

Multi-Tier System in Coconut

தென்னையில் பல அடுக்கு சாகுபடி



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Current Issues: தற்போதைய பிரச்சனைகள்

- ▶ மகசூல் இழப்பு - Yield Loss.
- ▶ அதற்கான காரணங்கள் - Reasons for Loss.

Reasons for loss or low yield

- ▶ Monocropping
- ▶ Extensive farming- Only coconut everywhere
- ▶ Pest disease incidence
- ▶ Cultural operations are not need-based

1. Kerala Root Wilt

: ::*பைட் டோபிளாஸ்மா*

1 Stage



2 Stage



3 Stage





Flaccidity



Ribbing



Tapering of terminal portion



**Premature
Leaf dry**



Button Shedding

Progressing of wilt



2. Stem bleeding disease (Tanjore wilt)

: தீயலவியாப்ஸிஸ் பாரடாக்ஸா



3. Coconut Bud Rot

: :ஃபைட்டோப்தோரா பால்மிவோரா



4. *Lasiodiplodia* leaf blight

: லேசியோடிப்ளோடியா தியோபுரோமே

- ▶ Major districts are Coimbatore, Erode, Dindigul, Tirunelveli and Kanyakumari districts of Tamil Nadu.

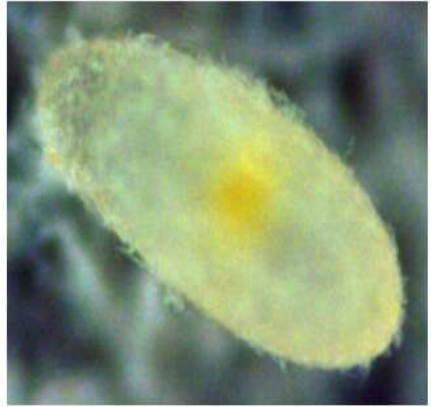
Symptoms:



Leaf blight affected palms and leaflets

5. Rugose spiralling whitefly

ருகோஸ் சுருள் வெள்ளை பூச்சி



Egg



First nymphal stage (crawler)



Second nymphal stage



Third nymphal stage



Pupal stage



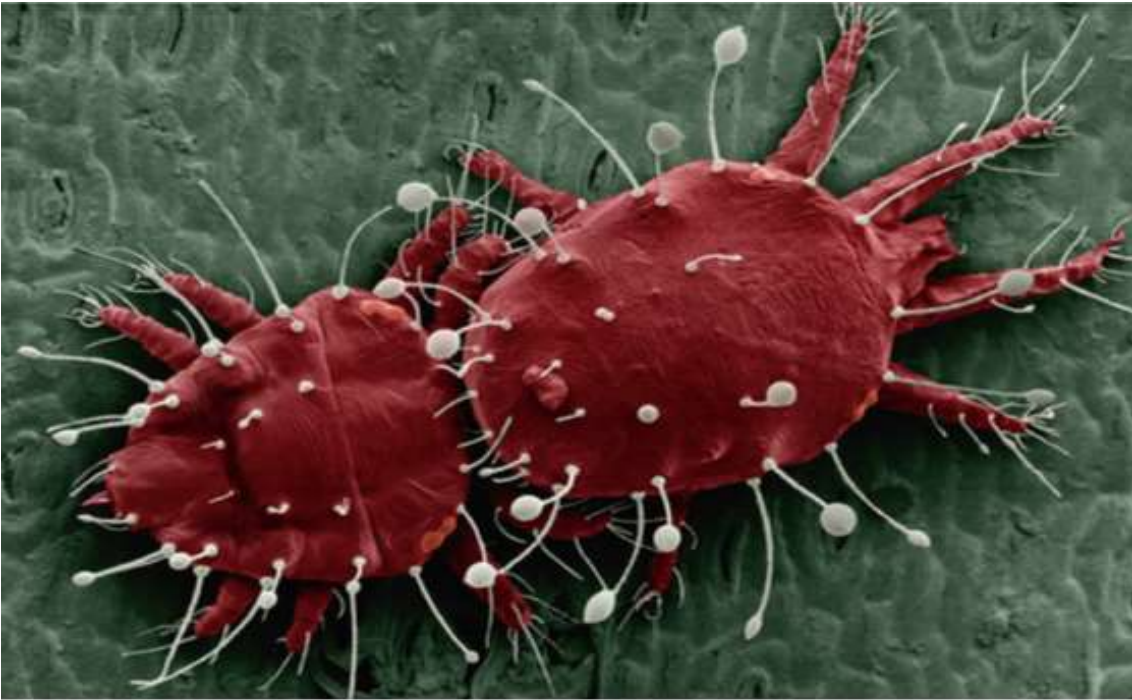
Adult



6. Red palm Weevil & Rhinoceros Beetle



7. Coconut Eriophyid mite



Yield Loss due to Pest & Disease

▶ Kerala Wilt	>90%
▶ Tanjore wilt	>70%
▶ Coconut bud rot	>50%
▶ Coconut leaf blight	>20%
▶ Rugose spiralling white fly	>25%
▶ Rhinoceros beetle	>15%
▶ Red palm weevil	>30%
▶ Coconut Eriophyid Mite	>10%

?

A. 100


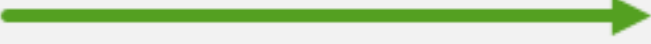
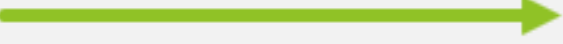

B. 75

C. 50

D. 25

E. 20

Land use efficiency in Coconut garden

- ▶ One acre of land  43,560 sq. feet.
- ▶ A Coconuts occupies a space of  113 sq. feet.
- ▶ Total area occupied by 70 Coconuts/acre  7,913 sq. feet.
- ▶ Unutilized area in an acre of coconut  35,647 sq. feet.
- ▶ Approximately **one-fifth of the area** is used by the coconuts.
- ▶ We do all agricultural practices (Weeding, Irrigation, Fertilizer application) for all the areas.
- ▶ We are not only wasting the land & water but also the light energy.

Why Multi cropping System

1. வளிமண்டல ஒளி பயன்பாட்டு திறன். (BETTER LIGHT UTILIZATION)
2. ஈரப்பதத்தை பாதுகாக்க இலை மற்றும் தாவர கழிவுகளுடன் தழைக்கூளம். (BETTER PLANT WASTE USAGE)
3. மண்ணின் கரிம கார்பன் உள்ளடக்கத்தை மேம்படுத்தவும். (ORGANIC CONTENT)
4. சிறந்த நுண்ணுயிர் கூட்டமைப்பு.(MICROBES)
5. நன்மை பயக்கும் பூச்சிகள் போன்றவற்றை உள்ளடக்கிய சிறந்த சுற்றுச்சூழல் அமைப்பு. (BETTER ECOSYSTEM)

Monocropping moderate spacing – ஒரு பயிர்

சாதுபடி
Partial light



Lux value under the center of the Coconut tree-----**14,000 lux**

Monocropping wider spacing

Full light

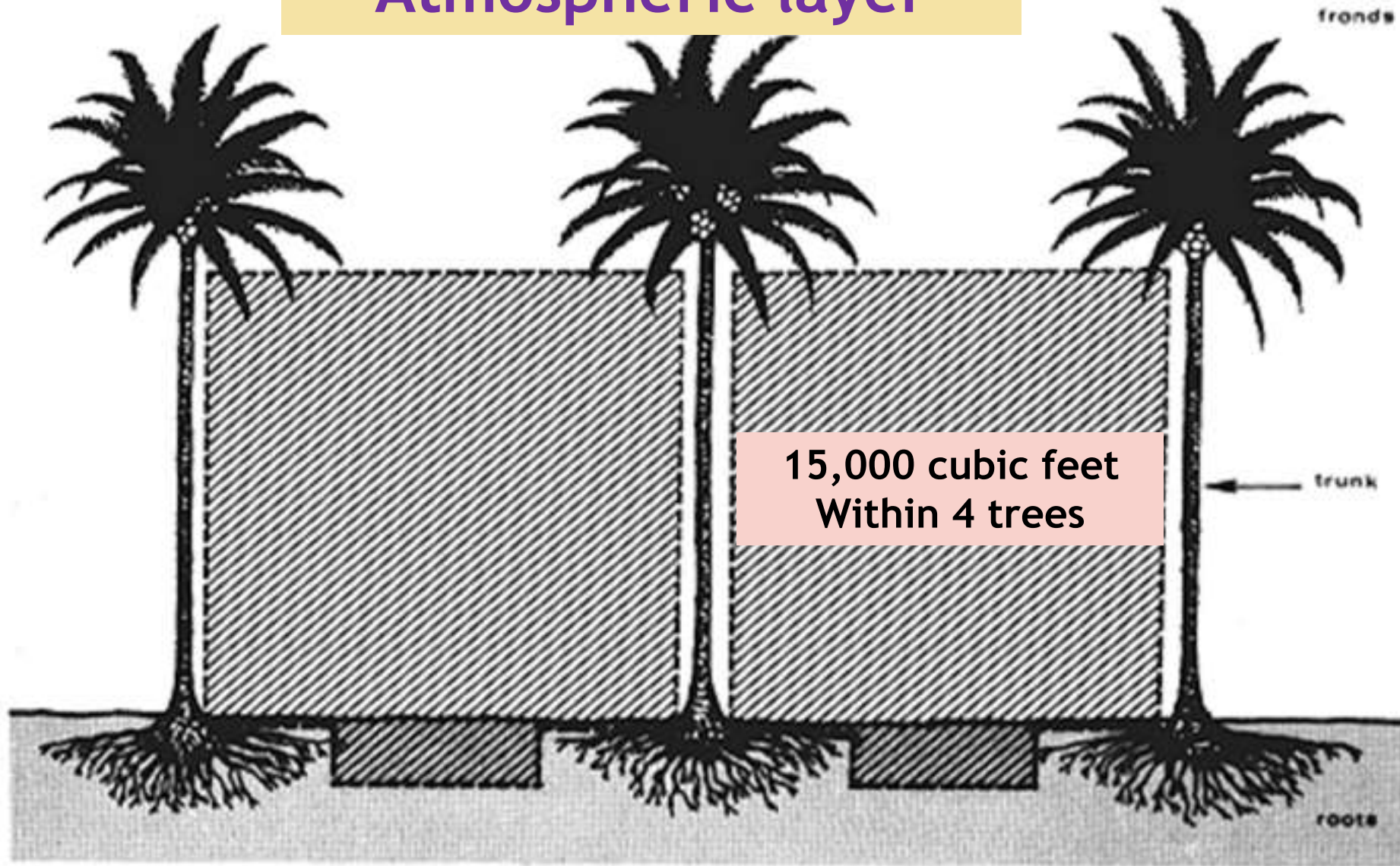


Lux value under the center of the Coconut tree-----**18,000 lux**

Light Penetration:

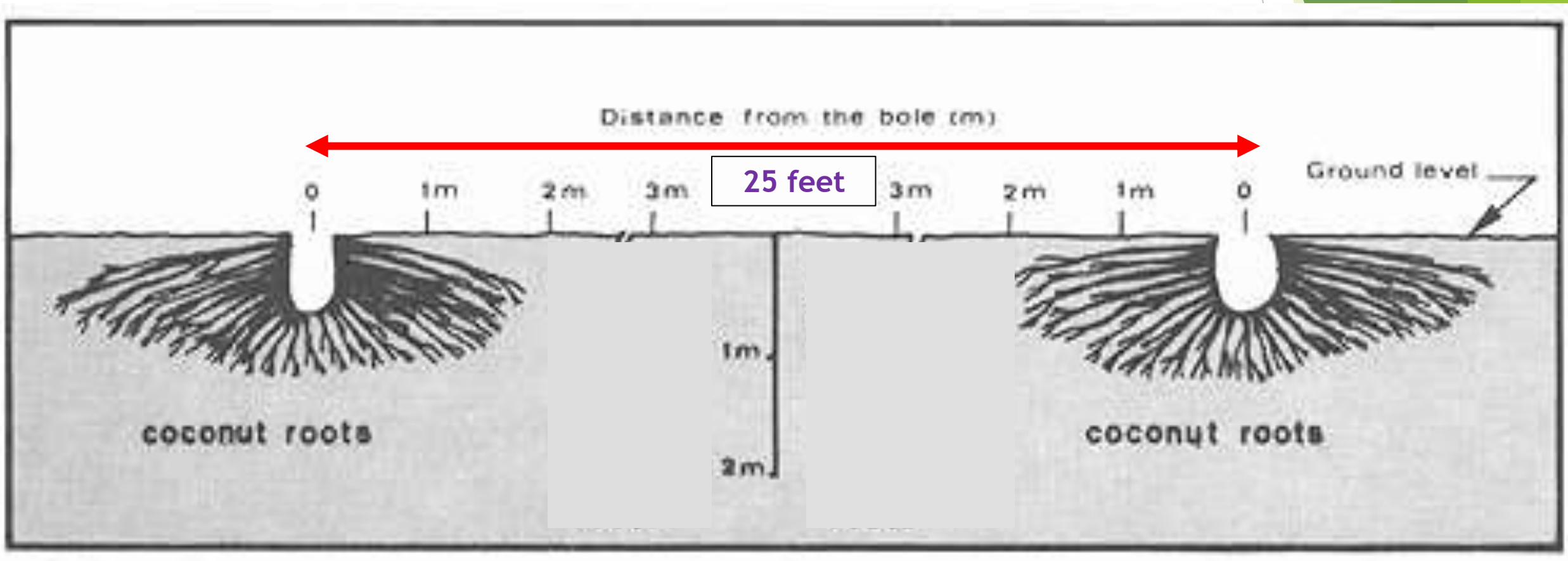
- ▶ Spacing between coconut 25x25 feet (Moderate Shading)
- ▶ **Open direct sunlight intensity (April 12, 2024, 1:30 PM)-----32,000 lux.**
- ▶ Lux value under the center of the Coconut tree-----**14,000 to 18,000 lux.**
- ▶ Lux value near the trunk of the Coconut tree-----**8000 to 12,000 lux.**
- ▶ **Remarks: All intercrops are suitable under Coconut.**

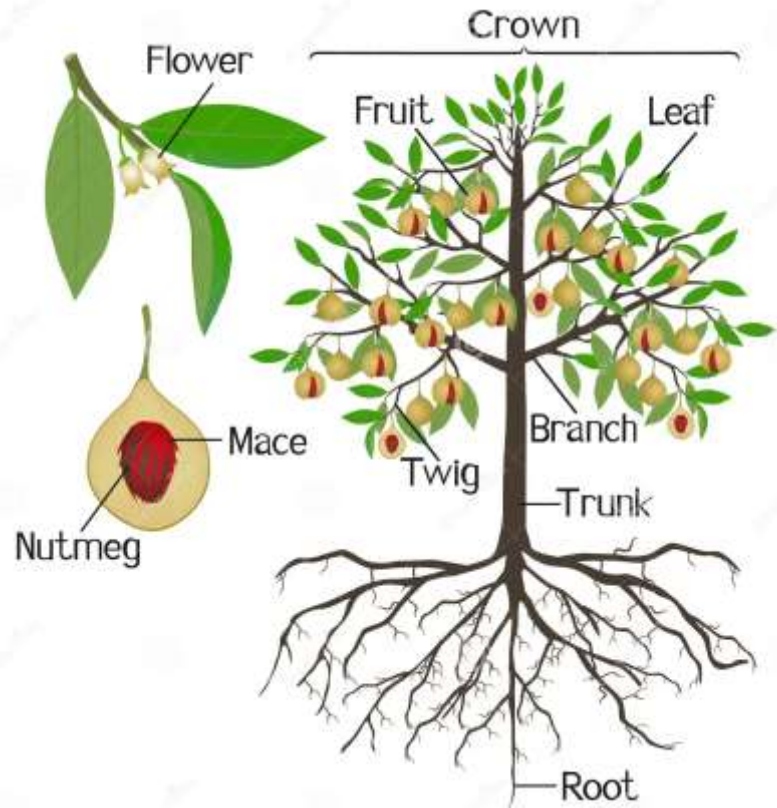
Atmospheric layer



Schematic representation of available intercropping area in coconut stands.

Coconut Rhizosphere





Nutmeg



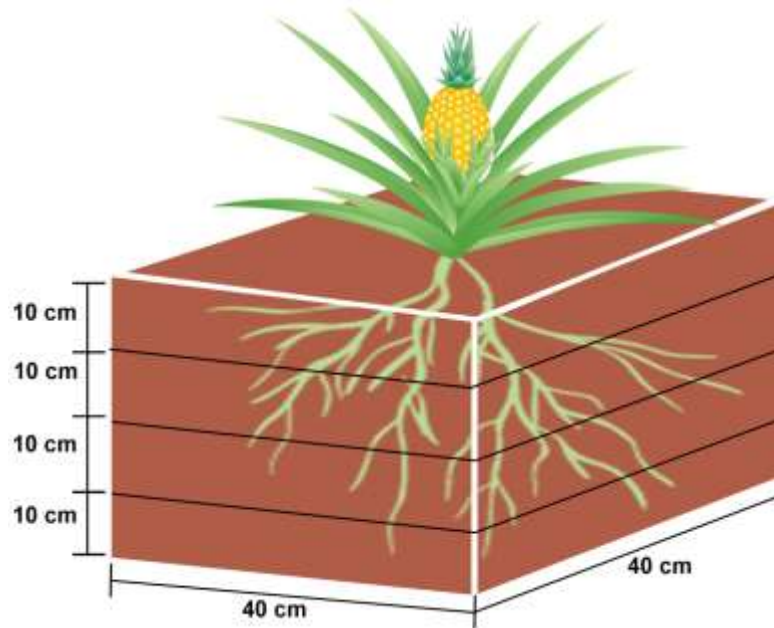
Avocado



Jack fruit



Lime



Pineapple



coffee

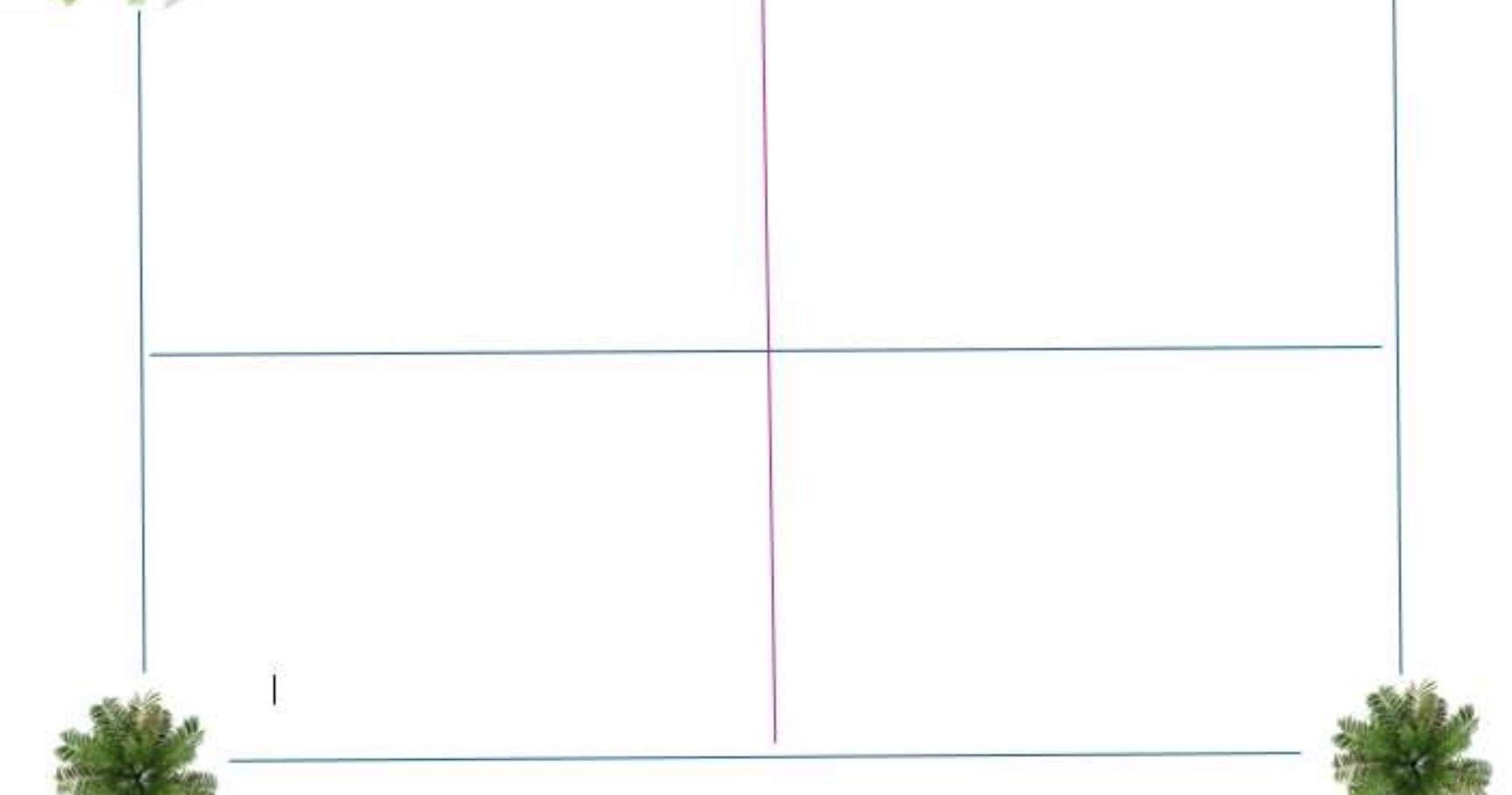
Categorization of farmers by Ministry of Agriculture and Farmer's welfare.

S. No	Category	Area
1.	Marginal – குறு விவசாயி	Below 1ha.
2.	Small – சிறு விவசாயி	1-2 ha.
3.	Semi- Medium – சிறு குறு விவசாயி	2-4 ha.
4.	Medium – நடுத்தர விவசாயி	4-10 ha.
5.	Large – பெரு விவசாயி	10 ha and above

coconut

Coconut Multi - Tier System (25 x 25 feet)

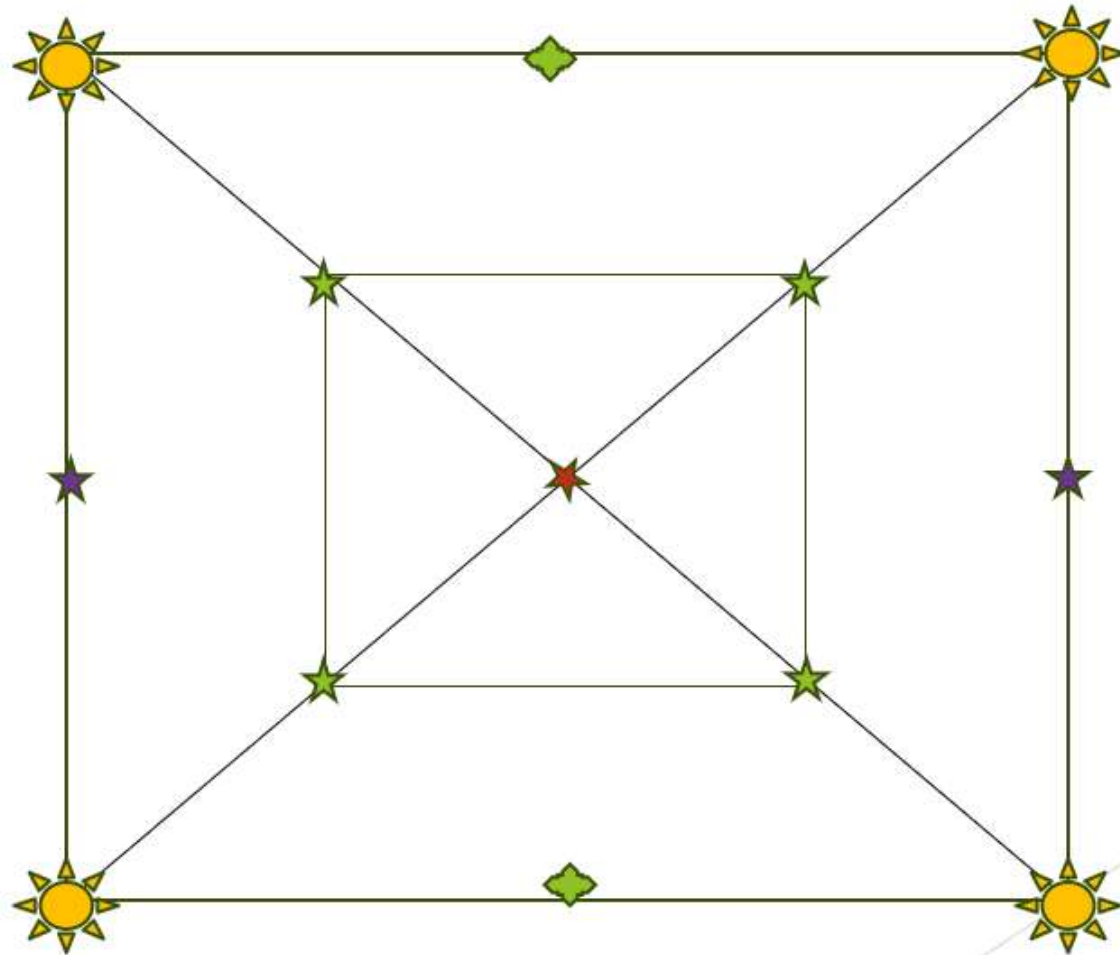
coconut



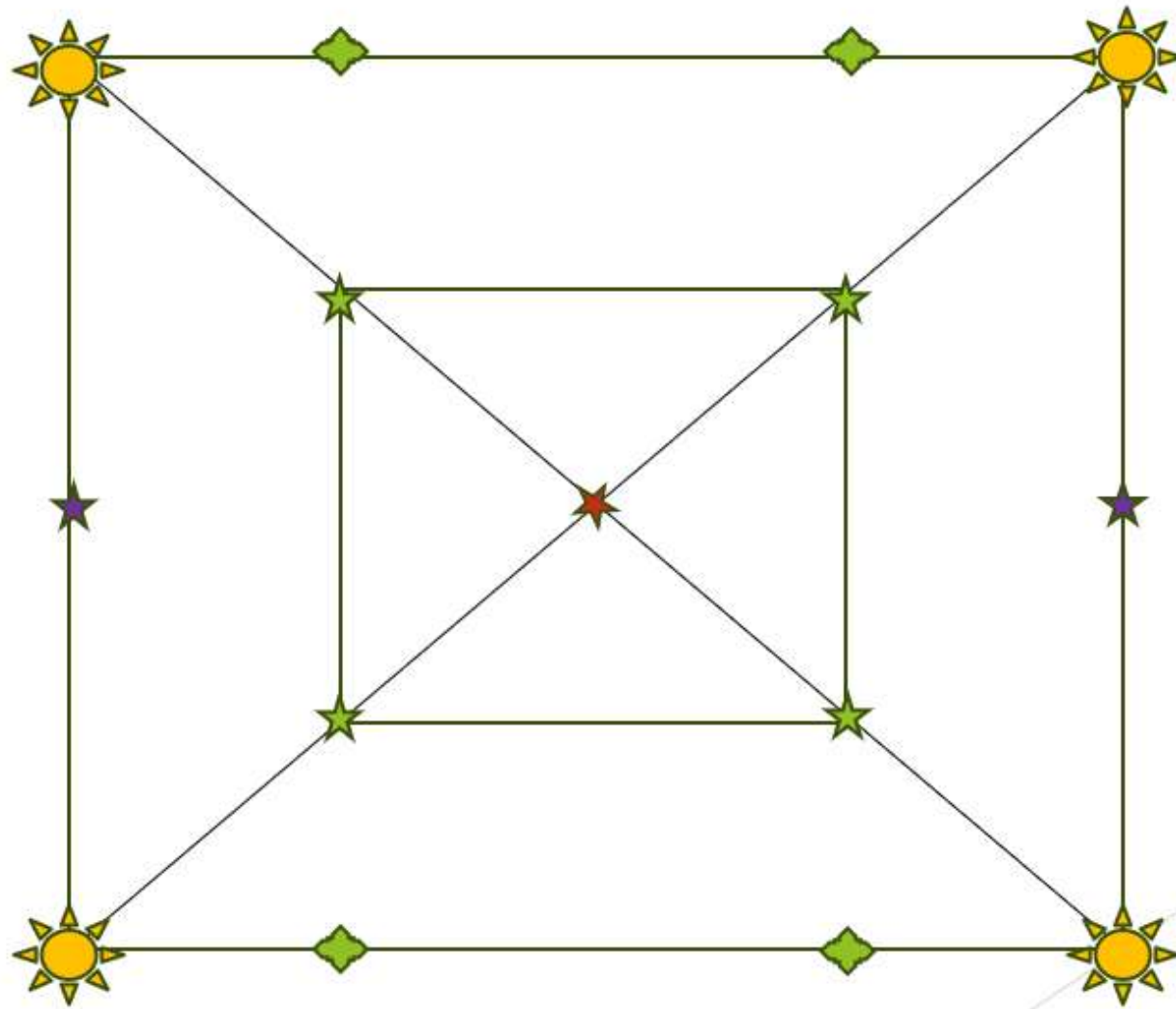
coconut

Only 5 Points

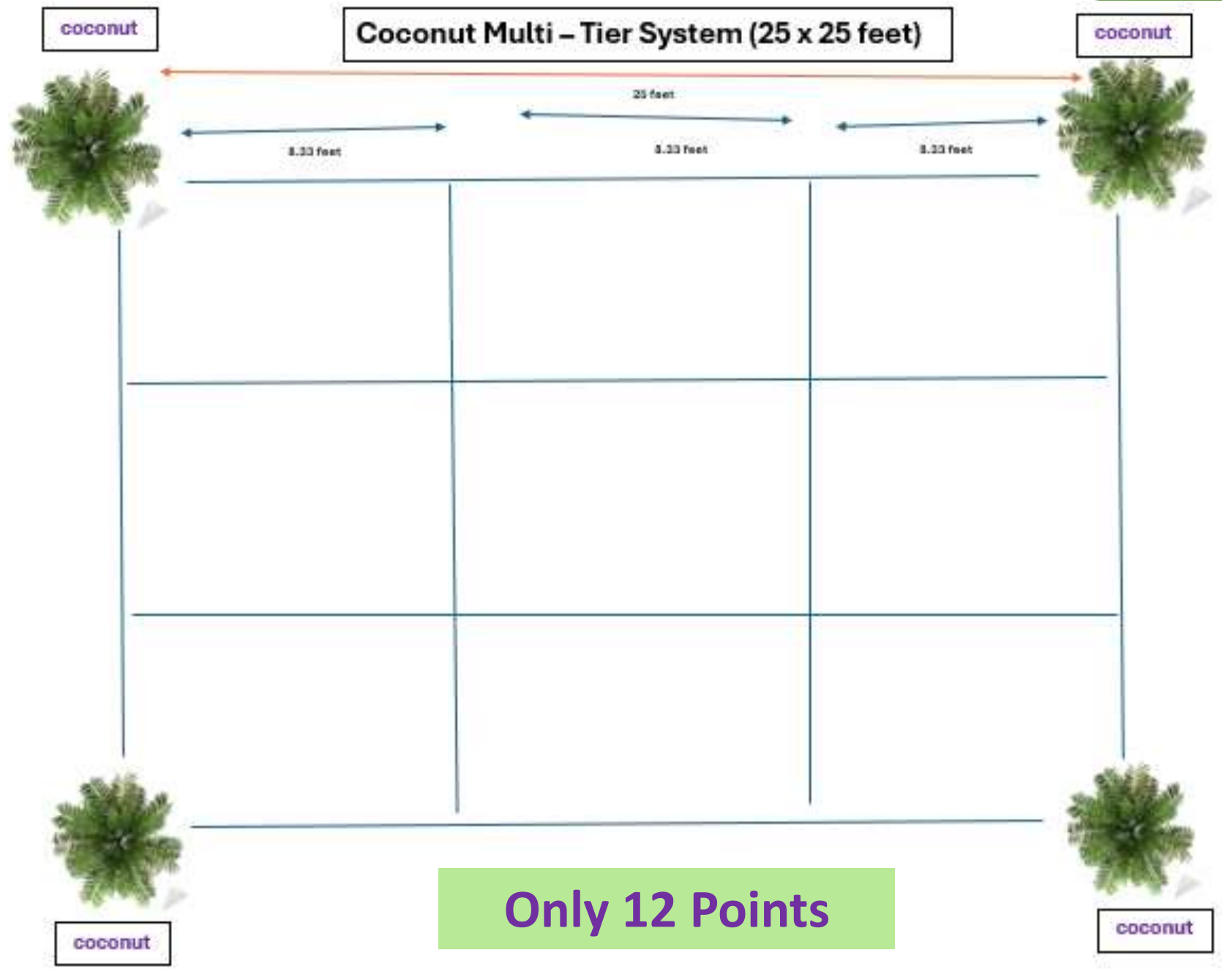
coconut



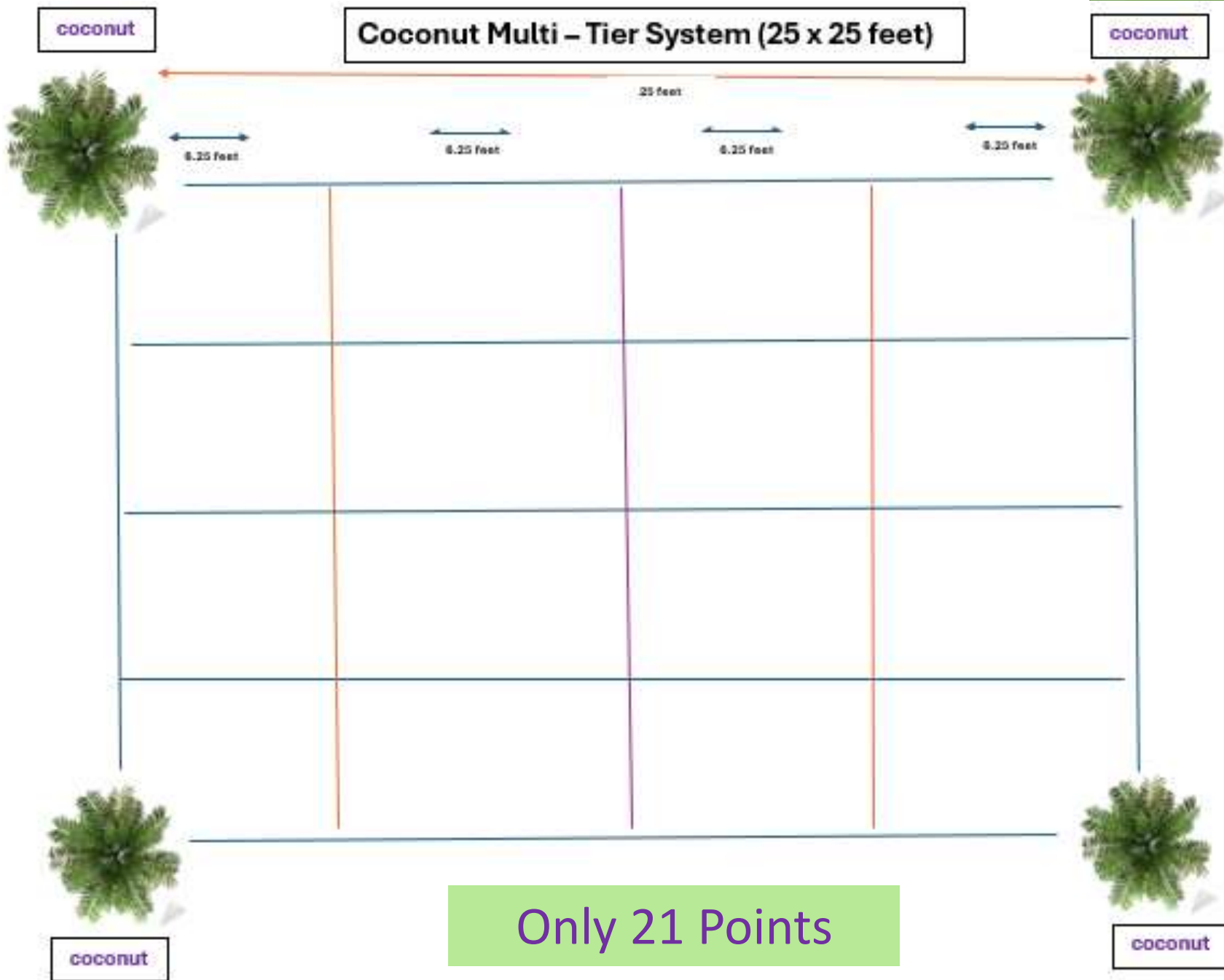
Only 9 Points



Only 11 Points



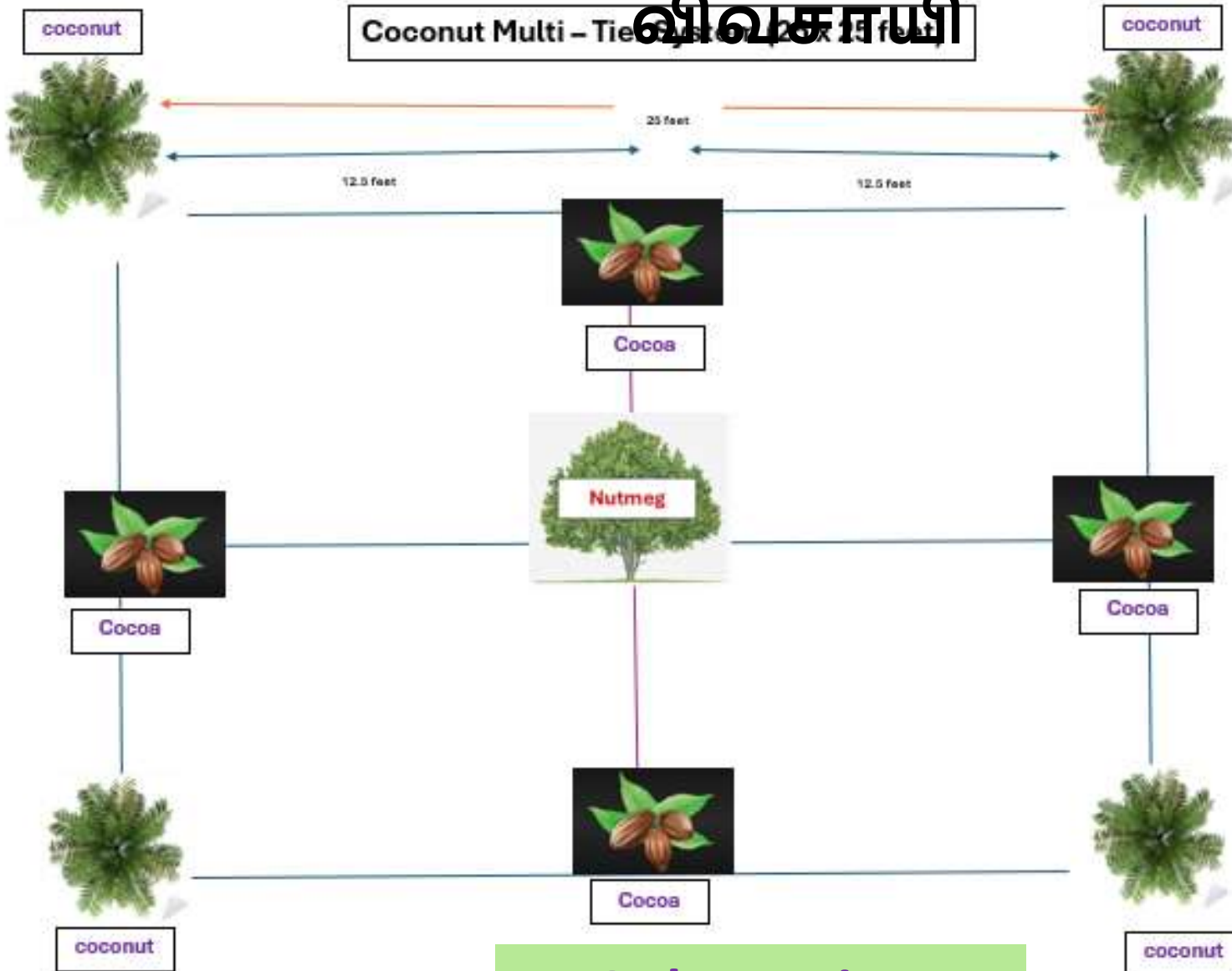
Only 12 Points



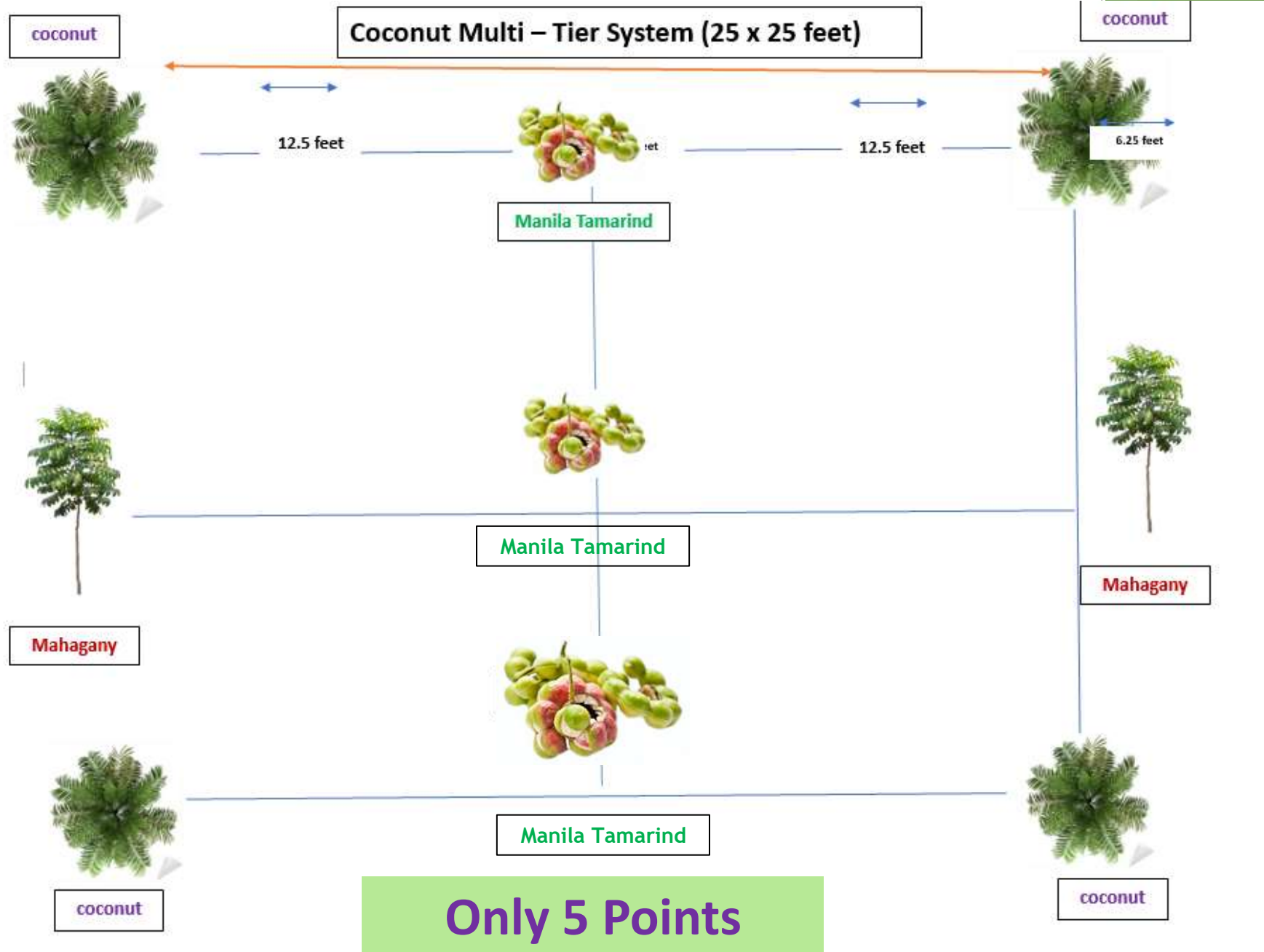
Only 21 Points

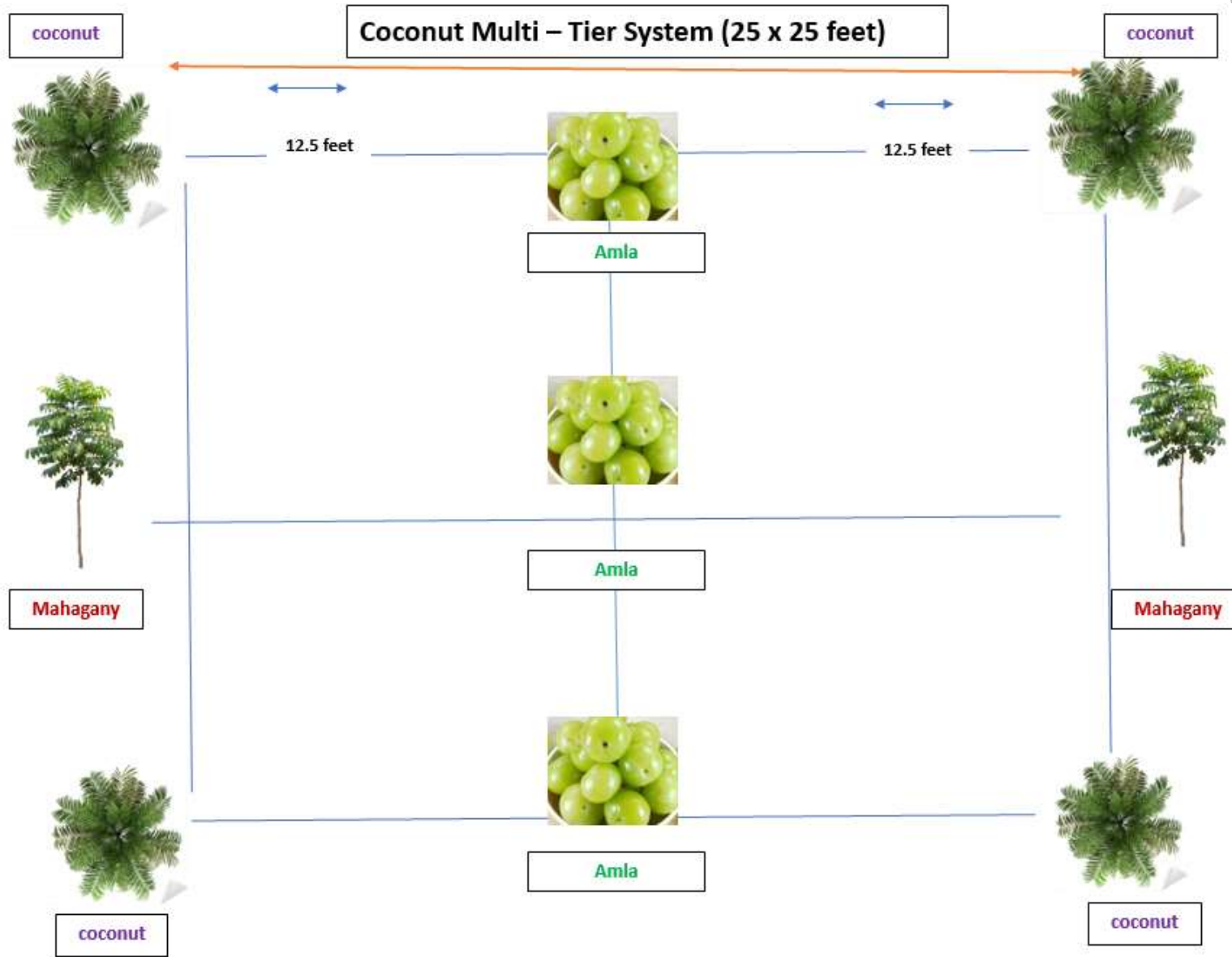
Ideal for Large and Medium farmers நடுத்தர/பெரு

விவசாயி

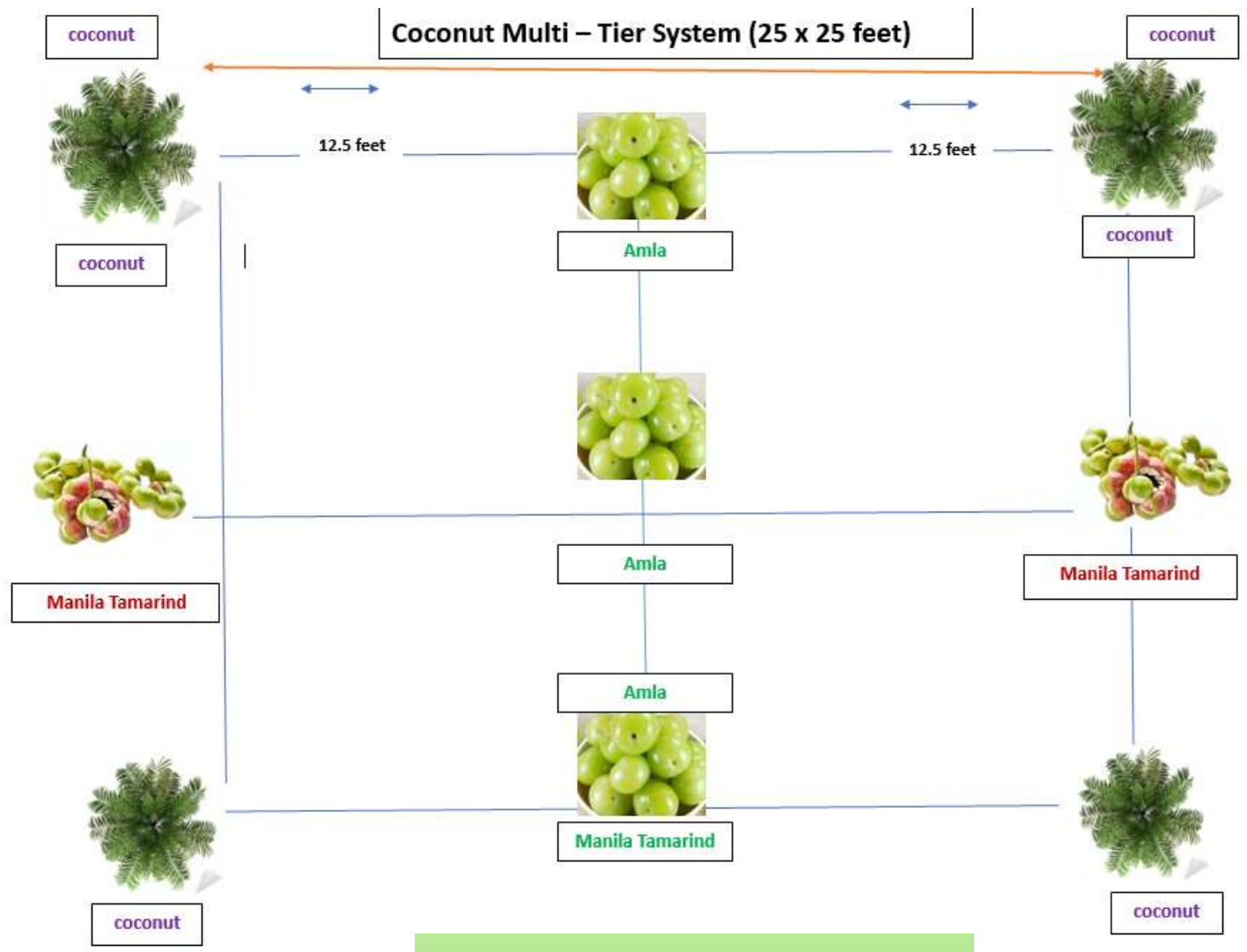


Only 5 Points

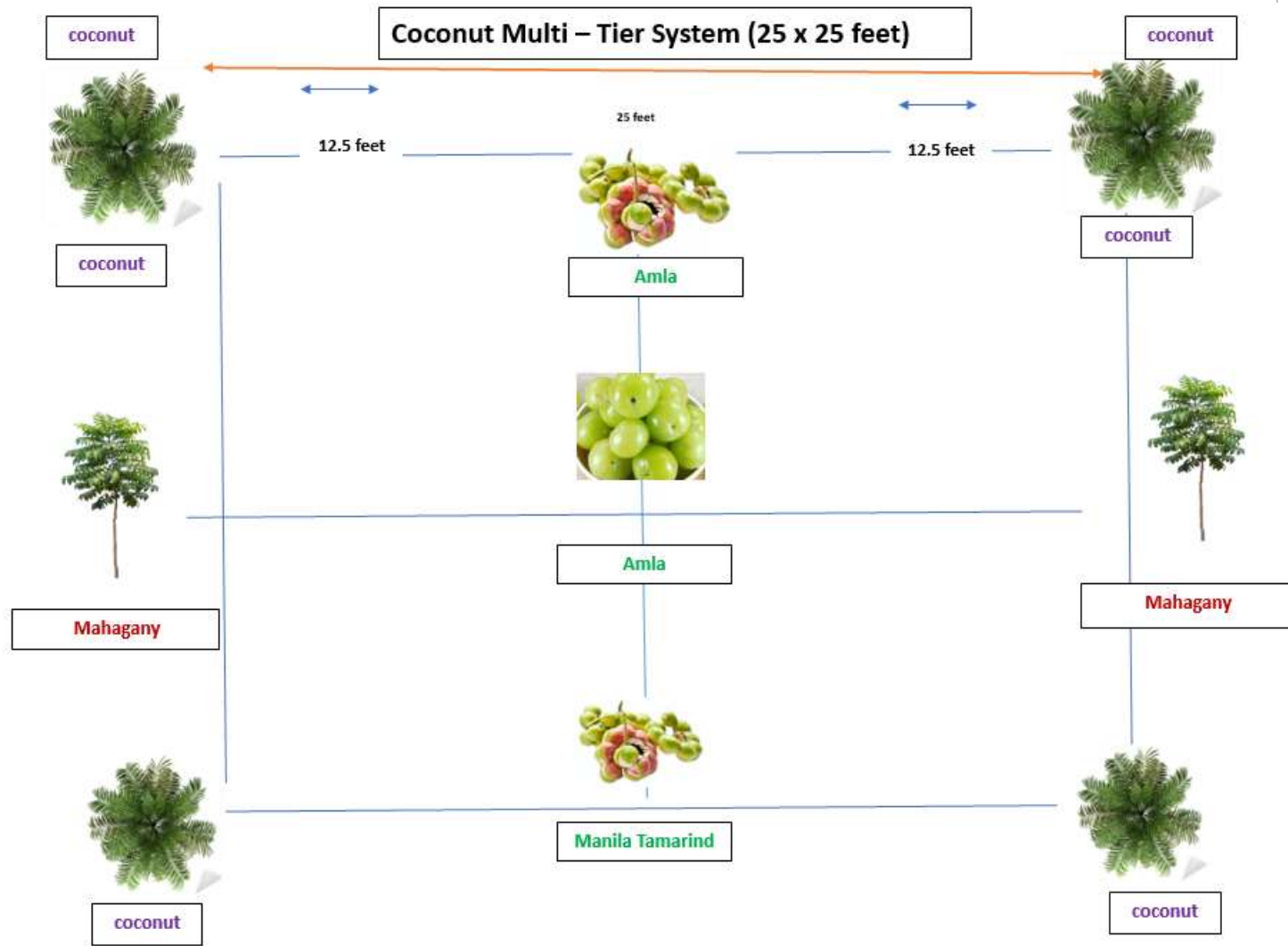




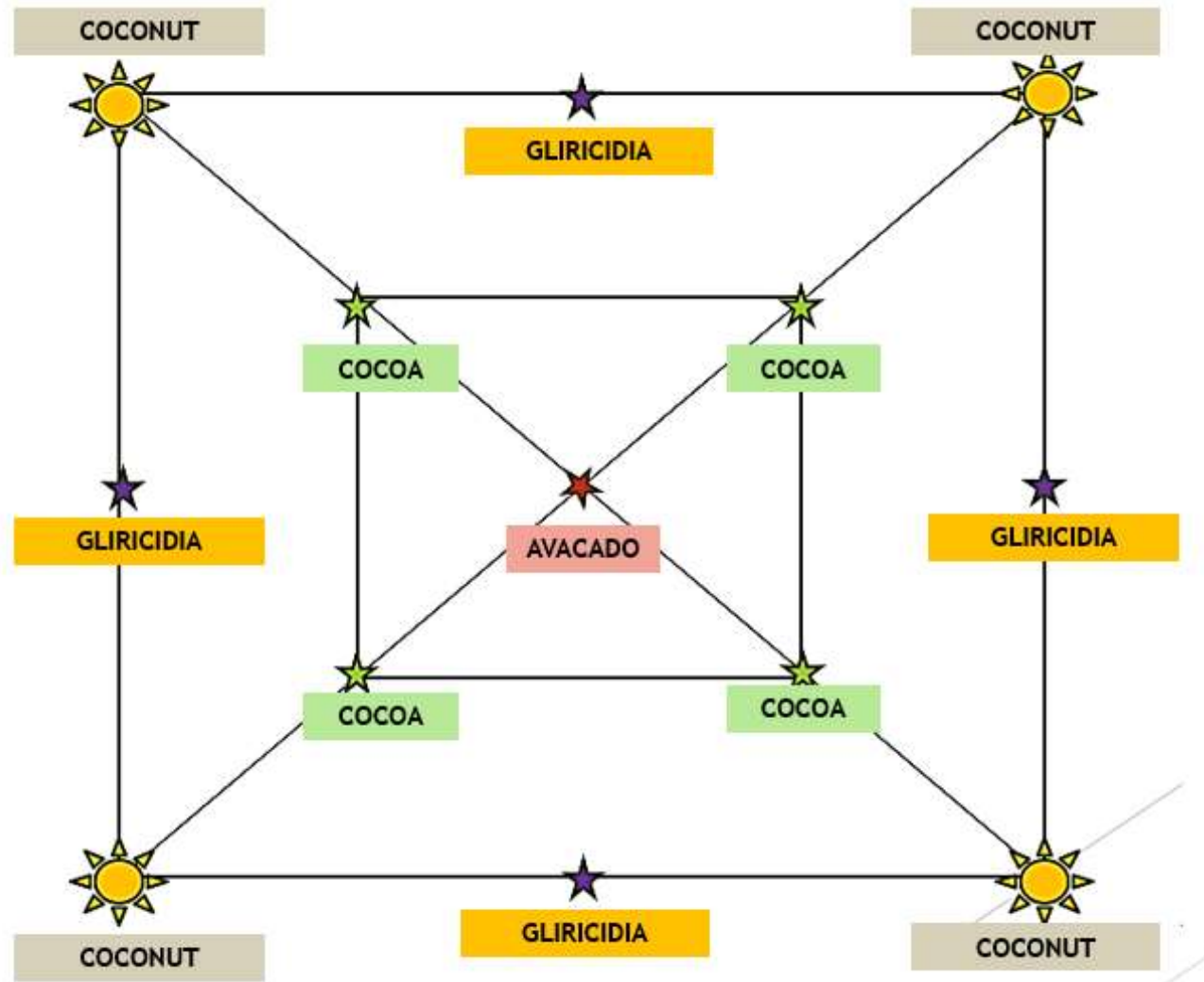
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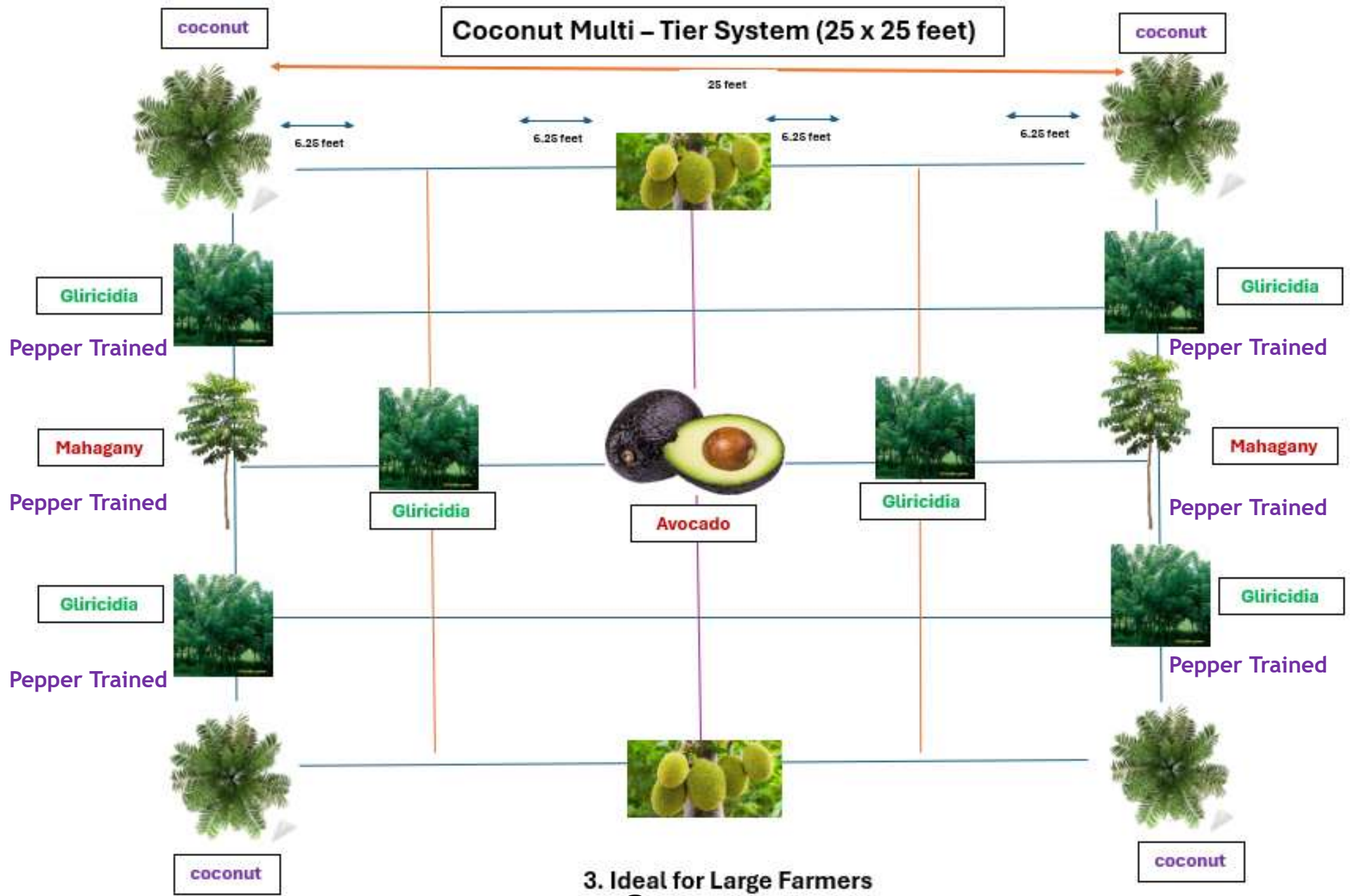
Only 5 Points



Only 5 Points

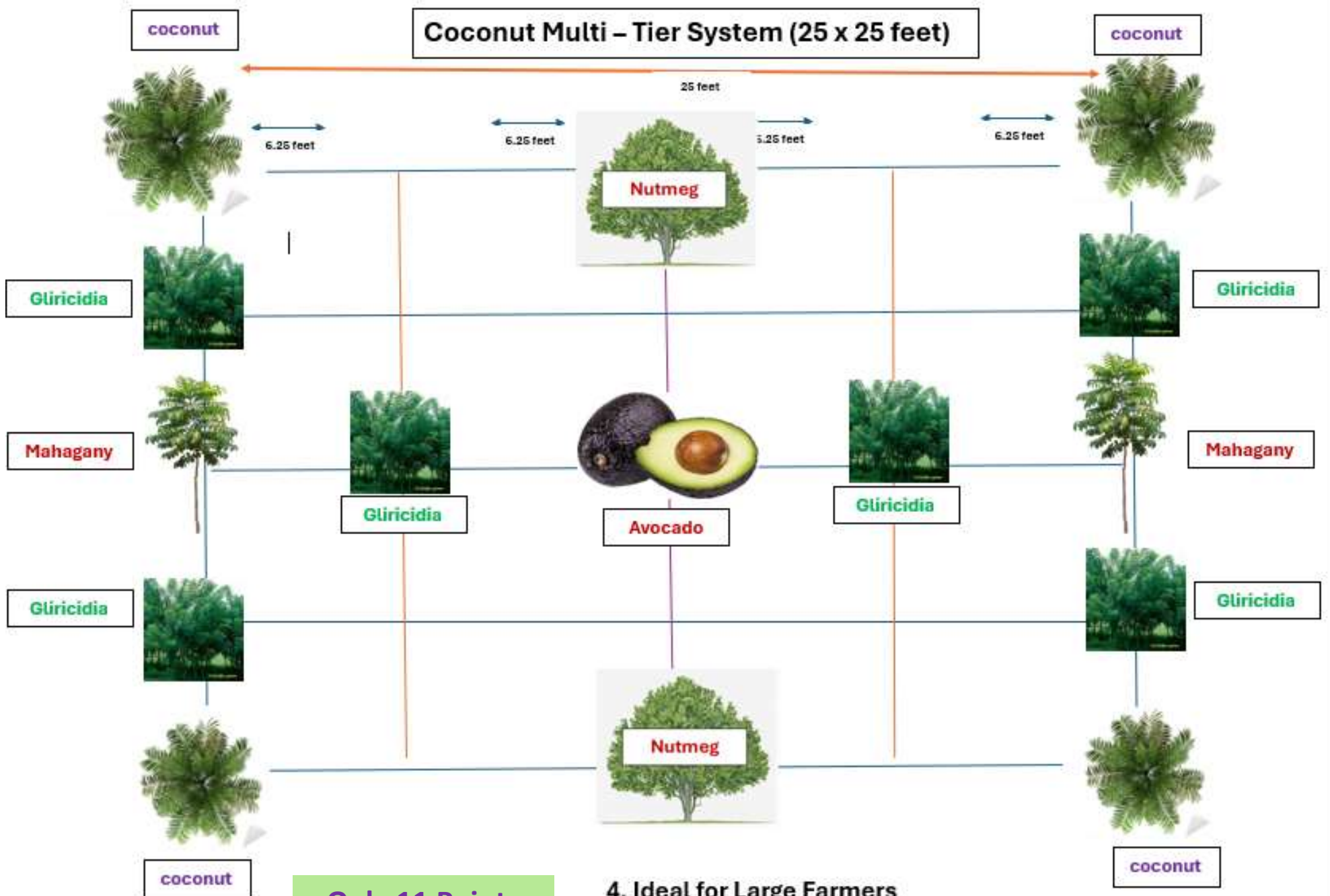


Only 9 Points



3. Ideal for Large Farmers

பெரு விவசாயி
Only 11 Points



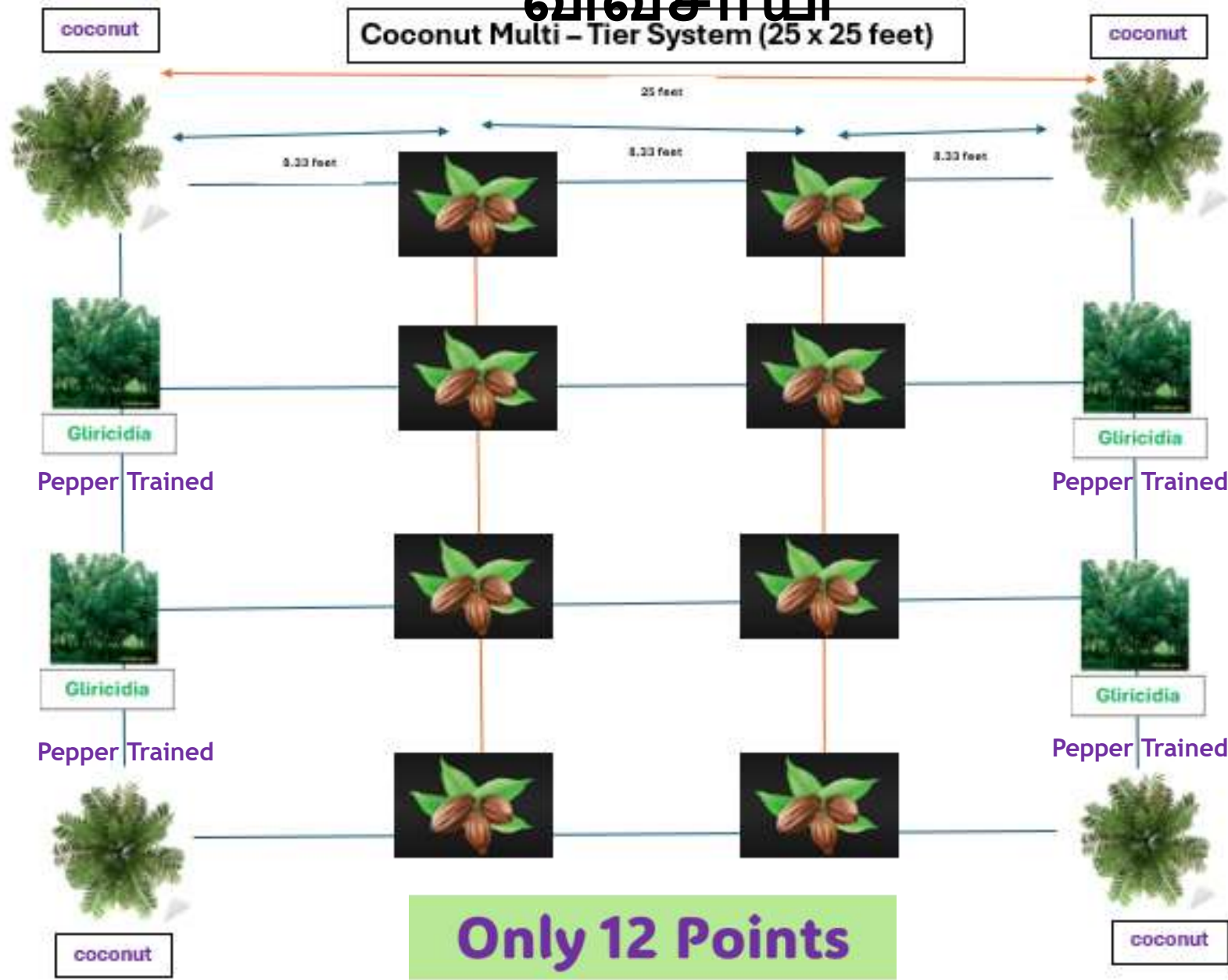
Only 11 Points

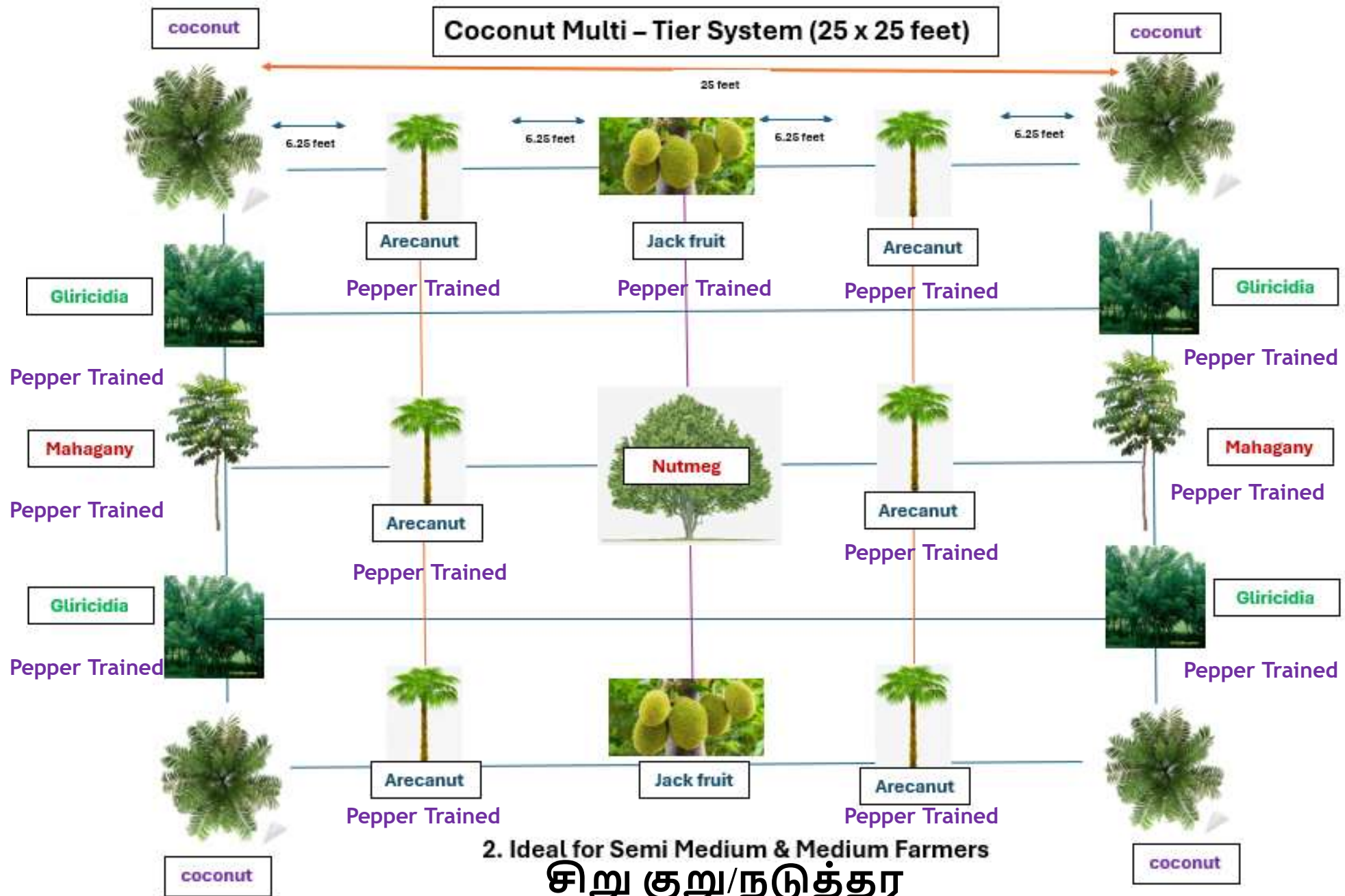
4. Ideal for Large Farmers

பெரு விவசாயி

Ideal for Medium & Semi Medium farmers சிறு குறு/நடுத்தர

விவசாயி





2. Ideal for Semi Medium & Medium Farmers

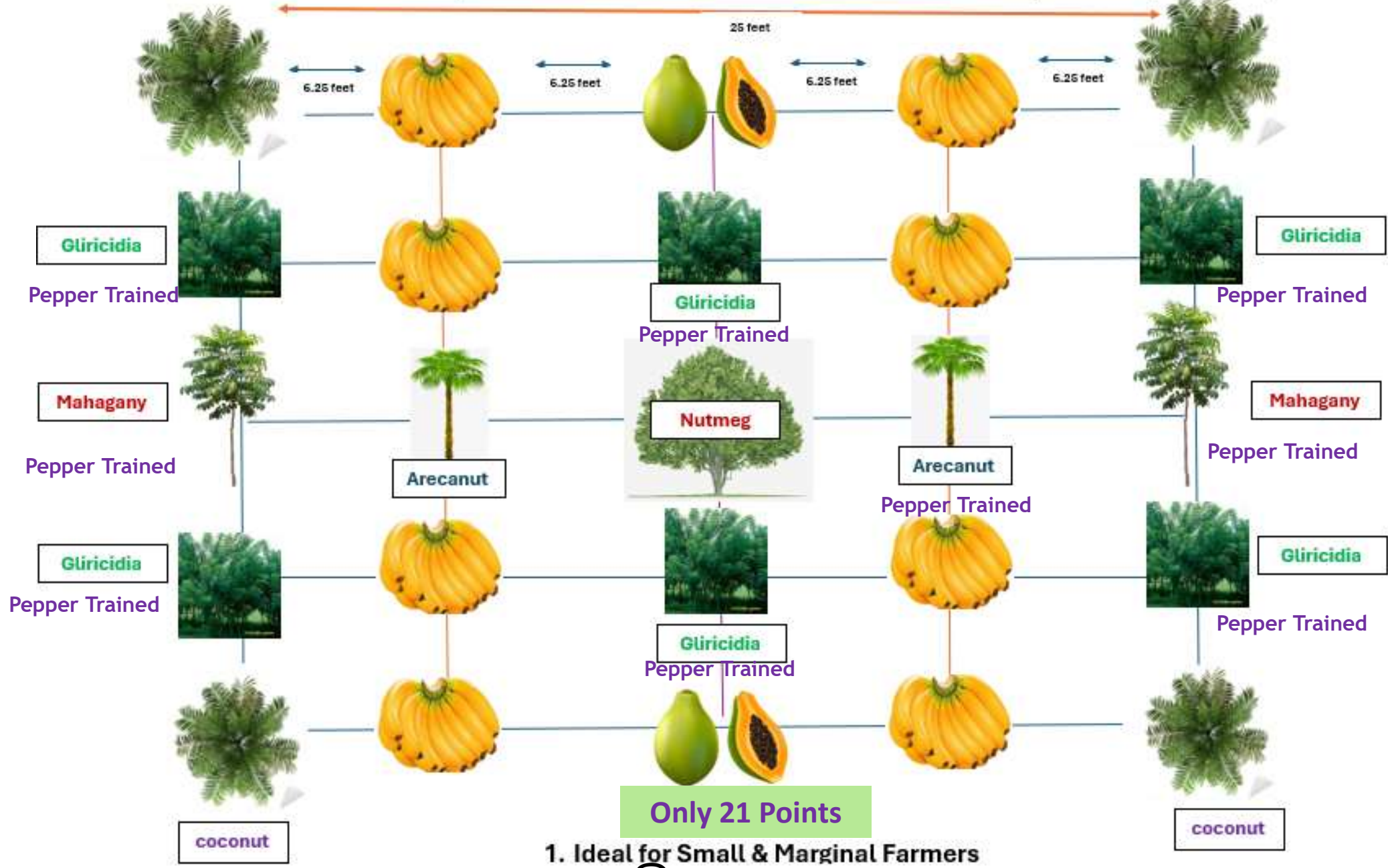
சிறு குறு/நடுத்தர
விவசாயி

Only 15 Points

coconut

Coconut Multi - Tier System (25 x 25 feet)

coconut



Only 21 Points

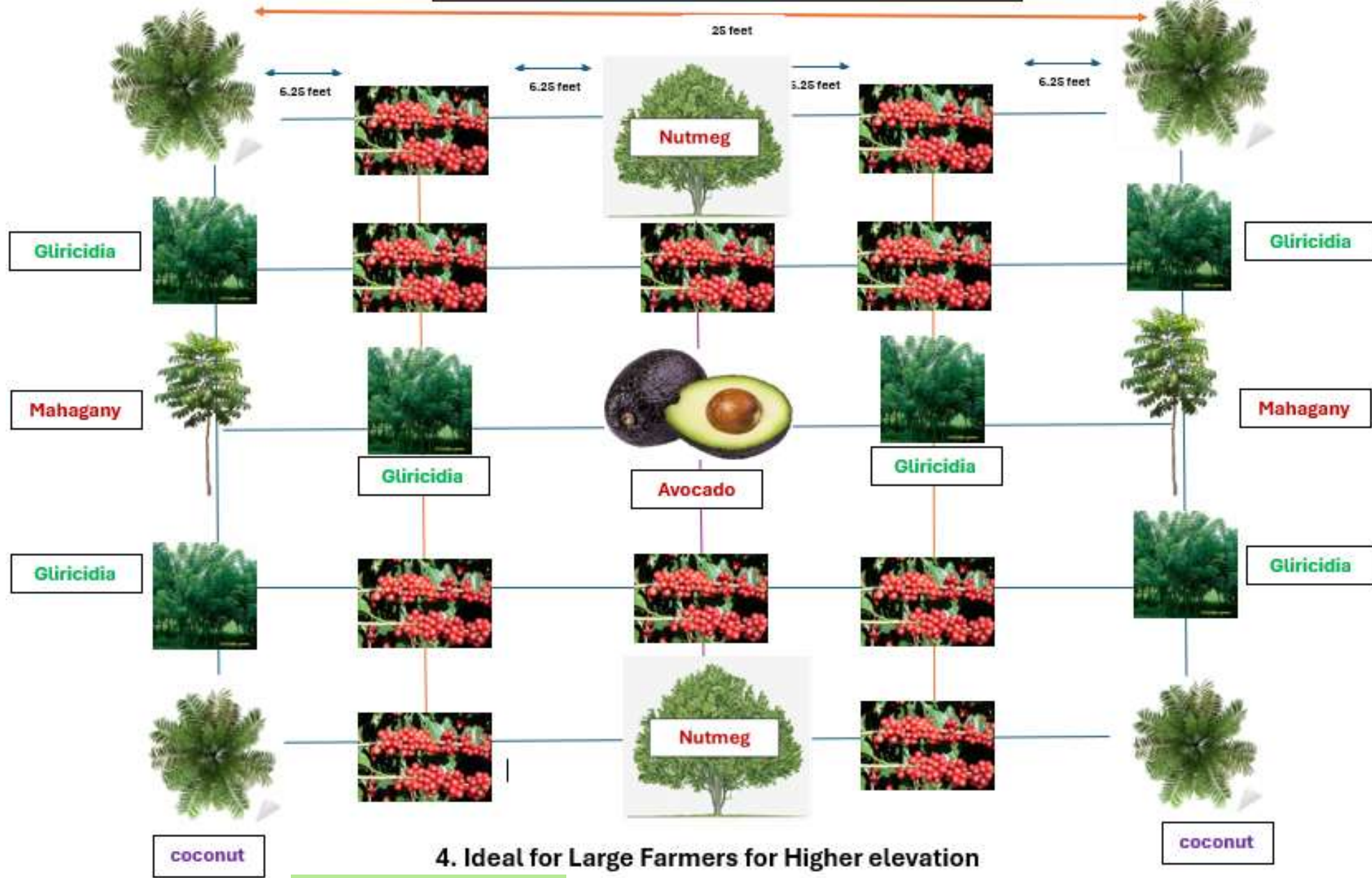
1. Ideal for Small & Marginal Farmers

சிறு குறு

coconut

Coconut Multi - Tier System (25 x 25 feet)

coconut



4. Ideal for Large Farmers for Higher elevation

Only 21 Points

பெரு
விவசாயி

Coconut + Nutmeg



Coconut + Cocoa + Nutmeg



Coconut + Cocoa + Nutmeg + Pepper



Nutmeg + Coconut – well established



Coconut + Nutmeg – well established





Perennials

1. Coconut
2. Arecanut
3. Nutmeg
4. Pepper
5. Coffee
6. Papaya
7. Banana
8. Citrus
9. Clove
10. All spice
11. Tittle
12. Vanilla





Perennials

1. Coconut
2. Arecanut
3. Nutmeg
4. Pepper
5. Coffee
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8. Citrus
9. Clove
10. All spice
11. Tipple
12. Vanilla



Crops for Multi-tier system

Crops tried under the multi-tier system in Kerala

Journal: Nutrient-based solutions

Beverages	Coffee, cocoa.
Fruits & nuts	Arecanut, Banana, drumstick, guava, papaya, pineapple.
Spices/Tree spices	Black pepper, cinnamon, clove, ginger, nutmeg, turmeric, manila.
Multipurpose trees	Blackwattle, casuarina, Erythrina indica, mangium, mulberry, teak, white Tephrosia.
Medicinal & aromatic crops	Arrowroot, Adhathoda, Indian long pepper, noni, Nagadanti, patchouli, snap ginger, vetiver.
Tuber crops	Tapioca, elephant yam, sweet potato, white yam - Dioscorea, taro - Colocasia.
Vegetable crops	Amaranthus, bottle gourd, bitter gourd, brinjal, chili, capsicum, cluster beans, cucumber, ridge gourd, tomato, snake gourd and French bean.
Green manures and cover crops	Calopo, gliricidia, sun hemp, daincha and stylo.



1. Coconut
2. Arecanut
3. Nutmeg
4. Coffee
5. Pepper
6. Mahogany
7. Gliricidia
8. Jack
9. Curry leaf
10. Mangosteen
11. Citrus-Lime
12. Pineapple
13. Guava
14. Papaya

The Organic carbon content ranged from 4.5 to 5.7%

Summary



1. Best utilization of Atmospheric light & Rhizosphere.
2. Conservation of Soil Organic & Moisture.
3. Excellent Microbial consortia built up.
4. Synergistic effect of plant consortium.
5. Better utilization of Rhizosphere.
6. Sustainability through better plant health & yield.



Thanks

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