tree or between 35 to 76 €/ha (including monitoring)

2.2.2 Auditing Tips

- Discussion with local conservatories to introduce some old varieties to have some resistant trees to diseases, pests and climate change.
- To preserve the sanitary quality of the fruits, grazing must stop at least 2-3 weeks before the fruits drop, and this until the end of the harvest, ie about 2 months in apple orchards.
- The traditional orchard in small grazing sub-units (from 0.3 to 0.5 ha) makes it possible to better adjust the livestock density and to facilitate livestock management.
- Grouping varieties with the same harvest date into each subunit minimizes the length of grazing interruption.
- Parking animals under trees can lead to tree removal. Watch out for old trees because they are more fragile.

- Remove animals from the traditional orchard when the soil is very wet: this induces soil compaction with a high risk of root asphyxia (apple and cherry trees are particularly sensitive).

2.2.3 Lessons learned and recommendations

- Choosing the well adapted varieties
- Efficient tree protection against cows

2.2.4 Quick Note

Cost	Benefit for biodiversity	Complexity of implementation and management
€ € €		

3. Conclusion

Overall, different actions were tested by our pilot farms. In this document we describe only a few of them in more detail, even though all the others are also contributing considerably to biodiversity. Most of them are long term improvement but does not cost much. Some of them are also supported by national or regional agri-environmental schemes. More information can be found on www.business-biodiversity.eu/en/biodiversity-training/advisors .
All pilot farms of the LIFE Food & Biodiversity Project test the Biodiversity Performance Tool (BPT), an online tool that helps to create a farm-specific Biodiversity Action Plan and thus supports the farmer in planning, adjusting and monitoring the measures for biodiversity on the farm. Furthermore, it helps auditors to assess the quality of the implemented measures. The final version of the BPT is available since summer 2019 : https://www.biodiversity-performance.eu/

3.1. Acknowledgement

Our special thanks go to the farmers that were part of the pilot project: Benoit Rozière, Caroline Carrette, François Maynier, Gilbert Cestrières and Gérard Valadier.
The testimony of Benoit Rozière has been published on the French website “Osez l’agroécologie”. An in-depth description of the farming system is provided with 3 videos :
https://osez-agroecologie.org/roziere-carte-identite
https://osez-agroecologie.org/roziere-videos

Hedgerows are essential on our farm for animal well-being (shadow, wind, ...) and for biodiversity (shelter for birds and mammals, landscape heterogeneity). We are valorizing them by using them for wood energy (100 m3/an) and litter. Benoit Rozière

4. Overview of the EU LIFE Project

The EU LIFE Project Food & Biodiversity "**Biodiversity in Standards and Labels for the Food Industry**" aims at improving the biodiversity performance of standards and sourcing requirements within the food industry by

- Supporting standard-setting organisations to include efficient biodiversity criteria into existing schemes; and encouraging food processing companies and retailers to include biodiversity criteria into respective sourcing guidelines
- Training for advisors and certifiers of standards as well as product and quality managers of companies
- Implementation of a cross-standard monitoring system on biodiversity
- Strong communication to raise awareness among all stakeholders in the industry

The project has been endorsed as a "Core Initiative" of the Programme on Sustainable Food Systems of the 10-Year Framework of Programmes on Sustainable Consumption and Production (UNEP/FAO).

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