



Life Polyfarming Project
LIFE15 ENV/ES/000506



polyfarming

The regenerative agri-food model: the Polyfarming system

LAYMAN'S REPORT



Project number: LIFE15 ENV/ES/000506

Acronym: LIFE+ POLYFARMING

Project description: Demonstration of a new agrosilvopastoral use of land to improve the profitability of farms in mountain areas

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Total Budget: € 1,135,787

EU contribution: €672,863

Beneficiary coordinator: Center for Ecological Research and Forest Applications (CREAF)

Project coordinator: Marc Gràcia.

Team: Javier Retana, María Josep Broncano and Ángela Justamante.

Pilot farm: The pilot farm in which the Polyfarming project was demonstrated is the Planeses farm, a 80-hectare farm located in the Garrotxa region, 40 km north of Girona (Catalonia, Spain).

Project website: polyfarming.eu

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Introduction

Intensive agriculture, overgrazing and deforestation are, among others, human activities responsible for soil deterioration and the current climate crisis. Faced with this negative dynamic, the **regenerative production model** emerges as an effective way of reversing the situation. In particular, the Polyfarming project stems from the need to have **demonstrative farms** that, on the one hand, support the potential and viability of this model as an alternative to the conventional model and, on the other, serve as an example to facilitate learning and change for farmers, ranchers, environmental technicians and other interested persons.

The Polyfarming project, funded by the LIFE program of the European Commission and led by CREAM, began in July 2016 with the aim of **recovering the agricultural and livestock activity of Planeses**, an abandoned farm in Girona, based on the principles of the regenerative model and applying promising techniques that improve soil structure and fertility, as well as its water retention capacity.



The conventional production model versus the regenerative model

Conventional model

Conventional agriculture and livestock are intensive production systems characterized by the large-scale use of technologies to achieve maximum production. However, this production model entails **high environmental costs** because (1) it is heavily dependent on external energy consumption such as machinery, fertilizers, herbicides and insecticides. (2) causes soil and water pollution and depletion of available water resources, and (3) results in a significant increase in greenhouse gas emissions.



Regenerative model

The regenerative production model is an alternative to the conventional model. This model is based on **regenerating, stimulating and maintaining soil fertility and biodiversity**. It does so by integrating agriculture, livestock and forestry as the backbone of a sustainable food system that reproduces natural patterns and processes. It promotes the accumulation of organic matter in the soil, integrating animals into the functioning of the system and reducing inputs needed to produce food. In this way, it has important advantages over the conventional model for overcoming the current environmental and climate crisis.



The bases of the regenerative model



- Maintain high production and diversity of plants over time and in space to nourish the soil's food chain.



- Incorporate organic matter into the soil surface to provide nutrients and coverage.

Balance the inputs and outputs of organic materials to maintain carbon stocks in the soil.



Avoid management practices that block the soil's trophic network and destroy its biodiversity, such as: ploughing, leaving the soil bare, and the use of chemical and phytosanitary fertilizers (insecticides, fungicides and herbicides).



Improve water retention in soil by increasing its organic matter content.



The regenerative model in livestock farming and agriculture

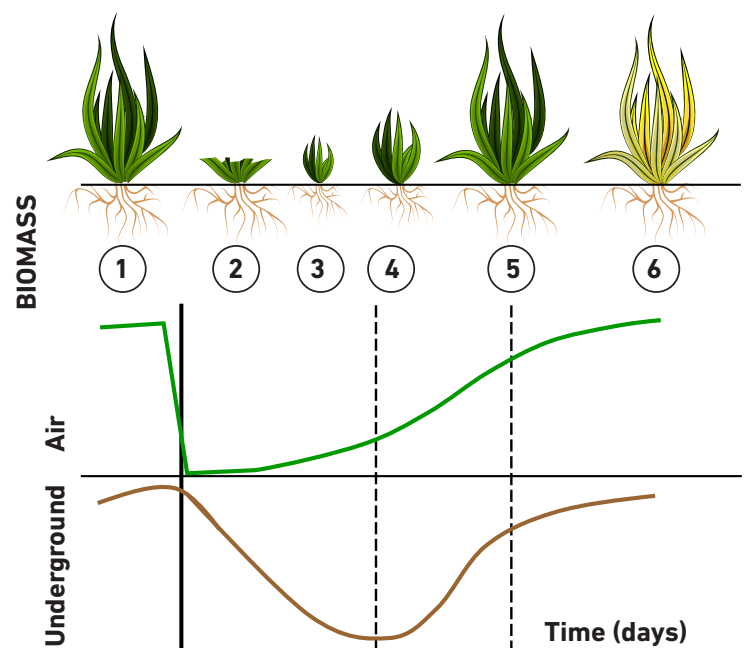
How the regenerative model works in livestock farming

In the regenerative model, grazing **animals** are a key element in recovering soil fertility, but they must be managed in a planned and controlled way so that plants are not deteriorated by trampling and the first reshoots of the pasture are not eaten. To achieve this, the livestock remain in the pasture plots for a short time and are moved every day from the plot they are in to another plot that is ready to be grazed. Thus the animals **fertilize with their excrement**, eat the best grass and return when it is ready again.

The method is based on the concept of **optimal resting point**, which is the best time for grazing, as it combines the needs of plants and livestock (it is point 5 in the chart below). A number of important points are now being met: (i) the plant has already passed the maximum growth phase; (ii) the plant has recovered its root reserves; (iii) water consumption per kg of organic matter produced is the most efficient; and (iv) the nutritional value of the plant is the most balanced.



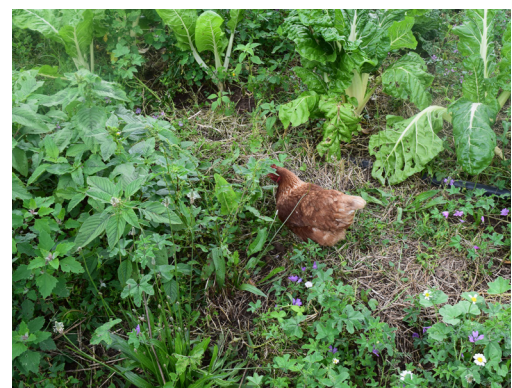
Changes to a grass plant after grazing



How the regenerative model works in agriculture

How crops function, whether they are fruit, orchards or extensive crops, is based on a number of aspects related to their management, which differs from the conventional model in the following ways:

1) **Maintains the soil without ploughing:** regenerative agriculture does not break the soil structure and maintains soil biodiversity. 2) Increases soil fertility with **green fertilizers and vegetable remains**, while conventional agriculture fertilizes to feed plants directly. 3) There is permanent soil protection by maintaining **crop remains**, rather than bare soil exposed to evaporation and erosion. 4) There is control without elimination of adventitious plants, which contribute fertility to the soil and food and shelter to beneficial animals. 5) **Does not use fungicides or insecticides** for disease and pest control, but is based on enhancing plant health and pest control through natural predators and parasites.



The Polyfarming system

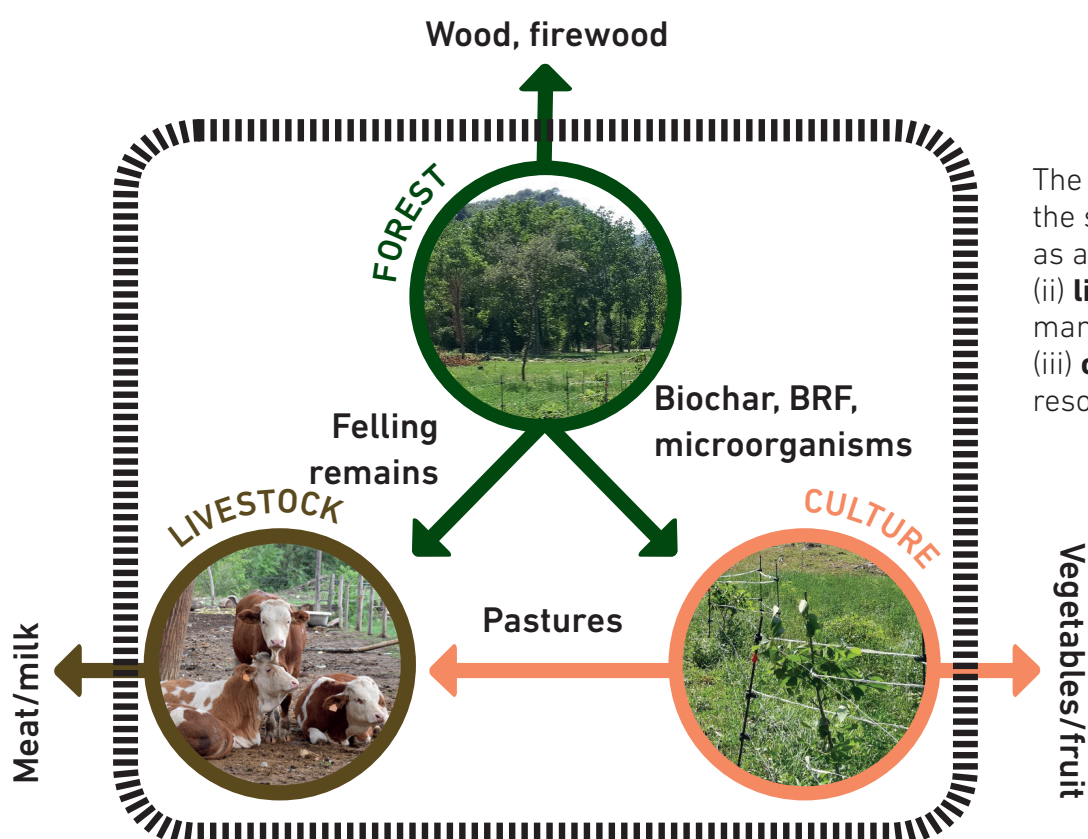
The Polyfarming system applies **integrated and regenerative agrosilvopastoral** management that uses farm resources such as forest, animals and orchards to stimulate and maintain fertile soil. This system is a cost-effective alternative to the conventional model, especially in areas that suffer from rural neglect and have deteriorated soil. In these areas, applying the regenerative model may be part of the solution to the environmental and socio-economic problems associated with this abandonment.

Polyfarming was launched in a **pilot farm, Planeses**, where it is implemented on a real scale since 2016. Planeses is a farm located in the Garrotxa region in Girona (Catalonia, Spain).

After five years applying Polyfarming, its profitability and potential to combat climate change and rural neglect have been demonstrated.



Components of the Polyfarming system



The three components of the system are: (i) **forest**, as a source of resources; (ii) **livestock** as a management tool; and (iii) **crops** as recipients of resources.

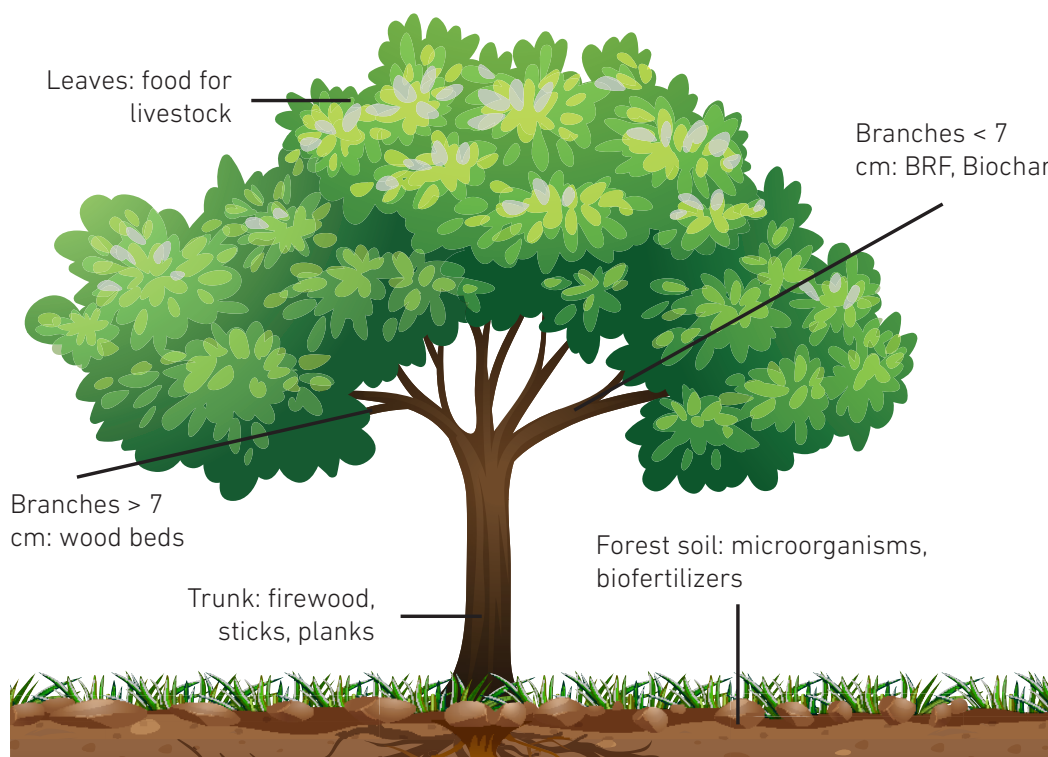
The forest as a source of resources

The Polyfarming system, in addition to firewood and wood, uses other **forest products** such as branches, leaves or forest soil.

Products are obtained from these resources that can be used in other components of the farm, mainly in **crops**, such as BRF, which improves the structure and capacity of soil water retention;

biochar, which has a high organic content, is very resistant to degradation and has high micro- and meso- porosity; wood beds, which when placed on the soil of the orchard or the fruit trees act as sponges to 'store' water and microorganisms, and biofertilizers, which are very nutritious liquid fertilizers for plants.

Products obtained from the forest



BRF



Biochar



Wood beds



Biofertilizers



Livestock as a management tool

In the Polyfarming system, animals are managed by **intensive controlled grazing**. According to this method, the meadow is divided into plots of a similar size and the animals are moved every day from the plot they are in to another one that is at the optimum grazing point. In this way, the **livestock don't spend much time on each plot** so there is no risk that they will feed on the first plant shoots they have already eaten or that they will cause excessive trampling of the grass.

This method can be applied to different animals: chickens, rabbits, etc., although it works optimally with dairy or meat cows.



Crops as recipients of resources

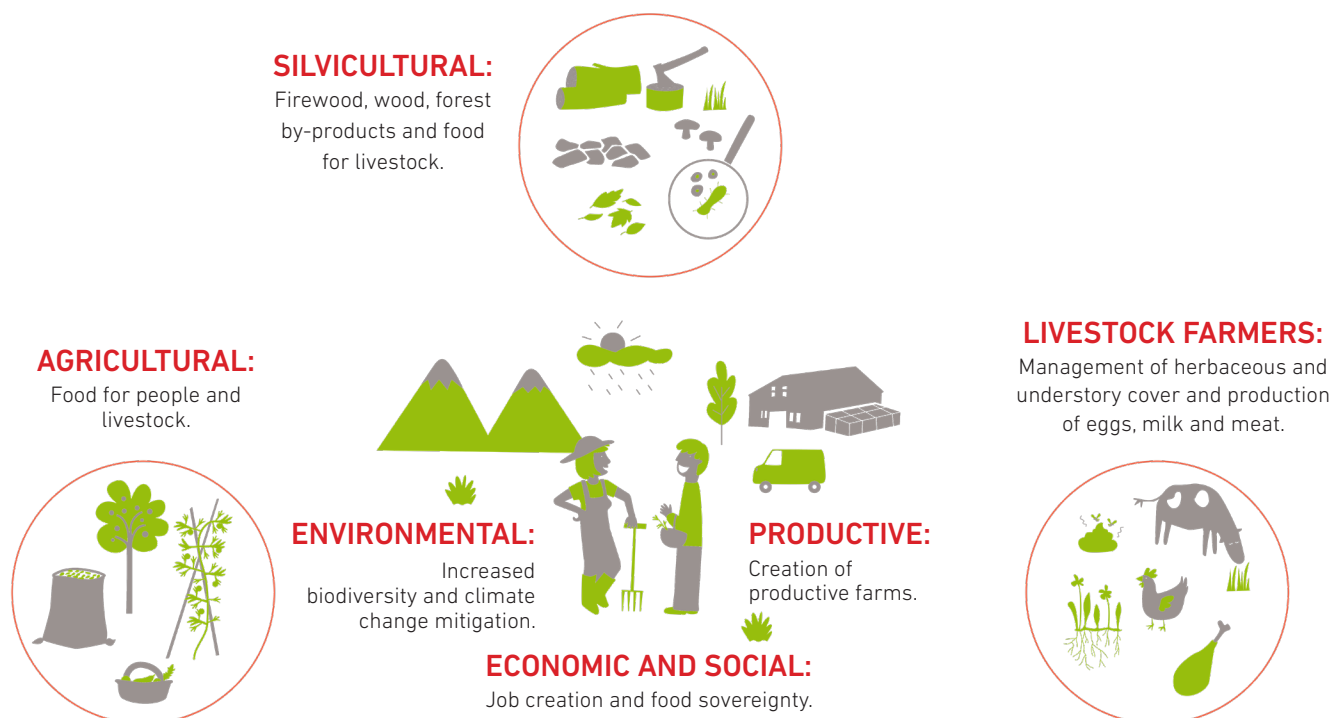
In the Polyfarming system **agrosilviculture** is promoted, combining fruit trees and orchards with pastures and animals.

The main characteristic that defines the management of the orchards according to this model is that **the soil will not be ploughed**. Cultivated plants are accompanied by weeds that, when cut, are left in the soil to decompose and thus **improve** soil fertility.



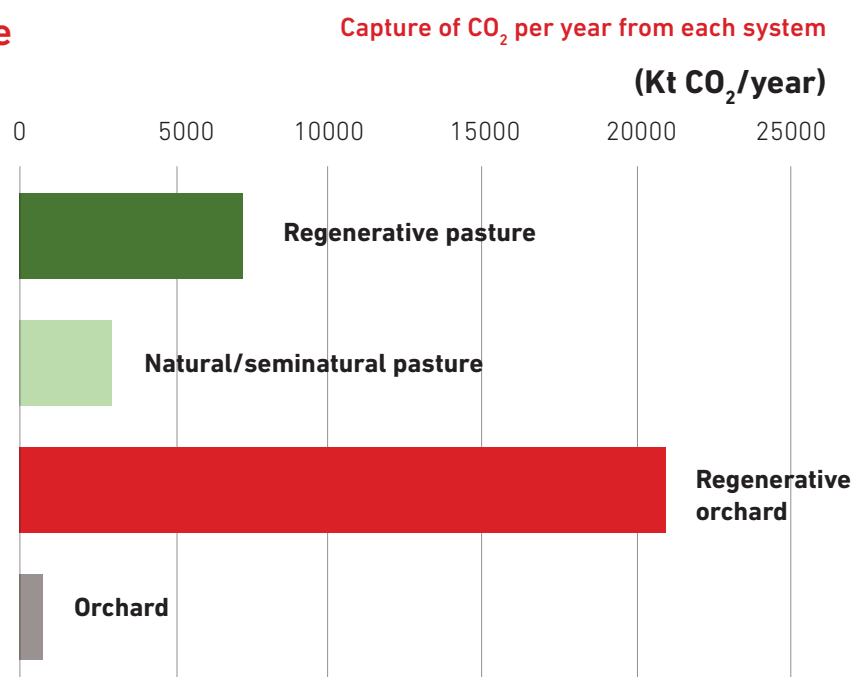
Benefits and results of the Polyfarming system

BENEFITS



Increases carbon sequestration from the atmosphere to mitigate climate change

Soil with a high organic content is capable of storing more atmospheric carbon. After three years of applying the regenerative model in the Planeses orchard, the results indicate that the farm orchard is **able to sequester up to 30 times more CO₂ per year than the conventional model**: and grazing also increases CO₂ capture threefold compared with natural pastures.



Improves water use

Increasing the content of organic matter, increases the soil's capacity to store more water. In the case of Polyfarming, in three years the organic matter in the soil of the orchard multiplied by two and **the capacity to retain water increased by up to 20%.**



Reverses the tendency to abandon the rural environment

- **Prevents dependence** on market inputs and heavy machinery for system management.
- Uses **accessible technologies.**
- Improves **farm profitability.**
- Promotes **job creation**, especially for young people.
- Establishes new ways of selling products.
- Restores **food sovereignty.**

The Polyfarming project pilot farm, Planeses, was an abandoned farm before implementing the regenerative model. Today it is a project that **eight people work on** and has recovered the farm's agricultural and livestock activity.



Promotes diversity of mosaic habitats or landscapes

Polyfarming recovers open spaces in a way that favors a greater diversity of habitats with extensive gradients of humidity and light. This creates **environmental heterogeneity** in which numerous species of microorganisms, animals or plants can find shelter or food. At the same time, **it reduces the risk of fire**, by opening spaces of discontinuity and landscape diversity.

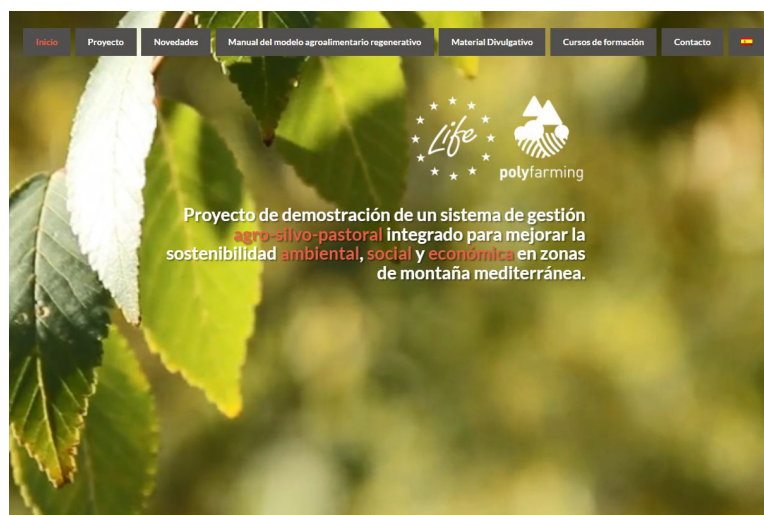
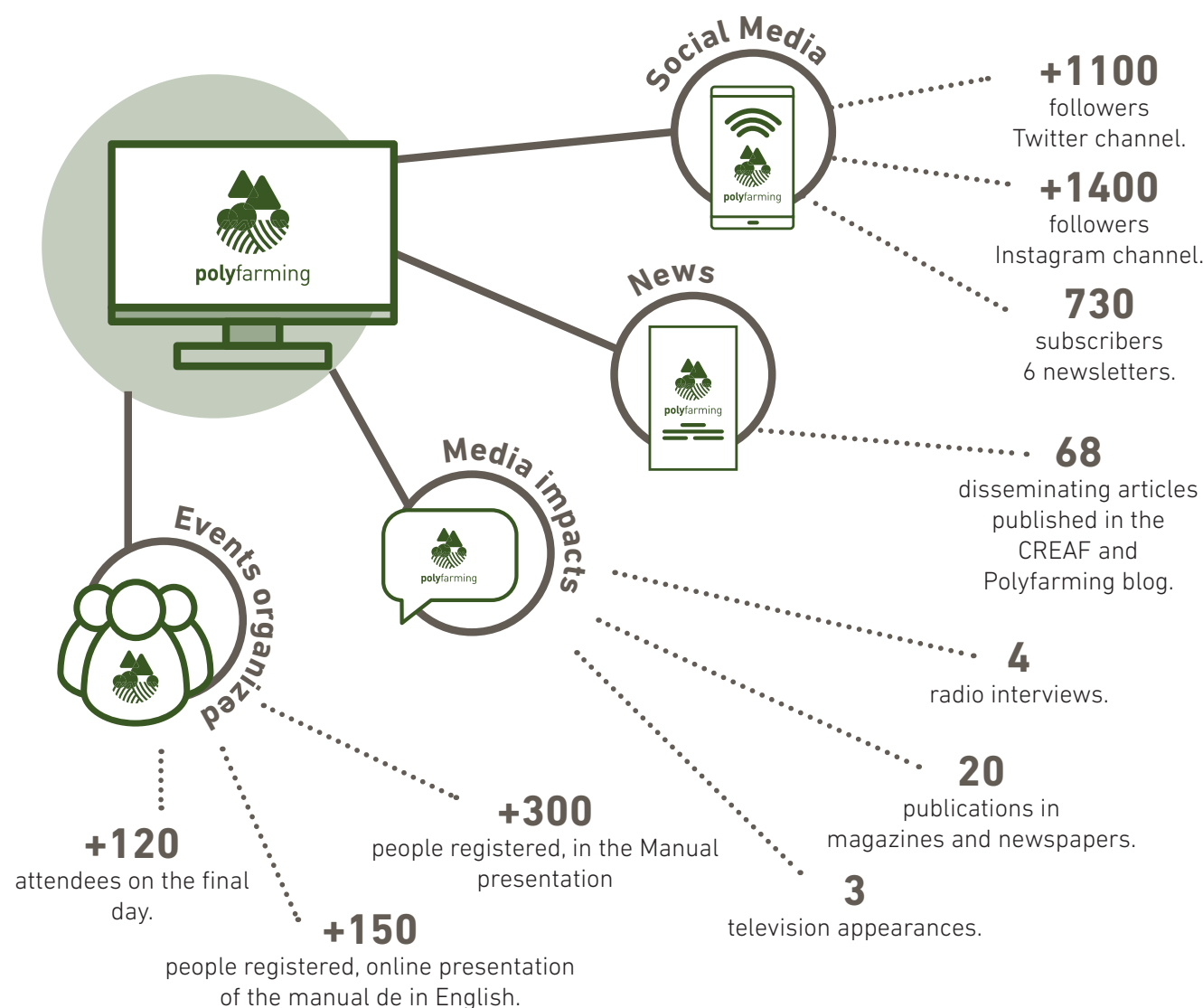


Training actions for future producers

- In order for the regenerative system supported by Polyfarming to be replicated locally and globally, the Polyfarming project offers a **free manual** and downloadable sheets so that any producer can apply the different techniques proposed.
- Polyfarming has also produced **informative videos** of the Polyfarming system and the techniques it applies: general video of the Polyfarming system, BRF, wooden beds, biochar, biofertilizers, managing small animals on pasture and managing cows on pasture. The videos are available on CREAM's YouTube channel.
- In addition, two **replication sessions** have been held in the Basque Country and Extremadura, and multiple assessments have been conducted for farmers and livestock farmers.



Dissemination and communication actions



Political impact

- Meetings with state and regional representatives of the Spanish Ministry and the Government of Catalonia.
- Meetings with Members of the European parliament.
- Meetings with major agri-food associations at European level such as ELO or COPA-COGECA.
- Participation in strategic plans of the Government of Catalonia related to the rural agenda, food, climate change and research and transfer of innovative agri-food models.



Elaboració del Pla Estratègic de l'Alimentació a Catalunya (PEAC)

Formulació estratègica i estructura del Pla
- Dimensions, objectius i línies estratègiques -

Maig de 2020

Generalitat de Catalunya
Departament d'Agricultura,
Ramaderia, Pesca i Alimentació



AGENDA RURAL DE CATALUNYA



Why are Polyfarming and the regenerative model the future?

The regenerative agri-food model is a **truly sustainable alternative** to food production and a proposal for the future at both local and global levels. Farms such as Planeses and projects such as Polyfarming are reference centers, **real and demonstrative examples** that contribute to a shift toward production systems that are better for the planet and human health.

global **One Health** initiative, which contends that maintaining the integrity of ecosystems benefits both humanity and plant and animal biodiversity.

In addition, this model fits perfectly with the

One Health model

