

A holistic transition of a mixed farming system combining annual crops and dairy cattle towards agroecology:

“Innovation through production, processing and marketing of grassland-based animal products”

Farm: “VELGHE Jean-Marie and Arnaud”

**Location: BAUGNIES (PERUWELZ),
BELGIUM**



Picture 1 (Credit: sambre-meuse.lanouvellegazette.be)

Background

The Velghe father and son farm (picture 1) is a mixed farm integrating annual arable crops, temporary and permanent grasslands and a dairy cow herd. It is located in Péruwelz (Wallonia, Belgium). The grandfather was a young Flemish farmer when he immigrated to Wallonia in 1959 and started farming on 20 ha. Jean-Marie, the father born in 1960, progressively increased farm size up to 100 ha and herd importance up to 70 dairy cows. He constructed several buildings such as air-conditioned warehouse storage for potato tubers, a modern free-stall cow barn with straw bedding and equipped with a milking robot, a structure for barn hay drying, several buildings for machinery including a mechanic’s workshop. He diversified cropping activities by adding to traditional regional crops, cereals and sugar beet, more profitable industrial productions such as potato, spinach, green bean and pea. In parallel, he converted the dual-purpose cattle breed of the farm into a specialized high merit Holstein-Friesian dairy cowherd. In a first step, these dairy cows were partly fed by grazed permanent grasslands, grass and green maize silage and also by massive use of purchased concentrate feed including soybean meal. This changed over time (see below). In addition to farm activities, Jean-Marie developed an agricultural contractor business starting with organic manure spreaders and later on with several agricultural tools for direct drilling, and modern harrows for superficial soil work and cracking. Jean-Marie is considered today as a pioneer of sustainable farming practices in Belgium given his numerous efforts for notably developing no-till techniques,

green manure, farmyard manure composting, herbaceous field margins, barn hay drying instead of grass silage, large forage self-sufficiency for cattle feeding and decreased pesticide and fertilizer use. Arno, the son born in 1987, his wife and his sister are now working in the farm too. They are developing dairy product processing and marketing activities.

Detailed description

Jean-Marie adopted two main strategies in the last 25 years: increasing income by choosing high profitable farming activities such as milk and vegetables, and improving farm heritage by improving soil and decreasing erosion and pollutions. He first adopted the typical rationale of the conventional agriculture system by increasing farm size and crop and animal yields. Farm size enlargement necessitated large investments and required important loans for buying land, machines, tools, animal genetics, and for constructing buildings. Increasing yields was achieved by an intensive use of fertilizers, pesticides, animal feed (green maize cropping and concentrate feeding) which induced high production costs.

This system generated stress and negative environmental consequences. After a disastrous erosion incident that destroyed an important part of a large potato field, Jean-Marie started thinking to the limits of the system and tried to reduce soil degradation and erosion by using compost, buffer strips and reduced tillage techniques. Observing the beneficial results of the adoption of soil conservation techniques and thus more and more sensitized to the importance of soil life and structure, he started to progressively reduce the use of soluble fertilizers, herbicides, fungicides and insecticides. This caused a reduction of production costs that became little by little a major strategy of the farm. Reduced tillage techniques have also decreased working time which in turn induced stress reduction and availability for other activities. Another profitable activity became then possible, the business of agricultural contractor. In 2018, about 1,000 to 1,500 ha were worked for other farms by the equipment of the Velghe company.

Understanding the high economic potential of the cost reduction rationale, Jean-Marie applied it to several farm activities and notably to animal feeding. He started producing conserved forage in legume-based temporary grassland as an alternative to green maize silage. For improving forage grass quality, he built a hay-drying barn for replacing grass silage. Conserved grass quality became

consequently so good that temporary grasslands finished by replacing totally the surface cropped for green maize (picture 2). Grass protein replaced also soybean meal protein of purchased feed. Finally all expenses linked with commercial animal feed were stopped. Dairy cow diet was based to a large extent on grazed grass and barn dried hay. This diet is now completed by on-farm produced cereal and cereal/pulse grain mixtures. The rate of forage self-sufficiency is close to 100%. The management of permanent grasslands was very much improved by the adoption of a dynamic rotational grazing system (one to three occupation days per plot and per grazing cycle combined with long rest periods) on the 21 plots in the dairy cow grazing area and the 14 plots in the heifer grazing area. This management had an extremely good impact on grassland vegetation quality. White clover abundance increased a lot in the sward and all synthetic nitrogen fertilization was abandoned. In temporary grasslands, an innovative mixture was designed for replacing the traditional, heavily nitrogen fertilized monoculture of perennial ryegrass (*Lolium perenne*) that produces good quality forage but is difficult to wilt and not drought resistant. A complex mixture of several grass (*Dactylis glomerata*, *Festuca arundinacea* and *Phleum pratense*) and legume (*Medicago sativa*, *Trifolium repens*) species has been adopted. It produces high forage amount, is easy to wilt and well adapted to longer drought periods of a changing climate. Moreover, it does not require synthetic fertilizer. This mixture is cultivated on arable land in rotation with annual crops. It stores carbon in soils, improves soil structure and soil life, fix high amount of nitrogen that is partly available for the following crops, and control arable weeds. Forage produced from these temporary grasslands and grain and straw from on-farm produced cereals are part of a nice cycle where nutrients from grass and grain are excreted by ruminants in barn and mixed with straw for making a farmyard manure that is composted and spread again on arable land as an organic fertilizer. Consequently, increasing forage self-sufficiency also decreased production costs associated to fertilizers and herbicides in annual crop productions.

Despite the obligation to reimbursing important loans notably for the free-ranging cow shed and the milking robot, Jean-Marie decided in 2015 adopting a new daring strategy: decreasing the number of dairy cows, crossbreeding the high-yielding Holstein-Friesian cows with lower yielding but higher quality milk Normande breed blood, decreasing the proportion of milk production sold to the dairy factory for processing the remaining part of milk for making cheese and sell it in short

and local marketing chain in a new shop built in the farm itself. Arnaud trained himself in a local agricultural school for learning how to make quality cheese.

The most recent achievement is the cessation of industrial crop (potato and vegetables) production and of all the commercial input use associated to these crops for focusing on dairy products.

Results

In one generation, a very small farm created by an immigrant farmer became a large efficient farm that is considered as an exemplary agroecological system. It innovated in different domains related to fertilization, weed, disease and pest control, reduced tillage techniques, animal feeding, grazing system, grass/legume forage mixtures, forage conservation, carbon storage in soils and reduction of pollutions. This had also a positive impact on biodiversity below and above soil surface.

In 2018, about one quarter of the total milk volume of the farm has been transformed into cheese, yogurt, ice-cream, butter, fresh milk and pastry. The raw milk hard-cheese, similar to the 'Tomme' or the 'Comté' types of French mountain regions, has been awarded the same year as the best raw milk farm cheese of Wallonia (picture 3). Cheese sales overcame the business plan forecast for that year. Clients are mainly from the village and the surroundings but progressively they are also coming from small more remote towns. It is expected that the totality of milk production will be soon processed into cheese and sold in the farm shop.

Another important achievement consisted in creating jobs on the farm. Not only Jean-Marie has a successor since Arnaud is associated to his father's and grandfather's farm but two other jobs were created. In about 30 years, the number of jobs on the farm raised from one to four. This is spectacular in a period of fast farm disappearance and where few young farmers are ready to take over the farm of their parents mainly because of a lack of profitability. This demonstrates that there are alternatives to the dominant model that is based on a race to farm size and productivity increase. At the opposite, this new model is based on the use of local resources that replaces commercial inputs and allows forage and nutrient self-sufficiency, on the decrease of production costs, on product processing and short and local marketing of this processed food.



Picture 2 (Credit: laprovince.be)



Picture 3 (Credit: nordeclair.be)

Adoption criteria

The success of this farm is based on a progressive, well-thought transformation, and on a clear strategy that was also defined little by little for facing the challenges of soil quality and agricultural market price degradation. The farmer designed this strategy for escaping from the well-known 'scissor effect' that consists in the continuous increase of input price and the fluctuation and decrease of agricultural product price.

A strength of this farm is its coherent approach. Innovations did not consist in the adoption of isolated techniques but in a holistic approach where all elements are complementing each other and ensure the profitability of the whole system.

Jean-Marie has been also always open to scientific and technical information. He considered that reliable advisors are important supports but after consulting experts he thought by himself for defining his own strategy. He has also been always ready to collaborate with researchers for organizing experiments or making analysis on his farm.

He considers that the return to the ancient 'peasant' model combined with new techniques and knowledge (e.a. milking robot, agricultural machinery, and no-till system) is necessary for surviving.

Future prospects

This approach can be adopted by any farmer, by changing what has to be changed, for adapting techniques and system to local conditions of each farm. This farm demonstrates that there is no fatality. Even in a context of high loans, a farmer is not locked-in in a deleterious system. He can change his strategy and his system. This gives hope for a better future of European farming.

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