



Symphony of soil

A forest guardian's journey in biodiversity conservation and sustainable utilization

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In an era of rapid climate change, biodiversity loss, and increasing agricultural intensification, biodiversity conservation through traditional farming practices has become increasingly important for sustaining ecological balance and safeguarding plant genetic resources. Rooted in indigenous

knowledge and a deep respect for nature, such farming systems play a vital role in conserving agrobiodiversity while ensuring household food and nutritional security.

A recent field survey conducted in the Kuzhakkad area of Mamalakandam under Kuttampuzha grama panchayath

of Ernakulam district revealed that Mr. Raghavan Korallil Vellan, a 62-year-old farmer, has transformed his 2-acre forest-right land into a thriving, entirely organic farming system. Rather than relying on intensive mechanisation, synthetic fertilisers, or chemical pesticides, he follows ecologically sustainable farming practices that integrate

diverse food crops, spices, fruits, medicinal plants, and wild species. His farm demonstrates how traditional agricultural practices can effectively conserve biodiversity, strengthen climate resilience, and preserve valuable plant genetic resources. Through his lifelong commitment, Mr. Raghavan exemplifies the important role of custodian farmers in safeguarding Kerala's rich agrobiodiversity for future generations.

Rooted in Tradition: The Man Behind the Soil

Mr. Raghavan K.V., a 62-year-old farmer from the Urali tribal community, resides in Kuzhakkad, Mamalakandam, in Kerala. Drawing upon generations of indigenous knowledge, he practices traditional organic farming on his two acre forest-right land, conserving a remarkable diversity of crops while maintaining ecological balance.

Through years of hard work, perseverance, and a simple



farming livelihood, he overcame numerous hardships to educate and raise his three children, all of whom are now doctors. His journey reflects the dignity of labour and his unwavering commitment to both his family and the land. Supported by a perennial open well and a small irrigation pump, he personally undertakes most of the farm operations, demonstrating his dedication to sustainable agriculture and biodiversity conservation.

Living free from financial liabilities, Mr. Raghavan considers the rich biodiversity of his farm not material wealth to be his greatest asset. His life exemplifies how determination, traditional knowledge, and a deep respect for nature can sustain both a family and an invaluable agricultural heritage.

A Living Botanical Garden

Raghavan's two acre farm represents a living botanical garden, characterised by an exceptional diversity of cultivated and wild plant species maintained under a completely organic farming system. Rather than following conventional input-intensive agriculture, he strictly avoids the use of synthetic fertilisers and chemical pesticides. Soil fertility is sustained through the

application of farmyard manure, compost, dried cow dung powder, green manures, and other organic animal manures, which improve soil health, enhance microbial activity, and maintain long-term soil productivity.

The adoption of these ecologically sustainable practices has created a favourable habitat for a wide range of food crops, spices, medicinal plants, fruit trees, and wild species to thrive. The farm serves as an excellent example of how traditional organic farming can simultaneously conserve agrobiodiversity, improve ecosystem health, and promote sustainable agricultural production.

Pepper Diversity

Black pepper constitutes one of the most significant components of Raghavan's agrobiodiversity conservation efforts. Unlike other farmers of the locality, he conserves 11 distinct black pepper varieties maintained on more than 100 vines. The vines are traditionally trained on living standards such as jackfruit (*Artocarpus heterophyllus*), *Gliricidia* (*Gliricidia sepium*), and Indian coral tree (*Erythrina* spp.), contributing to a sustainable agroforestry system.

His collection includes the improved variety Panniyur-1, known for its long spikes, bold berries, early bearing,



and high yield potential. The farm also conserves several valuable indigenous landraces, including Karimunda, recognised for its tolerance to foot rot disease; Neelamundi, valued for its superior berry quality; Vellanamban, a reliable local yielder; Marampidathi and Vellamundi, traditional hill selections adapted to local conditions; Kuthiravali, characterised by long spikes and an alternate bearing habit Athuthakkadi and the traditional mundi types Thotumundi, Manjamundi, and Cheppakulam Mundi. The conservation of these diverse varieties preserves valuable genetic resources that are important for future crop improvement, disease resistance, and climate resilience.

Cash Crops and Traditional Food Crop Diversity

Raghavan's farm conserves a diverse range of perennial cash crops integrated within a traditional agroforestry system. The farm includes arecanut, more than seven coffee plants, two nutmeg trees, more than five cocoa trees, and coconut palms, all cultivated in a multilayered cropping system that enhances biodiversity, improves soil health, and provides diversified sources of income.

The farm also serves as an important repository of traditional food crop diversity. Raghavan conserves five traditional banana varieties, including Nendran, Palayankodan, and Njalipoovan. Nendran is preferred for cooking and processing into chips, Palayankodan is valued for its sweet taste and regular bearing, while Njalipoovan is appreciated for its flavour, aroma, and nutritional quality. The cultivation of multiple banana varieties enhances household

food security and reduces the risk of crop loss.

He also maintains several tuber crops, including tapioca (cassava), elephant foot yam, and taro (Colocasia). Tapioca serves as an important staple food with good drought tolerance and reliable productivity. Elephant foot yam is valued for its high yield, nutritional richness, long storage life, and medicinal properties, particularly in traditional digestive health. Taro is an easily digestible food crop rich in carbohydrates, minerals, and dietary fibre, and is widely used in traditional diets.

A unique feature of the farm is the conservation of yellow and blue arrowroot landraces. These rare varieties produce high-quality starch that is easily digestible and traditionally used as a nutritious food for children, elderly people, and convalescent patients. Arrowroot also holds importance in indigenous medicine for its soothing effect on digestive ailments.

In addition, Raghavan conserves rare wild edible tubers such as Nooran Kizhangu and Thotti Kizhangu, and other yams which have traditionally served as emergency food sources for indigenous communities during periods of food scarcity. These species possess valuable genetic

traits for adaptation to local environments and represent an important component of tribal food culture and plant genetic diversity.

Through the conservation of these traditional food crops and wild edible species, Raghavan safeguards valuable genetic resources, strengthens household food and nutritional security, and preserves indigenous agricultural knowledge for future generations.

The Natural Pharmacy

Raghavan's farm serves as a valuable repository of indigenous medicinal plants, conserving several rare and traditionally important species that preserve the rich medicinal knowledge of tribal communities. These plants continue to play an important role in traditional healthcare systems for the treatment of common ailments.

Among the most significant species is Black Turmeric (Karimanjal, *Curcuma caesia*), a rare medicinal rhizome valued for its anti-inflammatory, analgesic, antimicrobial, and antioxidant properties. It is traditionally used to manage joint pain, respiratory disorders, digestive ailments, and skin diseases. Adalodakam (*Justicia adhatoda*) is widely recognised for its bronchodilator





and expectorant properties and is extensively used in the treatment of cough, asthma, bronchitis, and other respiratory illnesses. Castor (Avanakku, *Ricinus communis*) provides medicinal oil used as a natural laxative and for relieving joint pain, muscular inflammation, and various skin disorders.

The farm also conserves important indigenous medicinal herbs, including Murivukooti, traditionally used for wound healing and fracture management; Muyal Cheviyan, valued for treating inflammation, minor infections, and skin ailments; and Karinochi (*Vitex negundo*), an important medicinal shrub with anti-inflammatory, analgesic, antimicrobial, and insect-repellent properties, commonly used for arthritis, fever, headaches, and respiratory disorders. In addition, several locally important tribal medicinal herbs are maintained for the treatment of digestive disorders, fever, skin diseases, insect bites, and other common health conditions.

By conserving these medicinal plant species, Raghavan safeguards valuable plant genetic resources while preserving the

traditional healthcare knowledge of indigenous communities for future generations.

From Abiu to Velvet Fruit: An Exotic Orchard

Raghavan has established a diverse fruit orchard comprising both indigenous and exotic fruit species, making his farm an important repository of fruit crop genetic diversity. The orchard includes three mangosteen plants, two rambutan plants, two abiu plants, five distinct citrus varieties, and one sapota tree. In addition, he conserves one plant each of avocado, mulberry, milk



fruit, miracle fruit, velvet fruit, dragon fruit, and custard apple, along with three traditional gooseberry varieties.

The farm also conserves six distinct jackfruit varieties including Vietnam super early each exhibiting variation in fruit characteristics and maturity period, thereby preserving valuable intraspecific diversity. In addition, wild grapes and five large unidentified wild forest fruit trees are maintained as part of the farm ecosystem. These wild species represent important plant genetic resources and highlight the rich biodiversity conserved within the farm, while also warranting further taxonomic documentation.

The conservation of indigenous, exotic, and wild fruit species within a single farming system demonstrates Raghavan's commitment to preserving fruit crop diversity and safeguarding valuable plant genetic resources through on-farm conservation.

Commitment to native breed conservation

In addition to crop cultivation, Raghavan contributes to the conservation of indigenous livestock by rearing two Vechoor cows, one of India's native cattle breeds renowned for its adaptability and cultural significance. Together, the cows produce approximately one litre of milk per day, which is primarily utilised for household consumption. Although the milk yield is modest, it is highly valued for its quality and richness, with one litre being sufficient to prepare nearly 25 cups of tea. The maintenance of this native breed reflects Raghavan's commitment to conserving indigenous animal genetic resources while supporting the nutritional needs of his family through a sustainable farming system.

Table 1: Varietal diversity of crops in Raghavan's field

Category	Crop	Varieties	Remarks
Spices	Black Pepper	Karimunda, Neelamundi, Vellanamban, Panniyur-1, Marampidathi, Vellamundi, Kuthiravali, Athuthakkadi, Thotumundi, Manjamundi, Cheppakulam Mundi	11 varieties; >50 vines
Plantation	Arecanut, Coffee, Nutmeg, Cocoa, Coconut	Traditional cultivars	Mixed multi-storey farming
Banana	Banana	Nendran, Palayankodan, Njalipoovan, Choondilla kanan, Robusta	5 varieties
Tubers	Tapioca, Elephant Foot Yam, Taro, Arrowroot	Yellow & Blue Arrowroot, Nooran Kizhang, Thotti Kizhangu	Traditional & wild tubers
Fruits	Fruit crops	Avocado, Rambutan, Mangosteen, Sapota, Mulberry, Abiu, Milk Fruit, Miracle Fruit, Velvet Fruit, Orange, Dragon Fruit, Custard Apple, Wild Grapes	15+ fruit species
Others	Gooseberry, Jackfruit	3 gooseberry varieties; 6 jackfruit varieties; 5 unidentified forest fruit trees	Conserved germplasm
Livestock	Vechoor cow	2 indigenous cows	Native breed conservation
Medicinal	Medicinal plants	Karimanjal, Adalodakam, Avanakku, Murivukooti, Muyal Cheviyan, Karinochi and unidentified herbs	Traditional medicinal flora



Farm Produce Utilisation and Marketing

Raghavan's farming system primarily focuses on household food security and the conservation of agrobiodiversity rather than commercial production. Most of the farm produce is utilised for household consumption and

is shared with extended family members, reflecting the farm's role in sustaining traditional food systems.

Surplus produce is marketed through local channels. Traditional tuber crops, including tapioca, elephant foot yam, taro, and other

indigenous tubers, are sold in nearby local markets as well as directly to consumers who visit the farm. Other produce, such as black pepper, bananas, and seasonal fruits, is also marketed locally based on seasonal availability. This direct farm-to-consumer marketing provides supplementary household income while maintaining the farm's conservation-oriented approach.

Raghavan's farming system demonstrates that biodiversity conservation and livelihood generation can coexist within a sustainable agricultural framework. By prioritising the conservation of indigenous crop diversity while meeting household needs and marketing only the surplus, his farm serves as an exemplary model of on-farm conservation, ensuring the continued preservation and sustainable utilisation of valuable plant genetic resources for future generations. ■