Characterisation of the different elements of the Polyfarming system

The Polyfarming system integrates the different uses at farm level: forestry, livestock and crops. Each of these uses can be broken down into several elements. Specifically, the **Polyfarming system** includes the following: **forest**, **dehesa**, **pasture**, **extensive crops**, **fruit tree crops**, **garden crops**, **cows**, **calves for fattening**, **chickens**, **rabbits and hens**. These different elements are described in this sheet based on a series of **outstanding characteristics**: the level of labour and mechanisation they require, and the time of year when they are most active.

Main elements of the Polyfarming system

The Polyfarming system integrates the different uses at the farm level: forestry, agriculture and livestock. Each one includes a series of elements that are combined or share products to ensure the integrated functioning of Polyfarming. Specifically, the elements that this system comprises are: forest, dehesa, pasture, extensive crops, woody or fruit crops, garden crops, cows, calves, chickens, rabbits and hens. They are described below in detail, depending on the level of labour and mechanisation they require and the time of year when they are most active. Mechanisation is described for each element once the system is working. However, start-up requirements are not included and can be very high as they depend on the starting point.

- Forest. The level of labour required for the activities in the forest is very important, since forest management is based on the cutting, delimbing and dragging of trees outside the system. Chainsaws are used for the first two activities and a tractor is used to pull logs. The main activities in the forest are carried out in autumn and winter.
- Dehesa. The level of labour required to maintain dehesa is low: it includes the movement of animals when they are in it and, every four or five years, the replanting of areas where the pasture is not so good. Once established, the mechanisation requirements are practically nonexistent. The activities that are carried out in dehesa are concentrated at times when the animals are present, mainly in winter, and occasionally in summer.
- Pasture. This element is key and interacts with the various animals. In general, the level of labour required once established is low, since it is maintained by grazing the animals (Figure 1). There is only clearing or reseeding works, but when the grass is well established, they should be scarce. The mechanisation required for these activities depends on the total area: if the area is large, a direct seeding seeder is required for reseeding, but if the area is small, sowing is performed manually. Similarly, at times of the year when there is a surplus, it should be mowed with a tool that is adapted to the conditions of the terrain and surface. This element works all year round, except in very cold times in winter or very dry in summer.

- Extensive crops. The level of labour required is lowmedium, since it is concentrated at the time of sowing and harvest, for which the direct seeder and the combine harvester are used, respectively. Fertility is maintained by incorporating the plant remains of the species that grow in the field into the soil and the presence of legumes as nitrogen fixers. The activity period depends on the crops.
- Fruit trees. The level of labour required by fruit trees is low-medium: annual pruning, the application of biofertiliser treatments and a fruit harvest. The level of mechanisation is low, since the herbaceous layer under the fruit trees is normally eliminated with animals. If they are not available, then it must be done with a brush cutter.
- Garden. The level of labour required for garden crops is very high, including preparing the irrigation system, planting, adventitious plant control, the application of BRF, compost, fertilisers and biofertilisers and, above all, harvesting. In a regenerative system, without tillage or chemical fertilisers, there is no mechanisation, and fertilising the soil is maintained using products such as BRF, compost or wooden beds. The activity in the garden is concentrated in spring, summer and autumn.
- Cows. They have a medium level of labour, which includes the movement of the animals, their feeding with forage in the months when it is necessary, and, at least, one daily milking. Mechanisation includes a stable for milking. They are active all year round (Figure 2), like the rest of the animals.
- Calves for fattening. In general, they have a low labour force, since they only have to be moved between different plots of pasture, dehesa or forest. They do not require any type of mechanisation. They are active all year round.
- Chickens. In the Polyfarming system they require a **medium level of labour**, which includes moving the cages into the pasture and feeding the animals. To feed them, a tractor with a trailer is needed to transport the feed to the place where the cages are. **They remain active throughout the year**.
- **Rabbits.** In the Polyfarming system, the labour required by rabbits is **moving the cages into the meadow**. It does





not require any mechanisation. This element remains active throughout the year.

• Hens. In the Polyfarming system, the only labour required by hens is their feed. Mechanisation is not required. They are kept throughout the year, although at certain times egg production decreases.

Table 1 summarises the main characteristics of the elements of the **Polyfarming system**. It can be seen that the level of labour required to maintain the elements varies from very high, as occurs in garden crops or in the forest, to low as in the dehesa, pasture or the different animals that are raised on it. In most systems, there is little or no mechanisation; only the forest and extensive crops require more machinery. Finally, the time of year when they are mainly active varies considerably. However, the overall functioning allows the Polyfarming system to have active elements throughout the year.



Figure 1. Pasture managed by animals in Planeses (Catalonia), farm where the Polyfarming system is implemented. This type of grassland requires very little labour. Photo: MJ Broncano.



Figure 2. Cows grazing following intensive programmed grazing in Planeses (Girona), where the Polyfarming system is implemented. Photo: Marc Gràcia.

Element	Level of labour required	Mechanisation	Time of year
Forest	Very high: cutting, delimbing, dragging	Tractor for hauling logs, chainsaw	Autumn, winter
Dehesa	Low: movement of animals, reseeding (every 4-5 years)	No	Winter, summer
Pasture	Low: movement of animals, clearing of unconsumed vegetation, reseeding, mowing when there is a surplus	For reseeding, direct seeder when the area is large. At times of the year when there is a surplus, it should be cut with a tool that adapts to the conditions of the terrain and surface.	All year round, except very cold periods in winter or very dry periods in summer
Extensive crops	Low-medium: sowing, harvesting	Direct seeding seeder, combine harvester	It depends on the crops
Fruit trees	Low-Medium: pruning, treatments, harvest	Elimination of the herbaceous layer with animals; if this is not possible, use a brush cutter	Spring, summer
Garden	Very high: irrigation, planting, control of adventitious plants, application of BRF, fertilisers and biofertilisers	No	Spring, summer, autumn
Cows	Medium: feeding, movement, milking	Milking stable	All year
Calves	Low: movement	No	All year
Chickens	Medium: movement, feeding	Tractor with trailer to transport food	All year
Rabbits	Low: movement	No	All year
Hens	Low: movement	No	All year

Table 1. Characteristics of the elements of the Polyfarming system: level of labour required, mechanisation and time of year when it is mainly active.

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