Valluvan walking through his multi-storey food forest, once a struggling coconut monoculture plantation. (Save Soil - Photographer team)

Transforming a coconut monocrop into a multi-storey food forest (India)

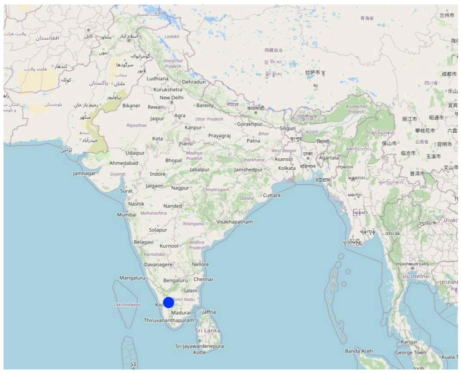
Ottraipayir Thennai Sagubadi Muraiyai Pala Adukku Unavu Kaadaga Matruthal.

DESCRIPTION

Transforming a monocrop coconut farm into a resilient food forest can sustainably enhance soil health, biodiversity and productivity while reducing labour and external input requirements. This demonstrates the potential to increase yields and provide long-term economic and ecological stability for farmers.

Transforming a monocrop coconut farm into a resilient food forest can sustainably enhance soil health, biodiversity, and productivity while reducing labour and external input requirements. This demonstrates the potential to increase yields and provide long-term economic and ecological stability for farmers. Experience was gained from implementation in 2008 on a monocrop coconut farm in Pollachi, Tamil Nadu. The stages were as follows:
1) Rainwater management: Trenches were dug throughout the farm to retain rainwater and prevent runoff, thus enhancing soil moisture. This was critical given the limited rainfall in the region. A drip irrigation system was installed for efficient watering.
2) Plant diversity: Various crops were introduced. Nutmeg, intercropped among coconut trees, provides 3 - 4 times the income of coconuts after 15 to 20 years. Timber trees extract micronutrients from deeper soil layers via deep tap roots: micronutrients are concentrated in the leaves which are used as mulch to enrich the soil nutrient profile. Banana and papaya provided early income, shade for plants, and added biomass. This diversity also ensures a steady income, reducing dependency on external markets.
3) Biomass and soil fertility improvement: Fast-growing crops were planted to generate additional biomass. Leaves were pruned and added to the water-retaining trenches as mulch. Nitrogen-fixing plants were cultivated extensively to improve soil fertility, eliminating the need for chemical fertilizers.
4) Mulch and bio-input application: Mulch in the trenches was decomposed by the bio-inputs from Cows (Earlier 2, now 1) applied via drip lines, which increased soil organic matter through enhanced microbial decomposition. The irrigation and sprinklers were used judiciously to achieve soil moisture rather than over-watering, as trees primarily needed stable moisture conditions.
5) Minimal maintenance approach: After establishing this system, the farm required minimal maintenance. There was no need for tilling, weeding, or other intensive practices, just monitoring of, and maintaining, moisture levels. This low-maintenance approach reduces farmers' workloads and improves their quality of life.
6) Enhanced biodiversity and pest management: To further enhance biodiversity, flowering plants to attract pollinators and predatory insects can be planted along the farm's boundaries - though this was not done at this particular site. Nonetheless, the increased biodiversity already fostered here brought in earthworms, birds, and beneficial insects for natural pest management.
After 12 years of minimal maintenance, soil organic matter content increased from 0.5% to 3.36%, and both production quantity and quality increased. The farm retained high soil moisture despite periods of low rainfall. Land users liked the use of minimal inputs, crop diversification as a financial safety net, and the visible impact on soil health and yield, as well as the increase in land value. There was initial fear about time and money invested and doubts about the feasibility of a technology that challenged the status quo of the region. Digging trenches and planting saplings were physically demanding. The initial pest pressure was also a concern before a stable ecosystem was established. The transformation of this coconut monoculture into a diverse food forest has demonstrated a sustainable model of enhanced resilience, productivity, and biodiversity. This model can be replicated across similar regions to help minimize labor and improve farmers' livelihoods while restoring land and ecosystems.

LOCATION



Location: Pollachi, Tamil Nadu, India

No. of Technology sites analysed: single site

Geo-reference of selected sites
- 76.90181, 10.55779

Spread of the Technology: applied at specific points/ concentrated on a small area

In a permanently protected area?: No

Date of implementation: 10-50 years ago

Type of introduction
- [ ] through land users' innovation
- [ ] as part of a traditional system (> 50 years)
- [ ] during experiments/ research
- [x] through projects/ external interventions

A neighboring farm, similar to Valluvan's before implementation of the technology (Save Soil Media team)

Valluvan's farm, after 15 years of implementing the technology, is now a lush, biodiverse food forest (Save Soil Media team)

CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- [x] improve production
- [x] reduce, prevent, restore land degradation
- [ ] conserve ecosystem
- [ ] protect a watershed/ downstream areas – in combination with other Technologies
- [x] preserve/ improve biodiversity
- [ ] reduce risk of disasters
- [ ] adapt to climate change/ extremes and its impacts
- [x] mitigate climate change and its impacts
- [x] create beneficial economic impact
- [ ] create beneficial social impact

Land use

Land use mixed within the same land unit: Yes - Agroforestry

Cropland

- Perennial (non-woody) cropping: banana/plantain/abaca, medicinal, aromatic, pesticidal plants - perennial, Curry Leaves, Lime, Turmeric, Papaya
- Tree and shrub cropping: coconut (fruit, coir, leaves, etc.), Nutmeg, Mahogany, Mountain Neem, Kino, Red Sandalwood, Blackwood, White Teak, Iron Wood
- Climbers : Pepper

Number of growing seasons per year: 1
Is intercropping practiced? Yes
Is crop rotation practiced? No

Water supply

- [ ] rainfed
- [x] mixed rainfed-irrigated
- [ ] full irrigation

Purpose related to land degradation

- [ ] prevent land degradation
- [ ] reduce land degradation
- [x] restore/ rehabilitate severely degraded land
- [ ] adapt to land degradation
- [ ] not applicable

Degradation addressed

soil erosion by water - Wt: loss of topsoil/ surface erosion

soil erosion by wind - Et: loss of topsoil

chemical soil deterioration - Cn: fertility decline and reduced organic matter content (not caused by erosion), Ca: acidification, Cp: soil pollution, Cs: salinization/ alkalinization

physical soil deterioration - Pc: compaction

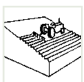
biological degradation - Bc: reduction of vegetation cover, Bh: loss of habitats, Bq: quantity/ biomass decline, Bs: quality and species composition/ diversity decline, Bl: loss of soil life, Bp: increase of pests/ diseases, loss of predators

water degradation - Ha: aridification, Hs: change in quantity of surface water, Hg: change in groundwater/aquifer level, Hq: decline of groundwater quality

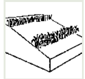
SLM group

- agroforestry
- improved ground/ vegetation cover
- integrated soil fertility management

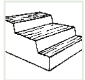
SLM measures



agronomic measures - A1: Vegetation/ soil cover, A2: Organic matter/ soil fertility, A6: Residue management (A 6.4: retained)



vegetative measures - V1: Tree and shrub cover



structural measures - S2: Bunds, banks, S4: Level ditches, pits, S6: Walls, barriers, palisades, fences, S7: Water harvesting/ supply/ irrigation equipment, S8: Sanitation/ waste water structures, S9: Shelters for plants and animals

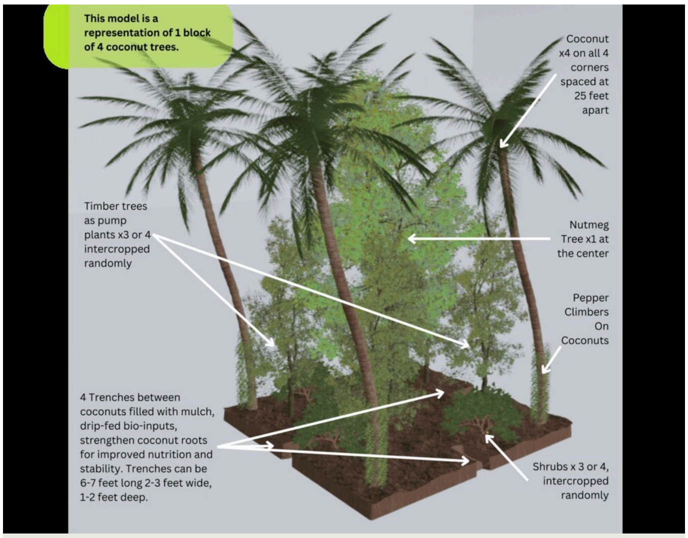
TECHNICAL DRAWING

Technical specifications

Area: 25 x 25 square feet.
Number of Coconut Trees: 4
Number of Nutmeg Trees: 1
Number of Pepper Climbers: 4
Number of Shrubs: 3-4 (Lime, Curry leaves, Medicinal herbs and Turmeric)
Number of Timber Trees : 3-4 (Mahogany, Mountain Neem, Kino, Red Sandalwood, Blackwood, White Teak and Ironwood)

Number of trenches : 4 (6x3x2 ft each, half in this block, half extended to the next block.
Irrigation System: Drip and a Center Fog Sprinkler for creating moisture in the atmosphere.
Input application: Cow dung and Cow urine mix flows to the trench covered with biomass. Decomposes it over time and creates humus for all the plants.
Initially biomass crops are planted, slowly transitioning to trees as the soil improves.

No maintenance after 3-4 years.
Coconut collected after it drops naturally.
Nutmeg and Pepper harvest happens in 3-4 years, gradually increasing yields.
Shrubs are harvested occasionally for self consumption and direct on farm sales.



Author: Aditya Tated

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated: per Technology area (size and area unit: **5.66 hectares**; conversion factor to one hectare: **1 ha = 1hectare = 2.47 acres**)
- Currency used for cost calculation: **INR**
- Exchange rate (to USD): 1 USD = 84.07 INR
- Average wage cost of hired labour per day: 600 INR

Most important factors affecting the costs

No factors significantly affected costs.

Establishment activities

1. Plot assessment and planning (Timing/ frequency: Before onset of rains)
2. Digging trenches for rainwater harvesting (Timing/ frequency: Before the rainy season)
3. Setting up drip irrigation system (Timing/ frequency: Before planting; dry season)
4. Planting initial tree species (timber, fruit, nitrogen-fixing) (Timing/ frequency: Early rainy season)
5. Planting startup crops (e.g., banana, papaya) (Timing/ frequency: Early rainy season)
6. Mulching trenches with plant biomass (Timing/ frequency: After trench creation, ongoing)
7. Adding bio-inputs to mulch beds (Timing/ frequency: Throughout growing seasons)
8. Pruning trees and returning biomass (Timing/ frequency: Regular intervals during dry seasons)
9. Planting additional companion species (Timing/ frequency: After initial species establishment)
10. Setting up pest repellent measures (Timing/ frequency: As needed, ongoing)

Establishment inputs and costs (per 5.66 hectares)

Specify input	Unit	Quantity	Costs per Unit (INR)	Total costs per input (INR)	% of costs borne by land users
Labour					
Trench Digging	machine-hours	100.0	1000.0	100000.0	100.0
Tree Planting	person-days	75.0	600.0	45000.0	100.0
Equipment					
Farm Tools	lump sum	1.0	20000.0	20000.0	100.0
Irrigation Setup	lump sum	1.0	100000.0	100000.0	100.0
Pruning Machine	units	1.0	25000.0	25000.0	100.0
Plant material					
Timber Saplings	units	5500.0	3.0	16500.0	100.0
Nutmeg Saplings	units	1000.0	20.0	20000.0	100.0
Pepper Saplings	units	1000.0	40.0	40000.0	100.0

Fruit Trees	units	500.0	100.0	50000.0	100.0
Fertilizers and biocides					
Organic Manure	load	10.0	1500.0	15000.0	100.0
Organic Pest Repellants	lump sum	1.0	20000.0	20000.0	100.0
Construction material					
Fencing Irrigation	lump sum	1.0	200000.0	200000.0	100.0
Bio-Input Preparation Unit	lump sum	1.0	200000.0	200000.0	100.0
Pipes and Valves	lump sum	1.0	530000.0	530000.0	100.0
Tool Shed	lump sum	1.0	50000.0	50000.0	100.0
Worker Shed	lump sum	1.0	50000.0	50000.0	100.0
Other					
Farm Animals	units	5.0	20000.0	100000.0	100.0
Fodder	annual	1.0	25000.0	25000.0	100.0
Total costs for establishment of the Technology				**1'606'500.0**	
Total costs for establishment of the Technology in USD				*19'109.08*	

Maintenance activities

1. Pruning (Timing/ frequency: Every 6 months)
2. Irrigation system maintenance (Timing/ frequency: Annually, before dry season)
3. Mulching trenches (Timing/ frequency: Twice a year, before onset of rains)
4. Adding bio-inputs to mulch beds (Timing/ frequency: Happens automatically with irrigation.)
5. Harvesting fruits and biomass (Timing/ frequency: As and when needed Coconut is collected after it falls by itself.)
6. Replanting missing or damaged trees (Timing/ frequency: Annually, before rainy season)
7. Fencing and protection checks (Timing/ frequency: Quarterly)

Maintenance inputs and costs (per 5.66 hectares)

Specify input	Unit	Quantity	Costs per Unit (INR)	Total costs per input (INR)	% of costs borne by land users
Labour					
Pruning, mulching, replanting	person-days	100.0	600.0	60000.0	100.0
Harvesting	person-days	300.0	600.0	180000.0	100.0
Equipment					
Tools for pruning fencing checks	lump sum	1.0	10000.0	10000.0	100.0
Irrigation system maintenance	lump sum	1.0	10000.0	10000.0	100.0
Fencing maintenance	lump sum	1.0	20000.0	20000.0	100.0
Plant material					
Replacement seedlings	pieces	50.0	30.0	1500.0	100.0
Fertilizers and biocides					
Preparing organic bio-inputs via irrigation system	lump sum	1.0	5000.0	5000.0	100.0
Construction material					
Fencing materials for repair	lump sum	1.0	8000.0	8000.0	100.0
Other					
Cow Care and Fodder	kg	5.0	5000.0	25000.0	100.0
Total costs for maintenance of the Technology				**319'500.0**	
Total costs for maintenance of the Technology in USD				*3'800.4*	

NATURAL ENVIRONMENT

Average annual rainfall

- [ ] < 250 mm
- [ ] 251-500 mm
- [ ] 501-750 mm
- [x] 751-1,000 mm
- [ ] 1,001-1,500 mm
- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm
- [ ] > 4,000 mm

Agro-climatic zone

- [x] humid
- [ ] sub-humid
- [ ] semi-arid
- [ ] arid

Specifications on climate

Average annual rainfall in mm: 865.0
Rainfall Distribution and Seasonality: Monsoon Seasons: Rainfall peaks during the southwest monsoon (June to September) and the northeast monsoon (October to November). August, October, and November are the rainiest months, each with an average precipitation between 167 to 214 mm.

Dry Periods: The driest months are January to March, with very low rainfall, averaging between 5 to 35 mm per month.
Name of the meteorological station: Coimbatore Metrological station, India Meteorological Department's (IMD) network.
Generally warm, with an average annual temperature around 26–28°C (79–82°F). The hottest months tend to be March to May, where temperatures can reach up to 36–40°C (97–105°F), while the coolest months are December and January, with average daily temperatures ranging from 25–26°C (77–79°F)

Slope

Landforms

Altitude

Technology is applied in

- [ ] flat (0-2%)
- [ ] gentle (3-5%)
- [x] moderate (6-10%)
- [ ] rolling (11-15%)
- [ ] hilly (16-30%)
- [ ] steep (31-60%)
- [ ] very steep (>60%)

- [x] plateau/plains
- [ ] ridges
- [ ] mountain slopes
- [ ] hill slopes
- [ ] footslopes
- [ ] valley floors

- [ ] 0-100 m a.s.l.
- [x] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [ ] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [ ] 2,001-2,500 m a.s.l.
- [ ] 2,501-3,000 m a.s.l.
- [ ] 3,001-4,000 m a.s.l.
- [ ] > 4,000 m a.s.l.

- [ ] convex situations
- [ ] concave situations
- [x] not relevant

Soil depth
- [ ] very shallow (0-20 cm)
- [ ] shallow (21-50 cm)
- [ ] moderately deep (51-80 cm)
- [x] deep (81-120 cm)
- [ ] very deep (> 120 cm)

Soil texture (topsoil)
- [ ] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [x] fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- [ ] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [x] fine/ heavy (clay)

Topsoil organic matter content
- [ ] high (>3%)
- [ ] medium (1-3%)
- [x] low (<1%)

Groundwater table
- [ ] on surface
- [ ] < 5 m
- [x] 5-50 m
- [ ] > 50 m

Availability of surface water
- [ ] excess
- [ ] good
- [ ] medium
- [x] poor/ none

Water quality (untreated)
- [x] good drinking water
- [ ] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Water quality refers to: ground water

Is salinity a problem?
- [ ] Yes
- [x] No

Occurrence of flooding
- [ ] Yes
- [x] No

Species diversity
- [ ] high
- [ ] medium
- [x] low

Habitat diversity
- [ ] high
- [ ] medium
- [x] low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [ ] subsistence (self-supply)
- [x] mixed (subsistence/ commercial)
- [ ] commercial/ market

Off-farm income
- [ ] less than 10% of all income
- [ ] 10-50% of all income
- [x] > 50% of all income

Relative level of wealth
- [ ] very poor
- [ ] poor
- [x] average
- [ ] rich
- [ ] very rich

Level of mechanization
- [ ] manual work
- [ ] animal traction
- [x] mechanized/ motorized

Sedentary or nomadic
- [x] Sedentary
- [ ] Semi-nomadic
- [ ] Nomadic

Individuals or groups
- [x] individual/ household
- [ ] groups/ community
- [ ] cooperative
- [ ] employee (company, government)

Gender
- [x] women
- [x] men

Age
- [ ] children
- [ ] youth
- [x] middle-aged
- [ ] elderly

Area used per household
- [ ] < 0.5 ha
- [ ] 0.5-1 ha
- [ ] 1-2 ha
- [ ] 2-5 ha
- [x] 5-15 ha
- [ ] 15-50 ha
- [ ] 50-100 ha
- [ ] 100-500 ha
- [ ] 500-1,000 ha
- [ ] 1,000-10,000 ha
- [ ] > 10,000 ha

Scale
- [ ] small-scale
- [x] medium-scale
- [ ] large-scale

Land ownership
- [ ] state
- [ ] company
- [ ] communal/ village
- [ ] group
- [ ] individual, not titled
- [x] individual, titled

Land use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [x] individual

Water use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [x] individual

Access to services and infrastructure

	poor				good
health	poor			✓	good
education	poor			✓	good
technical assistance	poor		✓		good
employment (e.g. off-farm)	poor		✓		good
markets	poor			✓	good
energy	poor		✓		good
roads and transport	poor			✓	good
drinking water and sanitation	poor			✓	good
financial services	poor			✓	good

IMPACTS

Socio-economic impacts
Crop production

Quantity before SLM: 110
Quantity after SLM: 160
Coconuts were small in size and fewer in number when the

decreased increased

farm was bought. After 6-7 years, the counts increased from 110 per tree per year to 160 and size increased 150% on average.

crop quality

decreased increased

Quantity before SLM: Not so tasty
Quantity after SLM: Taste is the best compared to surrounding many farms.

risk of production failure

increased decreased

Quantity before SLM: 50-60%
Quantity after SLM: 0%
The risk of production failure has come down to 0% as there is no pest and disease attack. The coconuts yield continuously throughout the year.

product diversity

decreased increased

Quantity before SLM: 1
Quantity after SLM: 3
From just one crop to 2 main crops, pepper as a sub-main crop and a variety of fruits for self consumption.

production area (new land under cultivation/ use)

decreased increased

Quantity before SLM: 40%
Quantity after SLM: 60%
Coconuts occupied approximately 40% area in terms of canopy. Now in addition to that there is nutmeg which occupies another 20%. Rest of the area is for timber and other supporting crops not included here.

land management

hindered simplified

Quantity before SLM: 24/7
Quantity after SLM: 1 Day a Week
Farmer before this owner spent hours in weeding, application of inputs and pesticide, burning of crop residue, harvesting coconuts. Now the whole farm needs 2 labour to collect fallen coconuts and turn on the irrigation switches and valves. The farmer comes to visit the farm once a week for monitoring.

drinking water quality

decreased increased

irrigation water availability

decreased increased

Earlier the bore wells would run only for a couple of hours and then the water would dry out. Now it fulfills the irrigation requirement without interruption.

demand for irrigation water

increased decreased

Demand for water has drastically come down as the SOC content in the soil has risen.

expenses on agricultural inputs

increased decreased

There is no expense in any agricultural input apart from maintenance of 2-3 cows. The entire system is automatic. The slurry from the cowshed goes into the tank which supplies input through a venturi to the drip irrigaton system.

farm income

decreased increased

Farm income has gone up significantly owing to the high yields, multiple crops, better prices, low cultivation and management costs.

diversity of income sources

decreased increased

Incomes are coming from sale of coconuts, nutmeg and pepper. Coconut oil is also extracted now by the farmer and sold at a high premium price.

workload

increased decreased

The drudgery of mainting a monocrop and all the works associalted with conventional agriculture is eliminated by 95%. The only workload is to pick up the fallen coconuts and harvest nutmeg and pepper.

Socio-cultural impacts

health situation

worsened improved

The health of the owner and the consumers is greatly benefitted owing to the absense of harmful chemicals and pesticides in the produce.

SLM/ land degradation knowledge

reduced improved

This model is a great source of wisdom about tree-based regenerative agriculture which can counter land degradation. It has all the necessary components of how to convert dirt into soil.

Ecological impacts

water quality	decreased	□□□□□✓□	increased	
harvesting/ collection of water (runoff, dew, snow, etc)	reduced	□□□□□□✓	improved	
surface runoff	increased	□□□□□□✓	decreased	
excess water drainage	reduced	□□□□□□✓	improved	
groundwater table/ aquifer	lowered	□□□□□□✓	recharge	
evaporation	increased	□□□□□✓□	decreased	
soil moisture	decreased	□□□□□✓□	increased	Soil moisture is maintained as high levels except for summers when its a little low due to the intense heat this region faces.
soil cover	reduced	□□□□□□✓	improved	
soil compaction	increased	□□□□□□✓	reduced	Soil compaction has reduced because of the heavy penetraton of tree roots, improved SOC and biological activity in the soil.
nutrient cycling/ recharge	decreased	□□□□□□✓	increased	It is evident from the yields that there is a very resilient process of nutrient cycling happening in the farm compared to what was happening earlier.
soil organic matter/ below ground C	decreased	□□□□□□✓	increased	Quantity before SLM: 0.5 Quantity after SLM: 3.36 The SOC level have increased continously and is still increasing because of the leaf litter that is added continuously throughout the year.
vegetation cover	decreased	□□□□□□✓	increased	Quantity before SLM: 40% Quantity after SLM: 90% Vegetation cover in the form of trees, shrubs, perennial crops and pepper has shown dramatic increase.
biomass/ above ground C	decreased	□□□□□□✓	increased	Addition of 3 times the number of trees has increased the above ground biomass multiple times.
plant diversity	decreased	□□□□□□✓	increased	The farm is now a home for more than 100 species of plants compared to just one when it was bought.
invasive alien species	increased	□□□□□□✓	reduced	There is an absolute balance in the farm ecosystem with no species going out of control. There are no significant weeds as the soil ecosystem and shade doesn't support the common invasive species found in the region.
animal diversity	decreased	□□□□□□✓	increased	Minor farm animals are seen. Since its not a large area, enough diversity has not been established.
beneficial species (predators, earthworms, pollinators)	decreased	□□□□□□✓	increased	There are no harmful species for which the farmer needs to worry about. All species are beneficaial in some way or the other.
habitat diversity	decreased	□□□□□□✓	increased	Multi layer multi crop system allows various different habitat for a variety of species. Here from high coconut to rich soil undergrond has a habitat diversity of semi-forest which was not present earlier.
pest/ disease control	decreased	✓□□□□□□	increased	The farmer says he doesn't know what are pests now which was not the case earlier. Earlier his coconuts would be continosly be harmed by something or the other.
drought impacts	increased	□□□□□□✓	decreased	The impact of drought is not significant in this farm because of the green cover, soil moisture, high water tables, year-round water availability and overall resiliance of the system. All other conventional farms face enormous hardship during droughts.
emission of carbon and greenhouse gases	increased	□□□□□□✓	decreased	This system is carbon negative as there is no use of chemicals or fossil fuels needed to run any operation except the transportation of coconuts to the markets.
micro-climate		□□□□□□□		The micro-climate is the most tangible change that anyone visiting the farm is able to relish. The coolness inside the

worsened — improved

farm is completely mood-changing for someone who is entering from outside. It leaves people wanting to live here or create such a place for themselves. Its an oasis in a desert.

Off-site impacts

water availability (groundwater, springs) — decreased / increased: ✓ increased

It is assumed that as the groundwater table in the site has increased, it would definitely have some effect of the neighboring sites.

COST-BENEFIT ANALYSIS

Benefits compared with establishment costs

	Rating (very negative – very positive)
Short-term returns	3 of 7 (slightly negative)
Long-term returns	7 of 7 (very positive)

Benefits compared with maintenance costs

	Rating (very negative – very positive)
Short-term returns	4 of 7 (neutral)
Long-term returns	7 of 7 (very positive)

CLIMATE CHANGE

Gradual climate change

	Rating (not well at all – very well)	
annual temperature increase	very well	
seasonal temperature increase	well	Season: dry season
annual rainfall	very well	
seasonal rainfall increase	very well	Season: wet/ rainy season

Climate-related extremes (disasters)

	Rating (not well at all – very well)
local rainstorm	very well
heatwave	well
drought	well
insect/ worm infestation	very well

ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

- [ ] single cases/ experimental
- [x] 1-10%
- [ ] 11-50%
- [ ] > 50%

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

- [x] 0-10%
- [ ] 11-50%
- [ ] 51-90%
- [ ] 91-100%

Has the Technology been modified recently to adapt to changing conditions?

- [ ] Yes
- [x] No

To which changing conditions?

- [ ] climatic change/ extremes
- [ ] changing markets
- [ ] labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- 1) Efficient Rainwater Harvesting: Trenches prevent water runoff and retain moisture, helping farmers adapt to water-scarce conditions. Drip irrigation ensures efficient water use, reducing waste and improving moisture availability at plant roots.
- 2) Nitrogen-fixing plants and bio-inputs build natural soil fertility, reducing or eliminating the need for chemical fertilizers.
- 3) Income Stability: Diverse crops (timber, fruit, and cash crops like bananas and papayas) ensure year-round income and minimize dependency on a single crop.
- 4) Pest and Disease Management: The natural ecosystem with pollinators and predatory insects reduces pest issues without needing chemical pesticides.
- 5) Minimal Labor: Once established, the system requires less labor with minimal tilling or weeding, allowing farmers to save on labor costs.
- 6) Increased Yield and Quality: Coconut yield has improved significantly, with larger and better-tasting coconuts, enhancing the crop’s market value.

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome

- 1) Learning Curve: Farmers may need additional knowledge on tree-based agriculture and organic soil management, which could necessitate training and support. 1) Training programs across the project region are conducted on various aspects of regenerative agriculture at minimal costs
- 2) Consistency in Bio-input Application: The effectiveness of bio-inputs depends on regular application; skipping or improper application could hinder soil improvement. 2) Farmer hand holding is available via farmer helpline for basic queries and farm visits are conducted if nature of query requires.
- 3) Higher Pest Pressure in Early Stages: As biodiversity builds up gradually, farmers might initially encounter some pest pressure until a stable ecosystem is established. 3) Pest and disease management trainings are quite frequent and also the training video is available on Save Soil youtube channel in regional languages for easy access for farmers

- 7) Ecological Balance: The increase in biodiversity supports natural pest control, improved pollination, and enriched soil.

Strengths: compiler's or other key resource person's view

- 1)Positive Environmental Impact:
  Enhanced Soil and Water Conservation: Rainwater harvesting and mulching contribute to soil health and sustainable water use, supporting resilient agricultural practices.
  Carbon Sequestration: The introduction of timber and fruit trees aids in carbon capture, helping to mitigate climate change.
- 2)Increased Biodiversity and Natural Pest Management:
  Reduction in Chemical Usage: Biodiverse ecosystems reduce reliance on pesticides and chemical fertilizers, fostering healthier food systems.
  Positive Environmental Metrics: Biodiversity and natural pest control align with ecological sustainability, improving farm ecosystems.
- 3)Model for Replication and Scaling:
  Technology Viability: A successful pilot farm serves as a model that other farmers can adopt, promoting tree-based agriculture and natural farming methods.
  Long-Term Sustainable Farming: This low-maintenance, high-diversity model provides a sustainable alternative to conventional farming, attracting interest from stakeholders focused on sustainable agriculture.
- 4)Attracting Donor Support:
  Appeal to Donors: The project's long-term sustainability and eco-friendly practices attract donors focused on climate resilience and food security.
  Potential for Diverse Funding: The combined focus on environmental sustainability, economic empowerment, and climate resilience appeals to various funding sources.

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome

- 1) Need for Technical Expertise and Training: Farmers may need intensive training in regenerative agriculture methods, necessitating resources for workshops, materials, and ongoing support staff, which may impact the organization's budget and staffing. 1) Major portion of funding goes into trainings and to create online and offline materials easily accessible to farmers. In mega training program where more than 1000s of farmers attend, free technical handbook is also provided to support them on a daily basis
- 2) Difficulty in Immediate Impact Measurement: Due to the delayed returns, reporting immediate success and impact might be challenging, especially in a results-oriented funding environment. 2) Need to implement milestone-based metrics, proxy indicators, and comparative reporting to showcase early progress. Farmer testimonials and case studies further illustrate positive outcomes, while data visualizations offer accessible insights into ecological improvements and economic stability.
- 3) Risk of Low Farmer Adoption: Farmers may be hesitant about the model's initial costs and labor, slowing adoption. 3) Selective aspects of the technology can be taken up initially to see early success in order to manage finances
- 4) Resource-Intensive Monitoring and Data Collection: Tracking soil health, biodiversity, and yields requires dedicated monitoring, which can be resource-intensive, especially across multiple farms. 4) Success of few model farms will convince farmer community to take up this technology without having the need to monitor each and every farm

REFERENCES

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Full description in the WOCAT database

https://qcat.wocat.net/en/wocat/technologies/view/technologies_7366/

Linked SLM data

Approaches: Conscious Planet - Save Soil's Farmer Training and Handholding Approach
https://qcat.wocat.net/en/wocat/approaches/view/approaches_7372/

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- Conscious Planet - Save Soil (Save Soil)

Project

- Save Soil Movement

Key references

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- SS-TKV Annual Report 2023-24: https://docs.google.com/document/d/1vvMD0kd-qWs4JtebbsBpOGBB-z_6CVr3ZcrK-1wV78Y/edit?tab=t.0

Links to relevant information which is available online

- Save Soil Movement - Model Farm, Proof of Concept: https://consciousplanet.org/en/save-soil/blog/save-soil-movement-model-farm-proof-of-concept
- A living example of Save Soil: https://www.youtube.com/watch?v=QVis4gkcPIU&t=353s