AGROFORESTRY SYSTEMS:
SILVOARABLE,
AF WITH HIGH NATURAL AND CULTURAL VALUE

Year of foundation	1986
Specialization	Crops: cereals, potatoes, flaxseed, rapeseed, beans, leeks…
Farm area	198 ha
Number of employees	3
Year of starting agroforestry practices	2012
Location	France, Pas-de-Calais, Guînes
Web page	Website of the farm: http://lefebvre.e-monsite.com/pages/a-propos.html Website of the "Agroforestry route": https://awafinfo.wixsite.com/awaf/la-route-de-l-agroforesterie

Marc Lefebvre's farm is approximately 200 hectares, mainly managed with **agroecology practices**. His objective is to maintain his farm activities **in accordance with the biodiversity and enhancing his soil stability and fertility, without decreasing his crop yields. He stopped tillage** in 1997, since then, he continuously sought the best agricultural practices, agroforestry being one of them.

Front view of the silvoarable plot (Source: PNR des Caps et Marais d'Opale)

Marc Lefebvre began to put the conventional farming model in question since 1997, when he **decided to stop tillage to reduce soil de-structuring and erosion. In the 2000s he involved himself in a program to reach a 80% of soil covered by vegetation, and began re-planting trees in hedges around his farm.** He also decided to stop the production of sugar beet because it was too detrimental to soil structure. It was thanks to a program called AgricoBio, promoted by a local nature conservation institution, that Marc initiated his agroforestry projects with a clear objective of practicing a productive agroforestry.

The farm began with **hedges reconstruction since the 2000s, and in 2011, 3 hectares of flower strips were planted, along with 2,300 m of tree hedges. Later, several silvoarable plots were added to the farm, reaching 19,2 hectares, lines of trees associated with Marc's crops. Finally, in 2014, Marc planted 17,36 hectares of Short Rotation Coppice** (SRC) to produce woody biomass and use it for Ramial Chipped Wood (RCW) soil amendment or mulch, woodchips for fuel, etc.

One tree line in the silvoarable plot (Source: PNR des Caps et Marais d'Opale)

- Marc Lefebvre is already witnessing first results of the implementation of these best agricultural practices with the **eradication of soil erosion issues, enhancement of water quality, increase of biodiversity in the farm and beautification of the landscape.**
- **He also achieved to maintain his crop yields** thanks to an efficient task organization, and increase his number of full-time employees.

Map of the various agroforestry plots at Marc Lefebvre's farm (Source: Osaé)

PROCESS OF THE IMPLEMENTATION OF AGROFORESTRY

Marc Lefebvre's agroforestry system relies mainly on 2 criteria: **interest for biodiversity and productivity**. That's why he chose to plant **silvoarable and SRC plots**, to add benefits of trees in the fields without decreasing crop yields, and also how he chose to plant hedges: **to put in place ecological corridors for beneficial fauna to move more freely in his farm.** He designed his agroforestry projects with the help of the team of the AgricoBio program and **received European and local subsidies that financed 80% of the tree expenses.**

Main skills needed:

- **Knowledge of cover crops and no-till practices** to optimize agroforestry practices
- Un**derstand cycle of nutrients** to plan tree plantings and cover crops sowing accordingly, and manage better plots' fertility for the crops.

DESCRIPTION OF USED TECHNICS DURING ESTABLISHING OF AGROFORESTRY SYSTEMS

For the silvoarable plot, established in 2012, 700 trees and 2200 shrubs were planted in lines on 19 hectares, meaning a 150 trees/ha density. Species on the lines were chosen for timbers (walnut, linden, maple trees…), for biomass production and biodiversity on the surrounding hedges (medlar, wild apple, dog rose, viburnum…). For the SRC plots, biomass trees were planted (willows, maple…). Soil has been sub-soiled and protection used to protect the trees against wild game.

Pruning operations on a tree line

Double row of trees with willows for SRC on the left

THREATS/CHALLENGES

- Agroecology requires a good **knowledge of nitrogen management and how to control weeds**. White clover has been planted to mitigate the risk of domination by weeds on the tree lines in the silvoarable plots.
- Several young trees were damaged by landing of birds - perches and birdhouses were installed in the plots to avoid this risk.

CONCLUSION

Marc Lefebvre is very satisfied by the early results of the implementation of agroforestry in his farm. He plans to expand it and continues thinking ahead to improve the landscape in a rational way that will benefit the fauna and men.

Agroforestry must be led with an economic logic to keep the financial balance of the farm and even improve it. Also, the implementation of the plots must be done gradually to anticipate new tasks organization and optimize workload.

View from the sky of one of the agroforestry plots

FUTURE PLANS

Marc Lefebvre plans to expand his SRC plots to produce more RWC and apply it in his fields to increase organic matter levels. He also plans to plant more white clover and manage it according to nitrogen mineralization cycles.

FINAL RECOMMENDATION

To take the transition step by step and limit the application of chemical products.

KEY WORDS

Crops, Short Rotation Coppice , silvoarable, no tillage, tree lines, mulch, hedges.

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