A European thematic network in support of a sustainable future for EU dairy farmers

EuroDairy spans 14 countries, from Ireland to Poland, and from Sweden to Italy, encompassing 40% of dairy farmers, 45% of cows and 60% of European milk output

D4.1: Two webinars on the main principles surrounding management for biodiversity

Names of the responsible authors and organisations:

Klik hier als u tekst wilt invoeren.

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Dissemination level: <Public>,

About EuroDairy
EuroDairy is an international network to increase the economic, social and environmental sustainability of dairy farming in Europe. EuroDairy will foster the development and dissemination of practice-based innovation in dairy farming, targeting key sustainability issues: socio economic resilience, resource efficiency, animal care, and the integration of milk production with biodiversity objectives.
EuroDairy is funded by the EU Horizon 2020 research and innovation programme under Grant agreement No 696364.
www.eurodairy.eu

Summary of deliverable

Within the EuroDairy project, biodiversity audits are being undertaken on 40 Pilot Farms, representing one third of the total number of farms participating in the project. The objective of this work package ('Biodiversity') is to assess biodiversity status, and to identify landscape, farm-specific conditions and management techniques being applied by farmers which enhance biodiversity. When combined with assessments for financial performance and resource efficiency, also being undertaken by the project on these farms, the aim is to identify how good environmental management can be combined with profitable dairy farming.

Two outputs are presented for this deliverable.

The first is a presentation of emerging findings from biodiversity audits conducted on EuroDairy pilot farms during 2017. This is available on the EuroDairy website by following the link https://eurodairy.eu/accelerators/biodiversity/

The second is a tutorial guide to the underlying rationale and practical use of the BIOTEX biodiversity assessment tool, also available on https://eurodairy.eu/accelerators/biodiversity/.

EuroDairy

The main principles surrounding management

for biodiversity

Sophie Bertrand

29.01.2018

What is biodiversity ?

- **BIODIVERSITY… "**Variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (*Convention on Biological diversity, UN ,1992*)

Biological Diversity is the living part of nature, the living in its diversity and complexity (*Bœuf 2011*)

Agriculture with all its varieties of plants and animals is fully integrated into biodiversity, …

Explaining Biodiversity ?

- **… ORDINARY…** She "has no intrinsic value identified as such but, the abundance and the multiple interactions among its entities, contribute to the functioning of ecosystems and production ". *Chevassus-au-Louis, 2009*

- **… AGRO-ECOLOGICALSTRUCTURE(AEI) :** Stationary parts of the landscape, both useful and productive, providing many services (reducing reliance on pesticides, soil stability). Ex : Isolated trees, Hedgerows, Stone walls

Highlights and ordinary biodiversity ?

Highlights

Ordinary

Biodiversity and dairy, Why is it important?

- **Farmland biodiversity** is the basis for agricultural activities (soil, plants, microorganism…) **and** agriculture production benefits from the wildspecies on the farm

> **Pest suppression services : decline of bats in US could be worth 3.7 billlions to the agricultural sector**
> *(Boyle 2011)*

- **Biodiversity boots productivity :** a demonstration in EuroDairy…

Biodiversity and dairy
What are the main challenges ?

- **Global need to balance productivity with maintenance of biodiversity**

- **Within the dairy sector :** wide range of landscape, production system, localised environmental drivers…the impact on biodiversity could be + or – depending on the intensity of production, practicies, local condition (climate..) **..COMPLEX**

No simple recommendation
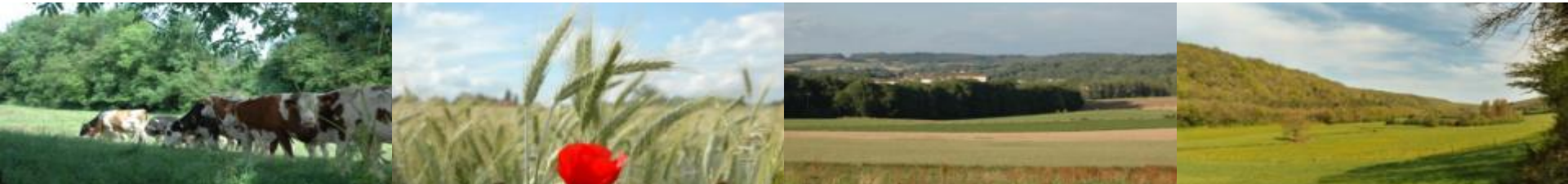
Biodiversity and dairy
What are the main challenges ?

Complexity – Bird response to intensity : no single response
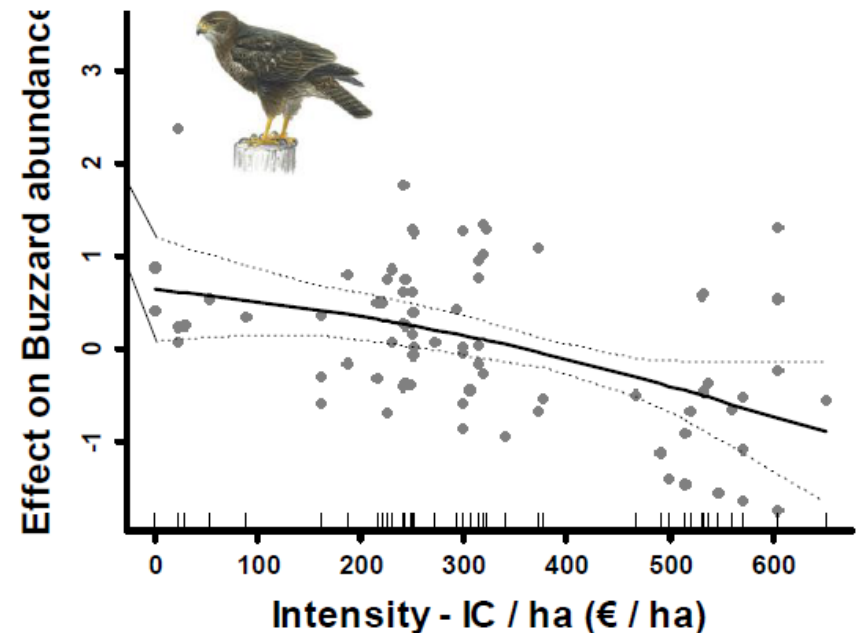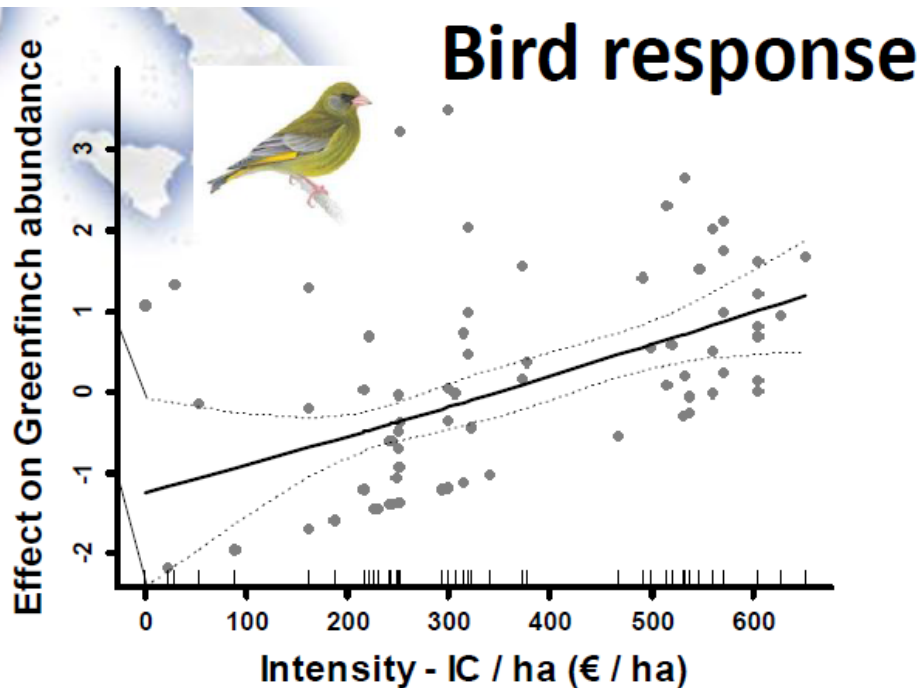
(Teillard 2010)

What are the general key principles ?

- **Biodiversity is complex, multivariate and extremely context dependant : assessment of dairy impact on biodiversity is very complicated**

- **The action plan should Identify action at habitat level and species level**

- **Need to reflect positiv and negativ impacts, and also direct and indirect impacts (off farm)**

- **Need to choose a reference state (baseline for comparison)**

Criteria used for the biodiversity Audits on dairy farms

- **Regional land use**

- **Farm land use**
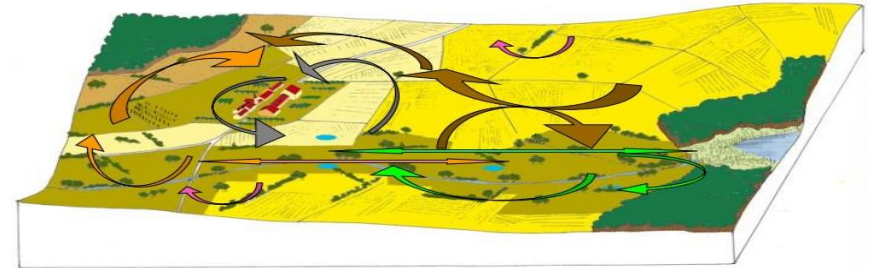
- **Farm spatial organisation of semi-natural habitats**

- **Management of permanent grassland**

- **Protected area**

Criteria used for the biodiversity Audits on dairy farms

- **3 components**

Mosaic effects

Agro-ecological Structures

Grassland management

Mosaic effect : heterogeneity of farming landscapes is positives for biodiversity

Specific biodiversity increase with the complexity and diversity of settlement.

(Freemark et al, 2002 ; ESCo INRA, 2008)
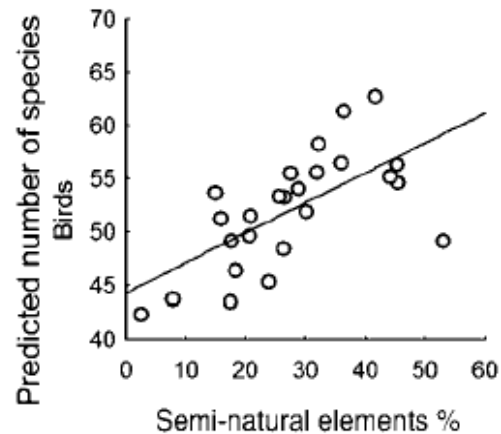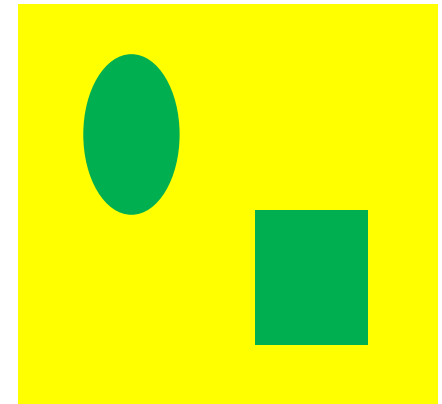
Criteria used for the biodiversity Audits on dairy farms

Mosaic effect : heterogeneity leverages the trade-off in biodiversity and production

Sabatier 2010
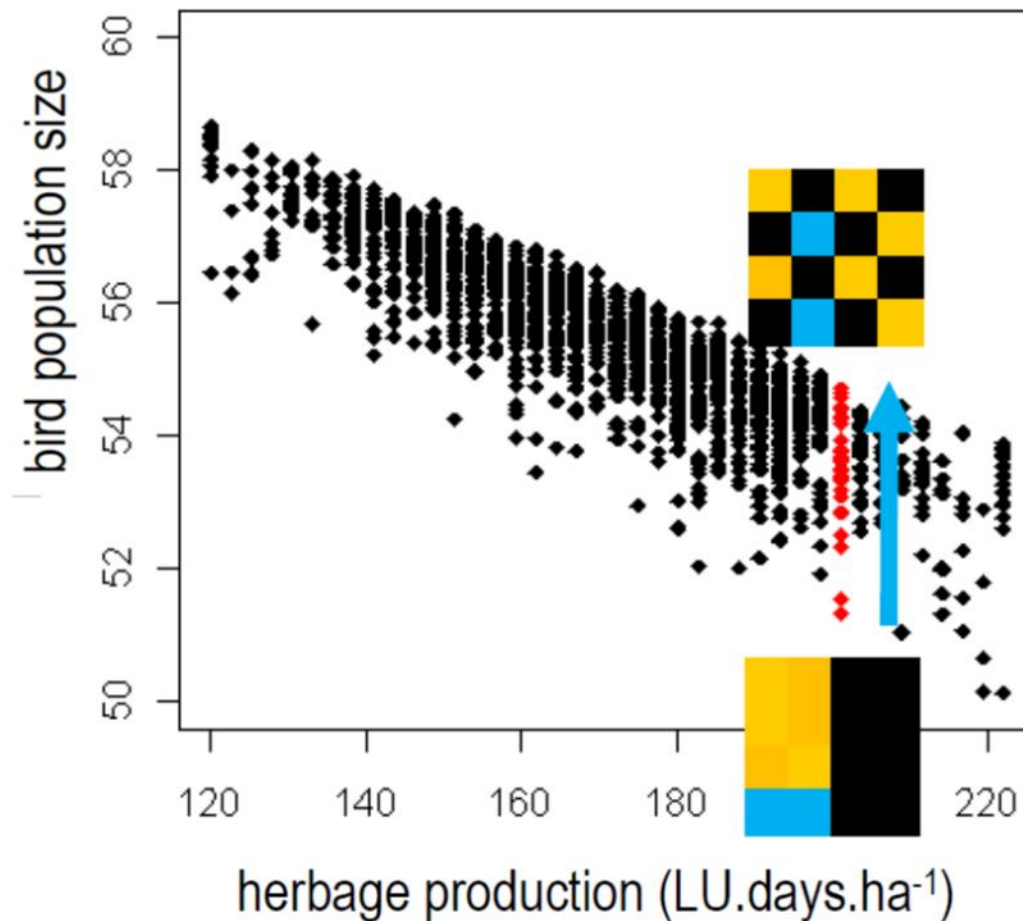
Criteria used for the biodiversity Audits on dairy farms

Semi-natural habitats :
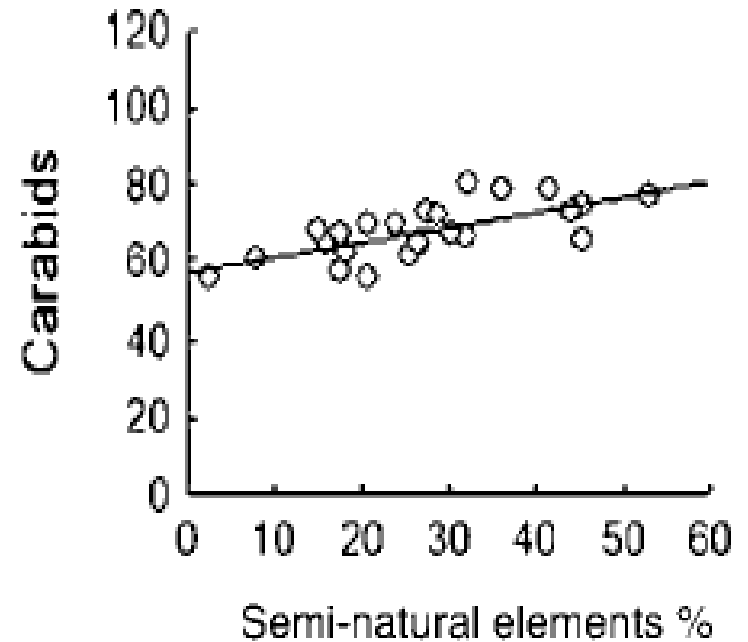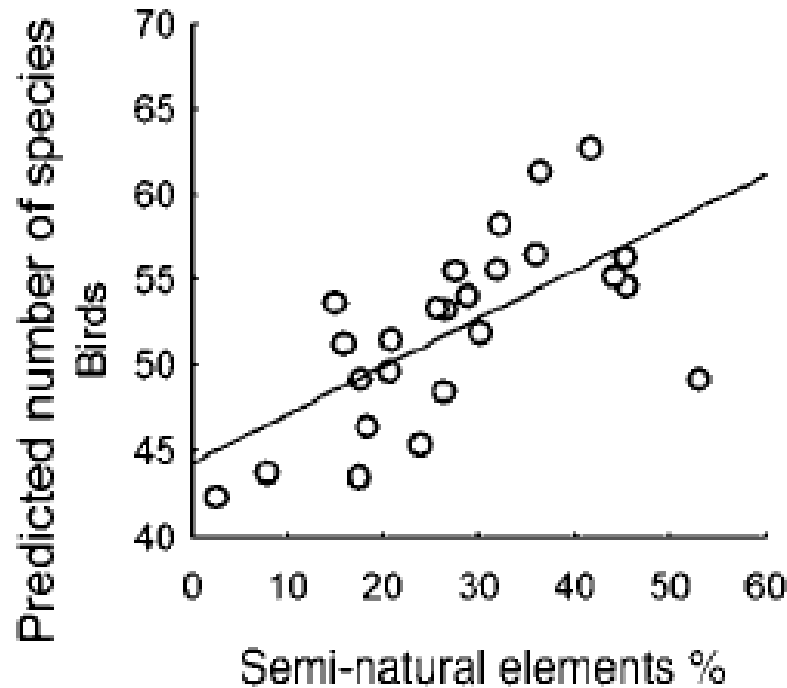
Billeter et al. (2008) in Le Roux *et al.* (2008),

Relation between the abundance of species en and % of semi-natural elements

Criteria used for the biodiversity Audits on dairy farms

Hedge

Riverine woodland

Creeks

Semi-natural habitats (IAE)

- Hedgesrow
- Walls
- Riverine woodland
- ditches, rivers…

→limitation of erosion, water epuration, …

Grassland management :

- **Grasslands are the most species-rich vegetation types .** Up to 80 plant species/m2 *(Vandewalle et al.2010)*

- **Grazing practices and fertilization practices influence the biodiversity state on the grassland.** The agroecological value is limited if the grassland is intensively grazed and receive more than 80 N units/ha of mineral fertilizer

Biodiversity audits results examples
Farm 1

Total surface in Permanent Pasture
Very large surface of AEI
Intensiv grassland management
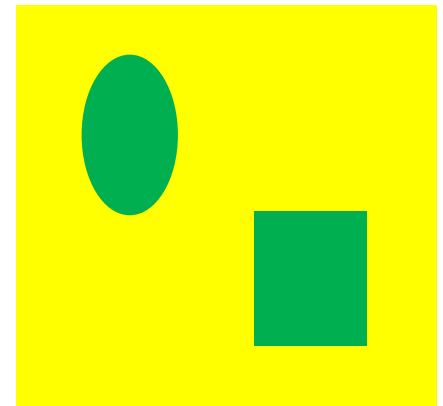
Biodiversity audits results examples Farm 2

Favorable
Neutral
Unfavorable

FARM scale

Farm land use

AND scale

Permanent grassland management

AES spatial organization at farm plot

Total surface in Permanent Pasture
A neutral to favorable surface in AEI
Intensiv grassland management
AND a protected coastal area

Biodiversity audits results examples Farm 3
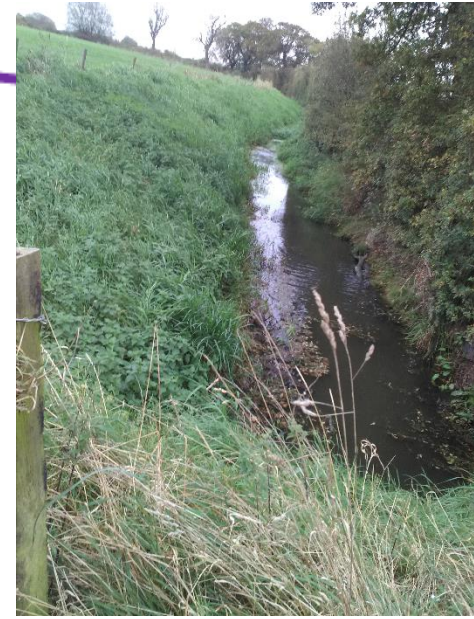
Landscape diversity equivalent to the region
A neutral surface of AEI DUE TO a wild bird cover
Intensiv grassland management compensated by extensiv pasture

Recommendations

- **Landscape diversity :** Biodiversity can be enhanced by increasing landscape heterogeneity

- **Seminatural habitats :** the agroecological element offer shelter possibilities. Biodiversity can be enhanced by increasing the number and diversity of AEI on the farm

- **Grassland :** grassland is an important factor for biodiversity. Keeping some grazing pasture with low fertilizer input (for heifers) can compensate the intensiv grassland aeras
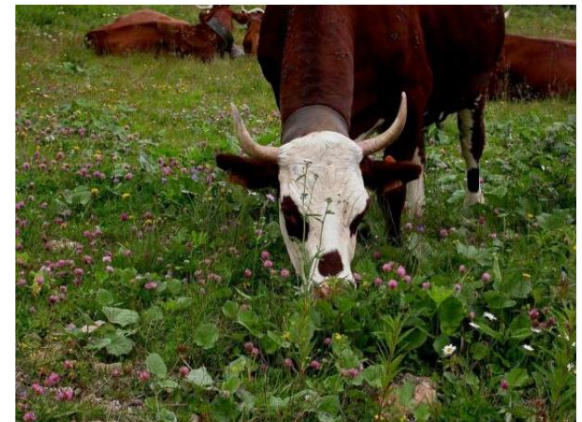
Conclusion

- **Design different solution for different system – context dependant (Finland/Ireland/Danemark..)**

- **Pollution reduction will also benefit biodiversity**

- **Raising knowledge about biodiversity may be just as important for protecting biodiversity**

Question

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Auditor's guide for the Biotex tool

Eurodairy – WP4 Biodiversity
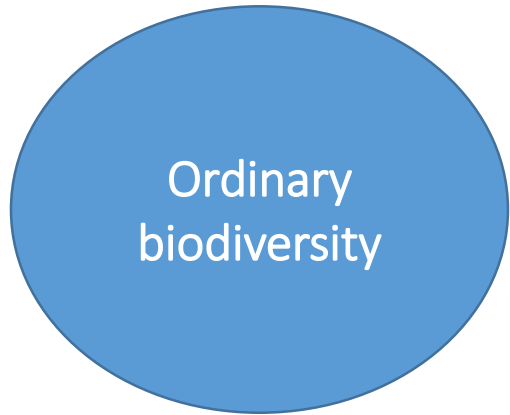
Jennifer Huet (Cniel) / Vincent Manneville (Idele)

June 2017
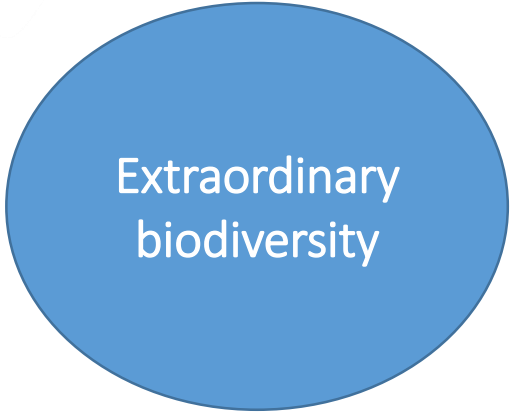
Extraordinary biodiversity

Describe goals and ways used to protect extraordinary species/habitats (depending of the national strategy) at the **dairy farm and region scale**

Ordinary biodiversity

Assess the capacity of farm to maintain grassland areas and semi naturals habitats, by comparing **the dairy farm and region scale**
➔ **BIOTEX Tool**

Easily implemented

- A 3 steps survey
- Based on available data

Time effective

- ¼ day on farm for data collection
- ½ day in the office for data analysis
- A « ready to use » template for auditors

Understandable by farmers

- Simple concept
- Link between the farm and its region
- Promotion of farmer's every-day work
- A 1 page feedback after the audit

Step 1: describe the landscape mosaic

Indicator: land use through crops diversity

Step 2: describe the landscape diversity

Indicator: presence of agroecological elements

Step 3: grassland management

Indicator: grazing and fertilization practices

Give an overview of farm's contribution to regional biodiversity and contribution of different practices implemented.
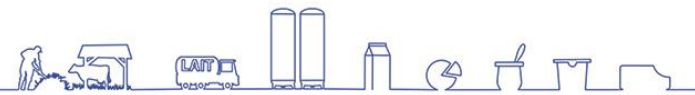
PART 1 : Audit and
data collection

Prior to the audit

- Locate the farm (GPS coordinates) and identify the region it belongs to.
- Collect **regional data on land use (in ha)** from national databases:
    - Total surface area
    - Usable agricultural area
    - Cereals
    - Oilseed crops
    - Protein rich plants
    - Forage crops
    - Maize area (forage and silage)
    - Sown pasture
    - Area under permanent grass
    - Vegetable cropping
    - Perenial crops

- Print the « audit guide »
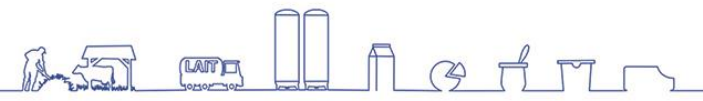
During the audit

Step 1: describe the landscape mosaic

Why ? When different crops are grown on adjacent parcels, different species will come. Also, it implies different crop management (treatments, harvesting time...). Species can easily find shelter from one field to the next.
How? Calculation of Pielou and Shannon's index, based on the comparison of farm and regional data

Data to be collected (in ha):
Usable agricultural area, Cereals,Oilseed crops, Protein rich plants, Forage crops, Maize area (forage and silage), Sown pasture, Area under permanent grass, Vegetable cropping, Perenial crops
Other: nb of dairy cows (1st calving, 2nd calving, 3rd calving), nb of LBU.
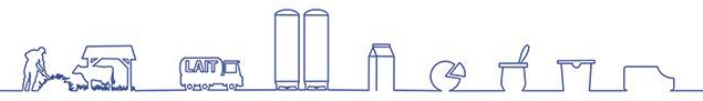
During the audit

Step 2: describe the landscape diversity

Why ? Landscape complexity is an indicator of the diversity of species present in the area. The diversity of agroecological elements and their repartition is an indicator of shelter possibilities.
How? Because biodiversity is not only on the ground, but on all the agroecological element surface, a simplistic geometrical development is used to estimate the average biodiversity area. Based on scientific studies, it is weighted by a defined coefficient

Data to be collected:
length of hedges (3 categories), group of trees (ha), number of isolated trees (3 categories), fruit trees (accrding to density), grassland, other

During the audit

Step 3: grassland management

Why ? Grassland is an important factor for biodiversity, as it provides permanent shelter for fauna and flora species. Intensivity of grassland management influences biodiversity

How? Analysis of grassland management (grazing and fertilization practices) according to the environment. According to a defined matrix, the agroecological value of grassland can be assessed

Data to be collected:
According to the template, and for permanent grassland only. All data in ha.

PART 2 : Data analysis

Register collected data in the database (EURODAIRY WP4 database.xlsx). <mark>Yellow cells</mark> are automatically calculated

- Step 1: « BASEDONNEES » Excel sheet for farm data,
  and « PRA_SHANNON » for regional data
    → Pielou and Shannon's index will automatically be calculated
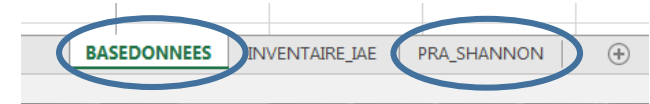
- Step 2: « INVENTAIRE_IAE » Excel sheet
    → Total biodiversity developped area will automatically be calculated

- Step 3: based on the diagram, determine total Bdv0 (unfavourable), Bdv1 (neutral) and Bdv2 (favorable) grassland area.
  The final result is the ratio (Bdv1+Bdv2) / (Bdv1+Bdv2+Bdv3)

The Excel file must me transfered to CNIEL (jhuet@cniel.com) for compilation

Feedback has to be sent to the dairy farmer with his individual results (see part 3)
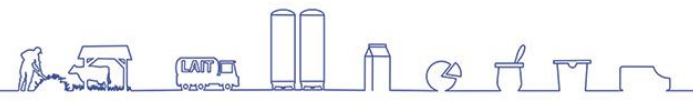
PART 3 : Synthesis

Each audited farm must receive a feedback after the audit.
A template has been established, it has to be filled in appropriately and a brief analysis of the farm's situation made by the auditor.