Agroforestry: Planting Trees, Hedges, and Promoting Meadows to Capture Carbon and Enhance Biodiversity

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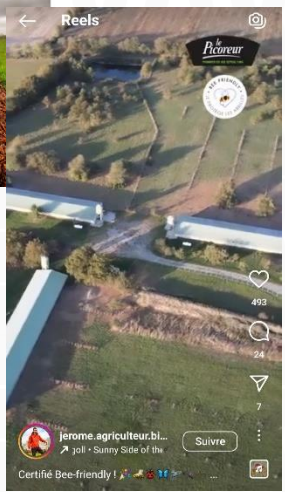
Agroforestry in poultry farming: a sustainable solution for the environment and animal welfare

Agroforestry is an ancient practice that integrates trees and hedges into agricultural and farming parcels. By combining animal and plant production, it promotes biodiversity, captures carbon, and enhances the resilience of farms face to climate change. For slow-growing broiler chicken farms, agroforestry offers numerous benefits: improved animal welfare through shade and protection from bad weather, enriched habitats for local wildlife, reduced soil erosion, better water management, and carbon storage. By optimising these ecosystem services, agroforestry contributes to the sustainability of farms. This factsheet provides a concrete example of implementing an agroforestry system in an organic broiler chicken farm.



His farm:
4 x 400 m² organic barns and 9-10 ha of permanent meadows, including over 1.6 ha of range per barn per batch

Figure 1: Planting of a windbreak on the left and aerial view of the farm on the right.

Example of implementing an agroforestry system in organic poultry farming

Jérôme Raingeard has been rearing organic poultry for 7.5 years with Bodin Bio, and has planted 8 hectares of agroforestry on his farm over the last 2-3 years. His goal is to encourage poultry exploration, restore biodiversity, and improve the resilience of his farming. He planted rows of 20-25 local tree species in his poultry ranges (e.g., oak, hornbeam, lime, whitebeam), alternating and spacing the trees 5 to 6 meters apart. Each row contains 5 to 30 trees, depending on the range configuration. The rows are spaced 15 meters apart. Additionally, he established 260 linear meters of hedges on the western side of the range (Fig. 1), with one plant per meter, to protect the poultry from prevailing winds and to give structure to the landscape. He planted tall trees (oak, gean, whitebeam, rowan), intermediate multi-trunk trees (pear, lime, elm, apple, maple, hornbeam), and 'filler' shrubs to densify the hedges (privet, medlar, viburnum, elder, hazel, dogwood). Some melliferous tree species were selected to attract pollinators, and others for their resistance to climate change (*e.g.*, lime). In total, the farmer planted 200 trees in agroforestry and 400 in hedges (1-year-old plants, 50 cm tall).

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Investment and maintenance costs

The farmer consulted the Chamber of Agriculture and his producers' organization (OP) to develop his project, which support €800- covered by the French State. He spent about 8 months planning how to adapt the system to his land. With aid from the Region and the FEDER (Fonds européen de développement regional), planting was subsidized at 100% for hedges and 80% for agroforestry, based on an annually defined per-tree prince. The total price of €7,000 –covering plants, stakes, protection, and mulching- was fully subsidized. Annual meadow maintenance with a tractor costs between €900 and €1,200. In the first two to three years, he reinforced the plantings with mulch (one-third of the initial investment cost) and supplemented some areas in the second year. He prunes the trees himself to encourage straight, uniform wood growth –an extra task with long-term benefits.

Benefits of the Good Practice (GP)

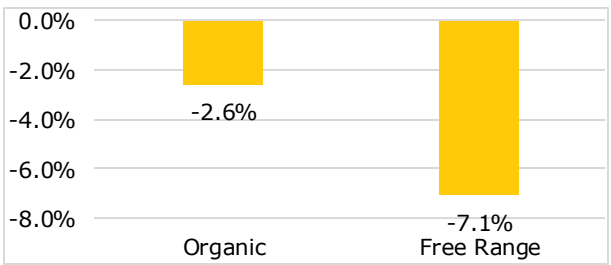
- Protection against raptor attacks.
- Boost to biodiversity: new insects, more birds and pollinators observed.
- First poultry farm with OP to earn 'Bee Friendly' label for pollinator protection.
- Agroforestry led to 15-20% more poultry range use vs. sparse-tree meadows.
- Increased carbon storage capacity.
- Climate resilience: broilers seek tree shade during heat, improving welfare

Farmer's insights

- Fruit trees not advised due to avian influenza risk.
- Plant rows 15m apart to ease mowing and maintenance.
- For tailored guidance, contact the Chamber of Agricolture, your OP, or agroforestry experts.

Cost-Benefit Analysis

The main measurable economic benefit of planting trees and hedges around organic and free-range broiler farms is a moderate reduction in energy costs due to the mitigation of winter and summer temperature extremes; this results in reduced energy costs to heat and cool the barn. The result is the change in gross margin (the difference between sales value and variable production costs) from gross margin before GP implementation.



The figure shows that implementing the GP, which involves planting trees and hedges, decreases financial results across organic and free-range farms. Although the GP provides environmental benefits, such as modest reductions in energy costs, it does not significantly impact productivity. Consequently, the Gross Margin decreases. Larger farms experience more significant reductions in Gross Margin due to higher associated costs. Implementing this GP contributes to reducing CO_2, NH_3, and PM10 emissions, bringing measurable environmental benefits. Depending on the emission reduction assumptions, organic farms reduce between 758–6,314 kg CO_2, 13–114 kg NH_3, and 2–30 kg PM10 (fine dust) per farm, while free-range farms achieve reductions of 4,280–35,667 kg CO_2, 71–642 kg NH_3, and 11–171 kg PM10 (fine dust) per farm.

To find out more about the farmer's agroforestry practices, check out his Instagram account: @jerome.agriculteur.bio.logique:

https://www.instagram.com/jerome.agriculteur.bio.logique?igsh=Z2UweHV4NXhlejg2

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