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Thanal

CASE STUDY -1

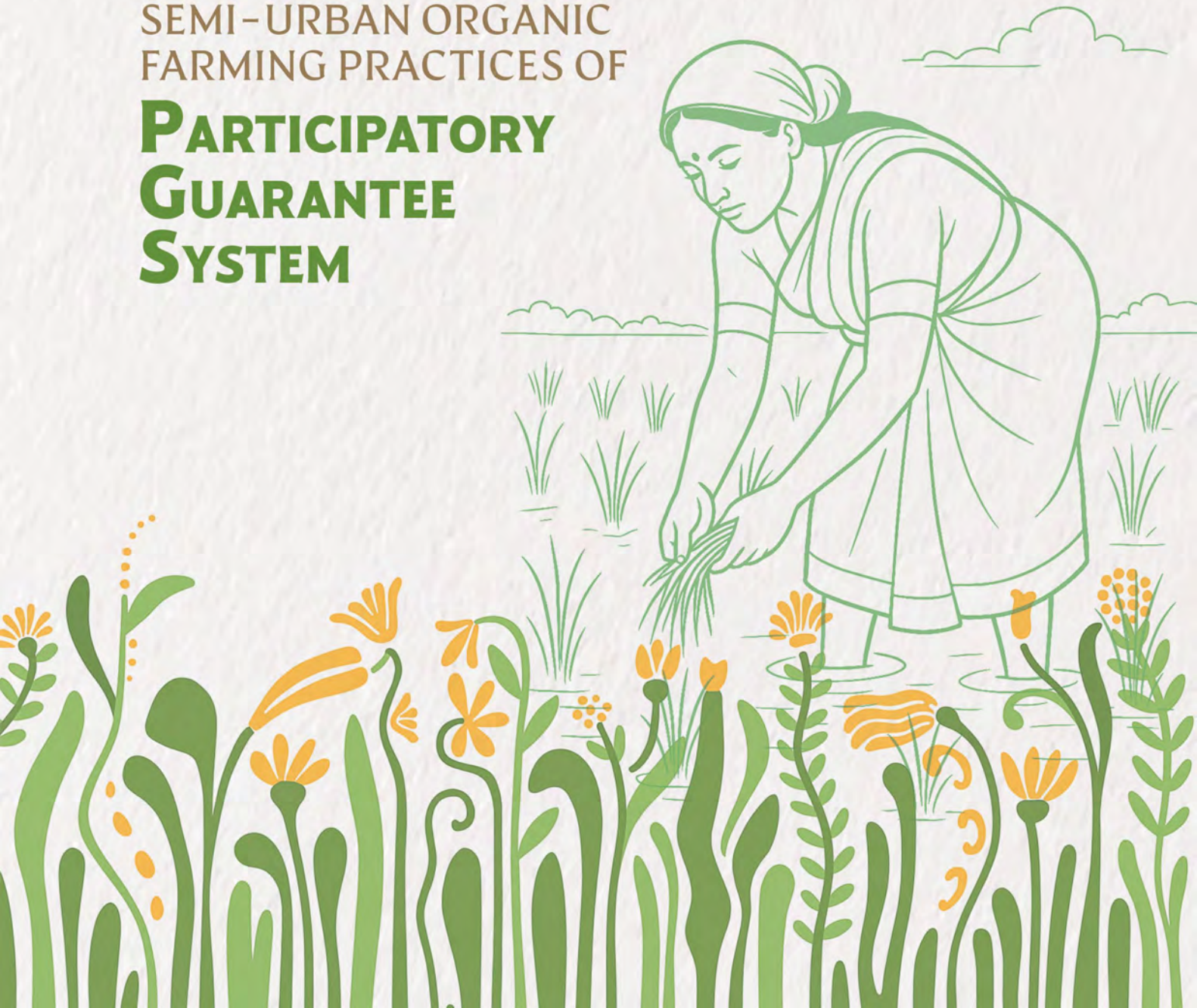
AGROECOLOGY FARMING PRACTICES IN KERALA, INDIA

WOMEN LEADING THE WAY

CASE STUDY -2

SEMI-URBAN ORGANIC FARMING PRACTICES OF

PARTICIPATORY GUARANTEE SYSTEM



CASE STUDY#1

Agroecology farming practices in Kerala, India
Women leading the way

Summary

Thanal with the support of Pesticide Action Network Asia Pacific (PANAP) has been supporting and training 26 women farmer groups (399 farmers) in Agroecology transition since 2022. From small-scale home gardening to community farming, raising a society, improving their livelihoods and making themselves self-sufficient in safe chemical-free food, these women are transforming their communities. Through capacity building programmes, hands-on-trainings, knowledge exchange programmes and continuous field management support, these 399 women farmers have stepped into agroecology, building their confidence, enhancing their livelihoods, and advancing food sovereignty.

Lead organization: **Thanal Trust**
Partners involved: **PANAP, Meenangadi panchayat (local self government)**
Donors: **PANAP**
Location: **Kerala**

General information

Farm size: **Mean farm size = 10 cents (405 m²)**

Legal link with the land: **Land owners**

Access to water for irrigation: **Pond, well, river**

Biome: **High range areas, upland and lowland mixed cropping system**

Climate: **Variable**

Pesticides of concern: **glyphosate, imidacloprid, 2,4-D, Saaf (carbendazim + mancozeb)**

Key indicators: **Biodiversity conservation, input reduction, increased productivity, pesticide and chemical fertilizer reduction, community farming**

Background

The project was conducted in Wayanad district of Kerala, India. Wayanad is an ecologically sensitive area and is highly vulnerable to climate change. The people there are small-scale farmers who practice conventional as well as organic farming. Through the new interventions, they started adopting agroecological practices, sharing their profits, gaining better access to fair price markets, and utilizing knowledge exchange platforms where they shared their field problems and successes. Biodiversity monitoring and agroecosystem analysis were also implemented in the fields of selected farmers.

Project activities, adoption and uptake

- The project provided training in agroecological farming practices to 399 women farmers over the period from January 2022 to December 2024. Of these farmers, almost 50% of them actively adopted some of the agroecological measures they learned through regular training.
- WhatsApp groups were created for farmers groups, through which 24 hour technical guidance on crop pest and disease management was provided. This social media platform provided farmers with a space for sharing their harvest stories which served as a motivation for the whole team.
- Among the 26 women farmer groups, 3 groups started group farming and were recognized by the Agriculture Department of Kerala and local

government bodies. As a result, the women farmers groups received opportunities to be a part of different government schemes.

Agroecological practices adopted in Wayanad, Kerala

Annual crops:

Conservation tillage practices were implemented, aiming at reducing soil erosion, improving soil structure and water infiltration. The crop residues were incorporated back into the planting pits. For basal manuring, powdered sea shells are added for neutralising soil pH. In addition, kitchen/leaf compost or Trichoderma-enriched decomposed cow dung is used as basal manures one week before planting and as mulch. At the time of planting, one teaspoon of VAM (vesicular arbuscular mycorrhizae) is added. After the 7th day of planting, Jeevamrutham/amrithapani/panchagavya is applied and on the 10th day, natural pest repellents are applied as a prophylactic measure. This is repeated until the crop reaches the flowering stage. At the flowering stage, diluted egg amino acid is sprayed for enhanced flower and fruit set.

Perennial crops:

For perennial crops, the tillage practices are the same as that of annual crops. Basal manure along with crushed sea shells, compost, enriched cow dung, and bone meal is also added. The manure application is repeated after 4-6 months based on crop growth progress.

Use of wild plants:

For making pest repellents, wild leaves with strong odours and those with latex are used.

A detailed table of agroecological farming methods introduced to farmers in Kerala is included at the end (see Annex).

Benefits observed

Climate mitigation

- Farmers reduced the use of fossil fuel energy sources and started using solar energy sources for farming operations, e.g. solar water pumps for irrigation.
- The manivayal regenerative agriculture project, when shifted to organic farming, contributed to an annual emissions reduction of 1.2 tonnes of CO -equivalent.

Climate adaptation

- Adjusting the planting timing: Farmers adjusted the sowing dates, which has been very effective in avoiding drought and flood periods; they also introduced short-duration crops. For example, previously farmers used to plant cool-season crops in November and harvest them by late February or early March. But summer now arrives earlier (February), so the planting is done in early October, allowing harvesting to be completed by the end of January, reducing the yield loss.
- Sucking pest infestation was widely seen in vegetable crops due to climate conditions favourable to these pests, such as increased humidity and high temperatures. So the sowing time was changed which helped to avoid pest outbreaks that have worsened with the warming climate.
- Use of cow dung manure formulations improved soil structure, earthworm count and soil properties important in controlling soil erosion.
- Windbreaks planted around the farming areas prevented crop lodging in heavy winds: Curry leaf plant (culinary), Glyricidia (manure and pest repellent), Calotropis (pest repellent) are the common windbreaks with multiple uses that are planted on farms.
- Increased climate resilience was achieved through use of native varieties of paddy, such

as Vellappokkan, an indigenous paddy variety that can withstand lodging in water-logged areas.

- Mulching, green manuring and crop rotation improved the water holding capacity and nutrient use efficiency, thereby reducing water stress in crops.

Economic Benefits

- The transition from costly chemical inputs to organic formulations made from locally available materials has significantly improved farmers' profit margins, especially among smallholders managing less than 0.1 ha (10 cents) of land.
- Farmers adopting regenerative agroecological practices reported notable yield improvements and higher farm productivity, contributing to enhanced income and food security. For example, in Manivayal, farmers reported paddy yields increased by 33%, following the shift to agroecology.
- Integrated and diversified farming systems reduced the risks associated with single-crop dependence, while providing multiple income streams from activities such as equipment leasing, organic input production, and farm produce sales. These diversified livelihood options have strengthened economic resilience and created more stable and sustainable rural incomes.

Biodiversity

- Training in biodiversity monitoring and agroecosystem analysis helped farmers to distinguish pests from beneficial insects such as predators and parasites, enabling the farmers to adopt wise pest management measures. This in turn reduced the irrational application of chemical pesticides that harm such beneficial organisms.
- Regular monitoring helped farmers to adopt timely management measures for pests and diseases, before reaching the Economic Threshold Level (ETL) for the crop.
- Fields in their third year of transition to agroecology showed an improved pest-to-defender ratio of 1:1, reflecting a ≈50% increase in beneficial insects such as ladybird beetles, spiders, red ants, praying mantises, and wasps, while pests outnumbered defenders by 2:1 in conventional fields.
- Agroecological fields recorded two to three times higher wild plant diversity than conventional farms, supported by richer soil organic carbon and minimal tillage practices.
- Agroforestry and integrated organic systems showed ~40–60% higher diversity of pollinators, birds, and predatory insects compared to monocropped fields. Frogs were present in 33% of organic farms but absent in conventional ones, while lichens and mosses thrived in agroecological fields, indicating healthier air, water, and soil ecosystems.

Gender and gender equity

- Gender equity and women's leadership was advanced, as 90% of participants were women, many of whom subsequently established women farmer groups.
- Representation from the Indigenous community: among 26 farmer groups, 2 groups were from the indigenous community, "Kurichya"

Mary Mathai, member of a women farmers group in Wayanad, conducts biodiversity monitoring in her field, with the guidance of Thanal field inspector, Aswathy. (Photo credits: Thanal)

Community organization

- Women farmer groups were formed which

brought them together, pooled their resources and started doing community farming. This created self-confidence and motivation and brought them out of social stigma.

- A community farming initiative was established in Manivayal village, where 10 men and 6 women from the indigenous community revived 8 acres which had been left fallow for more than 4 years due to water shortage. The community has been able to use solar energy efficiently, using a solar water pump to pump water from the nearby stream for vegetable farming purposes during summer and returning the water back to the stream.

Challenges

- Absence of subsidised organic inputs and resources, increasing the cost of cultivation;
- Lack of adequate economic support such as microcredits for small scale farmers;
- Decline in livestock farming, making it difficult to source organic manure, a major component in agroecological farming.
- Preference of farmers towards hybrid varieties, leading to loss of indigenous seeds.

Recommendations for policymakers and government agencies

- Promote the distribution of indigenous seed varieties through government schemes (instead of commercial hybrid seed), to enhance farmers' seed sovereignty and to strengthen agroecology;
- Initiate and implement government schemes that support farmers who wish to shift from conventional agriculture to agroecology during a transition period.
- Provide capacity building programmes for self-help groups (SHGs) in operating bioresource centres in every panchayat, to expand easy access to natural agricultural inputs. This can be done by agricultural extension departments.

SUCCESS STORIES OF AGROECOLOGY FARMERS, WAYANAD

Thankamani's Story

Woman farmer leads agroecology transformation in Wayanad

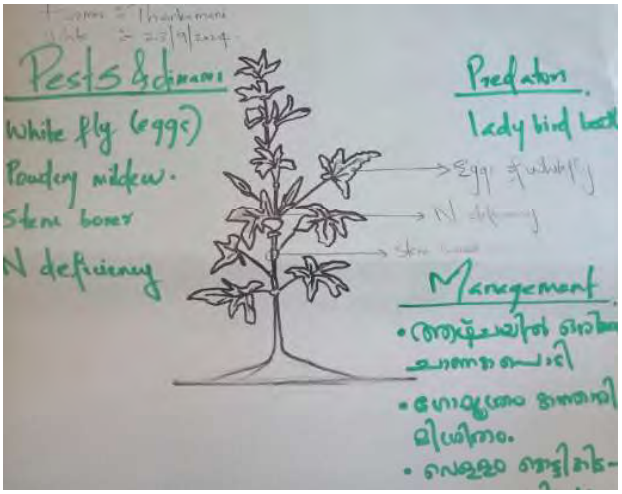
Mrs. Thankamani Suresh is a smallholder farmer who lives in Kolagappara village of Wayanad district, whose dedication to agroecology farming has earned her the Kisan Jyothi Award 2025, awarded by Meenangadi Gramapanchayat. She joined with Thanal in 2022 as part of the Women in Agroecology project (a three year project conducted in collaboration with Thanal and Pesticide Action Network Asia Pacific, aimed at mobilizing women farmers into agroecology, empowering them with a sustainable livelihood, and promoting community farming). During this time, Thankamani started learning about agroecological farming practices in an effort to reduce the use of pesticides and synthetic fertilizers. During the farmer training, homemade recipes for pests and disease management and biofertilizers for soil health management were the topics that caught her attention. She is supporting her family with the income generated from the sale of vegetables, tubers and other food crops.

Farming is the mainstay of Thankamani and her family. Over the past three years, Thankamani has revived barren lands, ensuring food security while conserving wetlands and groundwater. She grows indigenous paddy varieties like Ayiram Kana, Govind Bhog, Gandhasala and Jeerakasala, maintaining biodiversity and climate resilience. She also cultivates chinese potato, yams, root crops, coffee, pepper, millets, pulses, green manure crops and vegetables, reviving neglected farmlands into productive ecosystems through integrated farming with poultry, dairy and apiculture. Thankamani uses Jeevamrutham, Amrithapani and Pachagavya — effective cow dung formulations used as soil health enhancers that help in improving soil microbial activity. For pest management, she uses five-leaf extract, pheromone traps, thulsi-jaggery traps, fish amino acid and egg amino acid — natural inputs that reduce chemical dependency. During summers, the fallow sandy wetlands are sown with pulses and

the green manure crop, daincha, improving soil fertility by enhancing nitrogen fixation. This in turn reduces the use of urea for the second crop.

Leading an Agroecology Women Farmers Group in Kolagappara, supported by Thanal, Thankamani empowers other women to switch to sustainable agriculture through her farm visits and training. In 2024, with her leadership, an agroecology women farmers group was started in Kolagappara and took initiative in practicing agroecology at the household level. Now Thankamani is working closely with Thanal and is selected as one of the master farmers of our new project, "Mannorukkam- Enhancing Soil Health and Agroecology".

Thankamani on her diversified farm [Cassava,Red Amaranth and chinese potato) *(Photo credits: Thanal)*



Members of the women farmers group conduct agroecosystem analysis in Thankamani's field, analysing the ratio of pests to natural enemies, which then informs their pest management decisions. (Photo credits: Thanal)

Manivayal

Restoring land through diversified farming

The local panchayat president inaugurates their harvest festival.

In February 2024, a pilot project was launched in Manivayal village, bringing together 16 indigenous community farmers (ten men and six women) on eight acres of land to establish an agroecology farming model. The Manivayal regenerative agriculture project transformed the previously barren land, which had been left fallow for more than four years, into a productive agroecology farm, by addressing water scarcity through a solar water pump. Efficiently using the solar energy, they pumped water from the nearby stream, utilised for farming purposes and then returned it back to the stream.

Earlier, the community had been cultivating paddy in this plot and after the rice cultivation, the field was left fallow during summer (March-June). During the 2024 summer, mixed intercropping of 13 different vegetables, two flower crops and three millet crops was done. Agroecological training empowered farmers with new manure preparation techniques for soil health improvement, leading to chemical-free cultivation, ₹26,185 (297.37 USD) in earnings, and financial growth through reinvested profits. They harvested 437 kg of vegetables and more than 50 kg of marigold and sunflower which were sold locally.

Supported by Thanal in collaboration with Meenangadi Panchayat, the project also contributed to an annual emissions reduction of 1.2 tonnes of CO_2- equivalent. Building on the success of the solar water pump and regenerative agriculture initiatives, a superpower tiller was provided to enhance agricultural productivity and support the

economic empowerment of Indigenous farmers, as part of the UST Tribal Empowerment Program. The tiller, which began operations on July 13, 2024, worked for 78 hours across 24 fields, fostering a self-sustaining economic model as farmers leased it out for additional income. To ensure its efficient use, a skilled operator and helper were appointed, earning Rs 200 per hour and Rs 50 per hour, respectively. Each farmer paid Rs 700 (7.95 USD) per hour for tiller services, generating a total income of Rs 71,235 (809.28 USD). This initiative not only improved farm productivity but also strengthened the economic stability of the tribal community, reinforcing the role of sustainable agriculture in livelihood development and community empowerment. After the harvest of vegetables, paddy was cultivated and the rice yield increased from 1.2 tonnes in 2023 to 1.6 tonnes in 2024, marking a significant 33% increase in production.

Annex: Agroecological farming methods introduced to farmers in Kerala via agroecology trainings

Method	Further information	Agroecology principles
Mulching	Covering soils with dried leaves, straw and green manure leaves.	Synergy, biodiversity, soil health
Cover cropping	Cover cropping prevents weed growth and conserves soil moisture. Live roots harbor microbes that act as shields, preventing pest and disease attack.	Biodiversity, soil health
Jeevamrutham	An organic tonic prepared using fresh cow dung, cow urine, Jaggery, pulse powder, and top soil. This enhances soil microbial activity and thereby helps the soil bind nutrients for easy plant uptake. Soil is drenched once in 15 days. (500 ml/ plant)	Input reduction, biodiversity, synergy, soil biodiversity, resource utilization
Amrithapani	Organic liquid formulation of cow dung which enhances plant immunity and soil microfauna. Applied to soil once a week and during planting.	Input reduction, biodiversity, synergy, soil biodiversity, resource utilization
Fish amino acid	An organic pest repellent as well as soil tonic used for soil drenching and foliar spray. Used once in a month (3ml/L).	Resource utilization, soil health, biodiversity
Egg amino acid	An organic liquid made using egg and lemon water. Used for preventing flower drop and enhancing fruit setting.	Economic profit, resource utilisation, input reduction
Decision support	Simple counting method for monitoring levels of pests and natural enemies (action is taken when pest levels rise above 1 predator to every 2 pests). Actions include: a further spray of organic pest repellents and biofertilizers	Input reduction, biodiversity, participation
Wider spacing of plants	Mainly a disease management method and to enable farmers and workers to move more easily through the crop for better monitoring and better targeting of any applications.	
Application of Entomopathogenic fungi, nematodes and bacteria	Pseudomonas fluorescence, Trichoderma viridae, Pochonia, Beauveria bassiana, Verticillium lecanii, Paecilomyces lilacinus are the biofertilizers suggested for preventing and managing bacterial, fungal and nematode infestations in plants as well as to control beetles, caterpillars and bugs.	Plant health, food security, pesticide reduction
Application of biofertilizers	Azospirillum, Azotobacter, Rhizobium, potassium solubilizing bacterial consortium, and phosphorus solubilizing bacterial consortium are the major biofertilizers used for improving the uptake of soil nutrients for managing nutrient deficiencies in plants	Input reduction, biodiversity, synergy, soil biodiversity, resource utilization

Avoiding HHPs (insecticides and herbicides) harmful to natural enemies	Many insecticides are broad spectrum and kill natural enemies or interfere with their performance. Coffee farmers in Wayanad widely use a mix of chlorpyrifos and nimbecidine for controlling the coffee borers and imidacloprid for whiteflies and mealy bugs in vegetable crops. For weed control, glyphosate is commonly used. As an alternative to pesticides our farmers used cow urine, chilli extract and five leaf extract for caterpillars and Verticillium lecanii for sucking pests, fish amino acid for bugs and Clerodendrum infortunatum leaves for beetles.	Resource utilization, soil health, biodiversity
Applying compost/ dried cowdung/ enriched cowdung	Helps grow a healthier, more robust crop better able to withstand fungal attack and reduce volumes of synthetic fertilizer needed. Helps conserve soil moisture and can reduce drought stress in plants.	Recycling, input reduction, soil health, economic diversification
Roguing (hand pulling) of individual wilt or virus affected plants	Removes infective material from the field and reduces risk of disease spread	Input reduction
Sanitary pruning of badly diseased and older and yellowing leaves	Reduces level of disease spores able to spread to clean tissue, opens up lower crop canopy for better air circulation and reduces humid microclimate which favours disease	Input reduction
Thorough clean-up of all crop waste after harvest and removal from field	Reduces survival of pests which pupate or shelter as adults in crop waste. Crop waste can be composted, buried or fed to livestock or vermicompost units.	Input reduction

CASE STUDY#2

Semi-urban organic farming practices of Participatory Guarantee System farmers in Kerala, India

Summary

Thanal has been working as a certified regional council of Participatory Guarantee System (PGS) Organic Certification under the Kerala Department of Agriculture and Farmers Welfare since 2017. As part of the certification procedure, regular farmer trainings, peer monitoring, mobile agroclinic facilities and farmer to farmer knowledge exchange programmes are being conducted, enabling farmers to shift completely to organic farming practices, thus reducing the dependency on pesticides and chemical fertilizers.

Background

Trivandrum is the capital city of Kerala and the demand for chemical free organic food is comparatively high. There are semi-urban areas where the land area is limited for people to cultivate and the busy lifestyle forces them to depend more on outside markets. Since there is a great demand for organic produce, there are many fake products in the market that claim to be organic but actually are not. Certification was found to be a fair solution for this. But the third party certification costs are high, making it difficult for small scale farmers to afford. Participatory Guarantee System (PGS) certification works on transparency, shared vision and trust. It is a decentralised certification system, in which people from similar situations form a farmers group, inspect and peer review the crop production practices, and take decisions on organic certification. All farmers groups organise meetings and trainings every month, which improves the social bond between people in this busy urban lifestyle.

Activities, Adoption and uptake

(How well were the practices adopted, and by how many farmers, villages, districts, etc, and what are the future prospects/plans for scaling out?)

Lead organization: **Thanal Trust**
Partners involved: **Department of Agriculture and Farmers Welfare, Agriculture Extension departments**
Location: **Trivandrum, Kerala**

General information

Total and productive surface area of the property: 10 cents (405 m2)

Legal link with the land: Land owners

Access to water for irrigation (rivers, lakes, other): Well

Number of workers (including family members): Family members (2-3 people)

Membership of community and regional organisations: PGS registered farmer groups

Link with national and district public policies: Bharathiya Prakruthi Krishi Padhathi (BPKP- Government scheme for promoting natural and organic farming)

Type of biome / natural vegetation systems: Mixed farming, terrace farming, kitchen gardening

Climate of the area (temperatures, rainfall, etc.): Variable

Pesticides of concern: Imidacloprid, Carbendazim

Key indicators: Social values and diets, livelihood, fairness, participation, market access, connectivity, resource utilisation

- In Trivandrum, 18 PGS groups (85 farmers) have been trained and are practicing the below-mentioned agroecology practices.
- Some of the farmers started their own enterprises, such as running a vegetable shop, mushroom farm, etc.
- Through organic certification, farmers find it much easier to find a marketing channel that values the health and environmental benefits provided by these organic farmers.

Agroecological practices

Annual crops and Perennial crops

- Potting mixture preparation based on the purpose, i.e. for seed germination, for vegetable pot filling, for fruit trees (explained in detail in the annex).
- Crop management of terrace and kitchen gardens, including pest repellent preparation and manure-making.

Benefits

Climate Mitigation

- Nitrogen-fixing legume crops planted as an intercrop with high-value horticultural crops provided soil cover and improved soil fertility, thereby reducing the use of chemical fertilizers and the emissions from these fertilizers.

Climate Adaptation

- Crops selected based on seasonal suitability proved more resilient in withstanding the stresses of extreme weather conditions. This in turn strengthened their resistance to pests and diseases.
- Drip irrigation and sprinkler irrigation methods helped mitigate water and heat stress, enabling effective resource utilisation.
- Usage of temporary shades like green nets for raising seedlings and photosensitive crops was found effective in maintaining humidity and temperature levels necessary for plant growth.
- A method of tying cloths around trees proved effective in protecting plants from heat stress and reduced pest outbreaks.
- Coating lime over tree trunks reduced heat stress and damage from sun scorches and other climate change-related injuries.

Biodiversity

- Planting pollinator-attractive plants as border crops increased crop yield and supported insect and plant biodiversity in the agroecosystem.
- Planting trap crops (marigold, Calotropis, maize between main crops) attracts pests towards the trap crops, thereby limiting economic damage to the main crops and avoiding harm to beneficial insects.
- Planting both border and trap crops enhanced pollination activity and provided additional food sources for natural enemies, thereby increasing overall production, supporting natural enemy activity and reducing pest populations.

Income/economics

- Thanal has a social enterprise in Trivandrum, the "Organic Bazaar,"where our PGS farmers sell their surplus produce from the kitchen garden at a premium price.
- Through the Organic Bazaar, farmers earn an additional profit, a crucial supplement to income from their regular jobs.

Health (socio-environmental health)

- Reducing dependency on the outside market for food purchases improved household food security and thus the nutrition and health status of the families.
- Spending evenings on the terrace or in the kitchen garden with family members alleviated work-related stress and enhanced mental well-being.
- Working together in home gardens reduced the screen time of children and strengthened family relations.

Gender and gender equity

- Most of our small-scale farmers are women, who gained skills and confidence by participating in the project.

Community organization

- PGS farmers work together as a group based on their locality; they also manage and issue the certifications to farmers as a group, building social cohesion and pride in their local identity.
- Monthly trainings and meetings are conducted in farmers' homes and provides an open space for them to raise their problems and share suggestions on farming practices.

Challenges

- In urban areas, it is difficult for farmers to source organic manure. Compost is the only nutrient input which they can source or produce easily by themselves.
- In order to access the market, farm products have to be aggregated, which is a major challenge in PGS. Transportation costs are high; even during the transportation we have to ensure the products are not being contaminated, which requires additional certification in PGS; transporting perishable products is difficult, etc.
- Since PGS is a peer-reviewed certification system, disputes can arise in collective decision-making processes.

Recommendations

- Public initiatives, infrastructure support and subsidies are needed to support farmers and local communities in their adoption of agroecological farming practices and in the establishment of local marketing systems that will contribute to food security, health, biodiversity conservation and reduced harm from agrochemicals. Examples include:
- Surplus produce, even though of a small quantity, must be properly stored, processed and marketed. Initiatives and infrastructure to support short value chains are needed, for example: cold rooms, pack houses, and facilities for minimal processing which can be developed via capital subsidy to farmer producer organisations.
- Governments should provide subsidies (30–50%) for rooftop farming kits (soil beds, vertical planters, drip irrigation) to support food sovereignty and help meet local food security needs without dependence on chemical inputs.
- Linkages that connect rooftop gardeners with PGS/urban farmer collectives would facilitate seed exchange and bio-input supply.

Sreelekha's Story

Surplus produce and income from PGS-certified farming

Sreelekha in her terrace garden

Smt. Sreelekha, a homemaker from Kovalam, Trivandrum, was concerned about health issues from pesticide-contaminated vegetables. With limited land, she thought of terrace farming for her household needs. Hearing about Thanal's work in agroecology and PGS certification, she approached them through a PGS farmer friend. With regular PGS training and technical support, Sreelekha started terrace farming in 2018 and became a PGS-certified organic farmer by 2020. As her production grew, she began selling the surplus produce at Thanal Organic Bazaar, a social enterprise working since 2003 in Trivandrum, supporting PGS farmers. The extra income has contributed to her family's livelihood.

Presently, Sreeleha cultivates a diverse range of crops, including varieties of chilli, brinjal (eggplant), ivy gourd, cauliflower, cabbage, amaranth, beans, bhindi (okra), and papaya. Sreelekha has achieved a self-sustaining system where she produces the majority of the vegetables needed for her household. In addition, she maintains a poultry setup comprising seven hens and two roosters. The

organic supplements include compost, coir pith, fish amino acid, farmyard manure, green manures, Jeevamrutham, and Panchagavya — all of which play a pivotal role in nourishing her crops. As the potting medium base, she uses dry leaf compost made at her home, which is lightweight and a good source of plant nutrients. For pest management, she uses biofertilizers and home remedies like neem oil, garlic emulsion, cow urine chilli extract, insect traps like thulsi traps and yellow and blue sticky traps. For controlling flower drop and fruit drop, egg amino acid spray is used.

Now Sreelekha is supplying vegetables weekly at the Organic Bazaar. With her guidance, many other farmers in the locality have also started homestead farming and have formed a PGS farmers group in which they conduct regular meetings and provide training. In addition, Thanal is facilitating its PGS farmers with regular soil testing and necessary input supply through the mobile agroclinic. Through these interactions, they are learning new agroecological practices and practical solutions for crop management while also exploring new marketing channels.

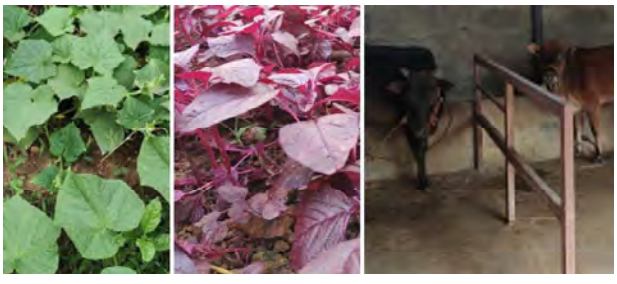
Veena's Story

A Woman's Quest for Food Security

In 2022, Mrs. Veena began integrated farming on 52 cents (0.2 ha) of her ancestral land, which had remained fallow for many years. Her first challenge was clearing the overgrown weeds, which were then incorporated back into the soil. This practice unexpectedly resulted in an excellent harvest (tomato, brinjal, chilli, amaranth, bitter gourd, yard long beans, etc.) in the first year. As a newcomer to farming, she had thought that the initial years would not be profitable, but her early productivity surprised her. However, the yield began to decline in subsequent years as the soil texture changed. She studied these changes in yield, soil color, and texture over the following years. Eventually, she realized the importance of soil mulching. She discovered that her initial success was due to the integration of organic residues, which had preserved soil texture, maintained soil temperature, improved water retention and carbon content, and thereby enhanced soil microbial activity and crop growth.

Veena adopted agroecological practices to rejuvenate her land. Meanwhile she bought indigenous cows and chickens for meeting the nutrient requirements of her crops. The major soil inputs used are compost made from leftover livestock feed, crop residues in the field, ash obtained from fuming the cattle shed in the evenings to prevent diseases in the cows, and composted poultry manure. For pest control, she uses leaf extracts of common weeds immersed in cow urine for one week; the resulting thick green liquid repels most of the vegetable pests. In addition to growing vegetables, Veena also started a small-scale value added operation for her farm produce. Milk, curd, ghee, paneer, and powdered spices are the major value-added products sold. Two permanent laborers on her farm, a husband and a wife, assist her in all the field activities. Thus Veena's farm also provides a livelihood opportunity for another family.

Veena primarily relies on word-of-mouth marketing to promote her product. She has a loyal base of regular customers who visit her to purchase her vegetables consistently. Additionally, she sells her surplus produce at nearby organic shops in Trivandrum. To ensure stable market pricing, Veena obtained PGS Organic Certification with support from Thanal Trust. However, as the demand for organic produce continues to rise, she has struggled to meet production targets. To address this, Veena adopted organic precision farming during the Rabi season with guidance from experts and consultants. This is a farming method in which precise amounts of required nutrients, water, and manures are given to plants as and when required, which ensures proper resource utilisation. She believes that precision farming is an efficient approach that helps save both time and space.



Veena's Integrated Farming approach in her 0.2 ha plot

Annex: Agroecological practices introduced to urban PGS farmers in Trivandrum via PGS Trainings

Method	Further information	Agroecology principles
Potting mixture for seed germination	• Coir pith • Coir pith+ top soil • Coir pith+ compost These are the 3 mixtures we use in Pro Tray (small containers used for raising seedlings with many compartments) as potting mixture	Recycling, land and natural resource governance
Potting mixture for vegetable garden (initial pot filling)	1 kg dried powdered cow dung for Nitrogen, organic matter, drainage; 1 kg leaf compost/dried leaves for Micro and macro nutrients; 1/2 Kg Bone meal for Calcium + Phosphorus; crushed sea shell for acidic soil reclamation for a single grow bag.	Land and natural resource governance, synergy, recycling
Decision support	Mobile agroclinics helped farmers in timely management of pests and diseases and also provided soil carbon testing.	Synergy, connectivity, fairness, participation
Jeevamrutham	An organic tonic prepared using fresh cow dung, cow urine, Jaggery, pulse powder and top soil. This enhances the soil microbial activity and thereby makes the soil bind nutrients for easy plant uptake. Soil is drenched once in 15 days. (500 ml/plant)	Input reduction, biodiversity, synergy, soil biodiversity, resource utilization
Amrithapani	Organic liquid formulation of cow dung which enhances plant immunity and soil microfauna. Applied to soil once a week and during planting	Input reduction, biodiversity, synergy, soil biodiversity, resource utilization
Egg amino acid	A formulation made up of egg and lemon water which accelerates flowering and fruit set	Synergy, resource utilisation
Fly traps	Installing yellow sticky traps for whiteflies and aphids Blue sticky traps for thrips Thulsi trap for fruit flies and bugs Banana jaggery trap for fruit flies	biodiversity
Pest repellents	Five leaf extract using different wild leaves having pest repellent properties when the pest-defender ratio exceeds 1:1 (neem, Calotropis, Vitex, Moringa spp.)	Plant health, food security, input reduction
Roguing (hand pulling) of individual wilt or virus affected plants	Removes infective material from the field and reduces risk of disease spread	Input reduction
Application of entomopathogenic fungi, nematodes and bacteria	Pseudomonas fluorescence, Trichoderma viridae, Pochonia, Beauveria bassiana, Verticillium lecanii, Paecilomyces lilacinus are biopesticides that are recommended for preventing and managing bacterial, fungal and nematode infestations in plants, as well as to control beetles, caterpillars and bugs.	Plant health, food security, pesticide reduction
Application of biofertilizers	Azospirillum, Azotobacter, Rhizobium, potassium solubilizing bacterial consortium, and phosphorus solubilizing bacterial consortium are the major biofertilizers used for improving the uptake of soil nutrients for managing nutrient deficiencies in plants.	Food security, soil health, pesticide reduction

Pesticide Action Network International (PAN International) is a network of over 600 participating nongovernmental organizations, institutions and individuals in over 90 countries working to replace the use of hazardous pesticides with ecologically sound and socially just alternatives.

Web: pan-international.org

Facebook: PesticideActionNetworkInternational

Thanal is a community-based environmental organization in Kerala committed to sustainable living through agroecology, waste reduction, biodiversity conservation, and climate resilience. Its initiatives empower communities and influence policies toward a just and sustainable future.

Web: thanaltrust.org

YouTube: thanal outreach

Facebook: Thanal Trust

Instagram: thanal_trust

Semi-Urban organic farming practices of Participatory Guarantee System farmers, Kerala

This case study was produced by **Thanal** in collaboration with PAN International. It is one in a series of PAN case studies showcasing the benefits and contributions of agroecology to climate resilience, food security, health and biodiversity protection. The series is produced by members of the PAN International Agroecology Workgroup. The full series is available in a number of languages via the QR code.

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