2Q 2025

ProAg
INVEST

Regenerative Transformation Plan

The case of an Avocado Farm in Spain

How is Regenerative Agriculture applied in the case of permanent crops?

Agriculture applied in the case of permanent crops? This is the question that often comes up in our conversations with institutional investors.

To explain it, there is nothing better than doing it with a real practical example of transformation from a conventional avocado farm to another with Regenerative Agriculture techniques.

We start the case by analyzing the initial context of the farm and defining the objectives we seek to achieve:

Location of the farm
South of Andalusia, Spain.

Challenges we encounter
Soils poor in organic matter and with a high proportion of stones, extreme water deficit, low productivity, aged and diseased trees, scarce biodiversity, lack of natural enemies and pollinating insects, heat stress due to high temperatures in summer.

Objective
Revaluation of the orchard through regenerative agriculture practices to double its value in the medium term, with regenerative certification at the end of the process , and increase agricultural yield in the long term.

In this context, we set out to achieve three main objectives:

- Improve productivity and long-term sustainability of the crop;
- Maximize efficiency in the use of resources;
- Improve the soil's health and enhance farm's biodiversity

To this end, without intending to be exhaustive, we define **seven formulas** for regenerative practices, each with a specific objective.

01

Soil Regeneration and Fertility

Essential to guarantee agricultural sustainability and preserve ecosystems, through:

a. Incorporation of beneficial microorganisms:

PRACTICE 1

Application of **microbial biofertilizers** (Trichoderma, Bacillus spp., arbuscular mycorrhizae)

OBJECTIVE

To improve the soil microbiota, decompose organic matter and promote nutrient uptake by the roots.

PRACTICE 2

Using **compost enriched with beneficial microorganisms**, such as Actinobacteria

OBJECTIVE

To reactivate biological activity in impoverished soils.

BENEFIT

Improved soil capacity and net fertility, increased root development, accelerated degradation of organic matter.

b. Organic Mulch:

PRACTICE

Cover the soil with **crushed plant debris** from avocado tree's pruning, cover crops, or straw.

OBJECTIVE

Reduction of surface water evaporation, increase in soil moisture retention capacity, greater resilience to water stress, soil temperature control and improvement of soil structure.

c. Nitrogen Fixers:

PRACTICE 1

Introduction of legumes (white clover, vetch, alfalfa) as cover crops

OBJECTIVE

Nitrogen fixation and improvement of soil fertility.

PRACTICE 2

Using Rhizobium Inoculants

OBJECTIVE

To maximize the nitrogen fixation capacity of these legumes.

BENEFIT

To maximize the nitrogen fixation capacity of these legumes.

02

Water Management

A key process to guarantee water needs through the efficient and sustainable use of resources, essential for the development of agricultural holdings

a. Precision Irrigation:

PRACTICE
Installation of localized drip irrigation systems and moisture sensors in soils and crops, and use of satellite measurements

OBJECTIVE
To optimize the frequency and quantity of irrigation, adjusting water use to the specific needs of crops, reducing water losses and consumption and monitoring its efficiency by areas.

b. Infiltration Ditches (Swales):

PRACTICE
Construction of swales or ditches between the lines of trees

OBJECTIVE
To capture and retain rainwater in the subsoil, facilitating its availability for trees in dry periods.

c. Adapted plant covers:

PRACTICE
Use of cover crops with selected species such as oats and clover, balansa or mustard and other legumes

OBJECTIVE
To reduce runoff, improve infiltration, protect the soil from erosion and provide nitrogen by atmospheric fixation.

d. Water Catchment Infrastructures:

PRACTICE
Pond or reservoir implementation

OBJECTIVE
To store rainwater.

e. Wastewater use:

PRACTICE
Reuse of wastewater, properly treated for agricultural use

OBJECTIVE
Circular economy in water-stressed areas

03

Biodiversity Management

Encompassing the conservation, sustainable use and restoration of ecosystems and their biological components

a. Biodiversity and Buffer Zones:

PRACTICE
Designate areas of the orchard for planting native and multifunctional species

OBJECTIVE
To serve as habitats for beneficial insects and pollinators.

b. Attractive Species of Beneficial Insects:

PRACTICE
Planting nectariferous plants such as borage (Borago officinalis), fennel (Foeniculum vulgare), marigold (Calendula officinalis) and lavender

OBJECTIVE
To attract pollinators and natural enemies of pests.

c. Pollinator Shelters:

PRACTICE 1
Construction of insect hotels and specific areas for wild bees.

PRACTICE 2
Introduction of managed honey bee hives.

OBJECTIVE
Support for crop pollination and promotion of biodiversity

d. Rotational Grazing Areas:

PRACTICE
Introduction of livestock (sheep) and controlled use in specific areas

OBJECTIVE
To manage weeds and provide fertility to the soil through natural manure.

ADDED BENEFIT
support for the local economy and population fixation through grazing agreements with small sheep farmers.

04

Renovation and management of the avocado orchard

Essential to maintain the productivity of the crop

a. Rejuvenation Pruning:

PRACTICE
Removing old and diseased wood

OBJECTIVE
To stimulate the growth of new productive branches.

b. Suitable selection of rootstocks in case of greenfield projects, in which it is designed from scratch

PRACTICE
Select rootstock varieties that are more resistant to water stress and disease.

OBJECTIVE
To increase the capacity and resilience of crops to water stress and salinization

c. Application of Biostimulants

PRACTICE
Use of algae extracts, amino acids and humic acids

OBJECTIVE
To increase the resistance of trees to water and thermal stress.

d. Organic Pest Control:

PRACTICE
Introduction of natural predatory enemies, such as lacewings and parasitoid wasps.

OBJECTIVE
To control specific pests without resorting to chemical pesticides.

05

Increase in Organic Matter

a. Diversified Cover Crops:

PRACTICE
Rotation of oats, clover and vetch

OBJECTIVE
To improve soil structure and provide fodder for animals.

b. Use of Composted Manure:

PRACTICE
Application of composted sheep or cow manure

OBJECTIVE
To increase soil organic matter.

c. Rotation with Small Livestock:

PRACTICE
Using Sheep for Grazing

OBJECTIVE
To recycle nutrients, control weeds and reduce soil compaction.

06

Adaptation to Climate Stress

a. Planting Perennial Species:

PRACTICE
Incorporation of shade trees such as carob or mulberry trees and green infrastructure such as hedges and windbreaks

OBJECTIVE
Creation of microclimates that mitigate heat stress.

b. System Diversification:

PRACTICE
Introduce heat-resistant intercropping, such as chia (Salvia hispanica) or moringa.

OBJECTIVE
Diversification of income.

07

Regenerative Certification and Commercialization

Allows increasing the profitability of the farm by producing a premium crop with a higher market value

a. Transition to Regenerative Certification:

PRACTICE
Adapting Regenerative Farming Practices

OBJECTIVE
To comply with regenerative farming standards from the beginning of the project.

b. Traceability and Regenerative Marketing:

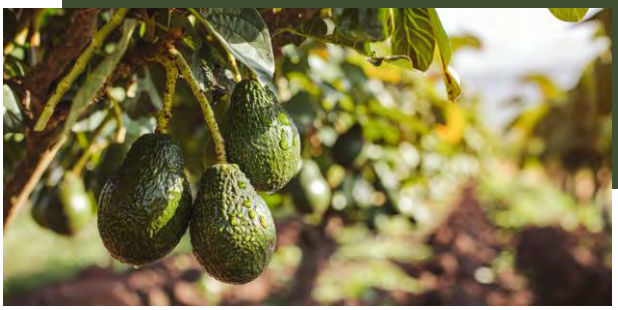
PRACTICE
Implementing Digital Tools

OBJECTIVE
Monitor and report regenerative impacts, improving the reputation of the product.

c. Product Diversification:

PRACTICE
Producing natural honey, fodder, and secondary crops

OBJECTIVE
To add value to the system.



RESULTS AND CONCLUSIONS

01 Improved productivity and long-term sustainability of the crop

Results

1. Increase in soil organic matter (+0.5% per year, depending on the budget to be allocated).
2. Increased water retention capacity by up to 20% in five years.
3. Reduction of plant diseases
4. Increase in yields between 15%-25% in 3 to 5 years.

Impact

1. The farm becomes more resilient to water and climate stress conditions, decreasing plant mortality.
2. It gradually replaces chemical inputs (synthetic fertilizers and pesticides) with natural alternatives, reducing costs and pollution.

02 Resource efficiency

Results

1. Reduction of water consumption per kilo of fruit produced, by 30%
2. Nitrogen use efficiency by 20%
3. Reducing fertilization costs.

Impact

1. Optimization of irrigation due to better moisture retention and the use of organic covers.
2. Reduced dependence on chemical fertilizers by 50%.

03 Improving the farm's biodiversity

Results

1. Increase in the functional biodiversity of the soil to be measured as a microbiome.
2. Increase in the population of beneficial insects (+50%), including pollinators.
3. Diversification of flora and fauna through biological corridors and buffer zones.

Impact

1. Greater resilience of the ecosystem against pests and diseases.
2. Ecosystem services such as natural pollination or biological control.
3. Target increase in soil carbon sequestration.

KEY TAKEAWAYS

What is Regenerative Agriculture about?

- Improve productivity and long-term sustainability of the crop
- Seek maximum efficiency in the use of resources
- Improve soil's health and enhance farm's biodiversity

Nowadays, the sustainability of investments is no longer an option but an obligation to guarantee the future of the planet.

Investing in Regenerative Agriculture means incorporating nature into investment decisions so that, in addition to achieving financial returns, we achieve a positive impact on natural resources and ecosystems.

Private investment plays a fundamental role in the shift towards more sustainable land use methods, which are necessary to restore nature's regenerative capacity, support living standards and ensure our basic means of subsistence.

Investing in Regenerative Agriculture offers a pathway for investors to make a positive contribution to global sustainability solutions, enhance climate resilience, and restore air, land, water, and biodiversity.

Investing in real assets, and specifically in farmland, can be really profitable. As with any investment, there are multiple alternatives, each with a different risk and return profile.

In exchange for relative illiquidity, it is presented as a source of attractive returns, totally uncorrelated, stable and predictable in the long term.

In agriculture, risks such as weather or diseases must be managed to minimize the possible negative impact. The key is the experience of agricultural managers, their ability to manage these risks, as well as the selection of the ideal location and variety of crops and their proper management.

"We have to keep in mind that we are managing a living being, the Soil, the source of that return, so we better take good care of it."

Ian Carlo Bottinelli

ProAg' Subtropical & Citric Crops Director

Ian Carlo is responsible for subtropical (avocado & mango) and citric crops development projects at ProAg Invest.

Ian Carlo is an Agricultural Engineer from the University of Chile. Further studies in Finance, University Diego Portales; diploma in Sustainability from the University of Buenos Aires and a diploma in Circular Economy and Sustainability Strategies from the University of Cambridge.

Ian Carlo has over twelve years' experience in high-level management positions in major agribusiness companies in Latin America, overseeing operations, finance, investments and develop high-performance teams.

He combines agronomic expertise, strong network, management skills, market knowledge, organizational development, and a corporate vision.

Ian Carlo served as Director of Agricultural Operations at EUROFRESH, overseeing 400Ha of organic fruit operations (avocado, mango and Nadorcott mandarin) in Spain, Dominican Republic and Peru.

Previously he was COO of AVOAMERICA, leading all operations in Chile and Peru, including over 3,000 hectares of avocado orchards, managing 50 field technicians, 1,000 operators, an annual global operating budget of $25 million with $5 million in capex investment. He was also a member of the corporate ESG and Sustainability team. During his management, over 30 million kilograms of Hass avocados were harvested.

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ProAg Invest is a farmland management firm specialized in high yielding permanent crops in Iberia & Latin America.

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