Main benefits of the Polyfarming system

The application of the Polyfarming system has important **benefits on an environmental, productive and economic level**. Specifically: (1) **improving soil conditions**, (2) increasing **carbon sequestration** and combatting climate change, (3) reducing fire risk, (4) **increasing biodiversity**, (5) greater diversity and **quality of the products obtained**, and (6) reversal of the tendency to abandon the rural environment.

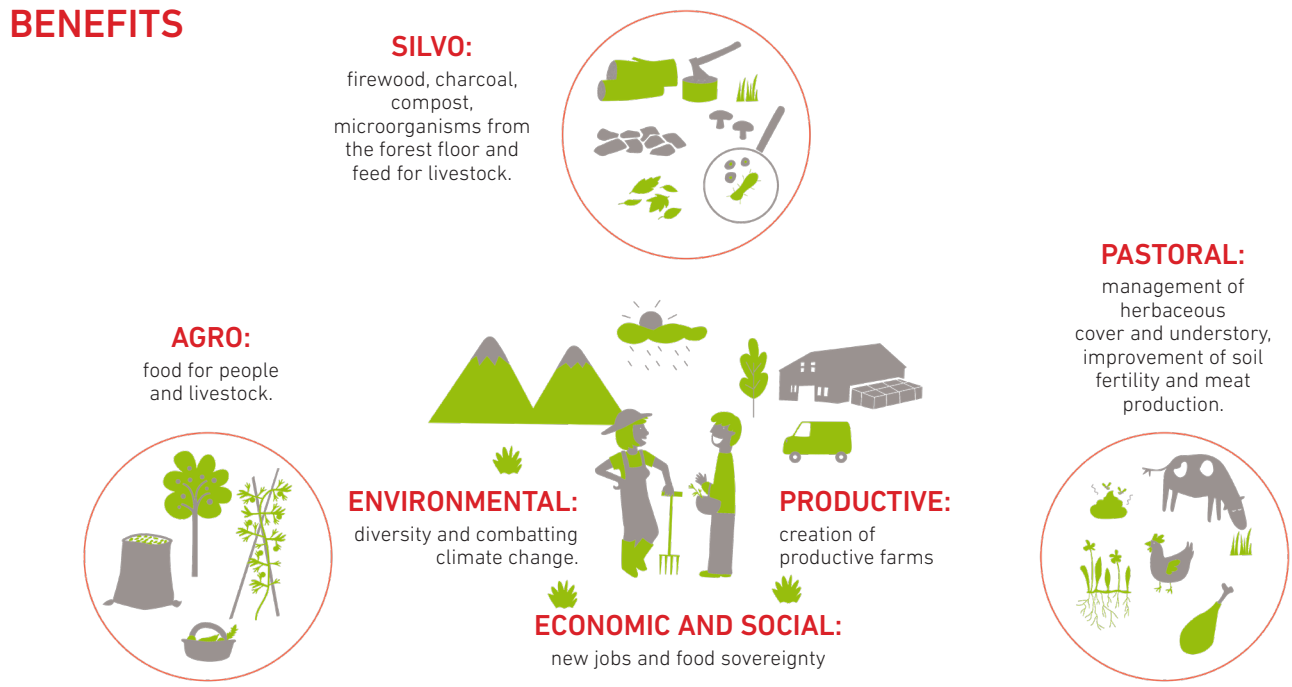

Figure 1. Scheme that reflects the benefits derived from applying the Polyfarming system

Environmental, productive and economic benefits of the Polyfarming system

The multi-functional management of mountain farms, as is the case of the Polyfarming system, has numerous benefits on all levels (**Figure 1**).

A) Environmental benefits. The Polyfarming system uses techniques that improve soil conditions, this translates into an increase in **carbon sequestration in the soil**, thus contributing to the fight against climate change. In turn, it creates discontinuity at landscape level and at local level, and thus **reduces the risk of fire** and generates habitats, thus increasing plant and animal biodiversity.

B) Productive benefits. The farms managed according to the Polyfarming system become productive. The techniques proposed by this system make it possible to **improve the farm's resources**, creating a new production system in which synergies are established between the different uses and which is managed with less dependence on external inputs. This results in **healthier and more nutritious food**, which is free of pesticides, fertilisers and drugs.

C) Economic and social benefits. The Polyfarming system benefits farmers since it presents an **economically viable** alternative for the recovery of abandoned farms of the Mediterranean mountain.

Here are some of the main beneficial impacts after the application of the Polyfarming system.

• Improvement of soil conditions

The regenerative model has the main objective of improving soil conditions. Therefore, the Polyfarming system focuses on recovering its vegetation **cover and introducing organic matter into the soil**. All this entails a series of improvements in soil conditions, specifically:

- **The structure and fertility** of the soils improves by leaving the plant materials on the surface. This facilitates the recovery of organic matter and the soil trophic network, and allows the reduction of the use of machinery, which also reduces the presence of uncovered soil and the risk of erosion.
- The increase in soil organic matter also leads to an **increase in its water retention capacity** since the organic

fraction of the soil is highly hydrophilic. This increases the usable water for the plants.

• Increase in carbon sequestration and fight against climate change

Climate change is one of the main risks facing the planet, especially in the Mediterranean region. The Polyfarming system achieves a positive carbon balance of the productive system at the farm level:

- On the one hand, there is a **greater sequestration of carbon in the soil** by two different processes: increasing the organic matter in the soil and not tilling it. The application of the different techniques proposed in the Polyfarming system represents an important incorporation of organic matter into the soil. This promotes the creation of stable humus in the soil as a result of its biological activity. But it is also that when the soil is ploughed its structure is destroyed and a large part of the carbon it contains is released. On the other hand, the regenerative model, though not tilling and covering the soil with plants, reverses this process. The regenerative model developed at Polyfarming implies that soils do not lose carbon, but rather store it.
- On the other hand, with the Polyfarming system, **greenhouse gas emissions** are significantly reduced, since the regenerative model does not have inputs of pesticides and synthetic fertilisers, which require a high energy cost to be produced. In addition, it needs much fewer fossil fuels due to less use of heavy machinery.

• Reduction of fire risk

The Polyfarming system, like other agrosilvopastoral systems, **represents a good way to reduce the risk of fire**, which has been increasing in recent decades due to the disappearance of open spaces (crop fields, pastures and dehesas) and the densification of forest stands (horizontal and vertical growth of vegetation).

Maintaining farms by applying a profitable system such as Polyfarming not only **increases landscape diversity**, but also creates landscapes that are less vulnerable to fire. This is because it preserves open areas with low fuel continuity. It achieves this **by farm animals eliminating plant debris** from the understory. Furthermore, grazing with an adequate stocking load in the forest or dehesa understory reduces the vertical continuity of the vegetation.

• Increase in biodiversity

The Polyfarming system promotes increased biodiversity directly and indirectly for several reasons.

- **At landscape level**, the recovery of open spaces is promoted, which in Mediterranean areas it is the appropriate environment for many species. Polyfarming also **promotes forest maturity**, which is associated with characteristic fauna and flora.
- On the other hand, at **local level**, the combination of trees, pastures and crops, which characterises the Polyfarming system, favours a greater diversity of habitats with wide gradients of humidity and light that create **environmental heterogeneity** in which many species of microorganisms, animals or plants can find shelter or food.

In the sheets "Increase in biodiversity. I Soil organisms" and "Increase in biodiversity. II Birds" there is a description of the biodiversity patterns of two groups of organisms in the Polyfarming system.

• Greater diversity and quality of the food obtained

The regenerative model developed in the Polyfarming system promotes **optimal nutrition and health**. To do this, it is committed to a balanced, healthy and quality production.
- A system made up of different elements can provide a **great diversification of products**: firewood, wood, forage, grain, fruit, many types of vegetables, meat from different animals, milk and eggs.

- In addition, the food produced has **great nutritional value**. Thus, the meat obtained has a higher density and a higher content of vitamins (A, D and K) and quality fats (Omega-3). Milk from cows raised on pasture also has more Omega-3 fats, vitamin E and beta-carotene than conventional milk. Regeneratively grown vegetables also contain much higher levels of antioxidants than conventionally grown varieties.
- Finally, **regenerative crops do not use agrochemicals**, which are products that have a high cost for human health and the environment, while animals raised in the pasture according to the Polyfarming system also have fewer diseases and need fewer drugs. All this creates healthier environments and food.

• Reversal of the tendency to abandon the rural environment

One of the main objectives of the Polyfarming system is to **reverse rural abandonment**. It achieves this by transforming abandoned agricultural and livestock farms into profitable farms, taking into account the following principles: (i) it **avoids dependence** on market inputs and heavy machinery to manage the system; (ii) it proposes **accessible technologies** for all producers and is applicable on different scales; (iii) it **improves the economic profitability** of farms; (iv) it allows **job creation**, especially for young people; (v) it must be linked to new ways of selling the products; and (vi) it proposes recovering **food sovereignty**, which implies being able to produce quality food for all society, without there being control by large external lobbies. The detailed description of these principles is explained in the sheet 'Reversion of rural abandonment'.