趨合農業

SYNTROPIC FARMING

糧食生產與森林再造共存的農法

以及我個人對趨合農業的想法

Presented by Tammy Turner

Tammy Turner (唐敏) 介紹

- 居住台灣已有35年。
- 樸門永續設計認證設計師與教師
- 2011年以來，在台灣、中國、印度推廣樸門永續設計。
- 致力於跨文化溝通、互動、交流； 深切關心大地與人的依存關係。

專業設計領域 Areas of Expertise

- 樸門永續設計與教學 Permaculture Design/Education
- 整題規劃 Master/Zone Planning
- 社群協力再生農業Community Supported Regenerative Agriculture
- 社區食物森林農藝Community Food Forestry
- 社區可食地景規劃與營造Community Edible Landscapes
- 再生經濟 Regenerative Economics

Overview to Syntropic Farming

- Type of agroforestry/regenerative agriculture developed by Ernst Götsch and recently promoted by the UN Food and Agriculture Organization (FAO).
- Imitates natural regeneration processes of forests, enabling people to create dynamic, successional, and economically viable ecosystems that restore degraded soil biodiversity, while also integrating them with productive agricultural food sources.
- Context: Brazil and other places with issues of deforestation where there needs to be a strong incentive to reforest local areas.
- Requires a deep understanding of the complex natural systems at play in local ecosystems. Different places will have different consortiums of species depending on local conditions.

趨合農業概論

- Ernst Götsch 所發展並最近由聯合國糧食及農業組織 (FAO) 推廣的農林業 / 再生農業類型。
- 模仿森林的自然更新過程，趨合農業使人能夠創建一種動態性、連續性、經濟可行性的食物生產農業系統，而該系統可以同時恢復退化的土壤生物多樣性。
- 相關情境：巴西和其他森林砍伐嚴重問題的地方，而且需要大量鼓勵當地重新造林的地方。
- 需要深入了解在當地生態系統中發揮作用的自然系統。不同的地方會因地制宜，會呈現不同物種群落。

- What is the difference between Syntropic Agroforestry and Permaculture?

- 趨合農業和樸門是怎麼樣的不同？

- Permaculture is a design framework.
  - It is a design framework for how to live, which also includes food and materials production, using the three ethics of:
    - Earth Care
      People Care
      Return A Surplus (Fair Share)
  - This structure and set of ethics informs how we can best function as individuals and as a society. Permaculture is an inclusive structure. If your method of production fits in with the three ethics, you are succeeding.

- 樸門是一種永續設計的框架
  - 是一種關於如何生活的設計框架，其中還包括食物和材料生產，使用以下三個倫理：
    - 照顧地球
    - 照顧人
    - 回報盈餘（分享多餘）
  - 設計架構和其倫理告訴我們如何以最好方式發揮個人和社會的作用。樸門永續設計是一種包容性結構。 如果你的生產方法符合這三個倫理，你就成功了實踐樸門。

- Syntropic Agroforestry is a specific form of production.
  - Syntropic Agroforestry focuses on the macro-organism of the forest system being developed, rather than on specific plants, which is common in Food Forest design.

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- 趨合農業是一種特定的農業生產方式。

  - Syntropic Agroforestry focuses on the macro-organism of the forest system being developed, rather than on specific plants, which is common in Food Forest design.
  - 趨合農業側重於發展中的森林系統宏觀有機體，而不是在食物森林設計中常見的特定植物。

- And how about Permaculture food forests?
  - A "Zone II" land use design concept, refers to perennial, multi-strata polycultures designed to meet more immediate, at-hand individual/family/community needs.
  - Many different examples, but generally not the main means of production for subsistence or economic crop farming.
  - Many people have created and manage food forests, with legume planting, "chop and drop", layers etc. It is a more open, fluid system.

- And how about Permaculture food forests?
- 與樸門的食物森林, 有什麼差別呢?

  - 在樸門永續設計的概念裡，是屬於分區規劃中的第二區土地利用，直接的滿足個人/家庭/社區需求的多年生、多層次的多元栽培系統。
  - 樸門的食物森林案例很多， 但一般來說，不是自給自足或經濟作物耕作的主要生產方式。
  - 很多人利用豆科植物固氮、chop & drop、多層次種植來建立並經營的樸門食物森林。
  - 相較來說，食物森林是比較開放有彈性的概念。

- Isn't Syntropic Agriculture just a kind of food forest?
  - It is a particular kind of food forestry that permaculture designers/practitioners would integrate in a Zone III/IV land use production pattern.

- Isn't Syntropic Agriculture just a kind of food forest?
- 趨合農業不就是一種食物森林嗎？

  - 趨合農業是一種特定的農林業相關的食物森林，樸門永續設計師 / 實踐者將這種食物森林整合到 第 III/IV 區土地利用生產模式中。

- Syntropic Agriculture: Definition from a practitioner

  - **Syntropic Agriculture** is based on a framework of how plants are arranged according to lifecycle and strata, how they relate through the multiple effects of the influence of time, creating a dynamic - a "**consortium**", which is part of a "**macro organism**", and then managing this through species succession, continually increasing the quantity and quality of consolidated life (**syntropy**). Syntropic Agriculture is a specific kind of planting and management of a food forest.
    (Scott Hall, Syntropia)

- 趨合農業：專業實踐者的定義

  - 趨合農業是基於一個設計框架，就是：植物如何按照生命週期和層次進行排列、如何通過時間影響的多重效應進行聯繫，形成一種動態「聯合體（consortium）」，它是「宏觀有機體（macro-orgamism）」的一部分，然後通過物種演替進行管理，不斷提高綜合生命的數量和質量（syntropy）。
  - 換句來說，趨合農業是一種特定型態的食物林種植和管理的農法。（Scott Hall，Syntropia）

- Syntropic Agriculture: Another (Better) Definition (Scott Gallant, Porvenir Design)
  - **Syntropic farming** is an intensive form of agroforestry that imitates market gardening and slash and mulch agroforestry, in order to provide yields at all stages of succession, generate its own fertility, and with the end goal of creating a productive forest that imitates the structure and function of the native forests.
  - The word **syntropy**, as contrasted to entropy, paints a powerful picture of a system that accumulates matter and energy, become more complex over time, all in order to create abundance.

- 趨合農業：另一個（我認為更好的）定義（Scott Gallant，Porvenir Design）
  - 趨合農業是一種集約化形式的農林業，模仿了市場導向種植系統和砍伐和覆蓋的農林業，以在所有演替階段提供產量，創造自身的肥力，並最終目標是創建模仿自然森林結構和功能上的生產性森林。
  - 與熵相反，趨合(syntropy) 這個詞描繪了一個系統的強大圖景，該系統在積累物質和能量上，隨著時間的推移變得更加複合，所有這些都是為了創造豐富多餘。

- Life in Syntropy
  - Video:

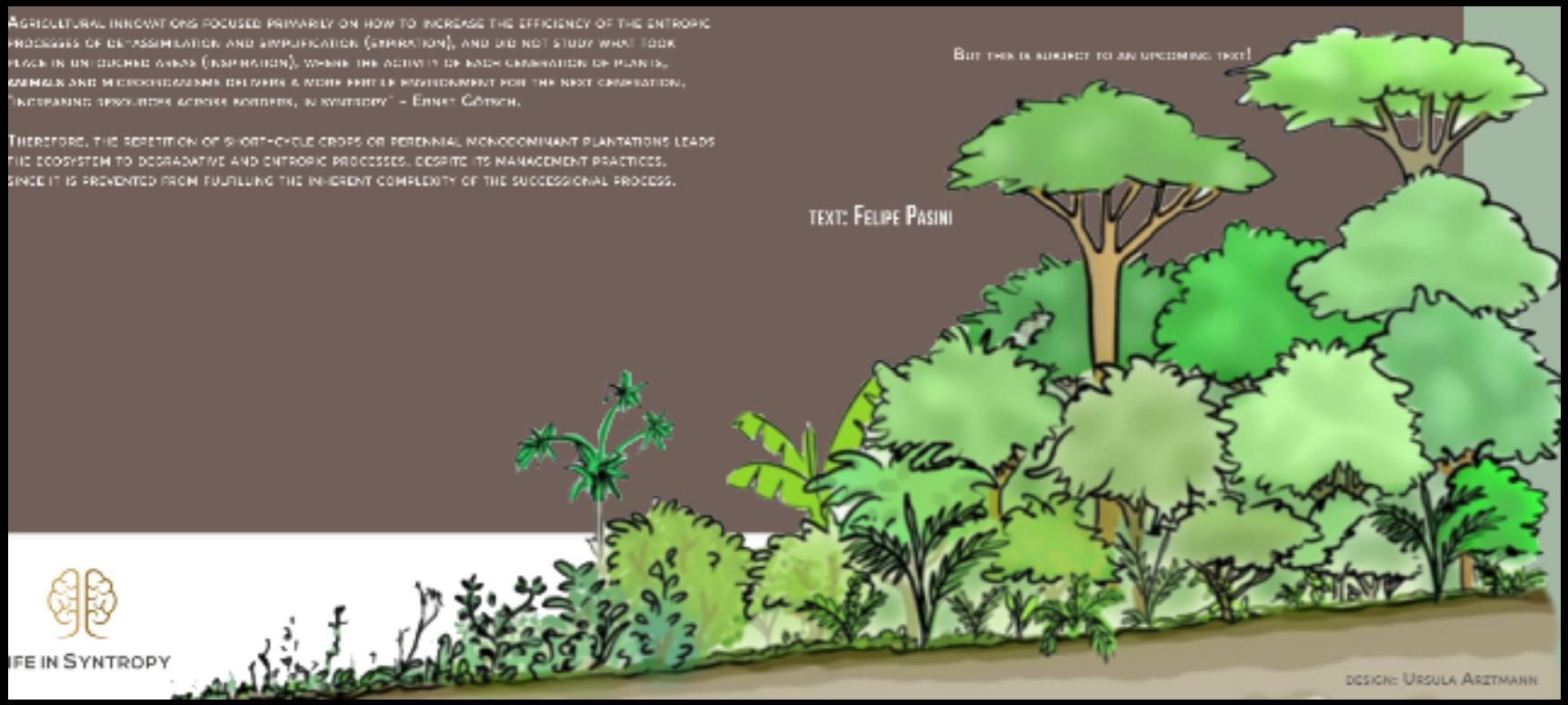
  - https://www.youtube.com/watch?v=gSPYNRu4ZPE

- **The Principles 趨合農業的簡單原則**
  - Keep the soil covered 土壤要一直覆蓋好
  - Maximize photosynthesis 光合作用要最大化
  - Stratification 分層
  - Synchronization 同步進行
  - Natural succession自然演替
  - Management 管理

- Keep the Soil Covered 土壤要一直覆蓋好

- Maximize photosynthesis 光合作用要最大化

- Stratification 分層



- Synchronization 同步進行

- Natural Succession自然演替
- Management 管理

(Accelerate Succession through Pruning)
*(*通過修剪加速演替過程*)*

- **Unique Characteristics 獨特性**

(Scott Gallant, Porvenir Design)

  - North to south rows 北向南排列
  - Direct seeding 直播
  - Intensive organization of biomass 生物質的密集安排
  - Weeding replaced with pruning 用修剪代替除草
  - Everything planted at once 一次種下所有植物
  - High density planting 高密度種植
  - Heavy logistical operation 繁重的物流作業
  - High input and high output system: primary inputs are knowledge, plant material and labor 高投入高產出體系：主要投入是知識、植物材料和勞動力
  - Challenging pruning 具有挑戰性的修剪

- North to South Rows 北向南排列

- Maximizing for light (photosynthesis potential), not water/moisture
- Suitable for more open lands, savannah, agricultural lands
- Not many examples of sloped land

- Direct Seeding Propagation (Trees) 直播

- Preference for direct seeding to transplanting when possible for trees.
- Viewed as cost saving and a means to plant huge quantities of species.

- Intensive Organization of Biomass
  生物質的密集安排
- Weeding Replaced with Pruning
  用修剪代替除草

- Plant Everything at Once 一次種下所有植物

- High Density Planting 高密度種植

- One 80 square meter plot planted over 1100 trees/seeds/cuttings
- 一個 80 平方米的地塊種植了 1100 多棵樹木/種子/插條
- Teachers recommend 20-40 plants/seeds/cutting per square meter (!)
- 老師推薦每平方米20-40株/種子/插條(!)

- Intensive Logisitical Operation
  繁重的物流作業
  - Sourcing large quantities of seeds/plants; storing until ready to plant
    取得大量種子/植物； 儲存直到準備種植

- High Input and High Output System
  高投入高產出體系
  - Requires high input of knowledge, plant material and labor; high yields of food, economic crops, trees/forest systems
  - 主要投入是知識、植物材料和勞動力 ; 糧食、經濟作物、樹木/森林系統的高產

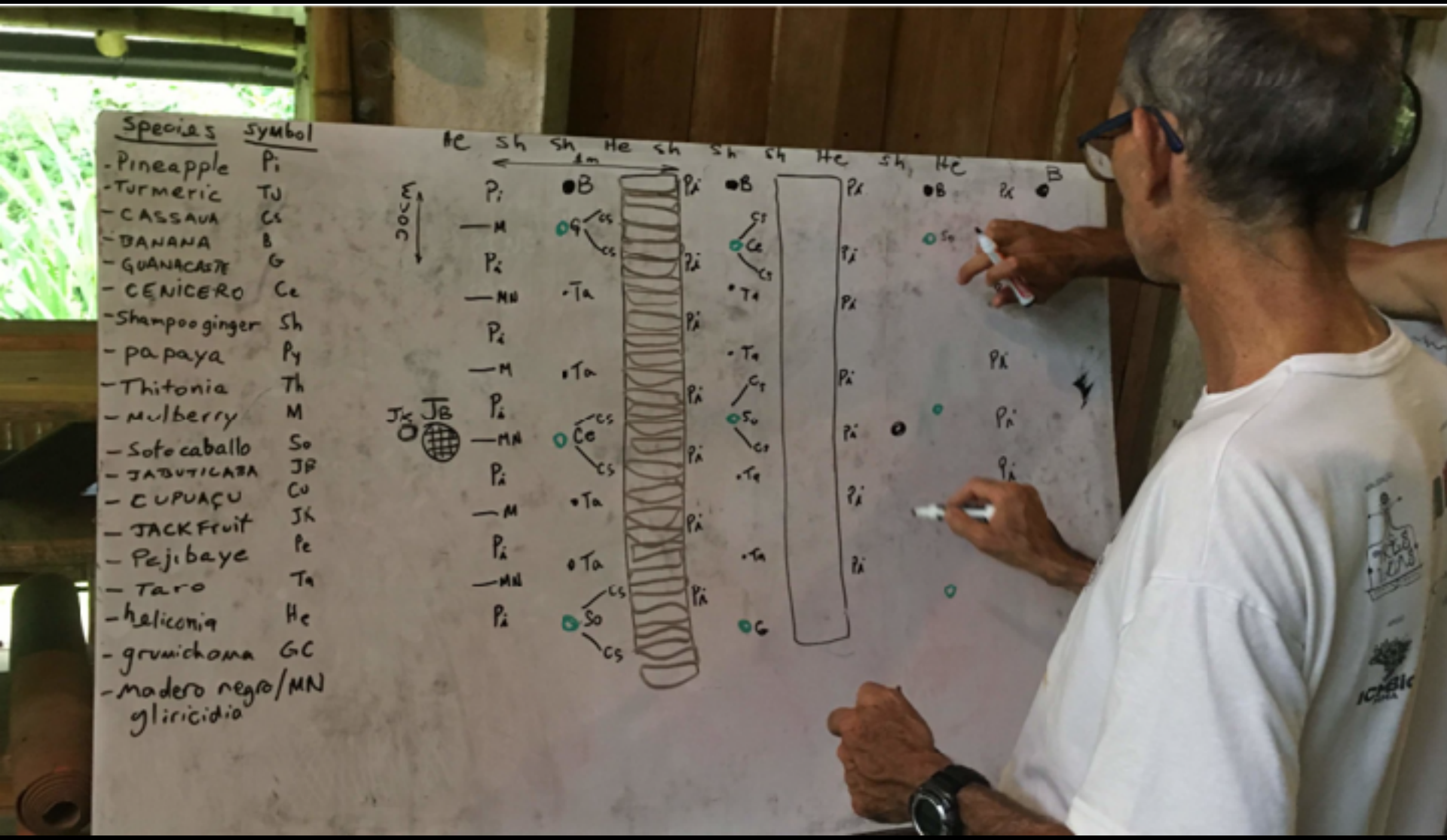
- Challenging Pruning
  具有挑戰性的修剪
  - Requires high skill of tools such as chainsaws for taller trees and other tools
  - 需要高技能的工具，例如用於高大樹木的鏈鋸和其他工具

- The Design Process 設計方法
  - **Spatial and temporal layouts** in syntropic systems seem to be very useful. It involves selecting species to fill in the below table, so that all of the ecological niches in the system are filled Below is an example of a chart one could use to organize planting patterns.
  - 以時間、空間編排的方式來規劃趨合系統非常有用。選擇物種來填入下表，讓系統中所有的生態位都被填滿。下面是一個可以用來組織種植模式的圖表的例子。

Strata **分層**	**Climate** **氣候**	**Succession** **演替階段**	**Habit** **生長習性**
Low 低	Arid 乾旱	Placenta 1	Groundcover 地被
Medium 中	Temperate 溫帶	Placenta 2	Herb草本
High 高	Subtropical 亞熱帶	Secondary Short	Shrub灌木
Emergent 透天	Tropical 熱帶	Secondary Long	Tree樹木
		Climax	

	Placenta 1	Placenta 2	Secondary 1	Secondary 2	Climax
Emergent					
High					
Med					
Low					

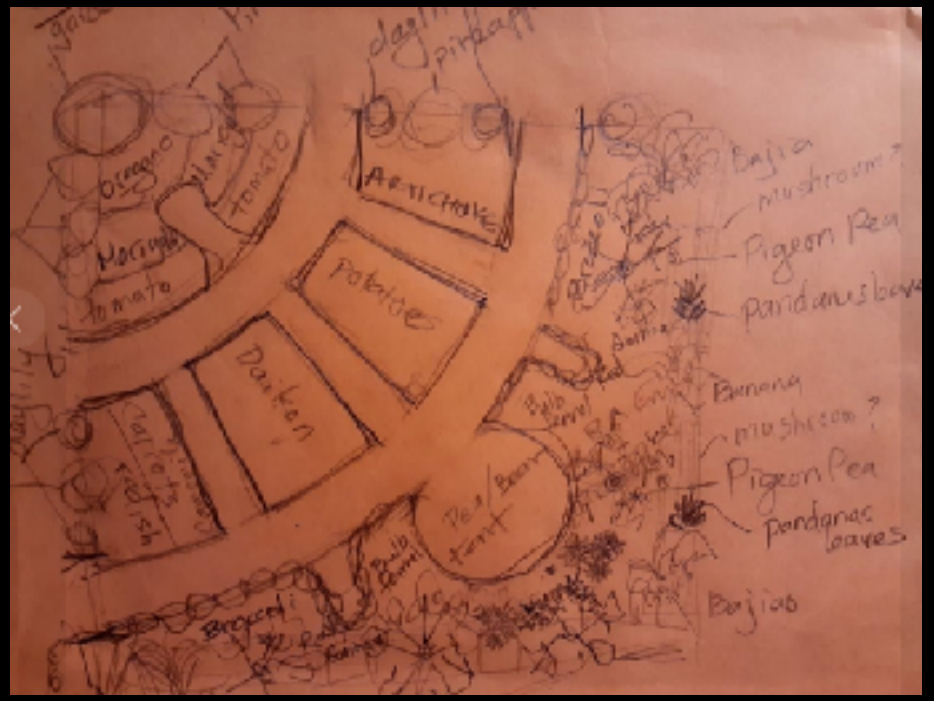
	Placenta	Secondary	Climax
Emergent	yuca, sunhemp	moringa, papaya	shizolobium, eucalyptus
High	canavalia, pigeon pea	musa, tithonia	madero negro, poro, jinocuabe
Middle	squash	wild hops, reina de la noche	kava
Low	sweet potato	peanut grass	peanut grass


Species symbol
- Pineapple Pi
- Turmeric TU
- CASSAVA Cs
- BANANA B
- GUANACASTE G
- CENICERO Ce
- Shampoo ginger Sh
- papaya Py
- Thitonia Th
- Mulberry M
- Soto caballo So
- JABUTICABA JB
- CUPUAÇU Cu
- JACK Fruit JK
- Pejibaye Pe
- Taro Ta
- heliconia He
- gruvichoma GC
- madero negro/MN gliricidio
He Sh Sh He Sh Sh Sh He Sh He
1m
30cm
JK
JB
Pi
B
M
G
Cs
Ce
Ta
MN
So

- Syntropic Farming for the Future
  面向未來的趨合農業
  - Potential for reforesting several regions of the world that have been devastated by deforestation, while also providing a stable income to local farmers and access to healthy, delicious, fresh, sustainably-produced food for the local community.
  - Not a one-size-fits-all practice, and requires a great deal of intimate knowledge of the local ecosystems
  - Rewards can be massive and long-lasting
  - 有可能使世界上幾個被砍伐森林破壞的地區重新造林，同時也為當地農民提供穩定的收入，使當地社區獲得健康、美味、新鮮、可持續生產的食物。
  - 不是一個放之四海而皆准的做法，需要對當地的生態系統有大量的深入瞭解
  - 回報可以是巨大而持久的

- How Might Syntropic Farming be Applied in Taiwan?
- **台灣如何應用趨合農業？**
  - Resilient farming applications **韌性農業應用**
    - Monoculture to polyculture transition process to diversify crop production and reduce single-crop risk; improved soil to mitigate flooding/drought/climate impact
      單一栽培向混合栽培過渡過程，以實現作物生產多樣化並降低單一作物風險； 改良土壤以減輕洪水/乾旱/氣候因素的影響
  - Enhancing agricultural land biodiversity – diverse plant species, improved soil biology and succession increases biodiversity
    增強農業用地生物多樣性——植物種類多樣化、土壤生物改良和演替過程能提高生物多樣性
  - Must be adapted for Taiwan's diverse landscapes and cultural needs
  - **必須以台灣多樣化的地景和文化需求調適**

{ Guangxing Community Forest Garden }


Oregano
Tomato
Malunggay
Tomato
Potatoes
Daikon
Bajia
mushroom?
Pigeon Pea
Banana
mushroom?
Pigeon Pea
Pandanus
leaves
Bajias

Thank you!

References

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