

Syntropic Agroforestry Principles

Work with nature and nature will work for you.



A highly sustainable form of regenerative agroforestry driven by the power of natural succession.

Paradigm shift: Create a forest-like environment and let nature take care of the fertilizer, irrigation and pest control.

A photograph of a narrow dirt path winding through a lush tropical forest. The path is flanked by numerous banana trees with long, green leaves and thick, textured trunks. Other tropical foliage, including palm fronds and smaller leafy plants, is visible in the background and along the sides of the path.

Introduction

How It Works

3 Keys to Syntropy

Feedback

Syntropic Agroforestry - Defined

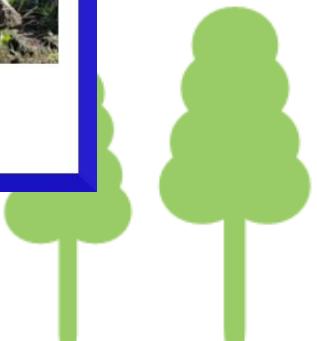
- Forest mimicry used for soil regeneration.
- Inspired by Swiss farmer, Ernst Götsch
- **Succession is the key** *What is succession? = evolve. Nature is intelligent.



Agroforestry in Haiti



Community Syntropic Farm in Haiti



Why better?

- Beyond sustainable, even producing an abundance without external inputs
- Large crop yields with waves of harvest over time
- Comfortable work environment
- Soil quality improves
- Eventually less labor intensive
- Disease resistant
- Drought resistant



Beans grown without a drop of rain



Wood for Farmers



Corn Yields 3X or more



Animal Fodder



What are downsides?

- Eventually cannot grow sun loving crops
- Requires learning new methods
- Investment in the beginning
- Full rewards are delayed



Inspired by Ernst Götsch

<https://lifeinsyntropy.org>



Ernst's Farm Before - 1984



Ernst's Farm After - 2015



Does it really work?

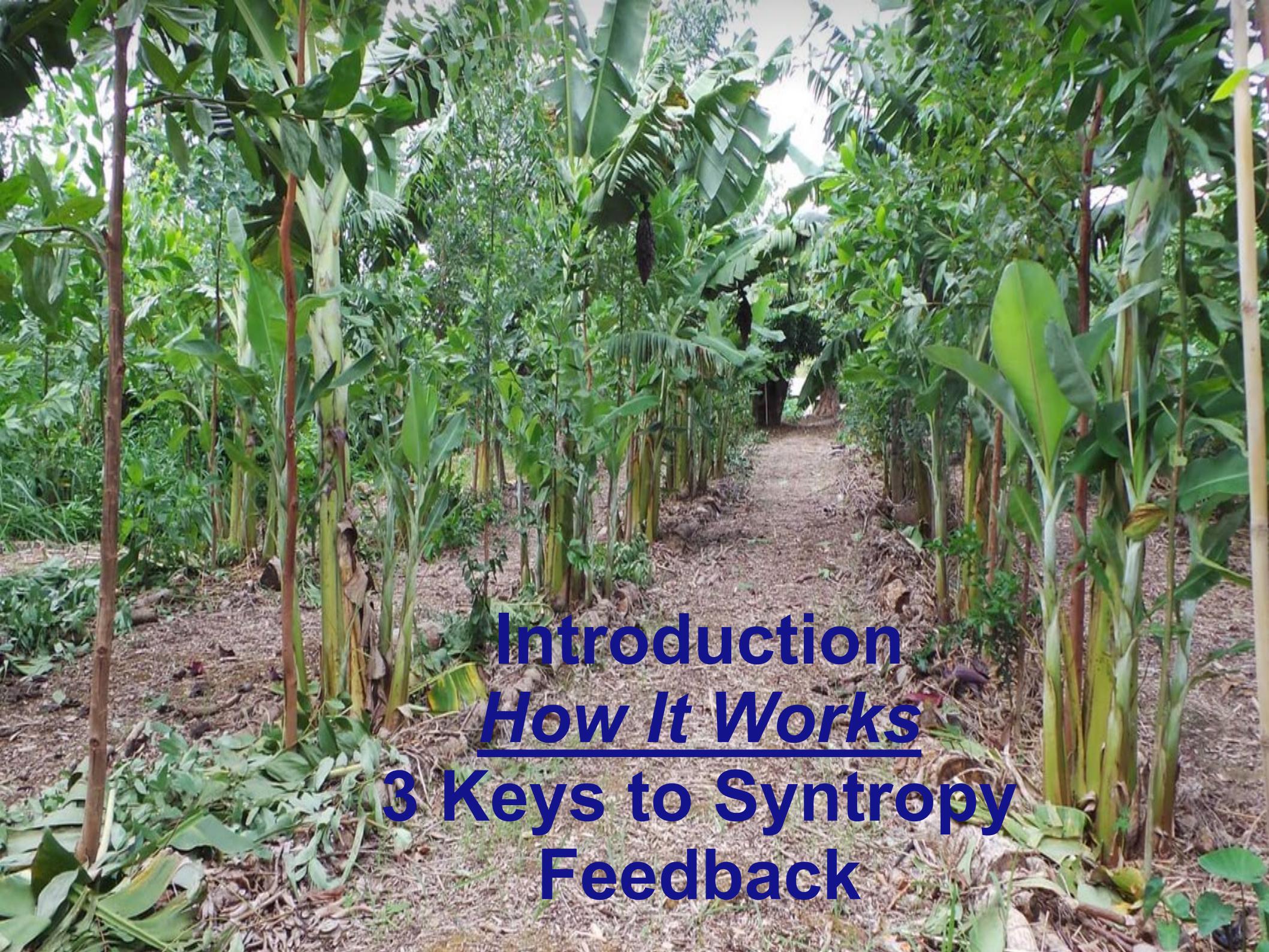
Table 8.2 Annual litter and harvest yields and associated input quantities from a successional agroforestry system, a conventional cacao production system, and as noted in literature recommendations

| | <i>Fazenda Olhos d'Agua: SAF Cacao System</i> | Conventional Cacao Plantation | Literature recommendations |
|---|---|----------------------------------|-------------------------------|
| <i>Dry matter/mulch (t/ha/year)</i> | 8–16 | 1.5–5 | 5–20 ^a |
| <i>Cocoa yield (kg/ ha)</i> | 110–370 | 225 ^b | – |
| <i>Inputs:</i> | | | |
| Fertilizers | 0 | 130 kg/ha (N) ^b | – |
| Pesticides | 0 | Fungicides ^b | – |

^aBeer (1988)

^bCEPLAC (Comissão Executiva do Plano da Lavoura Cacaueira), the Brazilian Cocoa Research Center



A photograph of a lush tropical forest floor. A dirt path leads through dense vegetation, including several large banana plants with long green leaves and red stems, and various other tropical plants like palms and smaller leafy trees. The scene is bright and green.

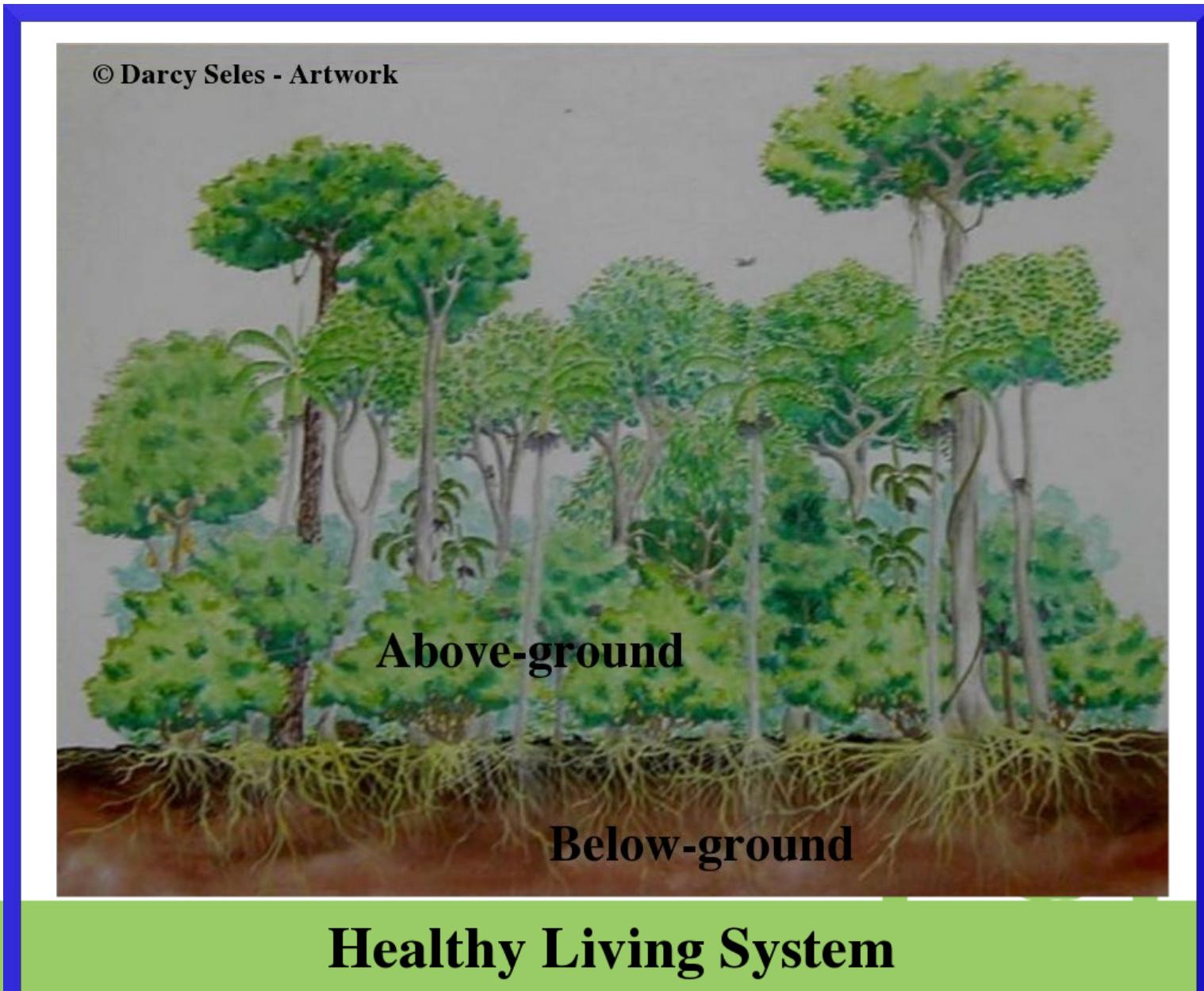
Introduction How It Works 3 Keys to Syntropy Feedback

How does it work?

1. Energy capture and handling – create fertility from thin air! *How?
 - Solar energy
 - Carbon
 - Nitrogen
 - Minerals
 - Water
2. Accelerated growth and evolution
 - Pruning
 - Farm management



Energy capture and handling



Healthy Living System

Elements of the living system:

- **Soil food web**
- Creatures
- Vegetation



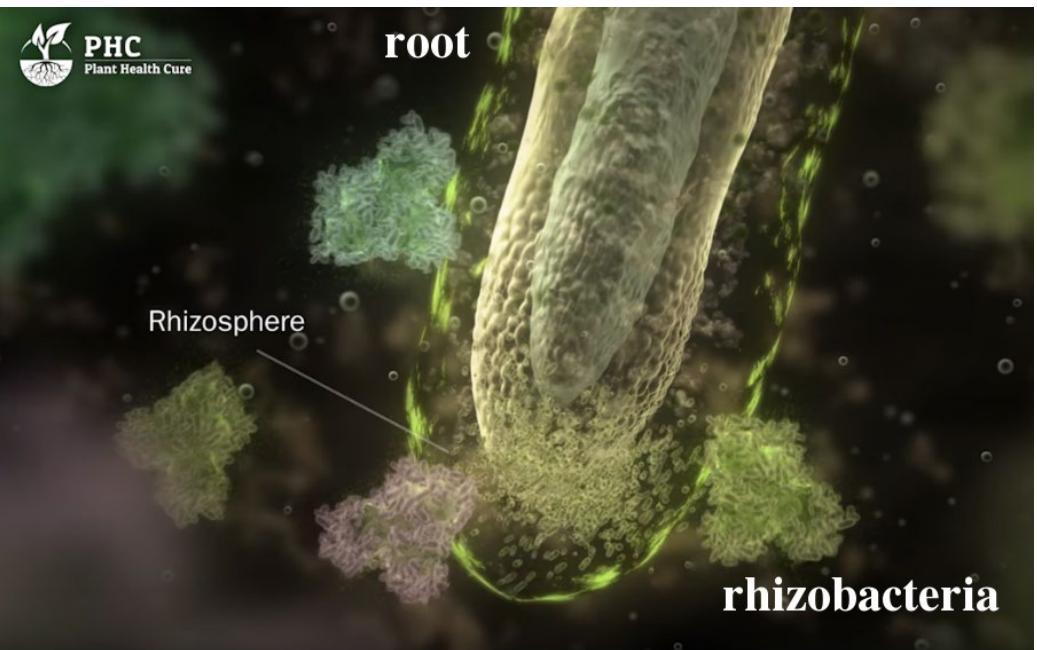
Soil Food Web



Soil Food Web



Soil Fungi and Root Interaction



Rhizobacteria and Root Interaction



Healthy Living System

Elements of the living system:

- Soil food web
- **Creatures**
- Vegetation



Soil Mesofauna

Invisible to the naked eye, but valuable to the farm.



© Andy Murray - all collage photos



Creatures

Decomposers



© Ursula Arztmann



Creatures

Pest Predators



© Ursula Arztmann



Healthy Living System

Elements of the living system:

- Soil food web
- Creatures
- **Vegetation**



Vegetation

- Important for energy absorption and feeding the soil



3 Keys to Syntropic Farming

- 1) **Prune to stimulate growth**
- 2) Cover the soil
- 3) Plant intelligent consortiums



Prune for growth – Syntropic



1. Grow dense rows

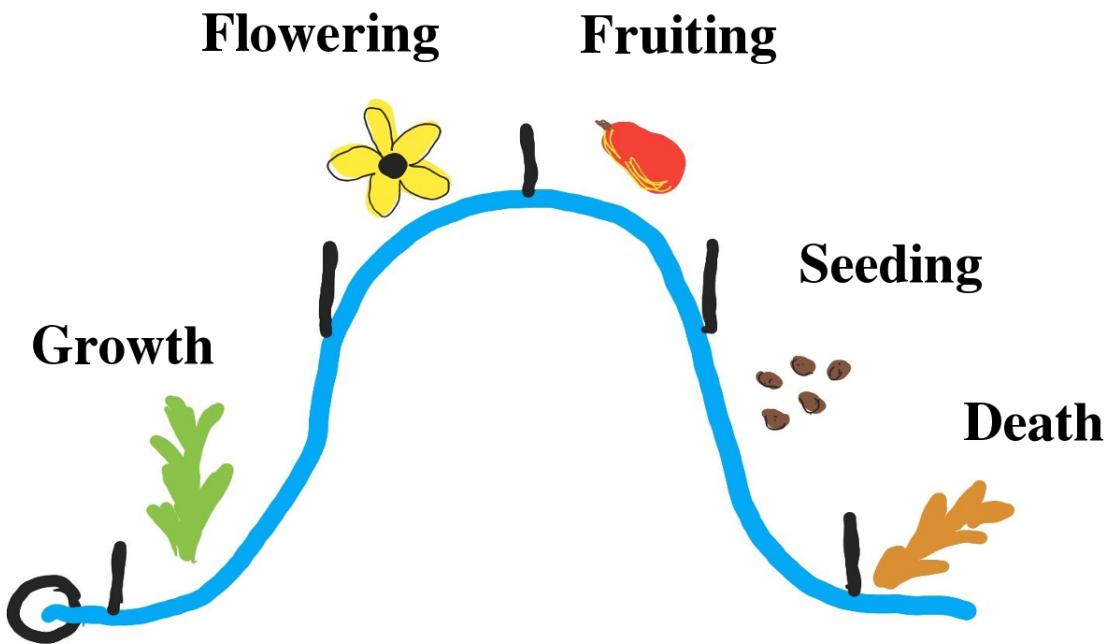
2. Prune for biomass

3. Enjoy rapid growth



Know the Life Cycle

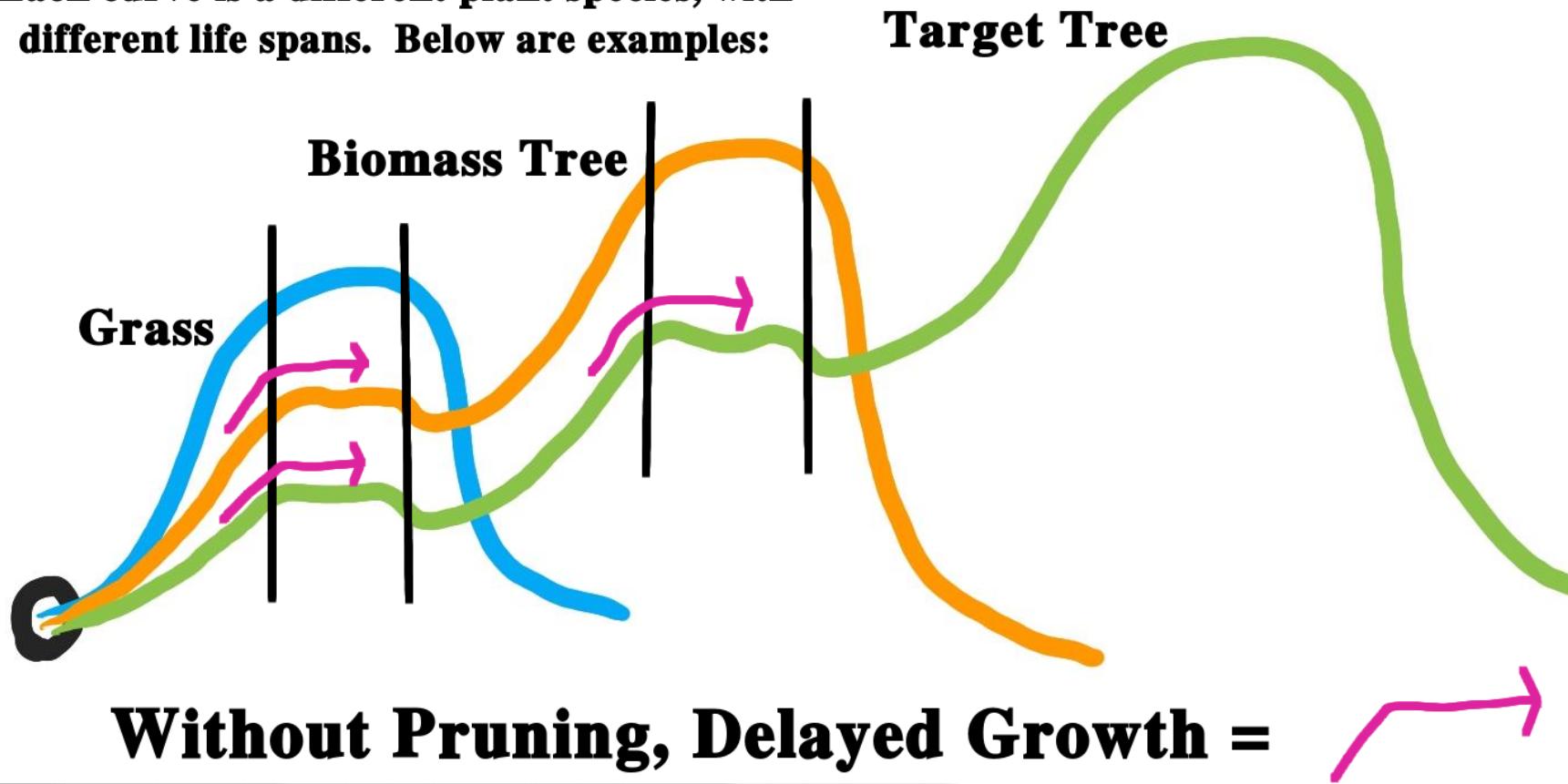
Plant Life Cycle



Aging Slows Growth for All

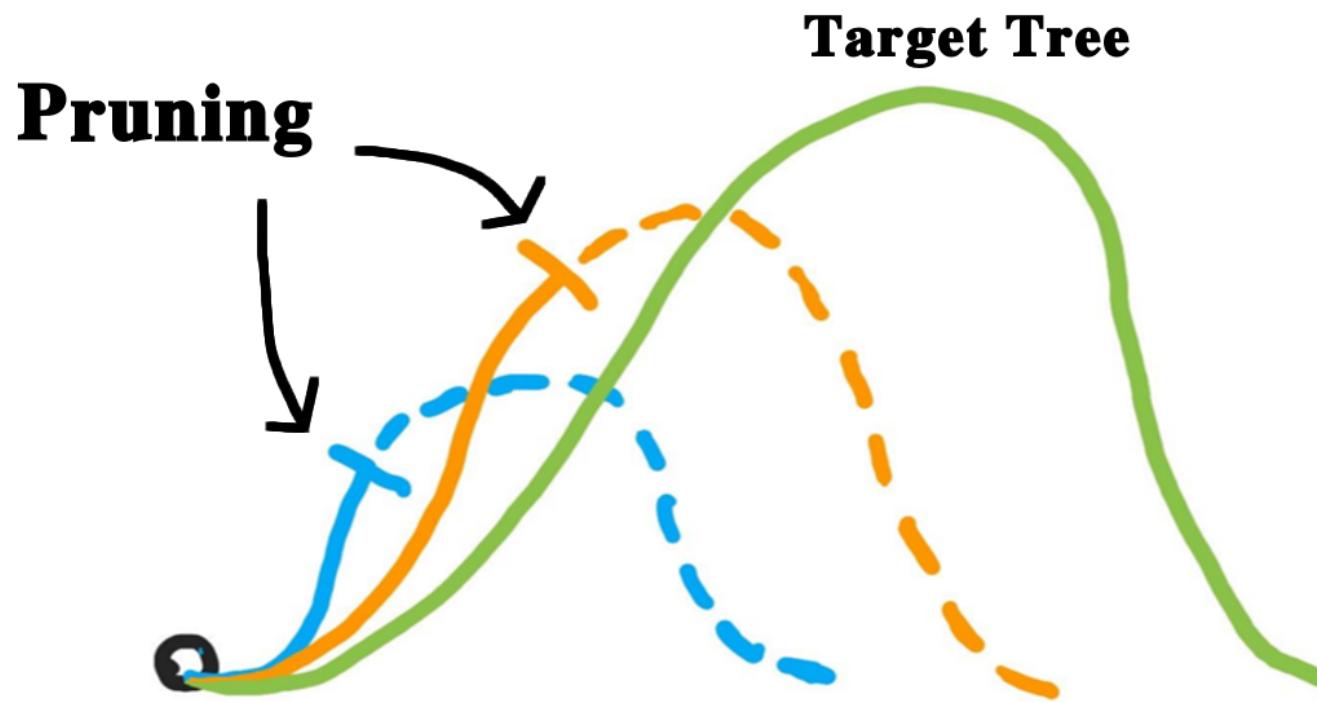
Senescence Slows All Plant Growth

Each curve is a different plant species, with different life spans. Below are examples:



Prune to Promote Growth

Pruning Promotes All Plant Growth



Growth of Target Tree Accelerated by Pruning

Prune Biomass Heavily



Biomass Trees are Heavily Pruned

Prune to stimulate growth – Inga Foundation



Aug 2012



Oct 2013

CURLA Inga alleys make rapid recovery Item 1 of 10



The first prune, marking the beginning of our new long-term research project Item 4 of 10



...and maturing Item 4 of 6



A photograph of a lush tropical forest floor. A narrow dirt path leads through the center of the frame, surrounded by tall banana plants with large green leaves and palm trees with long, thin fronds. The ground is covered with fallen leaves and organic debris.

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3 Keys to Syntropic Farming

- 1) Prune to stimulate growth
- 2) **Cover the soil**
- 3) Plant intelligent consortiums



Cover the Soil – 10cm or more



**Cover the soil with organic matter,
especially around the trees**



Notice all the soil is covered



Cover the Soil



© Steven Werner

Vegetation grows much stronger when the soil is covered. Here all the rows are planted the same, but notice the ones with mulch!

3 Keys to Syntropic Farming

- 1) Prune to stimulate growth
- 2) Cover the soil
- 3) **Plant intelligent consortiums**

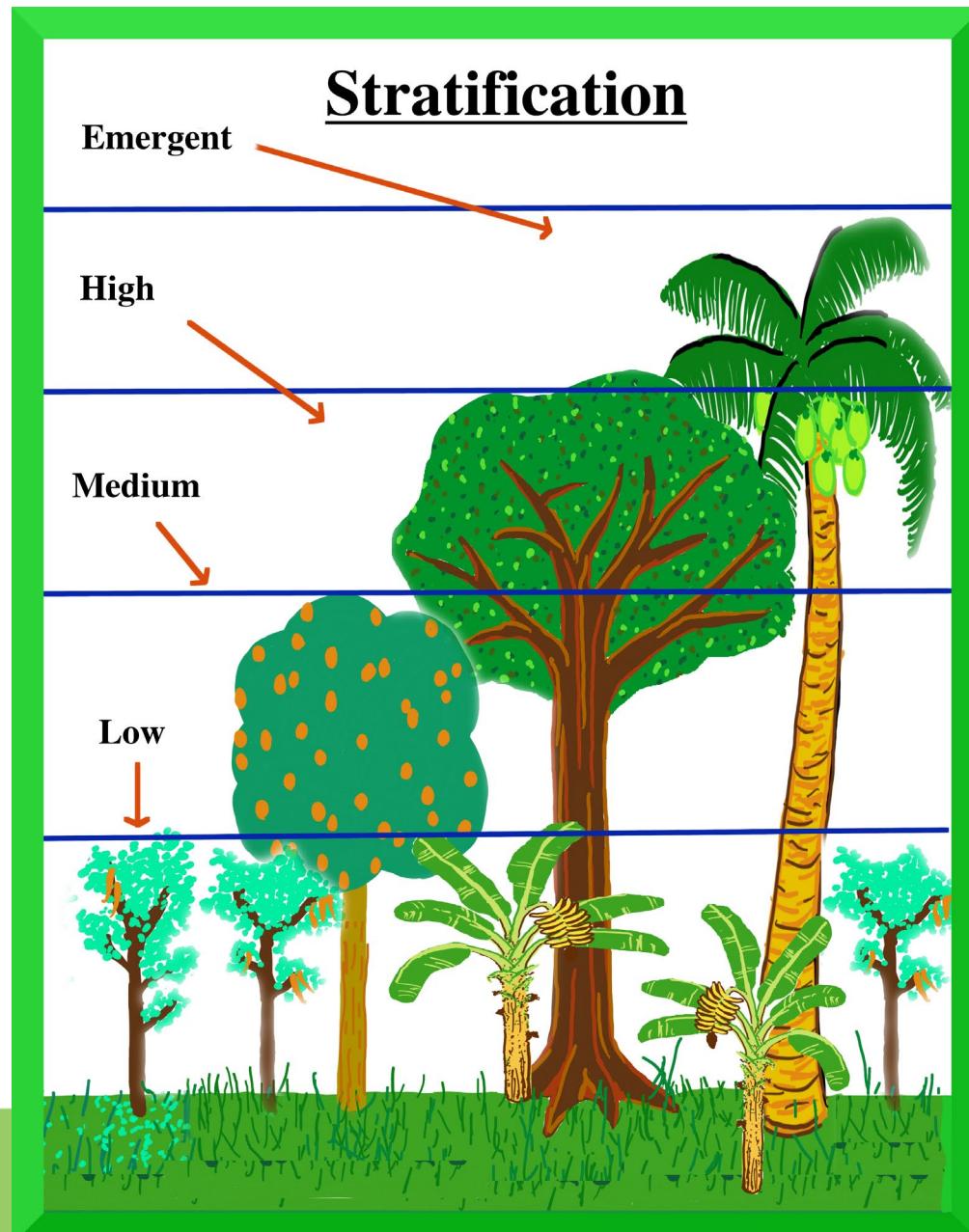


Consortium - Defined

A mix of vegetation that can be grown together cooperatively, which includes different stratum levels and successions.



Stratification

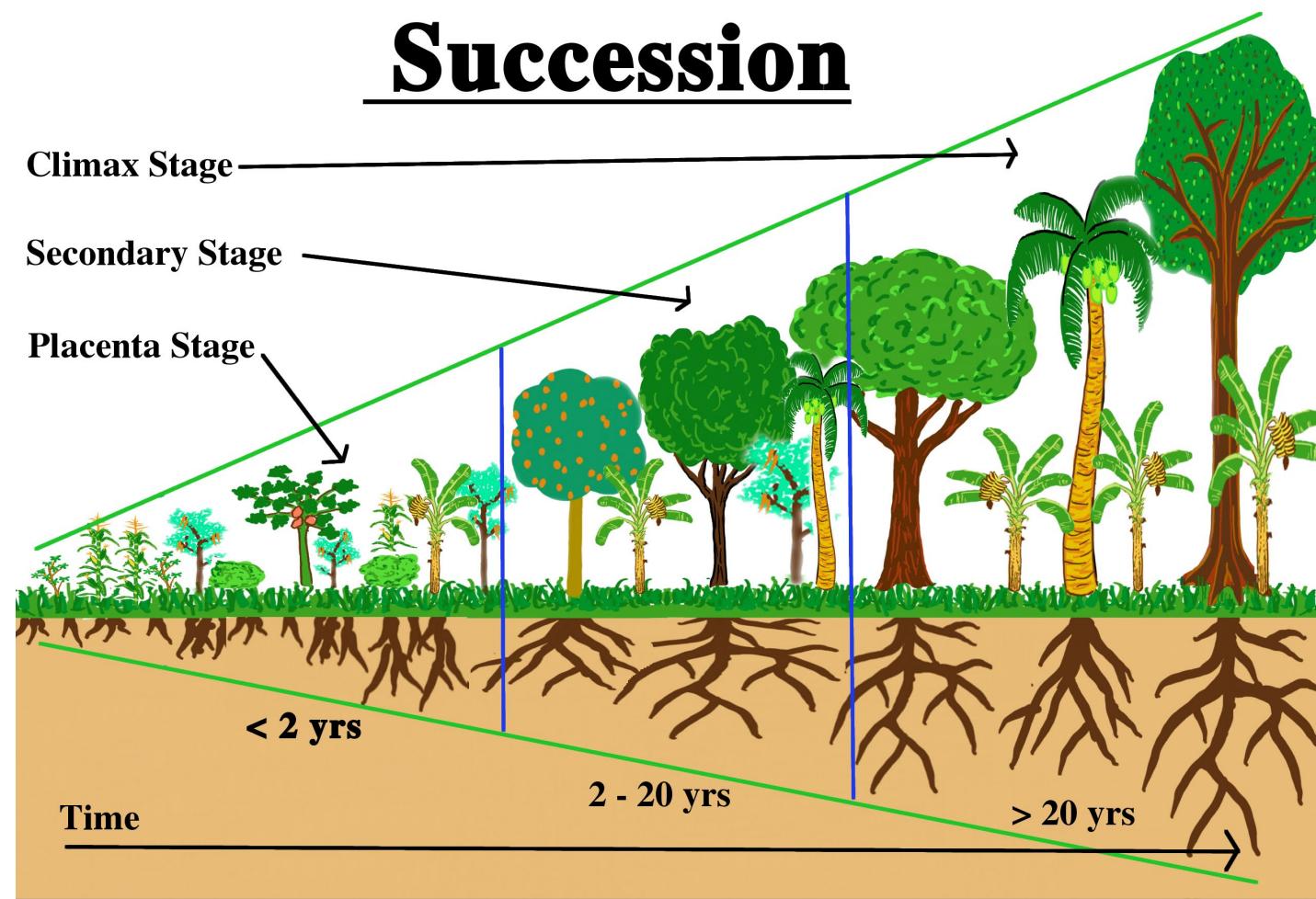


Stratification

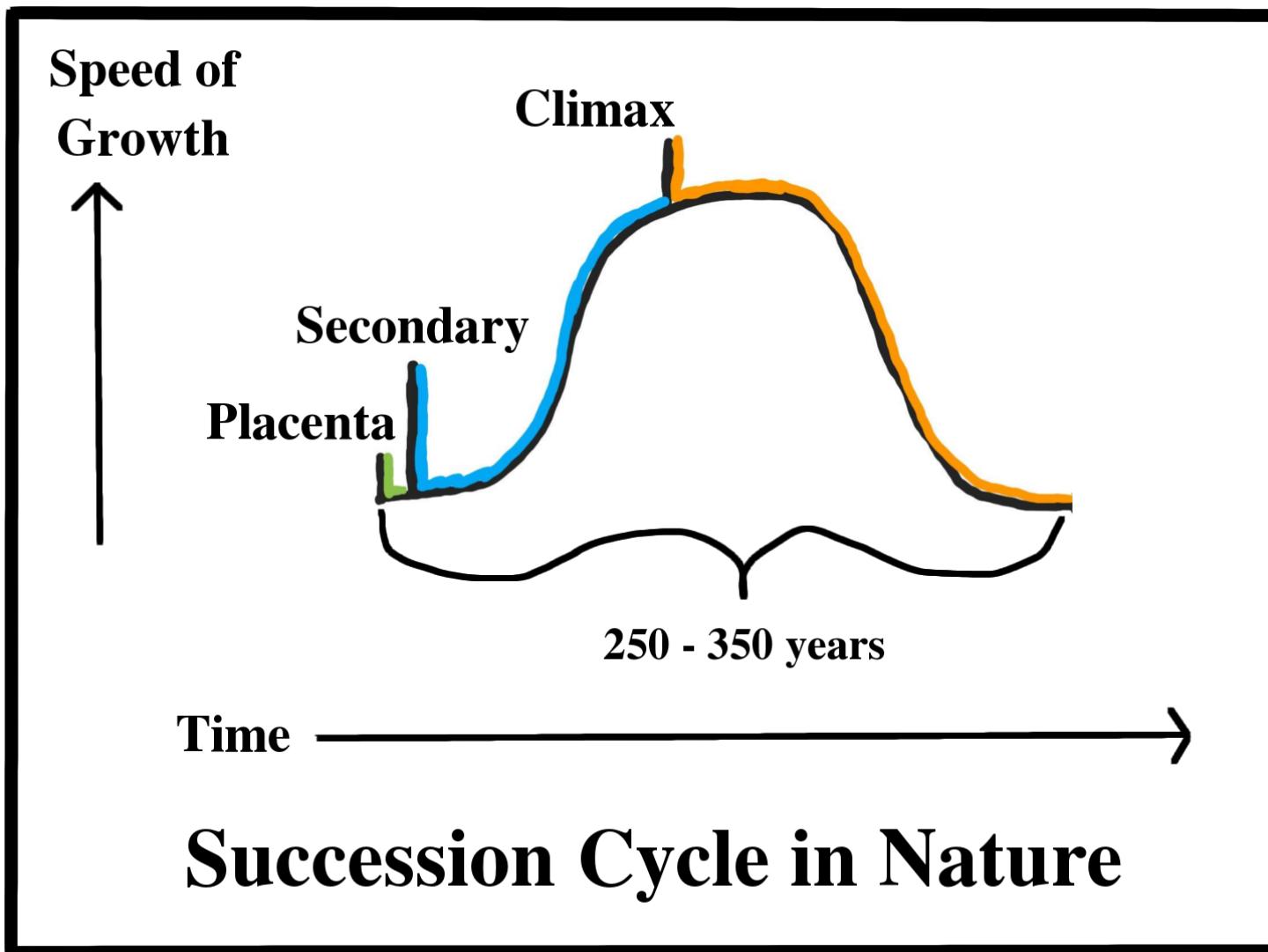
- Emergent – High – Medium - Low
- Determined by need for sunlight
 - Important for tree spacing



How to capture energy? Succession!



Succession in Nature



Succession and Strata

| Consortium Based on Stratum and Succession Level | | | | |
|--|---------------|-------------|------------|----------|
| | Placenta I | Placenta II | Secondary | Climax |
| Emergent | Corn | Papaya | Eucalyptus | Mahogany |
| High | Rice | Cassava | Mango | Tamarind |
| Medium | Climbing bean | Water yam | Inga | Mandarin |
| Low | Pumpkin | Pineapple | Annatto | Coffee |



Consortium Evolving

Farm Evolving



4mos: corn, climbing
bean and rice



1.5 years: plantain, papaya
and pineapple



5 yrs: Banana, peach
palm, cocoa, cupuaçu,
citrus, avocado and
firewood.



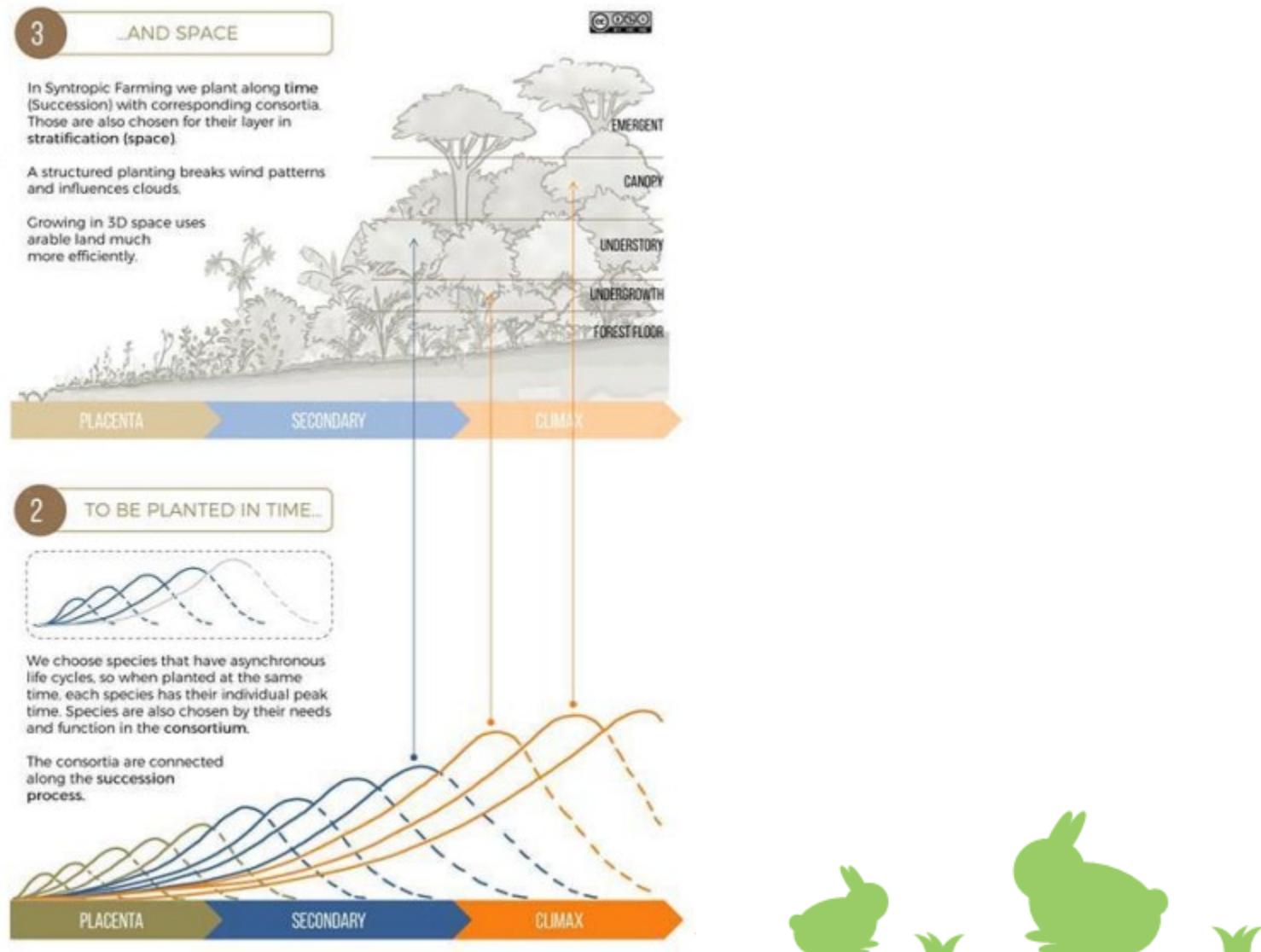
18 yrs: Banana, peach
palm, cocoa, cupuaçu,
caja, platonia, coffee,
rubber tree, and
firewood



40 yrs: Same as above
plus bacaba, Brazil
nuts and many other
fruits



Plant intelligent consortiums



Intelligent consortiums – veggie intercropping

Green brassica mix, tatsoi, spinach, lettuce, carrot and cabbage



Intelligent consortiums – veggie intercropping



Intelligent consortiums – veggie intercropping



A photograph of a lush tropical forest floor. In the foreground, several banana plants with long green leaves and thick red stems are visible. To the right, there's a cluster of palm trees with large, fan-shaped leaves. A narrow, dirt path leads through the vegetation towards the background, where more tropical foliage and possibly a small building are visible under a bright sky.

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Abundance Feedback

- Foliage color changes
- Improved soil structure, dominated by fungi
- Weed growth mimics forest floor
- Finicky species start to grow



Foliage color change



Vegetation Color Changes to Bright Green



Soil structure and weed growth



Placenta stage



No organic matter
or soil fungi



Late placenta stage



Some organic matter
and soil fungi



Soil structure and weed growth



Secondary stage



More organic matter
and soil fungi



Future of Farming?

