Design Agroforestry: Essential Beginner's Guide

Transform degraded land into abundant, productive ecosystems

By Elise Boon and Giuseppe Sannicandro

Fais-le toi-même

Erasmus+

TABLE OF CONTENTS

Ethical Foundations: Why syntropic agroforestry is essential?

In a world facing unprecedented environmental challenges, Syntropic Agroforestry represents much more than a simple alternative agricultural technique. It embodies a true ethical revolution in our relationship with the land, the ecosystems that rely on it, and food production.

Facing ecological urgency

Our conventional agricultural model is at an impasse. It is responsible for:
30% of global greenhouse gas emissions
70% of freshwater consumption
Catastrophic soil erosion and deforestation
The alarming collapse of biodiversity: 75% of insects have disappeared in 30 years in some regions)

Sovereignty and resilience

At a time when global supply chains show their fragility, where food inflation hits the most vulnerable, and where extreme weather events threaten harvests, developing local and resilient food systems is no longer a luxury — it's a necessity.

Syntropic farming by its very foundation, offers:

Diversified production that reduces risks of total failure
Increased resilience to droughts and floods
Progressive autonomy from external inputs (even organic ones)
Remarkable ability to thrive despite climate hazards

Reconciliation with the living world

Our modern society has gradually broken its connection with nature, considering it merely as a resource to exploit. This disconnection is at the origin of many contemporary crises, both ecological and psychological.

Syntropic agroforestry proposes a deep reconciliation:
It places us back in a role of co-creators rather than extractors
It teaches us patience and observation, essential qualities in the age of immediacy
It reconnects us to natural cycles and the complexity of life
It invites us to humility in the face of ecosystem wisdom.

Introduction to Syntropic Agriculture:
What is syntropic agriculture?

Syntropic agriculture is an approach to Nature and cultivation method that draws direct inspiration from natural forest ecosystems.

This approach aims to create productive and autonomous agricultural systems that, instead of depleting natural resources, regenerate and enrich them over time. Unlike conventional agriculture, which simplifies ecosystems and builds profit by degrading them, syntropic agriculture seeks to reproduce the complexity of natural forests while getting products from them.

Origins and basic principles developed by Ernst Götsch

This approach was developed and popularized by Swiss researcher Ernst Götsch, who began experimenting with these methods in the 1970s and refined them in his 500 ha farm, Olhos de Agua, in Brazil. After purchasing degraded land in Bahia state, he succeeded in transforming it into a productive and abundant forest within a few decades.

Unlike conventional agriculture that relies on monoculture, synthetic inputs, and intensive soil cultivation, syntropic agroforestry:

Favors dense and stratified polycultures
Uses no pesticides or synthetic fertilizers
Minimizes soil cultivation (normally just at the implementation phase)
Relies on natural regeneration processes

It also differs from “classic” agroforestry through:
Greater planting density
Dynamic management (based on pruning and rational organization of organic matter) inspired by natural cycles
More complex species integration according to their ecosystem function
Strategic use of pruning to favor system-wide growth

Ecological and economic advantages

The benefits of this approach are numerous:

Soil restoration and improvement
Water conservation and microclimate improvement
Carbon sequestration
Biodiversity increase
Resilience to climate hazards
Production diversification and year-round harvests
Reduced input and irrigation costs over time
Growing system autonomy that becomes increasingly productive over years

The principle of abundance and cooperation between plants

Contrary to the common belief that plants and other living organism compete, the syntropic approach considers cooperation as the dominant principle in healthy ecosystems. In a well-designed system, plants:

Help each other through underground mycorrhizal networks
Create favorable microclimates for one another
Provide protection and share nutrients with neighbors
Fulfill complementary functions (nitrogen fixation, mineral uptake, etc.)

High planting density is not a problem but an asset: it favors rapid establishment of a cooperative and it allows to select the best genetics of the desired species

Foundations of Syntropy: Two Design Drivers - Time and Spacial organization

Time: Natural Succession

In syntropic farming according to Ernst Götsch, natural succession is the evolutionary process that forest ecosystems naturally follow, and which we intentionally reproduce and accelerate in our syntropic agricultural systems.

The Systems

COLONIZATION
This is the first system in natural succession. It corresponds to ecosystems that establish on bare rock or extremely degraded soils. Colonization plants are pioneers that:

- Tolerate difficult conditions (poor soil, direct sun exposure)
- Cover the mineral substrate and start life colonization
- Prepare the ground for following species
- Create the first favorable conditions for more demanding species

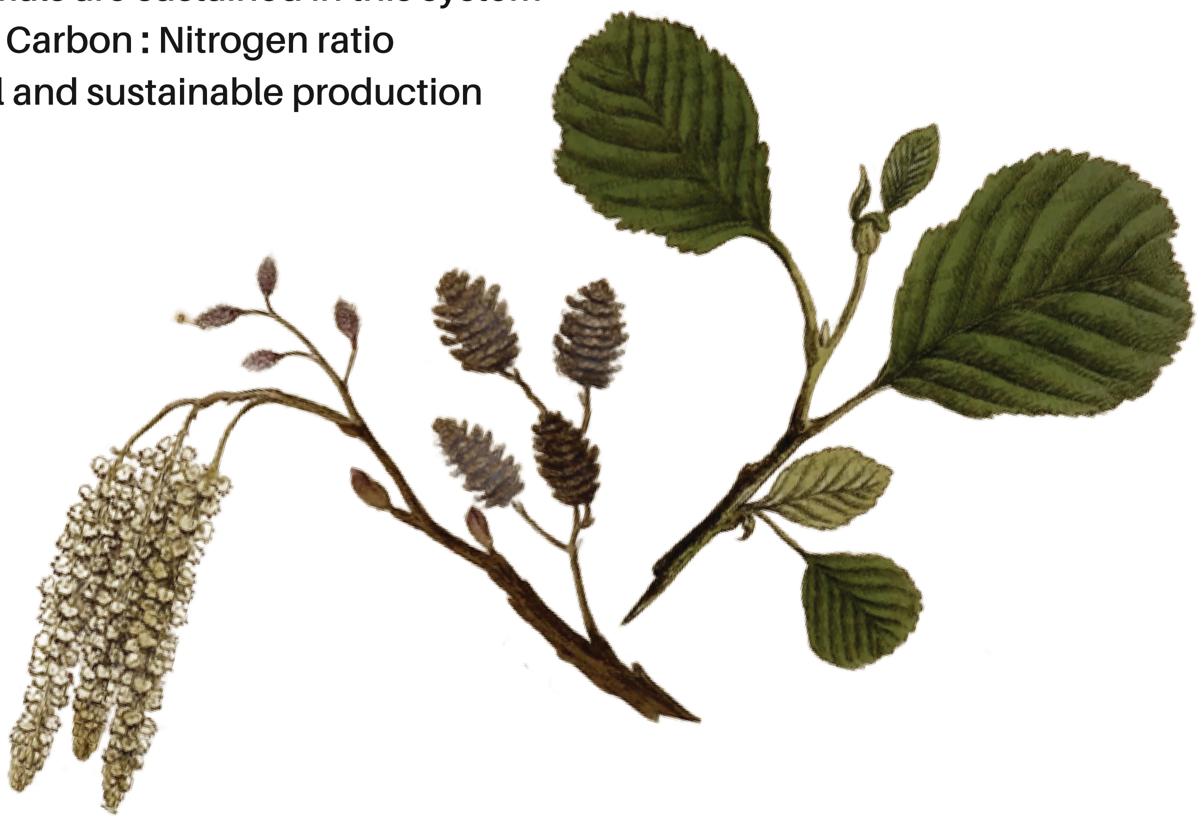
ACCUMULATION
This is the intermediate system where the ecosystem begins to structure and accumulates resources.

- Plants accumulate biomass and carbon in the soil
- Soil progressively enriches
- Diversity increases
- Conditions become more stable
- It’s a transition phase toward maturity
- Small animals are sustained by these species

ABUNDANCE

This is the **mature system:**

- Maximum complexity and quantity and quality of consolidated life
- Highest availability of water and nutrients (especially Phosphorus)
- Big animals are sustained in this system
- Smaller Carbon : Nitrogen ratio
- Optimal and sustainable production



Life Cycles Within Each System

Natural succession is the process by which plant species and "communities" progressively replace each other, preparing the conditions for the next and more demanding community. In a forest, different plant communities succeed each other, from pioneer herbs to large demanding trees that compose a mature forest.

Ecosystems thus evolve according to a natural process of ecological succession in three Life Cycles:
Placenta (1-2 years),
Secondary forest (70-80 years),
Climax (250-300 years).

Syntropic agriculture intentionally reproduces (and accelerates) this process by simultaneously planting:

- **Placenta**: fast-growing short living herbaceous plants
- **Secondary:** perennial woody fast-growing species
- **Climax:** slow-growing long living plants

The life cycle of plants is the fundamental characteristic for classifying them as: Placenta, Secondary, Climax

Each group plays a specific role and prepares the ground for the next. Pioneers quickly cover the soil, while long-cycle species progressively structure the system.

Syntropic farming consists of **accelerating and directing** these natural processes: instead of waiting decades for nature to restore a degraded ecosystem, we strategically plant species from different successional stages and manage them (pruning or thinning them out) to accelerate evolution toward a more abundant and productive system.

We thus play with designed disturbance getting each time an increase in ecosystem activity and fertility.

- **Spatial Organization**

The goal is to work our field with the idea of organizing it in levels according to plant light need in space, and natural succession in time. The organization is therefore designed to maximize photosynthesis input both at a given moment and as the plot evolves.

This approach allows creating agricultural systems that improve over time, unlike conventional agriculture that tends to deplete soils.

Stratification: Understanding Layers and Canopy Projection

Layers in syntropic farming are not related to the maximum height of a plant, but correspond to the amount of sunlight a plant requires to thrive. The key is to create a dense, multi-story canopy that captures as much sunlight as possible and filters it down to the plants below. The layers include:

EMERGENT LAYER

These are the tallest plants in the system in their life cycle, like large timber or nut trees in a Climax forest or Corn in Placenta. They require full sun exposure and occupy the highest part of the canopy. They are the layer that covers the least, accounting for roughly 20% of the canopy's occupation in an Abundance system.

HIGH LAYER

Below the emergent layer, these are typically high-value fruit trees in a Secondary or Climax forest and other plants that need a lot of sunlight but can tolerate some filtered shade (like tomatoes in Placenta). This layer can cover about 40% of the total canopy space in an Abundance system.

MEDIUM LAYER

This layer consists of smaller trees, large shrubs, and bushes in Climax and Secondary forest and other plants that thrive in partial shade (like lettuce in Placenta). Plants in this layer can cover about 60% of the space (canopy projection on the ground).

LOW LAYER
This is the layer occupied by shade loving plants such as Cocoa, most of the berries... in Climax and Secondary Forest and plants like spinach or zucchini in Placenta. They are shade-tolerant and can cover a significant portion of the ground, around 80%.

GROUND COVER LAYER
This refers to the plants that use the last filtered sun rays for their photosynthesis such as strawberries, cyclamin... This layer covers up to 20% of the ground.

The Importance of Layers

Layers are essential to a healthy syntropic system for several reasons:
Maximizing Photosynthesis: By stacking plants with different light needs, the system efficiently uses all available sunlight, increasing overall biomass production and microbial activity.

Resource Management: The dense layers create a favorable microclimate. They protect the soil from direct sun and wind, reduce water evaporation, and help retain moisture.

Increased Biodiversity: A multi-layered system provides a variety of habitats, which attracts a wider range of beneficial insects and animals. This can help with pest control and pollination.

Maximized Cooperation: When planned correctly, the different plant species work in a cooperative relationship rather than a competitive one. The taller plants provide shelter and shade for the lower-lying, shade-tolerant species reducing their stress.

Designing Your Syntropic Agroforestry Project with Card Game

Disclaimer: Nature can't be put in boxes of course.
What we have described in the Booklet and represented in the card game is a big simplification of Syntropic farming concepts and approach.

Nature can't be put in boxes of course. These boxes are useful for us to translate an overwhelming complexity in a language that allows us to take first steps, builds confidence and takes us to planting. Being paralyzed by lack of "complete" and most accurate knowledge is not helping ecosystems and is a luxury we don't have anymore.

For example ecosystems don't have focus and support plants of course. They have species that occupy a niche and perform functions. The concept of focus just helps us to start building our consortia optimizing them for the primary production we are intrested in.

Similar climates, temperatures and rainfall can support very different species according to geology, pH of the soil, microclimatic effects, winds... And same species can react very differently in different contexts in growth speed, quality of products and more.

Sometimes the design can start not from the productive species but from the pioneers that are more suitable for regeneration, especially if the conditions are really poor.

Our purpose in the production of these tools for understanding, designing, implementing and managing Agroforestry Systems was not to provide an automatic system that would compose "the" perfect pattern if all steps are followed. It is an attempt to get regenerative farmers and people that acknowledge the importance of ecosystem restoration started, give enough confidence to plant in an imperfect way. In the worst scenario, plants that don't make it will be digested from the system as organic matter.

Because planting something not perfect is always better than not planting at all. It's our duty. And our greatest passion.

Land Evaluation - Before starting, take time to observe and analyze your field:

- Available Surface: even a small space (50-100 m^2) can accommodate a syntropic system
- Adapt your project's ambition to available surface
- Observe texture (sandy, clayey, silty)
- Measure pH if possible (simple test available at garden centers)
- Note wet or dry, compacted or loose areas
- Identify your climate zone
- Note minimum and maximum temperatures
- Observe annual precipitation and distribution
- Identify wind-exposed areas
- Determine orientation (Slope facing north, south, east....)
- Identify shade and full sun areas
- Locate obstacles (buildings, large trees)

Define Your Personal Objectives:

Reflect on what you want to obtain from your system:

- Partial food self-sufficiency?
- Commercial sales?
- Fresh products ? Processed products?
- Land regeneration and reforestation?
- Production of specific fruits?
- Relaxation and leisure space?
- Experimentation laboratory?
- Educational demonstration?

You are ready to proceed to experiment designing your agroforestry

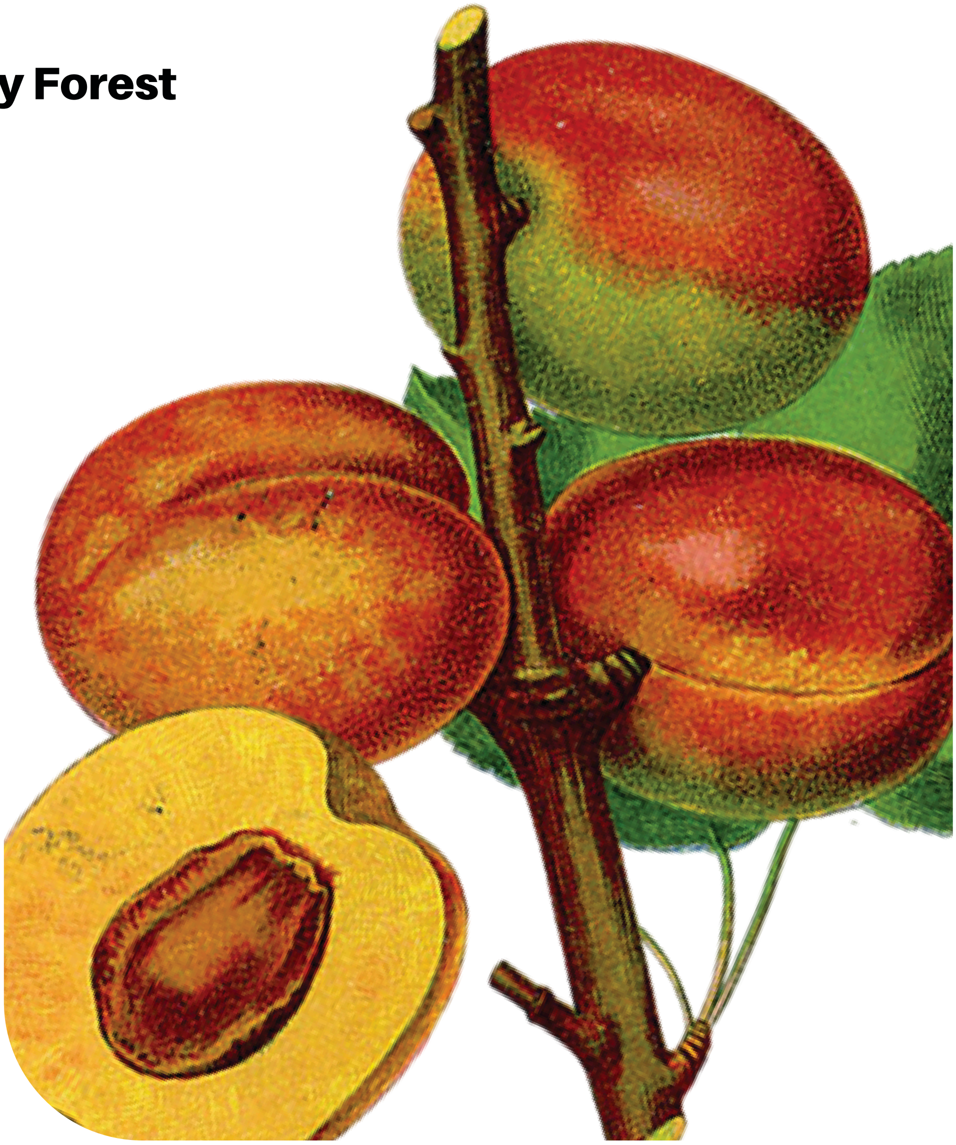
Apricot

Prunus armeniaca

Layer : **High, Medium**

System : **Abundance**

Life Cycle : **Secondary Forest**



Design Agroforestry is a project funded by the Erasmus+ KA210-YOU program, led by Fais-le toi-même (Belgium) in partnership with Associazione Regen ETS (Italy) from October 2024 to September 2025.

Because regeneration isn't just possible. It's inevitable... Seeding Life
regenhabitat.com faisletoimeme.be