



# CASE STUDIES OF SUSTAINABLE USE OF BIODIVERSITY



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# **CASE STUDIES OF SUSTAINABLE USE OF BIODIVERSITY**

## **Vol 4**

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### **Project**

Database of Tradable / commercially potential bioresources and economic valuation in Kerala, Rebuild Kerala Initiative, Government of Kerala

## **CASE STUDIES OF SUSTAINABLE USE OF BIODIVERSITY**

### **1. Tribal and social welfare**

1. Rehabilitation of tribes at Aralam, Kannur
2. Kudumbashree- women empowerment
3. Farmer Producer Organizations (FPOs)- Kerala
4. Ayurveda medicines- Ayurdhara Pharmaceuticals, Thrissur
5. Mitraniketan
6. Santhigiri Ashram
7. Kerala State Bamboo Corporation Ltd - Bamboo, Cane and Reeds

### **2. Sustainable initiatives of utilization of Agrodiversity**

1. Muthalamada Mango Farm
2. Medicinal Tobacco Story of Kasaragod
3. Strawberry farming - Kerala State Horticultural Products Development Corporation (Horticorp)
4. Vegetable and Fruit Promotion Council Keralam (VFPCK)

### **3. Floriculture**

1. Lotus nurseries
2. Homegrown Biotech
3. L.J. International Ltd Biotech division, Kochi
4. Pearl Orchids
5. Aarshasree Orchids

### **4. Plant/ Animal derived products**

1. TMV Aromatics (P) LTD

2. Chitin and Chitosan

## **5. Geographical Indicators- A tool for Biodiversity conservation**

1. Navara Ecofarm
2. Nilambur Teak
3. Vazhakulam Agro and fruit processing company- Pineapple
4. Marayoor jaggery

## **Annexures**

## INTRODUCTION

In Kerala, successful experiences in conserving biodiversity and utilizing bioresources sustainably for livelihood have not been widely publicized and hence have not been replicated elsewhere in the state. As part of the project several case studies were documented and some of the major ones are presented here. Depending on the main thrust areas of each, the selected case studies have been divided into four categories: Tribal and social welfare, Sustainable initiatives in agricultural crops, floriculture, plant extracts and forestry.

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The crucial role of local communities in conserving and managing bioresources that occur in their vicinity is well known. Their lives are closely interlinked with these bioresources and promoting initiatives that enhance the local economic value of biodiversity so that communities are incentivized to conserve and sustainably use it is necessary.

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The development of small, local businesses can be an important tool in such cases. Several such case studies are presented of which one of the best examples is that of Kudumbashree- the inspirational story of women empowerment, where the human resource is mobilized through institutional support.

The case studies in the sections floriculture highlights small entrepreneurs who through their dedicated efforts have converted their business into successful ventures with even export potential. Tribal communities are the most impacted by loss of biodiversity as their livelihood is intrinsely linked with biodiversity. Case studies where interventions for producing value added products from bioresources for enhanced livelihood options among tribal communities are also presented.

Farmers and landowners often sell primary products which then are purchased and processed and eventually reach the market place and sell for many times more than the initial sale price. The producers of the raw material receive only a fraction of the end sale value to which they contribute. Value addition is often proposed to counter the low prices paid for raw materials by traders and middlemen and to capture additional value per unit. In Kerala about 99.0 % of the farm holdings are small and marginal hence the farmers suffer from some problems such as absence of economies of scale, access to information, market for their produce etc. Development of collectives, producer companies etc create opportunities for producers to get involved in all aspects of supply chain right from inputs

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Farmer Producer Organisations (FPOs) are found to be an effective institutional mechanism for linking small farmers to the market as it helps farmers to reap many benefits, including improved access to market, technology and input, reduced transaction costs, achieving economies of scale, better quality and price realization for the produce. The scope for FPOs and other collectives is immense in Kerala.

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to marketing.

NABARD has taken several initiatives in creating FPOs in Kerala and it is pointed out that in Kerala nearly 45% increase in income for farmers can be achieved. State Governments and departments play an important role in facilitating sustainable use of bioresources and several case studies in such fields are also included. Most of these initiatives have been established and promoted by the government.

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Small Farmers Agri Business Consortium (SFAC) Kerala was established with a vision to foster the Agripreneur Ecosystem in Kerala. SFAC Kerala has nurtured more than 200 Agribusiness Start ups in Kerala.

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The Indian Organic Farmers Producer Company Limited (IOFPCL), Aluva, is the largest organic producer company in India owned by the farmers. The company aims to cut out the middleman and hence ensures that the farmer benefits the maximum in the end pricing of his agricultural produce. The company also ensures an Organic and Fairtrade premium over and above the market price so that the farmer has an incentive to follow Organic and Fairtrade practices. IOFPCL is registered with the Directorate General of Foreign Trade as an Importer – Exporter and is a 'Registered Exporter Member' of the Spices Board, Coffee Board, Coconut Board and the Agricultural and Processed Food Products Export Development Authority (APEDA).

Geographical indications (GIs) are gaining popularity as a way for communities to promote and safeguard markets for their biocultural products and is a tool for protection of traditional knowledge. The Geographical Indications (GIs) are endowed with fundamental features as a result of its origins. Kerala has received GI registration for several products, but the major issue is maintaining the quality and preventing misappropriation as produce developed elsewhere is also marketed under the GI tag.



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The case studies assess and demonstrate the role of small business development in biodiversity conservation; how biodiversity based entrepreneurship could be socially, economically and environmentally viable and sustainable. One of the major issues highlighted in all cases are lack of sufficient marketing facilities. Government initiatives for providing training and linking with B schools to develop innovative marketing strategies and utilizing the potential of ecommerce need to be promoted. Lack of storage and processing facility is another major issue highlighted especially in the case of perishable items like fish, fruits etc. Geo-tagging the land used for cultivation in case of GI products will enable to maintain the traceability of the crop output from the farm until it reaches the consumer, the quality and also procure premium price for the goods.

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## TRIBAL AND SOCIAL WELFARE

### 1. REHABILITATION OF TRIBES AT ARALAM, KANNUR

Tribal Resettlement and Development Mission (TRDM) was established by the Government of Kerala for the rehabilitation of landless tribal people in Kerala. Total area of Aralam Farm is about 1460 ha. and has a cultivable area of about 1200 ha. The case study focusses on the occupational status, entrepreneurship development, scope of self-employment, skill development activities and income generation process among the tribal communities of Aralam. The present study covered two tribal families (both have one acre land) to assess the economic viability of natural farming, and also to identify the constraints associated with farming. A semi-structured interview schedule was used for data collection and data was analysed by descriptive statistics.

#### 1. **Plot No 451/37. Block 13. Phase I (Owner: Sreedaran)**

The average yields of various crops grown in the area (Table 1) were good for certain crops and poor for other crops especially annual crops like ginger and turmeric.

#### 2. **Plot No 608. Block 10. Phase II (Owner: Thankamma)**

The average yields of various crops grown in the area (Table.2) were good for crops like pepper and kasturi manjal but, poor for annual crops like ginger and turmeric.

**Table 1. The average yield of various crops in one acre**

Planting material & lively hood activity Items	No of Items Planted	Cost of Seedlings	Planting expense	Organic Manure	Dolomite	Labour	Manure & labour Rs				Goat shed & Feed	
							Rs	Rs	Rs	Rs	Rs	II
Coconut	20 .nos	3000	3000	320	80	750	1390	1390	1390	1390		
Aracanut	100. nos	3600	2250	800	400	750	1550	1550	1550	1550		
Pepper	100. nos	3200	1500	800	500	750	1550	1550	1550	1550		
Cashew	30. nos	1560	2700	240	120	750	1200	1200	1200	1200		
Kudampuli	2. nos	200	100	10								
Papaya	5. nos	260	100	10								
Kanthari chilli	5. nos	25	100	10								
Karivepe	2. nos	20	50	10								
Turmeric	20. kg	1100	3000			3000						
Ginger	10. kg	900	4000	800		3000						
Vegetables	20.cent	1000	4500	2000		1500						
Goat	2. nos	16000									6000	
Total Expense		30865	21300	5000	1100	10500	5690	5690	5690	5690	6000	97525

**Table 2. The average yield of various crops in one acre**

Planting material & lively hood activity Items	No of Items Planted	Cost of Seedlings	Planting expense	Organic Manure	Dolomite	Labour Cooli	Manure & labour Rs				Goat shed & Feed
							II	III	IV	V	
		Rs	Rs	Rs	Rs	Rs					
Pepper Cuttings	50 nos	1600	1500	375	200	750	1125	1125	1125	1125	
Cashew	50 nos	2600	3750	375	200	750	1500	1500	1500	1500	
Arecanut	50 nos	1800	1500	375	200	750	1500	1500	1500	1500	
Turmeric	10. kg	550	1500			1500					
Ginger	5. kg	450	2250	400		2250					
Tuber Crops	30. kg	1200	2250			2250					
Vegetables	10. cent	500	2250	1000	100	2250					
Medicinal Plant	10. cent	7000	1500	500		1000					
Goose berry	5 nos	400	300	40	20		140	140	140	140	
Goat	2 nos	16000									6000
Total Expense		32100	16800	3065	720	11500	4265	4265	4265	4265	6000

## **Integrated & Sustainable Development of Center for Research and Development (CRD) in Aralam**

With the support from Tribal Development Fund of NABARD, CRD is implementing integrated & sustainable development programmes for the Tribal community in Aralam tribal rehabilitated area of Kannur district.

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CRD is promoting 6 FPOs in Kannur and Kasargod districts with the support from NABARD. They are Gramalakshmi Marketing Producer Company LTD, Thulunad farmer producer company LTD & Ksheera Farmer producer company in Kasaragod and Pariyaram Coconut Farmers' Producer Company LTD, Anthoor Vegetable & Fruit farmers producer company LTD & Kurumathoor and Honey farmers producer company LTD in Kannur.

There are 1098 families settled in the colony and are engaged in agriculture in the land provided by the forest department. It has activities in the fields of horticulture, soil conservation & water resources development, livelihood promotion, health & nutrition, lease farming, women development, community organization and aggregation of farming activities through farmer collective. The project also promotes unique farming practices of tribal and a goat village programme. The tribal products are being marketed under a common brand name - 'NAAC'. Value added products and honey is being marketed along with vegetables, turmeric, ginger, finger millet, and sesame and tuber crops produced organically.

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### **Farming system:**

The procurement of the seeds are done directly from the farmers of Kasargod (seed collection will done only after monitoring the quality check). Sometimes the seeds collected are grown to the sapling level and distributed to the tribal farmers from CRD office Iritty. Pepper, ginger, turmeric, kashurimanjal(*Curcuma aromatic*), areca, coconut,

tapioca, cashew were the major crops grown in the mixed cropping system of the agro ecosystem inside the forest. The natural farming model of these farmers did not depend on any external inputs except the application of manure available in the forest itself. Collected forest products were purchased by CRD and later it will be traded via open market. For example cashew procurement was done on March 2020, and they were given a better rate for their product while compared to the other markets. Two processing and marketing centres for tribal products are functioning in the area.

CRD is one of the empanelled Technical Agencies (TA) for TRIFED (Tribal Cooperative Marketing Development Federation of India) an organization under the Ministry of Tribal Affairs, Government of India for its SFRUTI project and is mandated to provide technical support to promote tribal cluster development activities. Each of the members who is under the project should have a Bank savings account, the commodities amount they sale after the harvest are directly credited to the tribal members account. This also reduces the social evil practices to an extent and misuse of money among the community. With the assistance from NABARD, a Rural Mart at Peria is run by Kairali Farmers' Club. Rural Mart facilitates marketing of the farmer's products and supply necessary tools and inputs for farming activities. Process is on to install a Rural Mart at Iritty for the Aralam Tribal Community. So far the CRD Aralam farm participated in two out sales one at Gadhika and other is Kathiroom

**Table 3. Collection List-2020**

Sl. No.	Name of the Item	Scientific Name	Quantity in Kg.	Buying Rate in Rs. (per kg.)	Total Amount
1.	Ginger	<i>Zingiber officinale</i>	354.500	40-60	16760
2.	Ash Melon (Kumblanga)	<i>Benincasa hispida</i>	10.500	16	168
3.	Colocasia (Chembu)	<i>Colocasia</i>	149.500	20-27	3091.50

4.	Papaya	<i>Carica papaya</i>	4.800	20	96
5.	Amorphophallus (chena)	<i>Amorphophallus paeoniifolius</i>	525.500	20-25	10547.50
6.	Curcuma (raw-Manjal)	<i>Curcuma longa</i>	1758	10-13	21652.50
7.	Kudam puli	<i>Garcinia gummi-gutta</i>	49.700	180-230	9787
8.	Kandari- Green	<i>Capsicum frutescens</i>	1.250	167-400	360
9.	Curcuma (dry-Manjal)	<i>Curcuma longa</i>	703.900	105-115	78188.50
10.	Honey (Cheruthenu)		19.100	1500	28650
11.	Honey (van-thenu)		36.250	250	9062.50
12.	Sesamum- Ellu	<i>Sesamum indicum</i>	0.800	110	88
13.	Manjal tada		50	90-100	4590
14.	Pacha Payar	<i>Vigna unguiculata</i>	3	35	105
15.	Banana	<i>Musa</i>	2445	20-45	104290
16.	Banana flower		6	20	120
17.	Greater yam-Kachil	<i>Dioscorea alata</i>	8.500	25	212.50
18.	Brinjal	<i>Solanum melongena</i>	0.300	15	4.50
19.	Koorka	<i>Plectranthus rotundifolius</i>	1.500	50	75
20.	Ladies finger	<i>Abelmoschus esculentus</i>	2	32	64
21.	Snake gourd (Padavalam)	<i>Trichosanthes cucumerina</i>	18	32	576
22.	Bread fruit	<i>Artocarpus altilis</i>	23.800	20	476
23.	Cashew	<i>Anacardium occidentale</i>	170.100	103-127	20659.60
24.	Agarbatti		48 packets	8	384
25.	Kastoori Manjal	<i>Curcuma aromatica</i>	8.500	70	595
26.	Pepper	<i>Piper nigrum</i>	299	291-300	88615.40
27.	Rice	<i>Oryza sativa</i>	277.400	35-40	10791
28.	Amaranthus (Red cheera)	<i>Amaranthus sp.</i>	56.400	35-40	2238.50

**Table 4 Collection List-2021**

Sl. No	Name of the Item	Scientific Name	Quantity in Kg.	Buying Rate in Rs. (per kg.)	Total Amount
1.	Ginger	<i>Zingiber officinale</i>	90	35	3150
2.	Ladies finger	<i>Abelmoschus esculentus</i>	10.900	35	368
3.	Pepper	<i>Piper nigrum</i>	14.300	310	4433
4.	Brinjal	<i>Solanum melogena</i>	2.300	25-33	70
5.	Amorphophallus (chena)	<i>Amorphophallus paeoniifolius</i>	13	25	325
6.	Curcuma (raw-Manjal)	<i>Curcuma longa</i>	88	10-12	988
7.	Kudam puli	<i>Garcinia gummi-gutta</i>	5	230	1150
8.	Curcuma (dry-Manjal)	<i>Curcuma longa</i>	3.500	100	350
9.	Honey (Van-thenu)		23.200	270-350	6404
10.	Honey (Cheru-thenu)		5.850	1500	8995
11.	Sesamum (Ellu)	<i>Sesamum indicum</i>	5.700	160	912
12.	Bread Fruit	<i>Artocarpus altilis</i>	21	30	630
13.	Pacha Payar	<i>Vigna unguiculata</i>	25	35-40	990
14.	Bitter gourd	<i>Momordica charantia</i>	9	40	360
15.	Luffa (Peechinga)	<i>Luffa arabum</i>	3.600	30	108
16.	Snake gourd	<i>Trichosanthes cucumerina</i>	16.500	30	384
17.	Banana flower		5 nos	5	25
18.	Cashew	<i>Anacardium occidentale</i>	61.150	94-96	5751.50
19.	Amaranthus-Red seeds	<i>Amaranthus spinosus</i>	1	800	800
20.	Amaranthus-Green seeds		0.800	1000	800



21.	Curcuma (kasthoori manjal)		21	50	1050
22.	Cucumber (vellari)	<i>Cucumis sativus</i>	4	30	120

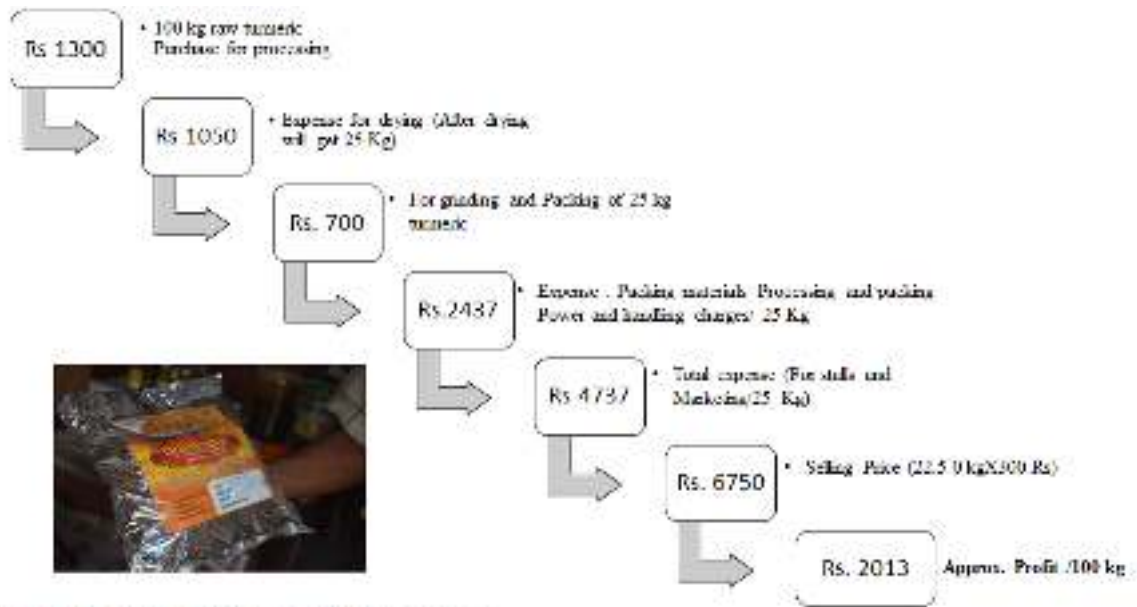
**Table 5. Selling details of farm produce - CRD Aralam in 2019-2021.**

Sl. No.	Name of the Item	Scientific Name	Quantity in Kg.	Selling Rate in Rs. (per kg.)	Total Amount
1.	Ginger	<i>Zingiber officinale</i>	4.480	60-92	4.480
2.	Ash Melon (Kumblanga)	<i>Benincasa hispida</i>	11.130	20-35	271
3.	Colocasia (Chembu)	<i>Colocasia</i>	27.46	38-55	1327
4.	Papaya	<i>Carica papaya</i>	5.500	25-30	147
5.	Amorphophallus (chena)	<i>Amorphophallus paeoniifolius</i>	23.670	30-35	834
6.	Curcuma (raw-Manjal)	<i>Curcuma longa</i>			
7.	Curcuma (dry-manjal)		15	250	3300
8.	Kudam puli	<i>Garcinia gummi-gutta</i>	7.980	240-300	2218
9.	Kandari- Green	<i>Capsicum frutescens</i>	1.310	350-400	510
10.	Curcuma (dry-Manjal)	<i>Curcuma longa</i>			
11.	Honey (Cheruthenu)		13.700	2000	27680
12.	Honey (van-thenu)		40.84	350	13825
13.	Sesamum- Ellu	<i>Sesamum indicum</i>	1.250	140-250	285
14.	Manjal tada				
15.	Pacha Payar	<i>Vigna unguiculata</i>	10.500	7.50-50	410
16.	Banana	<i>Musa</i>	2511.400	20-55	124027
17.	Banana (Poovan)		9.160	40-45	412
18.	Curry leaf	<i>Murraya koenigii</i>	0.100	80	8

19.	Amara payar		0.650	20-25	35
20.	Manjal tada		2	30	60
21.	Agarbatti		11 packet	10-12	114
22.	Pepper	<i>Piper nigrum</i>	5.400	450	2300
23.	Ladies Finger	<i>Abelmoschus esculentus</i>	6.300	40	240
24.	Nurukkari		4	50	200
25.	Manjal vithu		66.500	35-40	2925
26.	Ginger vithu(Ginger seed)		40	60-110	3200
27.	Amaranthus (Cheera)	<i>Amaranthus spinosis</i>	3.250	40	130
28.	Kasthoori manjal	<i>Curcuma aromatica</i>	0.250	72	18
29.	Nadan Manjal		4.660	45	210
30.	Snake gourd	<i>Trichosanthes cucumrina</i>	2	60	120
31.	Amaranthus seed		0.300	1000	120
32.	Payar vithu		0.200		25
33.	Brinjal	<i>Solanum melongena</i>	1.100	30-40	34
34.	Turmeric powder		54.75	250-300	6615
35.	Lemon		6	10	60
36.	Kachil	<i>Dioscorea alata</i>	38.800	30-35	1314

### Case study- Turmeric Products

This study analyses the key players in the supply chain of turmeric. The analysis included a preliminary analysis of cost of production of Turmeric.



### Production flow of Turmeric Powder

As shown in the flow chart, the turmeric products supply chain in CRD Aralam farm provides a graphic preview of the supply chain of commodity from producers to consumers. It depicts the channels or stages through which the commodity passes to the customers. Each block indicates the major functions of the chain such as production, collection, trading and marketing of the product. CRD received Best Performing Project Award from NABARD for the year 2019 for implementing its Tribal Development Project in Aralam Tribal Resettlement area. . The support from the Government will increase the marketing of these products, the idea of setting up KIOSK at various government offices and the usage of digital media platforms online Shoppe can be executed to reduce the marketing issues. According to the study high yielding and profiting varieties of this area are turmeric, ginger, Pepper and Cashew

## Recomendations

1. Species which can give yield within short time as also economically viable species such as Kurunthotty, adalodakam, asokam, kumbil, pathimukham, bitter gourd etc can be cultivated in Aralam farm. A buy back arrangement can be entered into with Ayurvedic medicine manufacturing companies including Oushadhi. Similarly a medicinal plant garden can be established which will be a source of attraction for students as also visitors.
2. As the area is rich in agrodiversity Farm seed bank of local landraces, farmers varieties etc can be developed. Infrastructure for producing quality planting materials from seed bank can be established to provide additional revenue and for the sustainability of the seed bank
3. Since the cultivation being practised is mostly free of chemical pesticides and fertilizers and the land is fertile, the farming can be entirely shifted to organic farming and organic certification may be obtained for creating a niche market for the Aralam produce. This will enable to create better livelihood opportunities for the local people. Organic products can be marketed through the HortiCorp with the help of Agriculture department. Market outlet in district headquarters can be used for marketing the organic products. A vehicle for transporting agricultural products will help to ensure the market of the Farm produce.
4. Integrative farming incorporating native breeds of cattle as Vechur, Kasargode dwarf, native breeds of goat, pisci culture, apiculture etc can be taken up which will help to provide the organic manure and also will be an added attraction for farm tourism. This component can be taken up with the support of Animal Husbandry department.
5. Multiple use of land for income generation such as cultivation of timber trees/soft wood like bamboo, floriculture etc. can be taken up.

6. Training to self help groups existing/ or newly created for making handicrafts and value added products can be given.
- Farm tourism can be promoted for sustainable livelihood of the tribal people. The Aralam Farm is already having a good collection of spices and a spice garden can be set up. In addition medicinal plant garden, and seed bank will be added attraction. The visitors can get hands on experience of farming and processing of various products. The locals can also be trained for providing hygienic ethnic food and in running home stays by creating Self help groups (SHG).
  - A need-based, innovative and tribal culture oriented support system should be provided. Proper protection measures should be provided against wild animal conflicts.
  - Attempts should be made to get entrepreneurs involved in small ways in rehabilitation areas through suitable incentive schemes.



**Aralam, Kannur**



## Trade Set-up to Support Farming



Higher transportation cost in marketing the product is the major constraint. Unavailability of enough inputs for farming and higher transportation cost in marketing the products were perceived as the most severe constraints by all the farmers. Proper initiative from the government with apt policies and procedures to support these farmers is the need of the hour; thereby the tribal community may be uplifted to the main stream. The case study highlights how joint initiatives can provide economic and social welfare for resettled tribes. This model can also be adapted in other Tribal rehabilitation areas also.

## 2. KUDUMBASHREE- WOMEN EMPOWERMENT

Kudumbashree is the poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala. Kudumbashree has a three-tier structure for its women community network, with Neighbourhood Groups (NHGs) at the lowest level, Area Development Societies (ADS) at the middle level, and Community Development Societies (CDS) at the local government

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In 2011, the Ministry of Rural Development (MoRD), Government of India recognised Kudumbashree as the State Rural Livelihoods Mission (SRLM) under the National Rural Livelihoods Mission (NRLM) and this is one of the largest women's networks in the world. In February 2019, Amazon India and Kudumbashree entered into an MOU as part of Amazon's program 'Amazon Saheli'. The products showcased on Amazon's online platform were made by the women entrepreneurs of Kudumbashree and were available to the 150 million registered users of Amazon across India. Kudumbashree's multiple activities helped to uplift a multitude of women entrepreneurs by providing them with avenues to generate income.

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level.

The case study highlights some of the bioresources based livelihood activities undertaken. The details and list of bioresource based Kudumbashree units in each district is given in Annexure **Agriculture**

The units in all the 14 districts have taken up vegetable and fruit cultivation. Ernakulam (772.732 ha) has the highest area of vegetable cultivation followed by Thrissur (723.18 ha) and Kasargod (696 ha). Minimum was at Kollam (145.06 ha) and Kottayam (172.24 ha). Total area of vegetable cultivation in Kerala was 6209.5 ha (Table 6, 7 and 8) In vegetable category, the number of women engaged in Alappuzha was 18270 (number of Joint Liability Groups was 3654) Ernakulam was 12020 (JLG 2404) followed by Thiruvananthapuram 9955 (JLG 1991). Kudumbashree has also ventured into the realm of

organic cultivation with a mission of bringing 10,000 ha under organic farming in 201 clusters in all districts. In 2020-21, a total of **5898.53** ha was under organic farming in the state.

Pickles are the main product from the units. Kasargod represents the highest with 26 units followed by Ernakulam with 9 units. Chips (187 units), Jams (35 units) and Squash (16 units) were the value added units in the fruit category of the state. Thrissur has the highest chips manufacturing district followed by Ernakulam (32). Idukki, Kozhikkode, Wayanad has 3 units each. Jam units was highest at Kasargod (19), followed by Thrissur (9), Ernakulam (9). Squash units was highest at Kasargod (10) followed by Kannur (3).

Kudumbasree is also undertaking cultivation and producing value added products from Banana, Tubers, passion fruit etc. with a mission to bring the fallow unproductive land into cultivable land for enhancing overall agricultural production and productivity in the state. Kudumbashree is planning to establish coconut oil processing units at the village or block level and common facility centers at sub district or district level. Also banana being one of the most important cash crops of the state widely prevalent in all districts and consistently in demand irrespective of seasons, banana value addition units would also be set up as part of this venture. In order to add value to the primary product and build a common packaging and branding element, common facility centres, focussing on industrial packing, standardisation and homogenisation will be established at the district and sub district level on both of these crops. Value addition units would be set up in 50 units in coconut, 35 units in banana and 5 CFCs each in both. Banana units is planned in 6 districts and coconut in 10 districts.

Kudumbashree Food Fests organized as part of seasonal celebrations mainly showcase traditional food products from all over the State. Food Fests offer a platform to enterprising women to offer the public a taste of homely unadulterated food. Nutrimix is another value added product developed using Wheat, Soya, Sugar, Bengal gram, and Ground nut. The districts where production of nutrimix is undertaken include Malappuram



1098451 Kg, Ernakulam 505284 kg, Kannur 466275.173 Kg and Alappuzha 442810.875 Kg respectively. Pathanamthitta was in the bottom position in terms of nutrimix production i.e., 116765 Kg. The total production in the state was 7866024.498 Kgs.

**Table 6. District-wise area of cultivation of vegetables and fruits by Kudumbashree**

District	Area of vegetable cultivation (ha)	Area of fruits cultivation (ha)
Thiruvananthapuram	445.74	1050.844
Kollam	145.06	295.63
Pathanamthitta	214.268	678.804
Alappuzha	489.18	106.64
Kottayam	172.24	589.27
Idukki	535	1245
Ernakulam	772.732	444.14
Thrissur	723.18	465.67
Palakkad	326.31	925.88
Malappuram	465	1823
Kozhikkode	188.59	1013.36
Wayanad	625.5	1555
Kannur	410.7	1090.52
Kasargod	696	296

**Table 7. Value added processing units of vegetables under Kudumbashree**

SI No.	District	No. Of JLGs	No. of women engaged	No: of units	
				Pickles	No. of Members
1	Thiruvananthapuram	1991	9955	4	20
2	Kollam	980	4900	0	0
3	Pathanamthitta	512	2560	0	0
4	Alappuzha	3654	18270	2	8
5	Kottayam	441	2205	6	28
6	Idukki	846	4230	1	4
7	Ernakulam	2404	12020	9	9
8	Thrissur	1622	8110	1	10

9	Palakkad	397	1985	0	0
10	Malappuram	1167	5835	5	25
11	Kozhikkode	1101	5505	8	19
12	Wayanad	864	4320	3	5
13	Kannur	1493	7465	2	2
14	Kasargod	1329	6645	26	74
	<b>Total</b>	<b>18801</b>	<b>94005</b>	<b>67</b>	<b>204</b>

**Table 8. Medicinal plant cultivation under Kudumbashree units**

<b>Districts</b>	<b>Area of cultivation (From April 1st 2019 to 31st July 2019)</b>	<b>No of JLGs involved (From April 1st 2019 to 31st July 2019)</b>
Thiruvananthapuram	11.5	140
Thrissur	35	70
Wayanad	0	0
Kannur	144	240
Kasaragod	0	0
<b>Total</b>	<b>190.5</b>	<b>450</b>

Kudumbashree had been depending on Vegetable and Fruit Promotion Council Kerala (VFPC) and Krishi Vigyan Kendra (KVK) for meeting the seedling requirements.

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Presently, Kudumbashree have 159 existing plant nurseries in hand. In addition to this, 140 new plant nursery units would be established, in a manner of 10 units per district in the common brand name 'Jaivika'

Medicinal plant cultivation was undertaken on 250 Ha of land by 2000 JLG. 50 ha each per district is targeted and 5 collection centres would be established for supporting cultivation. Revolving funds would be extended to each unit for the same. Scale up and branding of existing Kudumbashree nurseries are also planned.

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**Table 9. Nutrimix production under Kudumbashree units**

Districts	Quantity of wheat utilized	Quantity of Soya used	Quantity of Sugar used	Quantity of Bengal gram used	Quantity of Ground nut used	Quantity of nutrimix produced
Thiruvananthapuram	561205.2	25171.9	53095	37581	24734.7	251060.5
Kollam	143179	35520	76565	60340	40290	287882.5
Pathanamthitta	57504.8	11249.7	23288.1	18088.755	11811.422	116765
Alappuzha	226683.25	45414.35	89378.7	68478.025	46128.35	442810.875
Kottayam	136357	27453.2	54826.4	41407.25	27464.2	274051.125
Idukki	171402.5	30520	54340	44935	31615	242595.5
Ernakulam	252857	55776	99989	82393	59430	505284
Thrissur	145527.2	30992	59887.5	46198.45	30992	293977.25
Palakkad	111989.7	37401.1	73476.3	55945.95	37371.6	363707.5
Malappuram	87525.75	109858	219688	164781	109858	1098451
Kozhikode	93387.4	20536.1	40202.2	32883.2	21136.1	204169.875
Wayanad	151452.25	33787	60743	50264.5	33636	302895.95
Kannur	227567.695	54844.2	103521.325	67426.745	56273.73	466275.173
Kasaragod	53531	18292	40671	31064	20957	237964
Total						7866024.498

**Table 10 : Banana cultivation**

Districts	Area under intensive banana cultivation 2020-21 (acre)	No of JLGs involved under intensive banana cultivation 2020-21	No. of JLGs cultivated for 2020 Onam season	No. of members cultivated for 2020 Onam season	Quantity of banana marketed in onam season 2020 (Kg)	Total sales turnover in onam season 2020 (Rs)
Thiruvananthapuram	915	1500	0	0	13073	372592
Kollam	89.9	72	0	0	1270	89183
Pathanamthitta	2157.14	2062	0	0	5625	365625
Alappuzha	161.09	352	0	0	3109	164063
Kottayam	774	717	717	2950	423678	19780970
Idukki	109.87	132	0	0	1565	66640
Ernakulam	1522.84	1283	0	0	8865	438353
Thrissur	1344.18	1109	1103	4415	644744	30216605
Palakkad	1299.5	378	0	0	5772000	202020000
Malappuram	322	243	0	0	0	0
Kozhikode	552	815	0	0	63120	2019840
Wayanad	1014	559	0	0	3251	31972
Kannur	1605.5	1563	0	0	967	66980
Kasaragod	77.5	164	0	0	225	11250
Total	11944.52	10949	1820	7365	6941492	255644073

**Table 11. One crore fruit plant distributing program (2020-21)**

<b>Districts</b>	<b>Total no. of plug nursery seedlings distributed by VFPCK to Jaivika units</b>	<b>Total no. of seedlings hardened and hand over to Krishi Bhavan</b>	<b>Total no. of Jaivika Plant Nursery units benefited</b>
Thiruvananthapuram	68136	0	12
Kollam	12614	6641	22
Pathanamthitta	31815	11752	12
Alappuzha	12621	3664	15
Kottayam	42496	19868	7
Idukki	21663	0	12
Ernakulam	23560	13343	3
Thrissur	21999	12724	20
Palakkad	31512	16501	18
Malappuram	10691	0	0
Kozhikode	33461	2659	12
Wayanad	32256	1569	15
Kannur	32416	3377	8
Kasaragod	16930	135	14
Total	392170	92233	170

**Table 12. Jaivika plant nursery under Kudumbashree unit**

<b>Jaivika Plant Nursery</b>			
<b>Districts</b>	<b>No. of units functioning</b>	<b>No. of beneficiaries</b>	<b>Total no of new plant nurseries in 2020-21 (From April 2020 to till date)</b>
Thiruvananthapuram	25	43	0
Kollam	39	48	3
Pathanamthitta	20	29	0
Alappuzha	35	143	4
Kottayam	30	38	0
Idukki	32	65	0
Ernakulam	36	69	0
Thrissur	138	166	29
Palakkad	27	91	0
Malappuram	32	44	15
Kozhikkode	19	31	1

Wayanad	25	43	0
Kannur	25	46	0
Kasargod	21	64	3
<b>Total</b>	<b>504</b>	<b>920</b>	<b>55</b>

### **Animal husbandry**

Dairying has been considered as one of the activities aimed at alleviating the poverty and unemployment, especially in the rural areas. Ksheerasaagaram is an innovative project developed for providing employment to NHG members through Cow rearing, Milk marketing and Value addition. Kudumbashree will provide capital subsidy to the groups to establish cow rearing unit. Aadugraamam project is a goat rearing support initiative conceptualized and implemented by Kudumbashree. Goat farming has been greatly accepted among women farmers as it requires small establishment cost as well as easy to rear. It targets to provide regular source of income to Kudumbashree members through goat rearing enterprise. Total active Aadugramam units in the state were 2928 and total active Ksheerasagaram units were 1257. Idukki has 431 Aadugramam units, followed by Thiruvananthapuram 304 units, while Ksheerasagaram units were highest at Idukki 246 and Wayanad 193.

**Table 13 Details of dairy schemes during the previous years**

Sl. No	Year	No. of Panchayath	Groups	Beneficiaries
1	2012-13	21	83	415
2	2013-14	16	116	598
3	2014-15	48	279	1405
4	2015-16	28	159	814
5	2016-17	16	119	598
6	2017-18	15	79	397
7	2018-19	60	410	2050
	<b>Total</b>	<b>144</b>	<b>835</b>	<b>4227</b>

**Table 14. Details of aadugramam schemes during the previous years**

SI No	Year	No. of Panchayath	Groups	Beneficiaries
1	2012-13	32	360	1803
2	2013-14	120	1457	7322
3	2014-15	107	1216	6042
4	2015-16	43	379	1926
5	2016-17	36	324	1641
6	2017-18	23	206	1045
7	2018-19	22	206	1030
	<b>Total</b>	<b>383</b>	<b>4148</b>	<b>20,809</b>

### **Microenterprises**

Kudumbashree also provides skill development training to women, motivating them to take up micro enterprises for livelihood. More than 31,000 enterprises are set up in the state by individuals and groups. The Kudumbasree initiatives include collectives, consortiums and producers companies.

The case study highlights the benefits of empowering women in bioresource based livelihood. Recently KSBB in association with JNTBGRI is providing training to Kudumbasree members for propagation of rare and endangered plants and seedling materials are also being provided. The Kudumbasree units are being trained in establishment of nurseries and their maintenance. The project aims to utilize the wide network of Kudumbasree for



developing nurseries of rare and endangered plants. The seedlings so produced can provide the required saplings for the various afforestation activities presently undertaken by the state government. This will also provide livelihood options to women entrepreneurs.

### 3. FARMER PRODUCER ORGANIZATIONS- KERALA

Farmer Producer Organizations (FPO) are formal clusters of farmers promoted to enable them to tap the benefits of economies of scale, product aggregation, value addition, branding and marketing. The present study provides an overview of FPOs in Kerala. Annexure 3 provides a list of FPOs in Kerala.

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In Kerala NABARD is supporting FPOs in various sectors. In collaboration with NABARD and NCDC, PDS has been promoting FPOs from 2016 onwards in Idukki, Kottayam and Wayanad districts. In 2021 PDS was empanelled by NABARD and NCDC to act as Cluster Based Business Organisation (CBBO) and is engaged in promoting FPOs in different districts of Kerala.

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**Table 15: Majors crops- Farmer Producer Organizations**

Sl.No	Districts	Products
1	Thiruvananthapuram	Banana, Tapioca
2	Kollam	Cashew, Tapioca & tuber crops
3	Alappuzha	Vegetable, Paddy& Rice Products
4	Kottayam	Vegetable, Pineapple, Coconut oil/powder
5	Pathanamthitta	Honey, Banana
6	Idukki	Vegetable cool season/Spices
7	Ernakulam	Pineapple

8	Thrissur	Banana, vegetable, Rice
9	Palakkad	Millets ,Vegetable, Banana
10	Malappuram	Vegetable, Coconut products
11	Wyanad	Scented Rice/Banana
12	Kozhikode	Coconut
13	Kannur	Spices/honey, coconut Oil
14	Kasaragod	Vegetables

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The major producer companies include 1. Kannur Goat Farmers Producer Company Ltd 2. Thennala Agro Producer Company – Malappuram 3. Imashree Milk Producer Company Ltd –Idukki and has plans to develop a least one producer company/ district. Establishment of paddy collectives in the state and formation of an apex body for these producer companies are also envisaged. Kannur Goat Farmers Producer Company is a value chain project in animal husbandry aimed at increasing farmer's revenue through sale of good breed goats, feed supply to farmers, providing trainings to goat farmers and making them aware about scientific feeding, scientific breeding, insurance and other related activities. Activities of Thennala Agro Farmer's Producer Company include procuring organic paddy, processing and selling rice products at competitive rates. The company has made a tie-up with many agencies across the state for marketing rice and rice products. Imashree Milk Producer Company Ltd. is owned by Kudumbashree women dairy farmers of Nedumkandam Block- Idukki district. The company provides trainings to the member farmers in scientific cattle rearing and produces value added products and bio manures at cluster level

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**Table 16. Major FPOs and crops cultivated and traded in different districts**

<b>ALAPPUZHA</b>						
<b>Company Name</b>	<b>POPI Name</b>	<b>Activity</b>	<b>2016-17 (In lakhs)</b>	<b>2017-18 (In lakhs)</b>	<b>2018-19 (In lakhs)</b>	<b>2019-20 (In lakhs)</b>
Farmer tree Producer Company Limited	International Centre For Technological Innovations (ICTI)	Paddy seed sales, Puttu podi, Paddy & wheat value added products, Chilly & Turmeric powder	0.44	19.64	19.06	27.58
Kadalora Farmers Producer Company Limited	Alleppey Diocesan Charitable And Social Welfare Society	Vegetables (Local demand), Poultry egg, Fish Products (Planning), Organic fertilizers, fish feeds			0	0
Onattukara Spices Farmer Producer Company Limited	KVK Alappuzha	Seed production, cultivation and processing of spice crops like turmeric, ginger, pepper, garcenea etc	1.11	7.16	5.89	34.06
<b>ERNAKULAM</b>						
Kothamangalam Agriculture Producer Company Limited	Ernakulam District Farmers Club Association	Vegetables, Nursery, Nutmeg, Rubber sheet processing, Coconut oil extract unit, Flour mill, Dry Banana, Dry Meat, Pineapple, Banana, Tapioca, Coconut, Garcinia	91.32	119.49	32.27	87.59
<b>IDUKKI</b>						

Green Idukki Producer Company Limited	High range Development Society (HDS)	Dried Jack fruit, Jackfruit Flour, Jackfruit chips		4.23	1.78	
Green Vivo Agro Producer Company Limited	Idukki District Co-Operative Bank (IDCB)	Cardamom aggregation & processing, pepper, agri inputs to farmers, coffee, ginger		109	252	350
High Range Organic Producer Company Limited	Idukki District Co-Operative Bank (IDCB)	Eco Products, Dried Cardamom, Black & White Pepper, Nutmeg, Clove, Cocoa, Gambooge, Coffee	3.1	41.06	45.97	174.84
Hill Range Tribal Farmers Producer Company Limited	Peermade Development Society (PDS)	NTFC, spices, herbals, vegetables, tubers, banana chips and snacks, coffee powder, other FPO products, agriculture equipments, seeds, saplings, seedlings, spawn and provisions. Procurement, processing, branding and marketing	5.03	18.77	58.65	78.74
Idukki Spices Producer Company Limited	Highrange Development Society (HDS)	Dry Cocoa, Nutmeg Flower & Clove, Rubber Sheet & Latex, Tubers & Vegetables, Cardamom, Ginger, Turmeric, Black & White Pepper	0	15.31	7	

Karshakamithra Toxin Free Food Products And Producer Company Limited	Jaivasree	Pepper, Cardomom, Org Vegetables, Org Banana, Coffe powder, Tea, Marayoor Jaggery	1.2	2.64	0	15.92
Konnathady Attaining Mythical Environment Farmers Producer Company Limited	Evangelical Social Action Forum(ESAF)	Collection and sorting/grading/marketing of nutmeg & mace, Cocoa, nutmeg nursery, Cardamom drying, organic manure(nutrifish) wholesaler and Farm tourism	10	6.31		
Kumily Agro Spice Farmers Producer Company Limited	Peermade Development Society (PDS)	Vermicompost production	1.61	0.2		
Mankulam Agricultural Multi Purpose Producer Company Limited	Mankulam Service Co-Operative Bank	Organic Spices, Cocoa, Dried Jack Fruit, Jack Fruit Chips, Banana Chips,Bakery Items	0.9	3.86	9.73	16.62
Marayoor Agriculture Producer Company Limited	Marayoor Service Co Operative Bank Ltd No 2022	Jaggery, Vegetable (Carrot, Cabage, Beetroot), Seed, Seasonal Honey, Tuber crops,	30.44	31.83		

Marayoor Valley Toxin Free Food Products And Producer Company Limited	Jaivasree	Cardamon fertilizers, Jaggery, Organic vegetables	0.27	0.38	nil	
Neyyassery Agro Food Producer Company Limited	Idukki District Co-Operative Bank (IDCB)	Dried Tapioca, Jackfruit products, Coconut oil	0	2.76	8.06	11.68
Sahya Farmers Producer Company Limited	Thankamany Service Co-Operative Bank Ltd	Spices value addition, Cardamom, Pepper, Flour mill, Coffee powder,	52.06	244.42	75.17	
Thodupuzha Farmers Agro Producer Company Limited	Idukki District Co-Operative Bank (IDCB)	Dairy, Coconut oil extraction, cattle feed, arrowroot powder	0	70.94	177.61	191.42
Tillage Agro Producer Company Limited	Kakkombu Rubber Producers Society (RPS)	Nursery (Fruits, Vegetables), Open Market (Vegetables, Fruits)	20.62	41.59	53.86	
<b>KANNUR</b>						
Anjarakandy Agro Farmers Producer Company Limited	Anjarakandy Farmers Service Co-Op Bank Ltd	Coconut & Flower Nursery, Paddy Value added products,		0.31	4.53	
Kuttiattoor Mango Producer Company Limited	Kvk Kannur	Jam, Pickle, Squash, Kuttiattoor mango		5.45		

New Model Farmers Producer Company Limited	Malabar Social Service Society (MASSS)	Poultry farming, Bio Fertilizers	3.7	0	0	0.21
Thejaswini Coconut Farmers Producer Company Limited		Coconut products, Honey, Jackfruit products, Organic Manure, Bath Soap, Coconut oil, Turmeric powder	77.46	97.88	86.13	102.98
<b>KASARAGOD</b>						
Gramalakshmi Marketing Producer Company Limited	Centre For Research And Development (CRD)	Cash crops and spices, Turmeric, Pepper, Rubber, Coconut, Powder units	35.38	56.78	58.41	42.07
Madhuvahini Producer Company Limited		Arecanut & Coconut saplings, Plates from Arecanut Leaf, Organic manure fertilizers distribution, Honey marketing	1.42	6.4	15.67	25.75
Tulunadu Farmer Producer Company Limited	Centre For Research And Development (CRD)	Vegetable, Organic manure	0	2.73	2.73	0
Tulunadu Ecogreen	KVK Kasaragod	Honey, Organic pepper & Value added products from fruits & veg		4.24	10.29	9.84



Farmers Producer Company Limited						
<b>KOLLAM</b>						
Jaivasamrudhi Toxin Free Food Products And Producer Company Limited	Jaivasree	Oyster Mushroom, Vegetables, Banana,	0.1	0.82	0.86	11.23
Palaruvy Farmers Producer Company Limited	Pathanapuram Service Co-Operative Bank Ltd	Vegetables, Organic Manure and other agri inputs incl (Seeds , Seedling, Banana Suckers, Grafts, Plant saplings, etc) Machineries and Agricultural equipments		60.91	85.84	33.09
Venad Poultry Farmers Producer Company Limited	KVK Kollam	Poultry, Meat products, BV 380 Layer birds, Hi-tech cages	71.29	118.71	382.19	291.07
<b>KOTTAYAM</b>						
Kanjirappally Agricultural And Dairy Producer Company Limited	Kanjirappally Pcard Bank	Dairy, Cattle feed		45.7	59.45	101.82
<b>KOZHIKODE</b>						

Neeloor Producer Company Limited	Neeloor Service Co-Operative Bank Ltd No.K.51	Dammer Honey, Jackfruit products, Tapioca products	0	0.77	30.59	31.8
Pala Agri Producer Company Limited	Janatha Model RPS	Organic food products		0.82	2.44	3.3
Blessed Farmer Producer Company Limited	Centre For Overall Development	Bakery items, Jackfruit Products, Apiculture, Wheat & Rice flour, Dry Ginger, Coffee Powder, Cardamom, Pepper, Coriander, Arrowroot powder, Pickle,	0	2.98	14.01	21.01
Hillgrown Farmers Producer Company Limited	Chathangottunada Agriculturist Welfare Co-Operative Society	Aggregation of COCOA from farmers, drying of COCOA, Nutmeg, Garlic, Chocolate, Coconut value added products	0	5.25	16.98	30.2
Kozhikode Honey Producer Company Limited	Kerala Gandhi Smaraka Nidhi	Honey processing		1.06	1.41	
Kuttiady Coconut Farmers Producer Company Limited		Coconut products, (Oil, Coir Fiber), Coconut Seedlings		3.46	0	2.12
Niravu Farmers Producer Company Limited	Niravu	Vegetables (Beans, Lady finger, Pumkin), Fruits (Banana), Sugarcane, Jaggery, Rice, Bio gas plant consultant, Waste management	2.08	464.7	274.32	319.01

North Malabar Farmers Producer Company Limited	Integrated Development Center	Buffalo farming, Organic Vegetables, Cocoa, Banana	0.16	3.34	3.03	122.82
Perambra Coconut Producer Company Limited	Chakkittapara Service Co Operative Bank	Virgin Coconut Oil, Neera, Coconut Oil, Coconut fiber, Coir pith, Organic manure, Grow bag filler	13.5	16.75	96.49	100
Vadakara Coconut Farmers Producer Company Limited		Coconut products, Jaggery, Choclates, Neera	193.32	499.45	525.45	528.14
<b>MALAPPURAM</b>						
Edakkara Agro Producer Company Limited	Kudumbashree Edakkara Cds	Mushroom, Spawn, Layer Poultry & Hi tech Cage, Feeds, Puttu podi, Goat farming, Poly house, Fish farming, Irrigation etc.		160	285.58	156.52
Malappuram Agro Producer Company Limited	Evangelical Social Action Forum(ESAF)	Dairy and Milk supply, Org Vegetables & Fruits, Coconut		0.61	0	
Mannarmala Milk & Agro Producer Company Limited	Vidhyaposhini Grandhalayam Mannarmala	Dairy, Curd, Sambaram, Nature Fresh Milk, Ghee	0	2.68	51.54	52.84
Maranchery Kerasuraksha Agricultural Producer Company Limited	Kerasuraksha Federation Of Coconut Producers Societies	Nursery, Fertilizer, Coconut Products	26.15	12.36	11.08	8.21

Thennala Agro Producer Company Limited	Thennala Grama Panchayat Cds	Paddy products	4.81	3.1		
Nilambur Teaktown Farmers Producer Company Limited	Evangelical Social Action Forum(ESAF)	Fish farm		0	0	
<b>PALAKKAD</b>						
Attappady Farmers Producer Company Limited	Attappady Social Service Organization (ASSO)	Goatery, Spices, Millets, Honey, Bamboo Rice	0	2.12	5.92	14.5
Jan Kissan Producer Company Limited	Gangothri Charitable Cultural And Educational Trust	Milk, Curd, Milk Sambar, Ghee, Dairy, Goatery, Poultry, Organic rice, Biofertilisers, Flattened rice, Rice flour, Traditional food products		13.65	11.75	14.71
Palakkad Paddy Farmers Producer Company Limited	Evangelical Social Action Forum(ESAF)	Paddy seed sales, Vegetables, Spice powder, Coconut oil, Agri inputs and grocery items	0	50.69	134.94	186
Palakkad Sammisrakarshaka Producer Company Limited		Rice products, Coconut Oil, Honey and Tamarind (Puttu podi, Idiyapa podi)	4.27	0.84	8.41	26.5

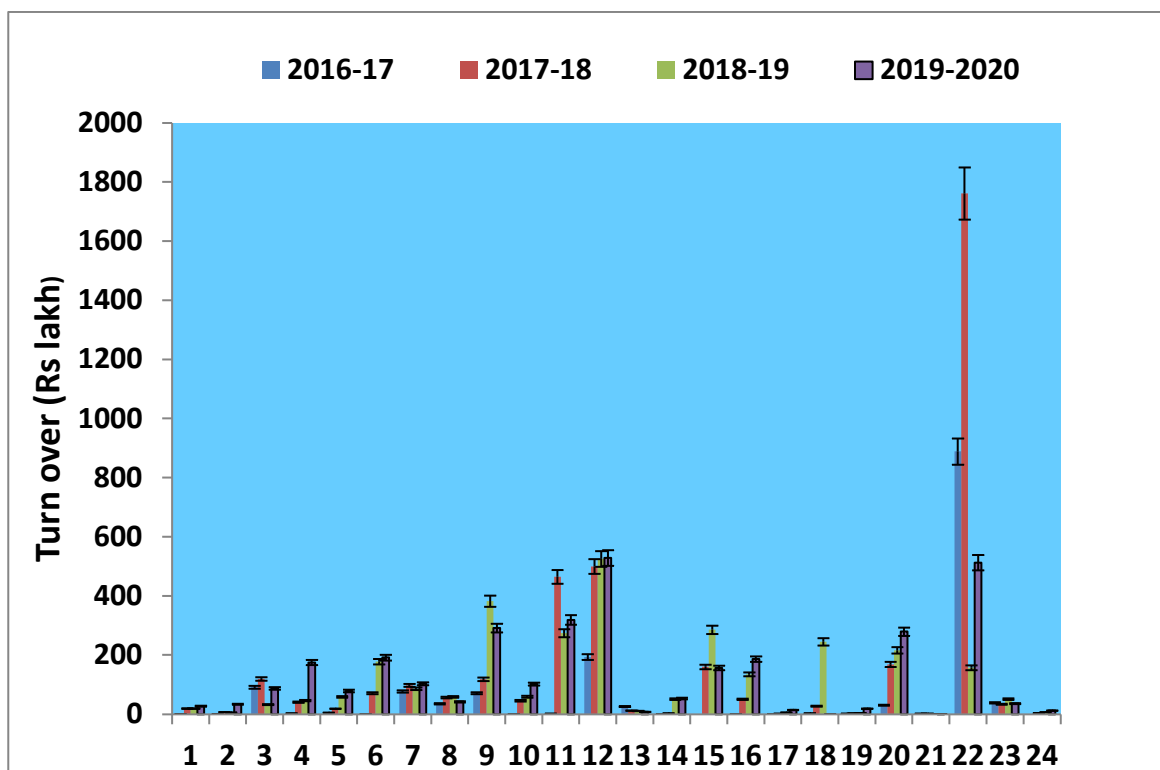
Polima Farmers Producer Company Limited	People's Service Society Palakkad (PSSP)	Jackfruit products, Banana products, Coconut products, Online marketing of produce from farmers	3.93	5.89	5.28	4.52
Sustainable And Integrated Farmers Producer Company Limited	Evangelical Social Action Forum(ESAF)	Fertilizers distribution, Coconut & Honey processing (Proposed)	7.81	10.33	3.33	
Susthira Farmers Producer Company Limited	Integrated Rural Technology Centre (IRTC)	Toxin Free Matta Rice, 40% Bran Matta Rice, Honey, Coconut Oil, Agriculture engineering services, Agri Inputs, Rice products, Organic Manure	4.35	6.6	20.38	20.9
Thachanattukara Farmers Producer Company Limited		Poultry, Vegetables, Organic manure	2.77	27.34	244.92	
<b>PATHANAMTHITTA</b>						
Karshakajyothi Agro Producer Company Limited	Adoor Rubbers Pvt Ltd	Branded Rice, Coconut Oil, Coirpith, Mushroom, Honey	1.69	2.65	4.17	18.77
Preeminent Farms Agro Farmer Producer Company Limited	KVK Pathanamthitta	Jackfruit products, Puttupodi, Squash, Honey, Turmeric, Cattle feeds to members, Vegetable plants				
<b>THIRUVANANTHAPURAM</b>						

Ananthapuri Coconut Producer Company Limited		Coconut oil, Copra, Coconut Chips, Virgin Oil, Neera, Neera Jam, Coconut Chutney, Theeyal Mix, Kuruma, Kalparasa	2.1	1.05	0	0.48
Panasa Farmers Producer Company Limited	Santhigram	Jackfruit Pulp, Jackfruit Squash, Jackfruit Jam, Jackfruit Halwa, Jackfruit Cake, Jack Seed Cake, Jack Seed –Millet, Biscuit, Jack Pickle ,Health Mix	1.48	1.91	1.16	0.56
Sabarmathy Agri And Livestock Farmers Producer Company Limited	Thiruvananthapuram District Co-Operative Bank	Poultry, Goat farming, Eggs, Layer chicks, Cattle rearing	30.36	168.54	216.11	279.27
<b>THRISSUR</b>						
Annamanada Farmers Producer Company Limited	Evangelical Social Action Forum(Esaf)	Nutmeg, Spices trading, value addition	8.49	6.97	3.62	0.07
Kuttikad Farmers Producer Company Limited	Kuttikad Farmers Service Co Operative Bank	Paddy products, Coconut products, Nutmeg, Turmeric, Spices value addition	2.15	0.74	0.06	0.003
Pananchery Farmers Producer Company Limited		Banana Chips, Jackfruit chips, Chembu chips Honey processing, Open auction of Vegetables, Coconut, Fruits etc	16.3	28.01	27.42	11.04

Thrissur Paddy Farmers Producer Company Limited	Evangelical Social Action Forum(ESAF)	Organic Rice, Rice products, Jaivamamrutham, Super Market (Coconut Oil, Choclote, Jam, Juice), Cut Vegetables, Hotel, Meat Processing, Buffalo farming, Fisheries, Paultry	888.75	1761.21	157.45	512.71
<b>WAYANAD</b>						
Bana Agro And Allied Producer Company Limited	Padinjarathara Farmers Club	Dairy products viz. Curd, paneer, ice cream, peda, sip up etc. , Poultry			0.34	4.25
Bhoomika Farmers Producer Company Limited	Malabar Social Service Society (MASSS)	Pepper, Paultry, Paddy, Turmeric, Vegetables, Market Outlet for FPOs, Agricultural equipment and Grocery	4.6	9.16	2.92	3.59
Loga Farmer Producer Company Limited	Kvk Wayanad	Organic Virgin Coconut Oil, Organic Coconut Oil, Organic Turmeric Powder, Organic Black Pepper, Organic Coffee Powder, Organic Clove, Organic Cardamom, Garcinia		3.14	2.16	24.04
Sreyas Tribal Farmers Producer Company Limited	Shreyas Social Service Centre	Coffee, Honey, Pepper, Rice, Vegetables	0.96	1.32	2.5	1.97

Thirunelly Agri Producer Company Limited	Thanal	Organic Traditional Paddy, Rice processing, Paddy seed		1.52	13.21	42.19
Wayanad Agriculture And Spices Producer Company Limited		Wayanadan Thondi Rice,		27.2	32.14	28.95
Wayfarm Producer Company Limited		Tomato, Carrot, Cabbage, Cucumber, Beans, Chilly, Onion, Potato, Brinjal, Okra, Dairy, Jackfruit products	38.95	33.78	51.1	35.78
Wynad Agri Marketing Producer Company Limited	Community Agrobiodiversity Centre - MSSRF	Spices (Pepper, Turmeric), Coffee, Traditional Paddy (Gandhakashala), Pulses, Seasonal vegetables & fruits, Honey, Jackfruit & products, Arrowroot powder, Millets, Nursery (Spices, Seedlings),		3.9	6.5	12





**Fig. 1. Turn over of FPOs from 2016-2020**

Sl.No.	Name of FPO
1	Farmer tree Producer Company Limited Alapuzha
2	Onattukara Spices Farmer Producer Company Limited Alapuzhha
3	Kothamangalam Agriculture Producer Company Limited Ernakulum
4	High Range Organic Producer Company Limited Idukki
5	Hill Range Tribal Farmers Producer Company Limited, Idukki
6	Thodupuzha Farmers Agro Producer Company Limited
7	Kannnur, Thejaswini Coconut Farmers Producer Company Limited
8	Gramalakshmi Marketing Producer Company Limited of Kasaragod
9	Kollam, Venad Poultry Farmers Producer Company Limited

10	Kanjirappally Agricultural And Dairy Producer Company Limited, Kottayam
11	Kozhikode, Niravu Farmers Producer Company Limited
12	Vadakara Coconut Farmers Producer Company Limited
13	Malappuram, Maranchery Kerasuraksha Agricultural Producer Company Limited
14	Mannarmala Milk & Agro Producer Company Limited
15	Edakkara Agro Producer Company Limited
16	Palakkad Paddy Farmers Producer Company Limited
17	Attappady Farmers Producer Company Limited
18	Thachanattukara Farmers Producer Company Limited
19	Karshakajyothi Agro Producer Company Limited, Pathanamthitta
20	Sabarmathy Agri And Livestock Farmers Producer Company Limited
21	Panasa Farmers Producer Company Limited
22	Thrissur Paddy Farmers Producer Company Limited
23	Wayanad, Wayfarm Producer Company Limited
24	Wynad Agri Marketing Producer Company Limited

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The case study highlights the role of FPOs in promoting sustainability of agriculture especially in a state like Kerala which has small and marginal farmers and the labor charges are high. By pooling financial resources and negotiating jointly, groups can prove to be more effective than individuals for marketing their produce. In Kolli hills the development of FPOs has helped a great way in conserving five different millet varieties as the initiative paved the way for sustainable income generation. It has been widely recognized that such initiatives promote crop diversification, nutritional diversity and ultimately Agrobiodiversity conservation as farmers can find better market for diverse crops and will have more access to diverse varieties of seeds.

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#### **4. AYURVEDA MEDICINES- AYURDHARA PHARMACEUTICALS, THRISSUR**

Ayurdhara Pharmaceuticals, Thrissur is a project of the Kerala State Federation of Scheduled Castes and Scheduled Tribes Development Cooperatives Limited, a Government of Kerala co-operative enterprise. Funded by the National Co-operative Development Corporation (NCDC) at a cost of Rs 110.42 lakh, the company manufactures over 425 Ayurvedic medicines, including patented medicines. Ayurdhara X-Power, Ayurdhara Balm, Ayurdhara Diab, Ayurdhara Linn, Pookuladi kalpam, Pookuladi kalpamshtam are some of the patent medicines produced here. Among the 425 Ayurvedic medicines of Ayurdhara Pharmaceuticals, there are 16 types of arishtams, 7 types of savams, 17 types of ghrutham, 27 types of pills, 42 types of kashayam, 92 types of thailams, 3 types of lepam, 30 types of lehyam, 20 types of kuzhambu, 44 types of choornam, 40 types of kashaya choornam, 69 types of karangal, It is produced in the arsenal, including about 9 Vadakas. The Government has awarded to the Federation the

exclusive right to collect minor forest produce (MFP) and medicinal herbs from the State's forests. The company purchases raw materials from SC/ST Federation and ensures sustainable sharing of benefits with the tribal collectives.

**G. Pachotti (*Symplocos racemosa* Roxb.) Bark**

Pachotti is widely used for anemia, bleeding disorders, ulcers, eye disorders, acne, blemishes, white and black heads. It is used in many skin diseases involving bleeding, oozing and secretions. In conjunctivitis, its paste is applied externally over closed eyes. Ayurdhara Pharmaceuticals purchase Pachotti bark from SCT Federation, Malabar Herbals, Ayurvedics Center and Krishna Ayurvedics. KrishnaAyurvedics and Ayurvedics Center are collecting Pachotti bark from Kolkata whereas Malabar Herbals is collecting Pachotti from SCT Federation. SCT Federation play major role in Pachotti bark collection from Kerala, directly from tribes of Pozhuthana and Thariyode villages in Wayanad district. Tribes are collecting the Pachotti bark usually during December to March as in these months the brakes are dried. SCT Federation acts as a platform for tribes for selling their products. Tribes get 80% share of the selling price for their product. Ayurdhara had purchased Pachotti bark through the SCT Federation at a rate of 100/- per Kg, for this sale tribal people get 80/- per Kg. Malabar Herbals collect Pachotti bark from SCT Federation through auction then they sell this with 5% margin price. Ayurvedics Center and Krishna Ayurvedics collect sample from other dealers from Kolkata and hence the study is focused on collection and sales through SCT Federation.

**Table 17 Ayurdhara Products containing Pachotti (*Symplocos racemosa* Roxb.) Bark**

SL. NO.	Item	QTY of item	QTY of Pachotti bark	QTY of the bottle	Price Rs.	Uses
1	Arimedadi Kashayam	100 Ltr	399 gm	200ml	145	Oral diseases

2	Nisakathakadi kashayam choornam	10 kg	1.25gm	2.5 kg	691	Various diabetic conditions, including diabetes mellitus, diabetes neuropathy, ulcers,
3	Arimedadi thailam	10 ml	17 gm	450ml	263	Pericoronitis. Burning mouth syndrome strengthen teeth.
4	Dasamoolarishtam	10ml	236 gm	450ml	103	Relieve fatigue and digestive disorders, respiratory complaints, body ache, joint pain, abdominal pain and gaseous distention of abdomen.
5	Abhayarishtam	100Ltr	454 gm	450ml	70	Piles, constipation, dysuria, flatulence, anuria, gas and abdominal distension.
6	Pushyanug churna	100gm	3.85 gm	500gm	786	Cough and other respiratory ailments. Menstrual disorders.
7	Chandanasava	100Ltr	125gm	450ml	67	Burning micturition and cystitis, improve digestion and increases appetite, treatment of gonorrhoea and urethritis
8	Saribadyasavam	100Ltr	500gm	450ml	87	Skin disorders, diarrhea, dysentery, eye diseases, syphilis, leukoderma, dyspepsia, chronic fever, leprosy, asthma,

***Symplocos racemosa roxb* Collection & sales details of SC/ST federation**

SI NO		2017-2018			2018-2019			2019-2020		
		Quant ity KG	Value RS	Unit Price	Quant ity KG	Value RS	Unit Price	Quant ity KG	Valu e RS	Uni t pric e
1	<b>Collect ion</b>	8266	5619 94	67.99	5347	2893 92	54.12	12054 .5	7509 80	62.3
2	<b>Sales</b>	15522	1183 382	76.24	25241	2091 430	82.86	8745	6674 41	76.3 2

The above tables show that at each stage from collection to sale of Pachotti by SC/ ST federation to manufacture of medicines there is value addition. Profit margin for Ayurdhara Pharamceuticals is very less because the Government of Kerala supplies products through GADs at least 30% less than the MRP of the product.

**5. MITRANIKETAN**

Mitraniketan functioning as a community in a 50 acre campus work in supporting community development and empowerment. Farm Science Centre or Krishi Vigyan Kendra (KVK) is the agriculture division of Mitraniketan funded by Indian Council for Agriculture Research (ICAR), Government of India, New Delhi. It mainly works on transfer of technology with the objective to bridge the gap between technology and farmer. Mushroom cultivation, its spawn production, production of bio control agents, micro irrigation technologies and artificial insemination to improve the local cattle breed are some of the unique activities of KVK. A Tissue Culture Laboratory is functioning in KVK which takes up the production of good quality banana, orchid and anthurium plants..

Quality-planting materials of fruit trees and ornamental plants are being raised in nursery and supplied to farmers at nominal rate. Seed production of vegetable crops such as cowpea, amaranthus, okra, bittergourd, snakegourd, cucumber etc is being carried out at KVK farm under Horticulture division. They also conduct training programs for Post-harvest technology of fruits and vegetables, Floral arrangement and handicrafts, production of value added milk products, coconut products, mushroom and tuber products and Income generation activities in agriculture are other major activities.

Integrated farming in coconut gardens, enhancing the efficiency of homestead enterprises, supply of quality disease free and high yielding plantation and ornamental planting materials, utilization and value addition of locally available fruits and vegetables, recycling of farm waste, utilization of farm energy sources and promotion of water harvesting techniques, promotion of scientific cattle and goat breeding facility for increasing the productivity of animals, promotion of scientific feeding techniques for animals utilizing non-conventional feed sources, empowerment of women in agriculture and allied areas, model organic farm, vegetable seed production unit, progeny orchard, vermi compost unit, biogas unit, rainwater harvesting unit, ornamental fish culture unit, soil and water conservation structures and drip irrigation model, terrace garden, medicinal plant unit, mushroom production unit, micro irrigation systems, apiculture, azolla unit are some of the activities taken up.

Rural women and housewives are another important target group that Mitraniketan is trying to educate. Often these women have productive skills that have been underutilized. Over the years, Mitraniketan has trained a large number of housewives and organized them into Self Help Groups in neighboring villages. The organization of women's groups has exposed them to the outside world, given them confidence, given them support and a voice. For providing employment to women around the village, a secondary packing unit has been established by linking with Hindusthan Latex (HLL), a Public Limited

Company which gives employment to 155 to 200 women. An average of Rs.8000/- is earned by these women workers every month which supplement their family income and improves their socio economic status in the community.

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Mitraniketan is producing a large number of rural based products connected with craft training, natural farming and women empowerment programmes viz, pottery, coir, fruit processing farm, carpentry, Coir (Coconut Fiber Unit) products etc. Conservation and propagation of Attapady breed for local farmers, Supply of goat breeds like Malabari, Jamnapary, Sirohi to the farmers at reasonable cost, training farmers in fish farming (Red belly, Assam vala) etc are other activities. Mitraniketan is promoting the traditional homesteads in local panchayaths with a scientific blending of all aspects of modern scientific cultivation to make it ecofriendly, economically sustainable and provide food and nutrition security.

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Fruit processing (Value addition): Processing of fruits and vegetable will not only supplement family income but also reduce post-harvest loss. Jack fruit, is one among the highly neglected food resources of the country. About 60 to 70 percent of Jack fruit grown are wasted every year. There is limited documentation on value added products, recipes and excellent jack varieties that are suitable for table purpose, vegetable, and processing are grown in Kerala. The main issues of its underutilization are:

1. Wastage of available Jack fruit during season in villages due to lack of processing skills, storage facilities, and improper harvesting.
2. Lack of awareness on the potentials of jack fruit for processing and value addition.
3. Lack of need based research on this local resource to ensure food & nutrition security.



4. Unavailability of appropriate and women friendly technologies for cutting, processing, storage, and value addition, especially in the villages.

A large number of women are trained in processing and value addition in banana, jack fruit, coconut and other common and locally available fruits. The various value added products traded by the processing unit includes Honey health mix, Honey ginger, Honey fig, Honey amla, Amla punch, Honey garlic, Honey chilli, Honey, Banana powder, Turmeric powder, Snacks and pickles. Mushrooms cultivated and traded were Oyster and Milky with annual turnover of Rs. 161861. Bio pesticides produced were Pseudomonas, Enriched Trichoderma, Neem soap, Neem oil, Nanma, Menma and Shreya and annual turnover was Rs. 439210. Plants are produced in the KVK nursery as well as in the satellite production centers under the technical guidance of KVK and annual turnover was Rs. 344675

**Table 18. Various value added products produced 2019-2020**

Product name	Total units	Total yield (per year)	Value added products	Quantity product produced (per year) number	Total sales value (per year) Rs.
Honey	5	18 .6 Kg	Honey health mix	59	5280.00
	4	10.8 Kg	Honey ginger	36	2400.00
	3	2.2 Kg	Honey fig	11	1920.00
	3	9.3 Kg	Honey amla	31	4400.00
	3	12.6 Kg	Amla punch	63	2000.00
	4	9.3 Kg	Honey garlic	31	3660.00
	1	3.6 Kg	Honey chilli	18	1700.00
	4	67 Kg	Honey	150	15000.00
Banana	4	13.6 Kg	Banana powder	68	4470.00
Turmeric	6	13.8 Kg	Turmeric powder	138	5520.00
Other items	8	17.9 Kg	Snacks	179	4000.00
	3	5.0 Kg	Pickles	20	385.00
			<b>Total</b>		<b>50735</b>

**Table 19. Products produced by Agronomy units**

Product name	Total units	Total yield (per year) Kg	Value added products	Quantity product produced (per year) number	Total sales value (per year) Rs.
Bio-Fertilizers	<b>Vermi compost</b>	4930 Kg	--	2465 Nos.	73950
	<b>Egg Amino acid</b>	22.6 Kg	--	--	9040
	<b>Fish Amino acid</b>	67.6 Kg	--	--	27040
	<b>Total</b>				110030

**Table 20. Plant protection products produced by KVK ( 2019-2020)**

	Total units	Total yield (per year) Kg	Total sales value (per year) Rs.
<b>Mushroom</b>			
Oyster	1017 kg	3390 kg	135261
Milky	200 kg	666 kg	26600
	<b>Total</b>		<b>161861</b>
<b>Bio pesticides</b>			
1. Pseudomonas	885. kg	885. kg	66390
2.Enriched Trichoderma	2514 kg	2514 kg	50280
3. Neem soap	26.5 kg	26.5 kg	7950
4. Neem oil	279.6 litre	279.6 litre	111840
5. Nanma	226.5 litre	226.5 litre	135900
6. Menma	56.1 litre	56.1 litre	28050
7. Shreya	77.6 litre	77.6 litre	38800
	<b>Total</b>		<b>439210</b>

**Table 21. Plants produced in the KVK nursery**

	<b>Total number of plants (per year)</b>	<b>Rate / plant</b>	<b>Quantity sale (per year) number</b>	<b>Total sales value (per year) Rs.</b>
Bilimbi	21	25	21	525
Jamba	52	25	52	1300
Cherry	127	20	127	2540
Jack Fruit - Muttomvarikka	7	100	7	700
Jack Fruit - Thenvarikka	63	100	63	6300
Chemparuthi varika	110	100	110	11000
Seemaplavu	49	125	49	6125
Mango Alphonso	69	150	69	10350
Mango Champavarika	1	150	1	150
Mango Kalappadi	17	150	17	2550
Mango Kotturkonam	134	200	134	26800
Mango Vellari	45	100	45	4500
Sapota Cricket ball	23	75	23	1725
Guava Kilopera	58	40	58	2320
Custard apple	9	25	9	225
Malayan Apple	49	25	49	1225
Kambilinarakom (Pomelo)	5	150	5	750
Kasthuri Orange	11	40	11	440
Lime	4	50	4	200
Lovi Lovi	40	25	40	1000
Nelli	24	100	24	2400
Sheemanelli	29	25	29	725
Passion Fruit Yellow	41	25	41	1025
Pomegranate	2	30	2	60
Rambutan Bud	11	300	11	3300
Rambutan seedling	154	20	154	3080
Cherry Mangosteen	5	25	5	125
Anthurium Arun Gold	13	75	13	975
Bougainville Double	14	25	14	350
Cassia	26	30	26	780

Crotons	282	20	282	5640
Araliya	31	30	31	930
Ixora	15	20	15	300
Mount grass	199	5	199	995
Mussanda Red	7	30	7	210
Balsam Double	1	15	1	15
Hibiscus	3	25	3	75
White heart	52	50	52	2600
Alovera	8	30	8	240
Garcinia	14	200	14	2800
Neem	66	20	66	1320
Vettiver	3	20	3	60
Sarppagandha	5	20	5	100
Arecanut	1555	20	1555	31100
Coconut- CDO	50	1250	50	7500
Coconut-CDG	6	180	6	1080
Coconut-DxT	12	250	12	3000
Coconut-Sannanki	191	300	191	57300
Coconut- WCT	120	100	120	12000
Palms ( ornamental)	33	25	33	825
Bush pepper	1315	50	1315	65750
Curry leaf	103	20	103	2060
Nutmeg	68	250	68	17000
Tamarind	6	40	6	240
Clove	44	25	44	1075
Mint	7	15	7	105
Teak	224	25	224	5600
Jasmine	52	20	52	1040
Celonmulla	4	20	4	80
Budhabelly	5	50	5	250
Dendrobium	5	150	5	750
Ground Orchid	2	20	2	40
Nun Orchid	8	150	8	1200
Orchid- Oncidium	5	50	5	250
Vegetable seedlings	9200	3	9200	27600
			<b>Total</b>	<b>344675</b>



**Coir mats by Mitraniketan**



**Value added products from coconut and jack fruits produced by Mitraniketan**

## **6. SANTHIGIRI ASRAMAM**

Horticulture is actively carried out at the various Ashram Branches as well and a variety of vegetables are grown on 25 acres of land close to the Ashram at Pothencode.. The vegetables cultivated at Pothencode include traditional varieties of amaranthus, gourd, long beans, cucumber, pumpkin, small beans, brinjal, green chilli, tomato, and banana and

tuber varieties. 42 items of fruits and vegetables were procured from local farmers and were traded via an ecoshop at Santhigiri. The produce were procured from the farmers without any intermediary persons ensuring fair price to them.

**Table 22. Vegetable trade at Shanthigiri during August, 2021**

	Purchase Rate (Rs)	Sale Rate (Rs)	Purchase Qty (Kg)	Sale Qty (Kg)
Alphonsa Mango	275	290	30	28
Amara	21	32.00	35.00	27.5
Venda	30	42.00	133.00	85.5
Kathiri	25	34.00	65.00	63
Carrot	67	85.00	100.00	30
Cabbage	22	32.00	26.00	23
Pachamulaku	33	45.00	35.00	31
Thondan Mulaku	65	95.00	6.00	5
Muringa (Nadan)	32	45.00	34.00	31
Beetroot	27	35.00	35.00	33
Pacha Manga	86	110.00	8.00	7
Vellari (N)	27	40.00	78.00	75
Ginger	50	80.00	24.00	22
Lemon	83	110.00	20.00	16
Mathan	14	20.00	60.00	55
Churakka	17	22.00	10.00	9
Sunami	14	20.00	25.00	23
Karikkaya	26	35.00	40.00	38
Savala	28	34.00	152.00	143
Potato	25	32.00	93.00	88
Ulli	27	40.00	32.00	26
Vazhuthana	29	44.00	11.00	10
Chembu	38	58.00	27.00	24
Chembu (S)	23	40.00	6.00	5
Beans	25	35.00	32.00	31
Kovakka	48	65.00	6.00	6
Cauliflower	58	80.00	30.00	29
Nellikka	50	65.00	15.00	14
Salad Vellari	25	36.00	15.00	13
Capsicum	55	80.00	8.00	7

Tomato	20	30.00	145.00	142
Padavalam	33	44.00	44.00	39
Kutty Padavalam	33	44.00	9.00	9
Chena	22	35.00	54.00	36
Payar	65	85.00	16.00	14
Pavakka (Nadan)	45	60.00	16.00	12
Cheera	25	40.00	5.00	5
Coconut	38	48.00	77.00	70
Valan Puli	125	160.00	18.00	2
Veluthulli	90	125.00	18.00	11
Kudampuli	170	230.00	1.70	1
Pine apple	52	60.00	12.00	10

Tea is grown in over 20 acres at Sulthan Bathery in Wayanad district. Rubber, coffee and pepper are also grown at this ashram branch. Rubber latex is tapped at Pothencode, Kallar and Pampadi Ashram Branches. Pepper is grown at Pothencode, Kallar, Kumily and Pampadi while cardamom is cultivated at Kumily and Kallar. Coffee beans are reared at Kallar and Kumily besides Sulthan Bathery.

The Agriculture Division has started production of saplings in large numbers to spread the cultivation of medicinal plants among the local farmers. Two projects by the names of "Schoolil Oru Oushadhathottam Onnu Ende Veetillum" (A Herbal Garden in School and one at My Home too) and 'Ende Oushadha Gramam' (My Herbal Village) have been started to promote the cultivation of herbal plants. The former project has been initiated in various schools in the districts of Wayanad, Kottayam and Thiruvananthapuram with assistance from the National Medicinal Plant Board. Under the second project, two nearby villages in the Pothencode and Manickal 'panchayats' have been adopted for distribution of free saplings to the farmers from the Santhigiri Herbal Garden. The matured plants are bought from the farmers directly by the Santhigiri Ayurveda & Siddha Vaidyasala.

The Dairy Farm is an important division, supplying milk and milk products for the use of the Ashram and the Santhigiri Ayurveda & Siddha Vaidyasala. A project for cultivation of grass in about six acres of land to ensure continuous availability of grass fodder, facilities for cattle feed preparation from natural inputs and plans to improve breed quality of livestock is also ongoing. Cow dung is also supplied from here for use as organic manure. Some of the ashram branches also have small-time dairy operations. More than 300 litres of milk is produced every day from the Dairy Farm at Pothencode. Daily, 50 pails of cow dung are produced and used for organic farming. In a pioneering effort, the Ashram has undertaken the manufacture of bio-fertiliser through a bacterial process utilizing cow dung and the organic waste generated by the Ashram as the raw materials. The bio-fertiliser called 'Santhigiri Prakrithi Neethi' is used by the Ashram and also distributed outside.



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A wide variety of local and exotic flowers is grown in the Santhigiri Flower Gardens spread over two acres of land close to the Ashram. Apart from use in the Ashram, the flowers are also supplied to the Santhigiri Ayurveda & Siddha Vaidyasala for the manufacture of medicines. Rose petals are used for making 'Nethradhara' while flowers such as Jasmine are used in medicine preparation. The women's wing of the Ashram, 'Santhigiri Mathrumandalam', is actively involved in the upkeep of the flower gardens. On an average, flowers worth Rs Three lakhs are bought by the Ashram every year. To provide genuine raw materials for the Ayurveda and Siddha medicines made by the Santhigiri Ayurveda & Siddha Vaidyasala, herbal cultivation has been initiated in the hospital complex. The Santhigiri Herbal Garden, close to the Ashram and with a forest like ambience, covers more than 50 acres. More than 100 medicinal plants including Aloe Vera, 'Brahmi', 'Adlodakam' and 'Padhimukham' and other rare species are grown here. The Herbal Division plans to collect rare and endangered medicinal plant varieties from all over the country as part of its efforts at bio-diversity conservation.

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Honey is being produced from a small bee-keeping farm attached to the Santhigiri Herbal Garden at Pothencode and some of the ashram branches. Honey, being an important ingredient in some Ayurveda and Siddha medicines, the produce of the bee-keeping farm is supplied to the Santhigiri Ayurveda & Siddha Vaidyasala.

**The Santhigiri Wood Industries** specialises in the manufacture of wood furniture, window and door frames etc. It is specially known for its beautiful carving done on doors, windows and furniture.

**Value added products** from bioresources from Santhigiri Ashram include Turmeric Powder, Chilli Powder, Kashmiri Piriyan Chilli Powder, Coriander Powder, Sambar Powder, Rasam Powder, Chicken Masala Powder, Fish Curry Masala Powder, Pickle Powder, Meat Masala Powder, Channa Masala Powder, Garam Masala Powder and Crushed Chilli.

**Table 23 Production and sales value of value added products from Santhigiri Ashram from 2020-2021.**

ITEMS	Product Name	Packing Size	MRP	TOTAL PRODUCTION	TOTAL SALES	Avg. Rate	SALES VALUE
				IN PKTS	IN PKTS		
1	TURMERIC POWDER	100 gm	25.00	141642.00	138379.00	15.67	2168398.93
	TURMERIC POWDER	500 gm	125.00	2508.00	2413.00	80.98	195404.74
	TURMERIC POWDER	1 Kg	245.00	1846.00	1809.00	150.91	272996.19
	TURMERIC POWDER(PQ)	250 gm	72.00	12269.00	12025.00	47.02	565415.5
2	CHILLI POWDER	100 gm	27.00	103143.00	100934.00	14.62	1475655.08
	CHILLI POWDER	250 gm	67.00	26712.00	26332.00	36.99	974020.68
	CHILLI POWDER	500 gm	134.00	10453.00	10274.00	79.79	819762.46
	CHILLI POWDER	1 Kg	265.00	16120.00	15826.00	156.99	2484523.74
	CHILLI POWDER(P Q)	250 gm	94.00	6992.00	6752.00	48.53	327674.56
3	KASHMIRI PIRIYAN CHILLI POWDER	200 gm	85.00	29643.00	29615.00	49.99	1480453.85
	KASHMIRI PIRIYAN CHILLI POWDER	500 gm	210.00	7144.00	7132.00	125.65	896135.8

	KASHMIRI PIRIYAN CHILLI POWDER	1 kg	410.00	8391.00	8378.00	237.19	1987177.82
4	CORIANDER POWDER	100 gm	19.00	62950.00	61189.00	11.77	720194.53
	CORIANDER POWDER	250 gm	46.00	24299.00	23907.00	29.01	693542.07
	CORIANDER POWDER	500 gm	90.00	9512.00	9355.00	57.66	539409.3
	CORIANDER POWDER	1 kg	178.00	14855.00	14601.00	111.37	1626113.37
	CORIANDER POWDER (PQ)	250 gm	65.00	8071.00	7842.00	42.37	332265.54
5	SAMBAR POWDER	100 gm	32.00	84619.00	82293.00	20.30	1670547.9
6	RASAM POWDER	100 gm	38.00	24061.00	22210.00	24.35	540813.5
7	CHICKEN MASALA POWDER	100 gm	35.00	51604.00	51047.00	21.89	1117418.83
8	FISH CURRY MASALA POWDER	100 gm	31.00	17049.00	15911.00	20.57	327289.27
9	PICKLE POWDER	100 gm	32.00	9498.00	8169.00	19.95	162971.55
10	MEAT MASALA POWDER	100 gm	33.00	25228.00	24814.00	20.37	505461.18
11	CHANNA MASALA POWDER	100 gm	35.00	18178.00	16892.00	22.15	374157.8
12	GARAM MASALA POWDER	50 gm	40.00	32095.00	31373.00	25.19	790285.87
13	CRUSHED CHILLI	100 gm	35.00	14249.00	14175.00	22.86	324040.5

## 7. KERALA STATE BAMBOO CORPORATION LTD - BAMBOO, CANE AND REEDS

In Kerala, 28 species of bamboo are found to occur with the main species being *Bambusa bambos*, *Ochlandra travancorica*, *Dendrocalamus strictus* etc. Kerala has around 11 types of thin walled bamboos *Ochlandra* genera which are used mainly for weaving purposes by the traditional artisans. Exotic varieties like *Dendrocalamus giganteus*, *Dendrocalamus brandisii* are also cultivated by farmers in areas like Waynad district. Bamboos from the Kerala forest are being supplied mainly to the pulp and rayon units under concessional rates. Reed bamboo is supplied to the artisans through the State Bamboo Corporation. A unique feature of the Kerala bamboo scene is that 67.3 % of the extracted bamboo comes from home gardens rather than from the forests.

Bamboo, plantation area under the forest department as on 31.03.2020 was 5391.112 ha, and 1986.57 MT was produced. Bamboo, cane & reeds as on 31.03.2018 was 8441.752 which come to 5.42 % of the total forest area. The area of Bamboo was 5160.858 ha (3.31%), Cane 2951.192 ha (1.90%) and reeds 329.702 (0.21 %).

**Major uses** includes Paper, rayon, Baskets, mats, handicrafts, winnows, broom sticks, Poles, tents, houses, scaffolding, agricultural, Farm uses, supports, scaffolding, Baskets and mats. Flowchart of production & supply of bamboo & reeds reveals that Forest department and Homesteads supply the raw materials to KSBC, Traditional communities, Paper/ Rayon and private industries.

**Table 24 Sector-wise usage of Reed and bamboo**

Sector	Type	Uses
1. Pulp	Reed and bamboo	Paper, rayon
2. Traditional	Reed	Baskets, mats, handicrafts, winnows, broom sticks
3. Household	Bamboo Reed	Poles, tents, houses, scaffolding, agricultural

4. Export	Bamboo Reed	Farm uses, supports, scaffolding. Baskets, mats
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The Kerala State Bamboo Corporation Ltd., a government of Kerala undertaking supports the bamboo weaving and reed cutter community as well as other traditional workers depending on bamboo resources. Over one lakh individuals, who are either engaged in reed cutting, mat weaving or making handicraft articles are benefited from the Corporation. Kerala State Bamboo Corporation's main activity is collection of good quality reeds from Government forests and distributing these reeds to the registered mat weavers of the Corporation, throughout the State of Kerala, on credit basis and procuring woven mats made of these reeds at reasonable prices, thus providing employment and regular means of livelihood to these weaver sections of the society. The Corporation is authorised by the Government to collect 29,000 M.T of reeds per annum from the forests.

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It has 12 reed collection centres, 87 depots for distributing reeds to the weavers, and 15 reed distribution centres to supply reeds to the traditional workers. Kerala State Bamboo Corporation Ltd. has three Processing Units for processing raw bamboo into Bamboo curtains for the production of Flattened Bamboo Board. The waste bamboo, arising out of the above process ranging from 50 to 70% are further used for the manufacturing of value added products like Toothpick, Curtain Blinds, and Bamboo Curtains, Incense Sticks etc. Besides bamboo Mats and Bamboo Mat Based product, KSBC has diversified into manufacture of Bamboo Mat Board (BMB), bamboo ply board and Bamboo Flooring Tiles (BFT) Bamboo Board Factory was established, to produce value added products using Bamboo mats as the main raw material. Hitech Bamboo floor Tile factory, Nallalam produce Bamboo furniture crafts, Bamboo flooring tiles (sq.Ft), Bamboo huts, Bamboo stripes and Bamboo stick

**Table 25. Production Hitech Bamboo floor Tile factory, Nallalam**

Item	Quantity (numbers) produced 2019-2020
Bamboo furniture crafts	450
Bamboo flooring tiles (sq.Ft)	3859
Bamboo huts	4
Bamboo stripes	15487
Bamboo stick (Kgs)	6

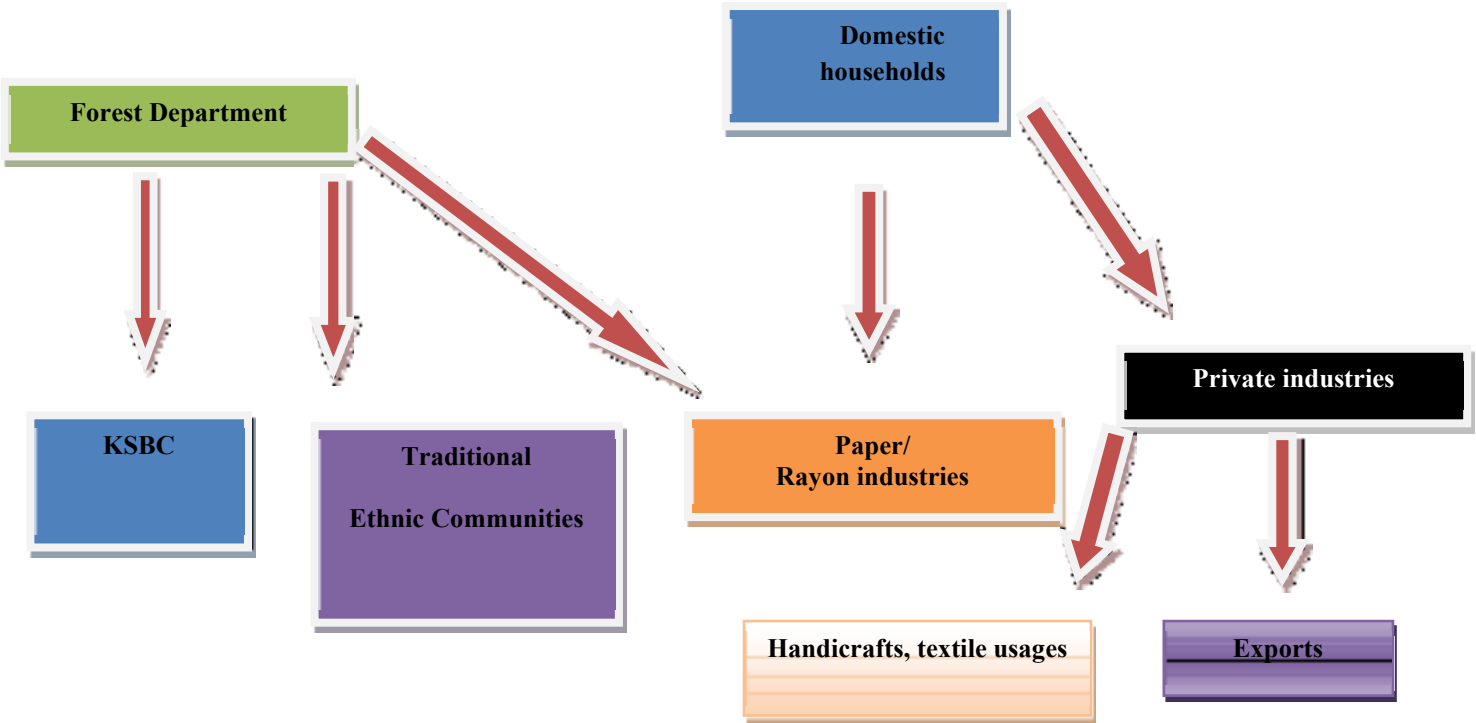
**Table 26. Mat sale 2019-2020 from Kerala State Bamboo Corporation Ltd, Angamaly**

Sl. No.	Month	Nos. of Mats	Amount (Rs)
1	Apr-19	4596	691726
2	Ma 19	4049	729904
3	Jun-19	3058	484718
4	Jul-19	1953	35421.4
5	Aug 19	1837	301947
6	Sep 19	956	377514
7	Oct-19	13624	2038896
8	Nov-19	1966	392908
9	Dec-19	3547	772735
10	Jan-20	1712	304381
1.1,	Feb-20	2181	389136
12	Mar-20	2348	400133
<b>TOTAL</b>		<b>41827</b>	<b>7238272</b>

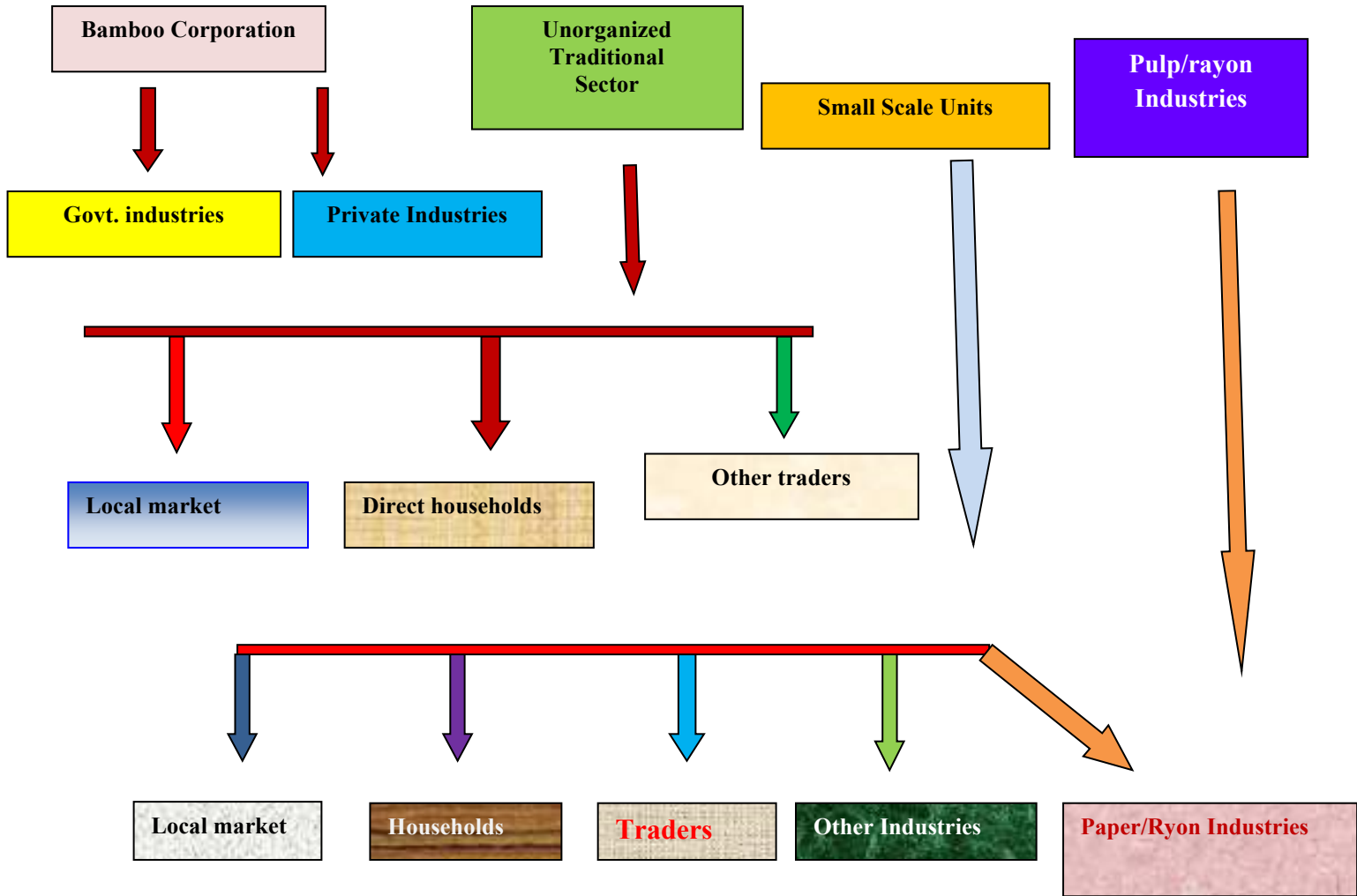
**Table 27. Cash sale of reeds Apr 2019 March 2020**

Sl.No		Nos	Value (Rs)
1	Chalakydy	45,665.00	10,04,223.69
2	Perinthalmanna	21,520.00	5,67,960.50
3	Kanjikode	63,465.00	16,79,645.50
4	Pathanamthitta	6,20,950.00	73,25,940.50

5	Pirappankode	5,440.00	79,709.50
6	Sasthavattom	3,960.00	51,760.00
7	Nedumangad	11,160.00	2,99,061.65
8	CMWC H.O	1,97,605.00	42,31,374.65
	<b>Total</b>	<b>9,70,765</b>	<b>1,52,27,474.99</b>



**Fig 2 . Flow chart of production & supply of bamboo & reeds**



**Fig 3. Marketing strategy of bamboo products from different sectors**



## SUSTAINABLE INITIATIVES OF UTILIZATION OF AGRODIVERSITY

### 1. MUTHALAMADA MANGO FARM, CHITTUR GRAM PANCHAYAT, PALAGHAT

Muthalamada, known as the 'Mango city' of Kerala is located on the Kerala-Tamil Nadu border, in Chittur taluk of Palakkad district in Kerala. Approximately 2700 hectares of land are under mango cultivation and more than 70 % of the fruits were sold beyond the State in Mumbai, Delhi and other places in India and abroad, thus fetching huge revenue through mango trade annually. Muthalamada is the first to supply mango fruits to markets in and outside the country as harvesting begins in Muthalamada by January-February every year and the season continues till the end of July.

#### **Cultivated varieties**

Muthalamada produces almost all the best and most sought after varieties of mangoes in India like Alphonso, Suvarnarekha, Mallika, Banganapally and Neelam and the local Moovandan, Chakkarakatty, Mulgoa, Chandrakaran and so on and they all have overwhelming demand in the international market. Moovandan variety is harvested twice a year, which is rare. The climate and location of Muthalamada, which lies on the lap of the Nelliampathy Hills and the Parambikulam forests bordering Tamil Nadu, are said to be the reason for the twin flowering. The annual production of mango in Muthalamada Panchayat is approximately 40,000 tons.

**Table 28 Major Mango growers at Muthalamada**

No.	Name and address	Extent ha	Varieties of mango cultivated
1	Harishkumar, Pothampadam, Muthalamada,	5	Tothapuri, Alphonso, Sindhooram, Banganappalli, Rumania, Kalapadi, Muvandan, Neelam, Mallika, Himapasand

2	Suresh S, Onthampallam, Muthalamada,	6	Sindhooram, Alphonso, Banganappalli, Kalappadi, Kilimookku, Malgova, Hudadath, Nadassala, Muvandan
3	Ramsheed A, Kambrathuchalla, Muthalamada.	9	Sindhooram, Banganappalli, Alphonso, Thothapuri, Muvandan, Hudadathu, Himappasand
4	Ayyappan K, Chappakkad, Muthalamada.	9.5	Sindhooram, Banganappalli, Alphonso, Kilimookku, Neelam, Kalappadi, Himappasand, Muvandan.
5	Mathew Madathikandam, Chappakkad, Muthamamada.	20	Sindhooram, Alphonso, Banganappalli, Kilimookku, Himappasand, Kalappadi, Malgova, Nadassala.

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Muthalamada has more than 700 farmers having 2-5 acres of mango orchards. The area has over 600 contractors, 36 registered exporters, and 20 mango parking facilities and they altogether provide jobs for more than 15,000 people in a season as fruit pluckers, sorters, and packers. Hygienic surroundings, clean water, grading equipment and treating chambers are necessary for ensuring quality. Harvested farm fresh mangoes are exported to wholesale markets through trucks. Good quality mangoes are meant for international markets. In face of allegations that the orchards use heavy doses of pesticides, many farmers are now growing organically cultivated mangoes with a high price tag.

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Local varieties such as priyor (a less fibrous, juicy fruit that's the first to flood the markets in Kerala); neelam (a fibrous, firm and juicy mango that goes for days without perishing); chandrakaran (a small fragrant fruit that is either sucked or used to cook with); and moovandan (a pest-resistant mango used for the first pickle in the south) are also grown. For the North Indian market, varieties cultivated were alphonso, totapuri, malgova and banganapalli.

But Muthalamada wasn't always known for its mango farming – paddy has been traditionally grown here. Balakrishna Vinod, a paddy farmer, said that with time, most farmers are moving towards mango cultivation – Paddy is not just labour and cost intensive, but above all, water intensive. There's a shortage of water here now, so staple crop fields are being turned into cash crop ones.

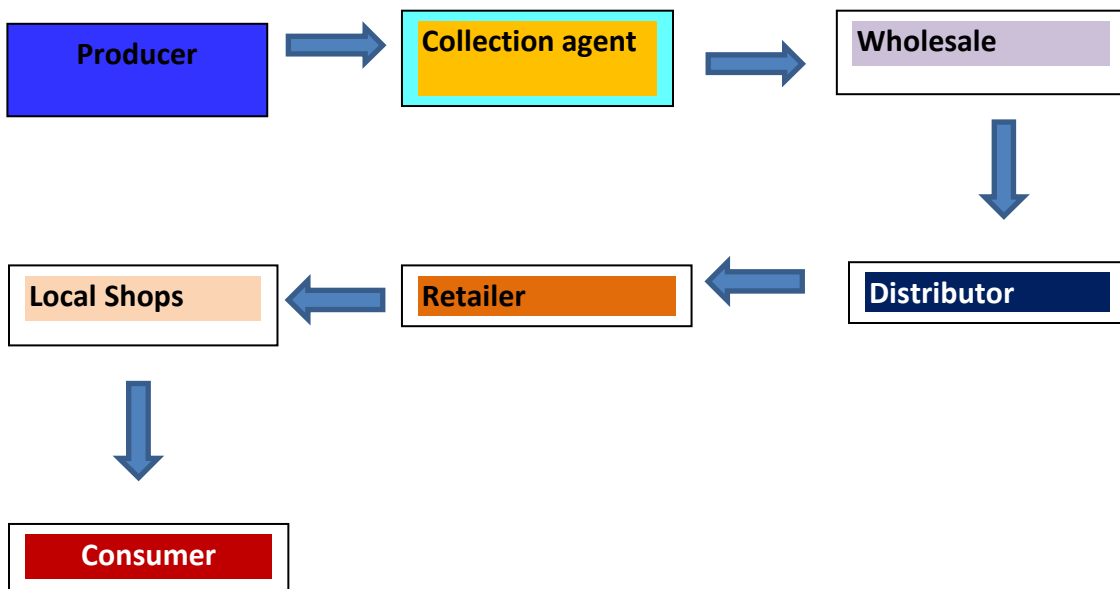
Chandra Haas Kumar, a fruit wholesaler from Delhi who works at Azadpur Mandi, Asia's largest fruit market used to buy mangoes from here. Traditionally, his family has sold apples from Kashmir and Himachal Pradesh. A farmer can get Rs 2,000 per 5 kilo box of mangoes. Sayyad Abdul Aziz from Bengalur supply to mandis and wholesale places such as Mumbai and Delhi from here. Rahul Rajput, a supplier from Ahmedabad, supply to places like Jodhpur, Udaipur, Bhavnagar, Mehsana, Jamnagar. Totapuri will sell at Rs 80 kg. As the season picks up, it will drop to Rs 20-30.

The first modern facility for mango processing and export in the State — Chittur Agro Park — began functioning in Muthalamada in May 2010 with technical support from the Indian Institute of Horticulture Research, Bangalore. It uses hi-tech technology in sorting, grading, ripening, packing and export of mangoes. The Horticulture Mission, Kerala has recognized it as a model unit for processing and export of mangoes. Most of the farmers lacked facilities to pack the fruit in international standards in chemical free hygienic conditions. Mango growers can bring their product here and get them sorted, graded, ripened and packed for export or to send it to cities like Mumbai and Delhi for a good price.

Value share of stakeholders in the marketing channels of fresh fruit (Quality I and II) revealed that marketing mangoes directly through trade provided the farmers double the margin that they received from the collection agents. They received a better price even for lower quality mangoes. Channel III (Quality III & IV) was also noticed i.e., the producers directly trade to the retailers. Most of the small scale farmers were extensively depending

on collection agents for marketing their produce. The profit that has to go the farmers were now enjoyed by these collection agents. The farmers were generally sidelined from the profitable dynamics of the mango value chain and yet it is one of the most promising value chains in the state.

### Marketing channels of fresh fruit - Channel I



### Channel II





### Channel III



### Rajagiri Garden, Chappakkad, Muthalamada

**Ownership:** Mr. Mathew Madathikandam (Mango Grower)

**Total Area of Farm:** 40 Acre, **Total Area of Mango plantation:** 20 Acre

**Total area of other plantation including experimental garden:** 20 Acre

Mr. Mathew Madathikandam (72) a native of Thodupuzha has adopted semi-organic method of farming and has planted mangoes in about 20 acres and other fruit trees with plantation crops in about 20 acre like Coconut, Pepper, Nutmeg etc.

**Table 29 Crops cultivated in the farm**

Sl.No	Crop	Varieties
1.	Pepper (13)	Karimunda, Panniyur(1,5,7), Thekkan, Vijay, Kalluvelli, Naadan, Neelamundi, Kuthiravali
2.	Nutmeg(18)	Own variety(3), Kadukumaakaan, Vishwasree, Kinatukara, Kochukudi, Vaikkom, Others(10)
3.	Jackfruit (22)	Muttomvarikka, Vietnam super, Dungsurya, Thailand pink, Thailand red, Thenvarikka, Chembarathivarikka, Sindhoorvarikka,

		Seedless, Seedfree, Gumless, Bellary, Micro(3), Kullanplaavu, Naadan(10)
4.	Cocoa(1)	Forestera
5.	Passion Fruit(2)	Yellow, Red
6.	Rose apple(5)	Thailand, White, Red, Naadan, Seedless
7.	Garcinia(1)	Own variety.
8.	Cashew(5)	Madakkathara(1,2), Vruthachalan, Priyanka, Dhana
9.	Arecanut(6)	Mangala, Sumangala, Sreemangala, Mohitnagar, Intercity mangala, Heerhalli.
10.	Coconut(6)	Kuttiyadi(WCT), DxT, Malayan, COD, Anangabhondham(Dawrf green/ 18 am patta)
11.	Guava	Lucknow 49, Grape guava
12.	Gooseberry	Gooseberry NA-7
13.	Others	Sapota, Mahagony, Teak etc.
14.	Mango	79 varieties listed below separately.

**Table 30 List of Mango Varieties in the farm**

Sl.No	Variety	Origin/Remarks
1.	Alphonsa	Rathinagiri
2.	Amrapalli	Rathinagiri
3.	Anmol	
4.	Andhra special	
5.	Apple Rumania	
	Alboorbinishan	
6.	Banganapalli	Andhra Pradesh
7.	Black & Rose	Indigenous (Naadan)
	Bear mango	
8.	Chandrakaran	Puducherry
9.	Chausa	Pakistan
10.	Chandrama	Maharashtra

11.	Chunkiri	Indigenous
12.	Cheruthoni	Wild Forest
13.	Cheeri/ Seeri/ Alambur baneeshan	
14.	Chandanam	
15.	Chinnarasam	Tamilnadu
	Chakkarakutty	
16.	Deeseri	
17.	Furta	Kozhikode
18.	Fruity	Maharashtra
19.	Gudadat	North India
20.	Goa mango	Goa
21.	Himapasand	North India
22.	Jahangir	North India
23.	Jwari	Tamilnadu

24.	Jailor	
25.	Jalalu	
26.	Jumbo red	North India
27.	Jalbundher	North India
28.	Kalapady	
	Kesar	
29.	Kotteparamban	
30.	Kilimooku/ Salem	Salem
31.	Kalluneelam	
32.	Kudoos	
33.	Kallapaddy	
34.	Kottekonam	Thiruvananthapuram
35.	Kolumbu (Karpooram)	
36.	Kossery	
37.	Konkan Ruchi	
38.	Keita	
39.	Kallar	Forest
40.	Kesar	North India
41.	Kid savoi	
42.	Kattimon	
43.	Kew sam rod	
44.	Ko mango	Indigenous
45.	Malgoa	
46.	Mallika	
47.	Moovandan	
48.	Maya	
49.	Mangali	Indigenous
50.	Mylapoor	Tamil nadu
51.	Neelam	

52.	Neelali pasand	
53.	Naypasand	
54.	Nadasala	
55.	Nambiar/ Kuttiatoor	
56.	Olor	
57.	Omlet/ Sugarcane	
58.	Prior	
59.	Periyarasam	Tamil nadu
60.	Pirankiladuva	
61.	Rumania	
62.	Sindhooram	
63.	Sindhuri	
64.	Sakkarakatty	
65.	Salem Banglora	
66.	Suvarnareka	
67.	Sheber	
68.	Sonia	
69.	Sundari	
70.	Tomyatkin	Foreign
71.	Thailand	
72.	Do Off Season	
73.	Retna	
74.	Lilly	
75.	Kopramamudy	
76.	White Rose	
77.	London Fibre	
78.	All Season	
79.	Naatu mango	

**Table 31 Cost of cultivation incurred by the farmers**

<b>Sl. No.</b>	<b>Component/acre</b>	<b>Proposed Expenditure</b>
<b>1.</b>	<b>Cultivation Expenses</b>	
	(i) Cost of planting material	2,000
	(ii) Manures & fertilizers	5,000
	(iii) Insecticides & pesticides	2,000
	(iv) Cost of Labour	8,400
	(v) Others, if any, (Power)	3,600
	<b>Subtotal</b>	<b>21,000</b>
<b>2.</b>	<b>Irrigation</b>	
	(i) Tube-well/submersible pump	45,000
	(ii) Cost of Pipeline	-
	(iii) Others, if any, please specify	-
	<b>Subtotal</b>	<b>45,000</b>
<b>3.</b>	<b>Cost of Drip/Sprinkler</b>	<b>25,000</b>
<b>4.</b>	<b>Infrastructure</b>	
	(i) Store & pump house	15,000
	(ii) Labour room	5,000
	(iii) Agriculture Equipments	5,400
	<b>Subtotal</b>	<b>25,400</b>
<b>5.</b>	<b>Land Development</b>	
	(i) Soil Leveling	4,000
	(ii) Fencing	29,600
	<b>Subtotal</b>	<b>33,600</b>
	<b>Grand Total</b>	<b>1,50,000</b>

Category I- Alphonso, Sindhooram, Kilimooku/ Salem and Banganapalli

Category II - Himapasand, Kallapaddy, Mallika, Chakkarakutty

Category III -Nadasala, Neelam, Chandrakaran, Alboorbinishan

Category IV\_ Sindhuri, Tomyatkin, Retna, Chausa, Amrapalli, Bear mango, Kesar

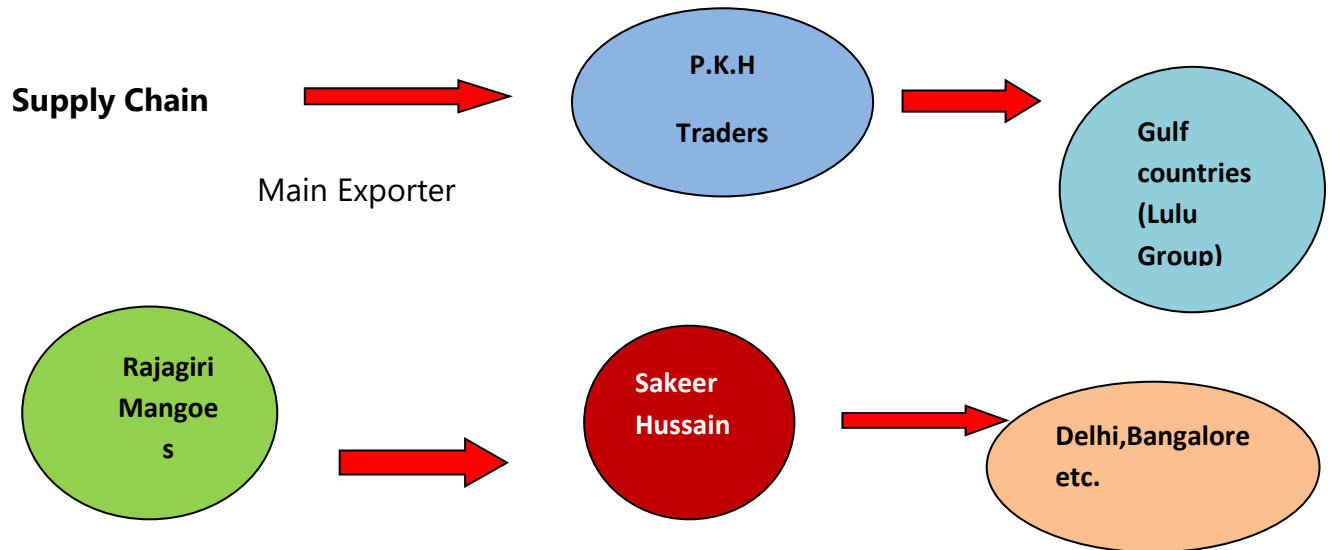
**Export Quality:** Alphonso, Sindhooram, Banganapalli, Kilimooku (Salem).

**Export Category:** Export Quality-I, Export Quality-II

**Other Category:** Quality- III, Quality-IV (Value added products-juice, jam, pickle etc)



**Total Investment:**10 Lakh invested.



P.K.Haneefa (Grower & Exporter)

### **Profit of Intermediate Agents**

Quality –I, represents the export grade and the money generated was able to meet/ settle the mango growers or producers. Export Quality II, III & IV were profit for the exporters.

**Problems Faced** 1) Climate Change. 2) Crop damage. 3) Reduced Harvest and turn over  
4) COVID-19 issues





Kalapadi



Killikukku



**Malgova**



**Mallika**



**Moovandan**



**Neelam**



**Sindhooram**



**Chandrakaran**



**Tomy Atkin**

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The trade and business of mango during the season is presently dominated by the private traders and export establishments. However, the farmers/producers of Muthalamada gets much less than the total commercial value. The Muthalamada Mango Farmers' Producer Company Ltd was established to work for the welfare of all mango growers in Muthalamada and has more than 30 clusters covering 700 small & mid-sized registered mango farmers. The Company has initiated development of Good Agricultural Practice (GAP) & Pesticides Free Produce. On farm conservation is an ideal approach for conserving local cultivars as this case study illustrates. The promotion of local level value added processing, promoting branding of the produce, educating the farmers on building competitiveness and increasing export potential will benefit the mango growers. This case study points out the need for integrating agrobiodiversity into sustainable development goals, taking into consideration all the three dimensions of it-economic, ecological and social sustainability. Conservation, Cultivation, Consumption and Commerce, all are equally important to maintain on farm diversity.

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## **2. MEDICINAL TOBACCO STORY OF KASARAGOD**

Kasaragod district is the only district of Kerala that produce tobacco. Pullur Periya, Ajanoor and Pallikara panchayath are the main areas of tobacco cultivation of this district. Tobacco

cultivated in kuniya region of Pullur Periya panchayath have more nicotine content compared to the tobacco cultivated in sea coast area of Pallikara. Farmers like Venu Thokannum, Velayudhan, Parvati, Sadan, Bhaskaran, Babu and Koran are now cultivating tobacco on acres of land. Velayudhan and his sister Parvathy from Kottapara have planted 5000 saplings. Cultivation season is January, February and March. Good hot weather is most suitable for tobacco farming. The field should be watered at 3 am. The leaves of the plants are hung on the harvest tent. After drying the stalks, the stalks are brought to the market. They say that in the 1990s, the government began raising awareness about the dangers of tobacco use. With the acquisition of the coastal area for the Bekal project, the farmers started abandoned farming.

Tobacco is now added to medicines to treat indigestion and anorexia. Tobacco juice is used by the native people to induce vomiting when toxins enter. It is also used as medicine in Ayurveda and Homeopathy. In this juncture Farmers of Kasaragod has now initiated tobacco cultivation as medicine. In 2020 the area under cultivation was restricted to 4.45 Ha only. The annual production was 6.6 tonnes. Farmers priced first grade tobacco at Rs 1,500 -2000 per kg, the tobacco has its market mostly in Karnataka. Second grade tobacco was cheaper with Rs 500/kg. Traders from places like Mangalore and Puttur come and purchase it. Chettukundu beach to Bekal beach Farm has the largest spread of over 40 acres.



**Fig. Tobacco farming at coastal area of Pallikarahe, Kasaragod**

### 3. STRAWBERRY FARMING - KERALA STATE HORTICULTURAL PRODUCTS DEVELOPMENT CORPORATION (HORTICORP)

Kerala State Horticultural Products Development Corporation (Horticorp) is a fully owned Government Company under the Department of Agriculture, Government of Kerala. Horticorp founded in 1989 has since been working for the benefit of consumers and horticultural farmers in the state, encouraging indigenous farmers to produce more vegetables and also prevent unreasonable price hikes.

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Lack of a farmer-friendly distribution network and marketing system is the biggest problem faced in the vegetable production sector of Kerala. Farmers are being exploited by the organized traders and commission agents. The cool season vegetables like Potato, Carrot and Beans produced in the Vattavada and Kanthallor panchayats of Idukki district are purchased by the traders of Tamilnadu and these items reach the markets of Kerala through Madurai and other neighbouring markets. The intervention of Horticorp for procuring vegetables directly from the farmers and marketing it through its "Haritha" network has helped farmers to a great extent in realizing a better price. Similarly the "Swasraya Karshaka Vipaniies" established by the Vegetable and Fruit Promotion Council , Kerala has succeeded in empowering the farmers with a bargaining power and enabled them to market their produce in an organized manner.

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#### **Major Activities**

##### **1. Procurement and Sales**

Horticonp collects fresh and non-toxic vegetables from farmers and sells them to customers at reasonable prices. The selling of vegetables is done through Haritha stalls located all over Kerala. The vegetables are either procured directly from farmers or through Karshaka Sanghams. This helps to avoid mediator- based exploitation. Horticonp has district offices in every district of Kerala except Kasargod. All the vegetables and products available in the Haritha stalls are guaranteed to be non-toxic. The stalls are open every day from 8am to 8pm.

2. Supply of vegetables and fruits to government institutions and schools

3. Marketing of planting material

4. Marketing of vegetables through mobile units

5. Pollination Support through Beekeeping: Food security, food diversity and productivity enhancement is ensured through promotion of beekeeping in all the districts of Kerala. A major component of the Central Scheme implemented by Kerala. Horticonp to support honey growers and promote production of value added honey products. For promoting beekeeping activities in the State, Horticonp acts as the State Designated Agency for implementing the Central Sector Scheme 'Development of Bee-keeping for Improving Crop Productivity' since 1998. There are two components under this scheme, 1) Pollination Support and 2) Assistance to Honey Production.

6. Value Added Products: Horticonp markets value added products such as potato chips, banana chips and tapioca chips made in pure coconut oil.

### **Strawberry farming**

In Munnar, Horticonp cultivates various kinds of organic vegetables and fruits but the focus is on strawberry cultivation. The strawberry farming was started in Munnar jointly by Horticonp, Agricultural Department, Horticultural mission, UNDP, and Haritha Keralam.

Strawberry treatment plant is functional in Munnar, Strawberries procured from Munnar , Vattavada and Kanthallur regions are used to make jams, squash, and honey preserve etc. Strawberries, fruits and vegetables are cultivated in the Govt. owned farm of 1.5 Acre. HortiCorp is also in the process of getting certification for jam from strawberry as a processing unit is now operational to utilize the fruit that goes unsold. Varieties of strawberries produced include Camarosa and Nebula

**Table 32 Production and yield of Strawberry in Munnar HortiCorp**

<b>Year</b>	<b>No of plants</b>	<b>Yield /1.5 acre</b>	<b>Rate /kg</b>
<b>2019-20</b>	10000	1686.850 kg	400
<b>2020-21</b>	7000	1070.470kg	500-600

<b>Products</b>	<b>Price</b>
Raw strawberry (In Farm)	400 INR /Kg
In Outlet Raw strawberry	100 INR / 250 gm pack
Strawberry Preserve (available during season)	150 INR/ 500 gm Bottle

#### **4. VEGETABLE AND FRUIT PROMOTION COUNCIL KERALAM (VFPCCK)**

Vegetable and Fruit Promotion Council Keralam (VFPCCK) is a company registered under section 25 of Indian Companies Act 1956 and has been established to bring about overall development of fruit and vegetable sector in Kerala. Established in 2001 as the successor organization of Kerala Horticulture Development Programme (KHDP), VFPCCK is managed by a result oriented multidisciplinary team of professionals. The Self Help Groups (SHGs) conceptualized by the Council form the base units for all the interventions like Extension, Rural Credit, Group Marketing, Participatory Technology Development (PTD), Value Additions and Exports.



VFPCCK is a company with majority stake of farmers and the Government and financial institutions as the other major shareholders. Self Help Groups of farmers constitutes 50% of shares, Government of Kerala has 30% and other related institutions hold 20% of VFPCCK's shares. The activities of VFPCCK are carried out by SHGs formed by 15-20 members with one master farmer who carries out extension activities. SHGs join and form Swasraya Karshaka Samithi (SKS) where they pool their market produce and traders come there for purchase. The Director Board with 11 members is chaired by the Minister for Agriculture, Government of Kerala and acts as the governing body of the Council. The board members include senior Government officials like Agricultural Production Commissioner, Director of Agriculture , Secretary (Finance), Chief Executive Officer of VFPCCK, four persons including a woman to be elected from the SHGs and one representative from national agency in horticulture and one representative of participating banks on rotation .

**Kerala Horticulture Development Programme (KHDP)** was initiated for promoting fruits and vegetable production in Kerala and also to study the feasibility of introducing SHG in agricultural sector.

Activities were first launched in the districts of Thiruvananthapuram, Ernakulam and Kottayam. Over the years, the programme has spread to other districts. KHDP had experimented and refined several agricultural practices, and were able to effectively address the hard felt needs of the farmers. This farmer friendly project has empowered farmers to rise up to the new and emerging challenges in the horticulture sector. As envisaged in the guidelines of the project, the activities of KHDP, after its completion was taken over by the new farmer led company known as Vegetable and Fruit Promotion Council Keralam.

## Achievements

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Promoted the concept of SHGs among horticultural farmers for their economic stability and better farming decisions. Formed around 9708 SHGs thereby bringing under more than 1.94 lakhs commercial fruits and vegetable farmers under its roof in Kerala. Equipped SHGs to ascertain financial needs and prudent use of funds. Facilitated farmers as farmer trainers and equipped them for farm research. Conducted more than 11585 farmer trainings and around 3302 master farmer trainings. Around 3460 participatory technology development trials and 1832 technical campaigns were conducted.

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Produced, processed and marketed 769.024 MT of quality vegetable seeds and around 55 lakhs tissue culture banana plantlets of high purity and varieties preferences to cater to the requirements of South India. Promoted production centre oriented farmer markets ensuring better producer share of consumer rupee and collective bargaining power of farmers.

The farmer friendly credit package of VFPCCK enhanced fruits and vegetable production. A total amount Rs. 999.4748 crores was disbursed to farmers as easy farm credit and an interest subsidy for of Rs. 248.98 lakhs was also given.

Unique insurance packages were developed for covering the crops and social security of farmers. 10371 farmers were covered under crop insurance and 1357 farmers under social security scheme annually. Krishi Business Kendra has been initiated to cater the quality planting material and inputs requirement for fruit and vegetable cultivation. Soil test based demonstrations were taken up in 14 districts to standardise the fertilizer application in banana and vegetable.

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VFPCK have initiated 287 farmer markets through which 83280.22 MT produces were sold for the year 2018-19, for a total value of Rs. 246.3827 crores. Around 180 collection centres and 147 vegetable retail outlets are set up for the supply of farm fresh fruits and vegetables to the consumers and to control price hike in the vegetable retail chain. Provided land for 143 SKSs and building worth Rs. 10 -12 lakhs for each 119 SKSs. Developed a data bank of daily market prices and arrivals for the last 17 years of 40 varieties of vegetables and banana from 14 centers in Kerala and 4 from other states for market oriented production of vegetables and fruits and improved marketing decisions.

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An urban household farming venture called "**Haritha Nagari**" was introduced with an aim of promoting organic vegetable cultivation and the same was set up in 38088 households. Vegetable seedlings of about 15 varieties are available throughout the year viz Cowpea , Amaranthus , Bhindi , Chilli, Tomato, Brinjal, Bitter gourd, Snake gourd, Ridge gourd, Bottle gourd, Cucumber , Pumpkin, Ash gourd. Cool season vegetable seedlings of cabbage, Cauliflower etc are available during October - November.

Equipped a team of professionally qualified and experienced extension personnel for successful interventions. Various schemes on productivity enhancement, high tech cultivation and marketing is being implemented for fruit and vegetable cultivation.

### **Haritha Nagari- Terrace garden- Kochi**

An urban homestead farming venture in Kochi's corporation area aims at promoting organic vegetable cultivation so as to produce farm fresh vegetables in terraces to make each household self-sufficient in vegetable production. This also helps to utilise the recycled household waste efficiently for cultivation of crop through vermi- composting.

The grow bags have been another key attraction for the urban population. The bags with seedling are ideal for terrace farming and growing plants in limited space.

The registered beneficiaries will be provided with 25 potted vegetable seedlings of their choice for Rs. 3500/- and also 25 grow bags for Rs 2500/- within 10Kms from Kakknad. If the beneficiary is willing to bear the transportation expense the unit will be set up at further distances. Vegetable seedlings are available at VFPCCK all round the year. VFPCCK official will provide necessary technical guidance during the crop period.

**Mushroom Cultivation** Oyster and milky mushrooms can be cultivated under the humid tropical climate of Kerala . The highly nutritive and medicinal values of these mushrooms add value to this crop thus creating high market price for fresh mushrooms. For promotion of mushroom cultivation, regular training programmes are being arranged by VFPCCK. Training kits comprising of spawn , polythene covers and booklet for starters in mushroom cultivation are also being supplied. Spawn packets of oyster mushroom is available throughout the year and milky mushroom spawn packets are available during summer season. Mushroom beds and training kits are also available for sale at VFPCCK.

**Organic farming:** For the promotion of organic farming, organic manures like cowdung, bonemeal, various oil cakes are supplied from SKS and Krishi Business Kendra.

In 2012-13, VFPCCK brought 2509 ha area under organic farming in Kerala. VFPCCK had always included organic farming in the regular programs and conducted 200 organic camps, 28 organic seminars, formed 125 organic clubs and supported organic demonstration plots since year 2010. Tribal development scheme in Attapady and Seethathode in Ranni is being carried out for the up liftment of the farmers undertaking banana and vegetable cultivation. All the supports like input, credit, insurance, trainings, marketing etc are being extended to the member farmers.

### **Production and trade of fruits, vegetables and other items from 2019-2021**

17 varieties of seeds and 10 different planting materials are produced and traded by Vegetable and Fruit Promotion Council Kerala. In 2019-2020, 92129 MTs of vegetables was traded with an annual turnover of Rs 270.084 crores.

In 2019-2020, maximum fruits production was noticed at Ernakulam i.e., 10500.003 MT, followed by Thiruvananthapuram (9858.15 MT) and Thrissur (9522.123 MT). Alappuzha showed the lowest with 820.8 MT. Meanwhile, in the case of Vegetables Palakkad was the top with 8557.56 MT followed by Thrissur (3594.055 MT) and Ernakulam (2401.354 MT). Malappuram showed the lowest with 47.537 MT. In the case of Tubers Kollam stands the first with 1847.35 MT followed by Kottayam 988.398 MT and Pathanamthitta 689.825 MT. Kasaragod recorded the lowest with 6.627 MT. Others were highest at Ernakulam i.e., 1008.33 MT, followed by Thrissur (986.115MT) and Kollam (852.13 MT). Kasaragod recorded the lowest with 11.03 MT (Table 8.38).

Sales Turnover (In Thousands) was almost same as production of the items. For example in the case of fruits Ernakulam with 321657.376 followed by Thiruvananthapuram 310456.495 and Thrissur 300046.221. For Vegetables Palakkad was with 182840, Thrissur 100737.115 and Ernakulam 53756.36. Tubers trade among the districts in Kerala in the order of Kollam 53434, Kottayam 21905.232 MT and Pathanamthitta 21892.176. For other items traded in the order Ernakulam, Thrissur and Kollam with 22995.89, 21211.0477 and 18694 in thousands respectively (Table 8.39).

Maximum fruits production during 2020-2021 was recorded at Thiruvananthapuram i.e., 18525.7MT, followed by Thrissur (12831.2 MT) and Ernakulam (10590.7 MT). Alappuzha showed the lowest with 866.45 MT. Meanwhile, in the case of Vegetables Palakkad was the top with 8479.33 MT followed by Thrissur (2862.7 MT) and Ernakulam (2322.6 MT). Malappuram showed the lowest with 71.4 MT. In the case of Tubers Kollam stands the first with 2002.86 MT followed by Malappuram 1953 MT and Thrissur 1059.1 MT. Kasaragod recorded the lowest with 15.4 MT. Others were highest at Thrissur i.e., 1665.6

MT, followed by Ernakulam 1241.82 (986.115MT) and Kannur (921.53 MT). Kasaragod recorded the lowest with 0.1MT (Table 8.40).

Sales Turnover (In Thousands) was almost same as production of the items. For example in the case of fruits Thrissur with 241703.7 followed by Thiruvananthapuram 221273 and Ernakulam 108076.08. For Vegetables Palakkad was with 164471.16, Thrissur 75561.5 and Ernakulam 65855.145. Tubers trade among the districts in Kerala in the order of Kollam 28107.59, Pathanamthitta 20545.11 and Kottayam 15459.1MT. For other items traded in the order Thrissur, Kollam and Kannur 232787, 18089 and 15443.93 in thousands respectively.

The grand total of bioresources from Kerala during 2019-2020 and 2020-2021 were 92129.3 and 116385 MTs respectively. Similarly, the trades of the item were 2745258.787 and 2157673.4 (in thousands) respectively.

**Table 33. Production Details during 2020-2021**

District	Quantity in MT				Total Qty
	Fruits	Vegetables	Tubers	Others	
Thiruvananthapuram	18525.7	2512	859	890	22786.7
Kollam	5637.49	1175	2002.86	623.41	9438.76
Pathanamthitta	3420.1	574.89	645.17	260.24	4900.4
Alappuzha	866.45	687.43	294.18	129	1977.06
Kottayam	2203.49	1838.85	799.52		4841.85
Idukki	4236.54	2038.21	260.928	8.164	6543.84
Ernakulam	10590.7	2322.6	521.742	1241.82	14676.9
Thrissur	12831.2	2862.7	1059.1	1665.6	18418.6
Palakkad	2886.34	8479.33	562	69	11996.7
Malappuram	4029.8	71.4	1953	0	6054.2
Kozhikode	3261.8	296	113	11.5	3682.3
Wayanad	5396.8	838.9	171.9	53.4	6461
Kannur	1756.98	277.653	37.353	921.53	2993.52
Kasargode	1404.5	192.8	15.4	0.1	1612.8
<b>Grand Total</b>	<b>77047.9</b>	<b>24167.8</b>	<b>9295.15</b>	<b>5873.76</b>	<b>116385</b>

**Table 34. Trading Details during 2020-21**

<b>District</b>	<b>Sales Turnover (In Thousands)</b>				
	<b>Fruits</b>	<b>Vegetables</b>	<b>Tubers</b>	<b>Others</b>	<b>TT Value</b>
Thiruvananthapuram	221273	32202	3312	2946	259733
Kollam	83256.47	41506.8	28107.59	18089	170959.86
Pathanamthitta	93910.8	19348.08	20545.11	4409.29	138213.28
Alappuzha	25183.06	16970	7525	2908	52586.06
Kottayam	54528.26	48085.471	15459.1	8949	127021.831
Idukki	38403.54	31818.83	3023.324	1339.901	74585.595
Ernakulam	108076.08	65855.145	7417.194	12120.982	193469.401
Thrissur	241703.7	75561.5	13597.6	232787	563649.8
Palakkad	47900.613	164471.16	9089	1752	223212.768
Malappuram	83186	1009	9039	0	93234
Kozhikode	74717.2	13072.2	4591	423	92803.4
Wayanad	62022.4	16089.1	3837.3	2374	84322.8
Kannur	49555.27	5964.73	1567.07	15443.93	72531
Kasargode	6260.3	4606.3	484	0	11350.6
<b>Grand Total</b>	<b>1189976.7</b>	<b>536560.31</b>	<b>127594.288</b>	<b>303542.1</b>	<b>2157673.4</b>

## FLORICULTURE

Floriculture is a rapidly growing industry in Kerala. The sub tropical conditions of Idukki and Wayanad districts are very much suitable for commercial cultivation of flowers like rose, gerbera, anthuriums, orchids like phalaenopsis, various bulbous crops, foliage plants viz. silver dollar, buxus, laetherleaf fern, hosta, etc. In the plains of Kerala, flowers like tropical orchids, anthurium, bush jasmine, seasonal flowers like, marigold, chrysanthemum, gomphrena etc. can be cultivated. The cultivation of Heliconia flowers in the barren land and is taking roots in the Wayanad districts. Kunnappally Siju, of Panamaram has initiated farming and it is expected that .Rs 60,000 investment for cultivating on one acre of waste land will fetch Rs 4.5 lakh per month from the seventh months. Single heliconia flower fetches Rs 45 in the market. One acre yields over 10,000 flowers a month with each growing to a height of 3 feet to 10 feet. The crop planted for one year will provide yields up to three years. It is having market at Hyderabad, Bengaluru and Delhi.

In Kozhikode a farmer is cultivating 34 varieties of Bougainvillea flowers for the past 20 years in their 36 cent land and earning a monthly income of Rs. 2 Lakhs. It is sold at local markets and Tamil nadu. Self-women group of the village at Alappuzha are at the forefront in cultivating Jamanthi or chrysanthemum flowers in 85 acres across 17 wards. The work is done by the beneficiaries of the MGNREGA programme under the Subhiksha Kerala project of the state government and selling 50 kg to 60 kg of flowers at a rate of Rs 60/kg. The major problems in this sector is lack of steady market and in order to reduce the post - harvest losses, cold storage facility and refrigerated trucks are needed for transportation of flowers to the market. Moreover, farmers are to be imparted with awareness regarding the procedures to enter into international flower markets.



**Habitat destruction, modification, and fragmentation** are widely recognized as the main threat to biodiversity. With habitat destruction, the collection of orchids for horticulture, food, or medicine represents one of the significant threats to the survival of some groups of orchids. Subsequent trade is unregulated and undocumented, and research into trade dynamics and harvest impacts will be of critical importance if we are to prevent orchids from being driven into extinction. Strengthening the legal trade and tackling illegal trade are both priorities. Sikkim and other North Eastern states are growing cool orchids like Cymbidium, Ladies slippers and other suitable orchids, whereas Southern states especially Kerala is most suited for almost all the tropical orchids like Vanda hybrids, Arantheras, Mokaras, Arachnis, Arandas, Aeridachnis etc which are sunny plants and can be grown in open sunlight. Dendrobiums and Oncidiums can be grown in partial shade under greenhouse conditions. Phalaenopsis which are becoming popular now a day need more shade and low temperature particularly low night temperature. Plants are selected according to the growing environment.

Vandaceous Orchids: The plants all can be grown in open beds specially prepared for that on ground and support given. The beds can be filled with coconut husk brick pieces and charcoal. Dried cowdung or chicken manure can be spread on the bed every 2 months. The plants grow straight giving new roots and leaves and flowers from the leaf axils. When over grown the top of the plants can be cut and planted like a new plant.

Phalaenopsis: Phalaenopsis hybrids are popular orchids used as pot plants and table plants. They can be grown in Green houses in cool area. Low temperature during night is necessary for flowering.

Sympodial Orchids: Dendrobiums, Oncidiums, cattleyas and terrestrial orchids like spathaglotis all come under this category. These plants are produced from the bottom portion of the old plants. More and more new shoots sprout from the bottom and make

plants bushy and they can be repotted after dividing them. Flowers are produced from the mature stems of dendrobiums and bottom leaf axils of Oncidiums .

The success of the industry depends on the quality of the product, rate of production, profit from it, developmental scope, availability of inputs, marketing and the flower should have long vase life of minimum 7 days from the day of harvesting etc . All orchid varieties are not suitable for cut flower production though they produce attractive flowers. The selected plants should be most suited for the growing area or suitable environment should be provided for good growth.

## 1. LOTUS NURSERIES

**Eldhose P Raju, Ernakulam- Piravom Mamalassery :** 20 varieties of lotuses including the Zhizun Qianban, Magnificent, Charming lips, Da Sajin and Fire bowl are cultivated. Monthly trade was approximately Rs 30,000. The main customers were people from North India mainly New Delhi, Mumbai, Kolkata and Pune. People from Palakkad and Thiruvananthapuram also purchase the lotus cultivars.

**Ganesh Kumar Anandhakrishnan Tripunithura, Kochi :** The diversity of Lotus in Asia is extensive that more than 2000 cultivars have been developed, ranging from micro to large. He remembers that the first hybrid was created as a small to medium cultivar, named in 2015 after his mother, Nelumbo 'Ala Melu. Candy Cone' is a long-petaled, single flowered type, which keeps changing colour and pattern from the first to fourth day. Small Lotus 'Little Princess' cultivars were other attractive high priced ones. Twinkle is absolutely charming with a purple blush on the tip of each white petal. Red Salute is an incredibly rich coloured hybrid. In 2018, he developed Nelumbo 'Little Rain', a micro lotus.

**Ms Sayana, Kattakada, Trivandrum** possess 50 lotus and 10 ambal cultivars. It flowers within 20 days to 3 months period. Price ranged from 500 to 5000 rupees. Sagashrathalam (1000 petaled) is the most attractive species. Tropical and hardy varieties were cultivated.

Tubers were sold to Punjab, Gujarat, and Hyderabad. 11 varieties were traded in high volume from the nursery.

**Table 35. Lotus varieties traded in high volume sale**

Sl.No	Lotus Varieties	Rate Rs.
1	Red phillip	1200
2	Lady binglei	550
3	Foreigner	350
4	Pink meadow	600
5	Yellow peony	900
6	Little rain	500
7	Heart blood	600
8	Chinese red shaoshan	1000
9	New star	500
10	Chinese red	1000
11	Pink cloud	1600

**Table 36 Other popular Lotus varieties**

1.	Jince Lotus	1000
2.	Green apple	1000
3.	Super Lotus 13B Tuber	1500
4.	American millennium	1200
5.	Amiry peony Lotus Tuber	1500
6.	Golden wave and jade Lotus Tuber	3000
7.	Elegant Woman Lotus Tuber	1000
8.	Ultimate 1000 Petal Lotus Tuber	3000
9.	New Brocade Lotus Tuber	1500
10.	Snow White Lotus Tuber	999
11.	Prima Lotus Tuber	1000
12.	Longevity Lotus Tuber (Dwarf Lotus	1500
13.	Kaekwan Lotus Tuber	2000
14.	Yellow Pror Pink Lotus Tuber	2000
15.	Yellow Peony Lotus Tuber	800
16.	Elegant women lotus	1000

**Musthafa Chakkaliparambil, Malappuram:** In Malappuram, , 50- year-old Musthafa Chakkaliparambil, raises lotus (*Nilumbium nucifera*) with 40 farmers. He has been cultivating lotus for 40 years and it has a steady demand from the numerous temples across north Kerala and outside. The flower crop earns the lotus farmers good income; however this unique floriculture activity is not just an income-earner of a few Thirunavaya locals, but a testimony to the communal. Musthafa's lotus flowers have good demand in temples cross the north Kerala as well as in the temples of Thrissur district like the Sree Krishna Temple, Guruvayur, as well as the Paramekkavu and Thiruvambady temples, both associated with the renowned Pooram. The community takes the fields on lease and cultivate lotus. Seeds are collected and kept for the next season. It takes three months for the lotus to bloom.

Lotus is cultivated at 20 acres at Valiya Parapoor, 10 acres at Cheriya Parappoor and seven acres at Vavoor Padam and sent to various temples. One farmer raises lotus on 85 acres. The lotus farmers sell a minimum of 20,000 flowers on a daily basis during season and they fetch a handsome price. Now since the labour charges have gone up, the rates of the flowers also have gone up. Earlier, he could sell one for 30 or 40 paise. Now one flower alone costs Rs 2.50. When the water level is high, they have to go in small boats to pluck the flowers. Frequent care is needed for the lotus, as the new flowers would not bloom in the absence of sunlight. Older leaves have to be plucked and removed often so that new ones sprout. Other aquatic plants and weeds also have to be removed periodically.

Lotus seeds are planted in June and July after tilling the land. After filling the field with water, it has to be tilled again for the better penetration of the lotus roots. The rates of the flowers depend on their size, bloom, colour etc. So, one has to be very careful in classifying them accordingly, The Tirunavaya lotus has always been in demand as it is preferred to the lotus from other places such as Thripayar and Nagercoil because of its colour, size and smell. The Tirunavaya pink lotus is preferred in temples across the State,

including Guruvayur. Farmers are hopeful that there will be a spurt in demand for value-added products such as kondattam, squash, pickles, and other herbal products made with lotus. Several Ayurveda medicines (Kottakkal Arya Vaidya Sala), especially some meant for children, are made with lotus.



## 2. HOMEGROWN BIOTECH NURSERY

Homegrown Biotech develops and sells seedlings and budlings as well as fully grown trees in fibre-glass containers. However, in addition to supplying planting materials, the company also imparts knowhow to the customers on all aspects of cultivation, including planting, watering, pruning, nurturing, etc. The customers are educated on the different manures, fertilizers and pesticides to be used during various growth phases of the trees. Homegrown Biotech currently caters to three categories of customers – Homesteads, Farmers and Nurseries, and Institutions.

Homegrown Biotech has identified and evolved fruit varieties that are suitable for home gardens as well as those for farms and nurseries. The customers are educated on the most efficient and effective farming techniques. Homegrown Biotech also supports corporations and other institutions in their green initiatives. The produce is marketed through 300 resellers spread across Kerala and exclusive company-owned depots located in Thiruvalla, Kanjirapally and Adimali.

Commercial fruit farming – an idea that Homegrown Biotech sowed two decades ago has come of age. Fruits are generally higher priced than all other farm produce. However, farmers are hesitant to be engaged in fruit farming. This is because of the lack of knowhow about which fruits would suit their soil conditions, the unpredictability of a good harvest, the ignorance as regards the correct techniques of farming, etc. Homegrown Biotech offers not only suitable planting materials, but also support, guidance and sufficient information on how to plant, grow and nurture them. The farmers and nursery owners are also given tips on easy and effective maintenance of the trees.

Initially the number of saplings produced were 10,000 (4.5 acres) and now they have expanded to 10,00,000 (70 acres). The plants were traded within the state, outside the state and also abroad. The turn over which was initially Rs 5 lakhs, is now about Rs 11.6

crores National Horticulture Board, State Horticulture Mission and Dept. of Agriculture recognized the firm with many awards. The nursery collaborates with private, cooperative and Govt. nurseries in promoting sale of their products.

The high price species are Jaboticaba, Durian and Marang. Jack cultivars from Vietnam, Malaysia, Thai and also Mango varieties both indigenous and exotic were cultivated and traded. The details of major species including area of cultivation, number of seedlings and rate per plant material is given in table. Features of some of the popular species are given below.

**Jaboticaba** Delicious, sweet, juicy litchi is one of the popular summer fruits that contain essential nutrients like vitamins, minerals, carbohydrates, antioxidants and dietary fiber. It is a sub-tropical tree native to the Southern provinces of China, but high quality fruits are produced in north Indian states, especially in Bihar.

**Marang** A native of Borneo, marang is widely cultivated in the Philippines. The fruit has a strong scent and superior flavor than both jackfruit and cempadak. Marang is rich in nutrients especially proteins, minerals, vitamins and carbohydrates. In the Philippines, marang is often paired with durian as its juicer counterpart and is the Filipino queen of fruit.

**Longan** This fruit is similar to litchi that originated in the southern China. The sweet succulent fruit is very tasty and enjoyable to eat, while providing vitamins, minerals, carbohydrates and anti-oxidants.

**Dragon Fruit** An extremely beautiful fruit that has dazzling flowers and an intense shape and color, dragon fruit is esteemed by fruit lovers. It is a good natural source of anti-oxidants which help to prevent the dangers of free radicals which can cause cancer and undesirable health determinants.



**Butter Fruit** Avocado or butter fruit is known for the large amounts of nutrition it provides. The fruit can be cooked, raw, in a salad or just taken off its tree and eaten too, or maybe used topically for skin and hair needs

**Milk Fruit** Delicious, sweet, juicy Milk Fruit is one of the popular summer fruits that contain an impressive list of essential nutrients like vitamins, minerals, carbohydrates, antioxidants and dietary fiber. It is a sub-tropical tree native to the Southern provinces of China, but high quality fruits are produced in north Indian states, especially in Bihar.

**Star Fruit** Delicious, sweet, juicy is one of the popular summer fruits that contain an impressive list of essential nutrients like vitamins, minerals, carbohydrates, antioxidants and dietary fiber.

**Soursop** Graviola (*Annona muricata*) is a rainforest tree, classified under the pineapple family Annonaceae. Also known as soursop this small evergreen tree with large glossy dark green leaves grows to a height of 5 to 6 meters. The edible fruit is heart-shaped, yellow green in colour and white inside.

**Miracle Fruit** *Synsepalum dulcificum* is a plant known for its berry that, when eaten initially tastes sour subsequently sweet.

**Passion Fruit** Pleasantly sweet and tart, passion fruit, also known as granadilla

**Mangosteen** One of the fine fruits in the world, mangosteen is regarded as the 'queen of fruits,' with exquisite, incomparable, appealing taste and flavor. Originated in Indonesia, mangosteen is found throughout the tropics.

**Durian** Durian is revered as the 'king of fruits' in the Southeast Asian countries, mainly Malaysia Thailand, Singapore, Philippines etc. It is a rich source of dietary fiber, essential vitamins, minerals, sugars and fats. Durian contains a great amount of amino acid tryptophan which alleviates anxiety, depression and insomnia. It is one of the most expensive fruit in the world.

**Pulasan** Pulasan is a close relative of rambutan, which has its origin in Malaysia. The pulp is very sweet and juicy, and easily separable from the seed. Consumption of the fruit reduces body fat, makes skin softer and has good use in hair care.

**Rambutan**The most popular Indian variety, N 18 is highly adaptable and is far superior to the existing varieties. Large delicious fruits with an aril percentage of 44, rich crunchy luscious pulp and a sugar content of 20 ° brix make N 18 unique among rambutan varieties. High amount of carbohydrates, proteins, minerals and anti-oxidants make rambutan an excellent candidate for maintaining overall health.

**Cempadak** Cempadak is an exotic fruit found mostly in Indonesia and Malaysia. It is similar to jackfruit but with much more honey flavor, sweet and soft. Several essential vitamins, phytopharmaceuticals and minerals are packed in the edible portion. A unique compound called heteriflavon C is present in this fruit, which helps to eliminate the malarial parasites. Considering the high amount of vitamin A, cempadak helps nourish the eyes and keeps the cornea healthy.

**Bush Orange** Bush Orange typically means *Philadelphus*, a mostly Holarctic genus of shrubs, particularly the species *Philadelphus coronarius* which is widely cultivated as an ornamental.

Home Grown Biotech has invested a great deal of resources into developing new techniques of farming and creating new varieties of fruits to render fruit farming profitable. The mother farm spreads across 23 acres of land on the banks of Manimalayar in Vizhikkathod village in the Kanjirappally district of Kerala. Budlings and seedlings of more than 20 varieties of native and non-native tropical fruits are developed in the mother farm. Homegrown Biotech gives training in efficient and effective farming of tropical fruits to farmers who visit the farm under the initiative of the Department of Agriculture through Krishi Bhavans and various other agencies.

Home Grown Biotech has a well-facilitated Research and Development Department which is constantly and consistently working to develop newer and better varieties of fruits and techniques of farming. More than 20 varieties of native and non-native tropical fruits have been developed by Homegrown Biotech to date. In addition to the mother farm, budlings and seedlings of these fruit trees have been made available at various outlets across the state. Home Grown Biotech has more than 300 resellers supplying their products across Kerala, of which around two-thirds are located in Mannuthy in Thrissur district. These resellers cater to a vast majority of the existing customers. Homegrown Biotech has its own exclusive depots at Thiruvalla, Kanjirappally and Adimali. In addition to supplying planting materials through the depots and resellers, Homegrown Biotech takes considerable effort to organize fruit farmers' societies and clusters in the various districts, and to visit them to spread awareness on optimum farming techniques.

**Table 37 Major species produced and traded from the nursery**

<b>Name of the plant</b>	<b>Total area of cultivation</b>	<b>Number of seedling produced / month</b>	<b>Rate of plant material (Rs)</b>
Jaboticaba	50 cent	500	1000
Marang	20 cent	520	500
Longan		2000	350
Dragon Fruit	10 cent	3000	100
Nutmeg	20 cent	1000	250
Bread Fruit	50 cent	2000	250
Butter Fruit	1 acre	5000	350
Champa Hybrid	10 cent	3000	200
Mango	20 cent	25000	120
Milk Fruit	20 cent	2000	350
Star Fruit	20 cent	2000	250
Soursop	10 cent	2000	100
GuavaHG Layer	20 cent	10000	75
Miracle Fruit	10 cent	3000	200
Passion Fruit	10 cent	2000	10

Mangosteen	2 acre	5000	200
Durian	5 acre	2000	750
Pulasan	1 acre	2000	250
Rambutan	5 acre	50000	180
Cempadək	5 acre	1000	150
Bush Orange	1 acre	1000	100

## 2. L.J. INTERNATIONAL LTD BIOTECH DIVISION, KOCHI

Founded in 1925 as a plantation company, AVT (A. V. Thomas Group) is a family owned, professionally managed group of companies with its headquarters in Chennai, India. In 1925, a young Indian entrepreneur, Alfred Vedam Thomas, bought 100 Ha of grassland in Pasuparai, Kerala, considered completely unsuitable to grow tea. At a time when plantations were strictly under the jurisdiction of the British, A.V. Thomas transformed Pasuparai into one of the highest yielding tea plantations in the nation, but also to become the first Indian to own a plantation company. Thus the AVT Group was born.

With this entrepreneurial spirit, AVT ventured into multiple new business areas to meet rapidly changing needs in India and beyond. In addition to plantations, the company's portfolio now includes Consumer Products, Natural Food Ingredients, Nutraceuticals and Leather Products. Paramount to the success has been the ability to continually forge strong, reliable and trusting partnerships with some of the biggest international names in the industry, such as McCormick, Gavia and Kemin Industries. The Group's business interests span between plantation business and agri-based consumer goods to bio-technology, industrial leather processing and wood products. The Group has 15 companies under the portfolio with revenues aggregating to more than US Dollars 400 Million. The Company follows a socially inclusive and highly professional business ideology and employs 11,000 personnel. Over the last

century, the Group has played an important role in sustainable development of local communities through the remote corners of rural South India.

A.V. Thomas group established the first commercial tissue culture unit in India in 1988. The commercial tissue culture units now exports 8 million tissue culture plants to many countries like Japan, Holland, Spain, USA, South America, China etc. Apart from producing quality tissue culture plants for breeders around the world the tissue culture plants have been produced for the domestic market also. A.V.T Gardenia is the marketing division of L.J. International and supply garden plants especially orchids, gerbera, anthuriums etc. AVT offers superior selections of fruit, flower and foliage plants as well as agriculture crops. Further, highest levels of quality are maintained by continuous product Improvement by way of innovative technology applications.

Tissue culture Production facility – 2 Numbers in Cochin, Kerala; Production capacity – 10 million plants. Green house facilities: 2 Numbers in Cochin, Kerala. (Area: 1200 Sqm). Hardening and plant production unit: 3 Numbers (Area: 1,700 Sqm). Hi tech growing facilities for Phalaenopsis: 3 Numbers at Caradygoody estates, Idukki, Kerala (Area: 3, 000 Sqm). Nearly 77 varieties were produced and traded (Table 8.74).

As per the balance Sheet as at 31<sup>st</sup> March, 2020, the Live Plants stored was 32, 40,968 in 2019-2020 as compared to 34, 10,435 in 2018-2019. Traded goods comprise live plants 75, 10,561 in 2019-2020 as compared to 52, 53,305 in 2018-2019. The respective traded seeds were 52, 53,305 and 46,365 (Table 8.75).

As per the Profit& Loss for the Year at 31<sup>st</sup> March, 2020, the live plants 1, 12, 54,074 in 2019-2020 as compared to 1, 29, 92,505 in 2018-2019. The respective traded seeds were 1, 94,815 and 10, 49,204 (Table 8.76).

As per the Accounts for the year ended at 31<sup>st</sup> March, 2020, the imported comprise 35, 82,164 in 31/03/2020 as compared to 42, 50,058 in 31/03/2019. The respective indigenous items were 85, 95,498 and 74, 24,067

**Table 38 Plants in AVT industry**

Sl. No	Name of the plant	Rate (Rs)
1.	Phalaenopsis Si1852	550
2.	Phalaenopsis Genki *Little Gem Stripes	550
3.	Phalaenopsis Ray *(Nuankung's 4.55 Pm *Estern) LX119	550
4.	Phalaenopsis Gem Miki YO33	550
5.	Phalaenopsis Stripe Beauty * (Prince * Lioulin Lady) LX114	550
6.	Phalaenopsis Pink Angel * Fuller's Sunset LL102	550
7.	Phalaenopsis Genki YO81	550
8.	Catteleya Fire Fox	750
9.	Catteleya Nodosa	430
10.	Catteleya Thong Supan	750
11.	Phalaenopsis LHB08	550
12.	Zygopetalum Patricia Eisenbeiss	1325
13.	Anthurium Pinkish Red	250.00
14.	Anthurium Pink	250.00
15.	Gerbera Prince	750
16.	Gerbera Marinilla	750
17.	Gerbera Rionegro	750
18.	Phalaenopsis L1480	750

19.	Phalaenopsis L1599	550
20.	Phalaenopsis L1271	550
21.	Dendrobium Red Beryl 1061	575
22.	Dendrobium Everlasting Love	575
23.	Dendrobium Airy Big Pink Stripe 832	575
24.	Dendrobium Airy New Normal	575
25.	Dendrobium Burana Charming	575
26.	Dendrobium Sakda Blue 707	575
27.	Dendrobium Brown King	575
28.	Dendrobium Roongka mol 2015	800
29.	Dendrobium Ariya Peach	800
30.	Dendrobium Akekapo n Splash	800
31.	Dendrobium Panama Red	575
32.	Dendrobium Minions	575
33.	Phalaenopsis Little Gem Stripes L1499	550
34.	Phalaenopsis Kitty Face "Rainbow" L6691	430
35.	Phalaenopsis Honey Sunkist L1764	430

36.	PhalaenopsisCherris *(Leopard Prince *Lady) LX109	430
37.	PhalaenopsisNagori Yuki PZT4	550
38.	PhalaenopsisSmile LK772	430
39.	Phalaenopsis Red Beauty LD1533	550
40.	Phalaenopsis Green Earth * Pink Angel "LX 133	430
41.	Phalaenopsis Red Sun * Golden Beauty LD1422	550
42.	Phalaenopsis Queen * Diamond LG576	550
43.	Phalaenopsis Orange Queen "LD1419	550
44.	PhalaenopsisPurple Lady L1716	550
45.	PhalaenopsisPokemo n YO97	550
46.	Phalaenopsis Swallow *(Big Mouse * Bridal Dress) L1237	550
47.	PhalaenopsisDemoliti on Si2226	550
48.	PhalaenopsisWhite Miracle Si3412	550
49.	CatteleyaRungappa Fancy	650
50.	CatteleyaMini Red Dragon	750
51.	CatteleyaPink Empress	750
52.	CatteleyaCorner Stone Perfection	750

53.	CatteleyaChyong Guu	750
54.	CatteleyaKing Of Taiwan	750
55.	CatteleyaOrange	750
56.	CatteleyaPlatinum Charm	750
57.	CatteleyaJairak Summer	750
58.	CatteleyaMahino Yahiro X Mari Song	750
59.	CatteleyaWhite	750
60.	CatteleyaPink Doll	750
61.	CatteleyaThosapol Secret Love	750
62.	CatteleyaSri Pattum Pink	750
63.	PhalaenopsisSG962	550
64.	PhalaenopsisL1281	550
65.	PhalaenopsisL1238 Cumquat	550
66.	PhalaenopsisC104-4	550
67.	PhalaenopsisC59-1	550
68.	PhalaenopsisC118-3	550
69.	PhalaenopsisC05-1	550
70.	Phalaenopsis Crimson cheurb x dragon tree eagle x summer dance queen	1325
71.	PhalaenopsisViolacea Indigo Red x sib	1325
72.	Phalaenopsis Violacea Indigo Red X Jang's Coral Wood 'Jang' JS69	1325
73.	Minions	575
74.	Panama Red	575
75.	Akekapon Splash	800.0 0

76.	Ariya Peach	575.0 0
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77.	Roongkamol 2015	800.0 0
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## ORCHIDS

The cultivated orchids of Kerala include

(1). **ARANTHERAS:** Hybrid of Arachnis and Renantheras. Arachnis are cut flower orchids for a pretty long period with long flower spikes. Usually arantheras have red flowers on long spikes like that of Arachnis. The shelf lives of flowers are very good. Sometimes they are called Red spiders. The common varieties cultivated are Aranthera Annie Black, Aranthera Mohammed hannif, Aranthera James Storeii and new varieties are being introduced even now.

(2). **ARACHNIS:** They are the famous spider orchids sometimes called scorpion orchids due to the shape of flowers. It is called a spider may be because the arrangements of flowers on the erect spike resembles a spider crawling up. The commonly cultivated plants are Arachnis Maggie Oei. They have different shades mainly "Red Ribbon" and "Yellow Ribbon". Some closely related to the species Arachnis flos aeris is "Black ribbon". Its flowers are fragrant like the original species. Arachnis are early varieties but still used as they are comparatively cheap to produce and easy growing varieties. The spikes will be 80 cm to 100 cms or more in length with more than a dozen flowers. Related plants are Arachnis Ishabel, Arachnis Kapama etc. Kapama has fleshy flowers arranged all facing a single side, making it good for many kinds of arrangements

(3). **ARANDAS:** Arandas are hybrids made crossing Arachnis and Vandas. Since so many vandas are used in hybridization work a lot of Aranda varieties of different colours and sizes are made. Aranda flowers are having wider petals than Arachnis and Arantheras,



erect spikes, bright coloured flowers, and easy growing. Popular items are Aranda Christene, Aranda Noorah blue, Aranda Golden sands, Aranda Majula etc. new varieties include Aranda green tiger, Aranda

(4). **VANDAS:** Vandas are used from early period for cut flower production. Vandas are of various types according to the leaf types. Strap leaf vandas are common. There are Pencil vandas with pencil like cylindrical leaves which can tolerate bright sunlight eg. vanda miss Jua Quim, Vanda Poe Poe Diana, Vanda Ruby Prince etc. Crossed with strap leaf type there are semi terete vandas and majority of commercial vandas come under this category. A lot of semi terete vandas are used in large scale cultivation. Vanda John Clubbs, Vanda TMA, Vanda Josephine van Brero, Vanda Velthuis, V. Emma Van devender, Vanda Hilo blue, vanda crosses with other plants like Ascocentrum, Vandopsis, and many hybrids are used for cut flower production.

(5). **MOKARAS** Mokaras are trigeneric hybrids involving, Ascocentrum, Arachnis and Vanda. All the qualities of these generas are dominant in Mokaras, especially the flourescent colours of flowers. All colours are available. It is a major cut flower orchid now. Popular varieties are Mokara Singapore red, M. chakuan pink, M.Chakuan orange, Mokara sayan, Mokara boonchoo gold, Moakara madam panni etc.

(6). **DENDROBIUMS** Among the Asian orchids the most cultivated and marketed orchid flowers are Dendrobiums. Regularly new varieties are being released from the various Orchid Companies. They can be grown successfully under controlled conditions, ie under shade net and are easy for growing them. They give flowers early compared to vanda plants. Because of their lightweight the flowers can be packed and transported easily, papery flowers are long lasting also. There are hundreds of hybrid varieties. But the early varieties are still good in respect of their plant life. All colours are available now.

Whites: Dendrobium Emma White, Den.Thailand White, Den. kasseem white, Den. Snow shite Den. Nappon White diamond etc.

Reds: Den.lady charm, Den. Pathum red, Den.Bobby masena, Den. Sabine Red, Den.Cyarak Red,Den.Cleopatra Beauty x Udomsri , Den.Stripo Stripe (Red), Den.Morning Sun etc.

Pink: Den.Chingmayi pink, Den. Sakura Pink, Den.nagoya Pink, Den.KB Pink, Den.pink lady, Etc.

Green: Den. Burana green, Den. Burana Jade, Den. Aeridang green etc.

Yellow: Den. Kassem gold, Den.sherifa fathima, Den. thongchai gold, Den.Boonchoo gold,Den.Yellow manta, Den.Thonchai X Lubang, Den. Give by God ,Den Beanana royal.Etc.

Dark colours: Den.Blue violetta x Poyck, Den. Bermis Ruby, Den.New Blue Charm, Den. Blue Charm x burana dark blue, Den.genting fragrance, Etc.

Multi Colours: Majority of dendrobiums are double colours with lip differently coloured and the beauty is with the contrasting lip colour. Pink and White, White and violet, white and Red, Yellow and Red, greenish white and maroon, light blue and dark, Etc.Etc.

Popular varieties are: Den.Yellow butterfly and yellow bomb,

Den. nappon star bright, Den.Ekapol panda, Den. Sonia varieties, Den.PopEye, Den.heang beauty, Den.Madam Vipar, Den.rinnappa, Den.Burana Jade Red Lip. Etc.

Striped: Den.strippo stripe, Den.candy strip and its numerous crosses, Den.Compactum pink strip, Den. burana strip, Den.aeridang green x Burana strip, Etc.

(7). **ONCIDUMS**: Many varieties of oncidiums are cultivated for Cut flowers especially Yellow and red varieties. free flowering varieties like. Onc. Goldiana, Onc.Aloha, Onc. sweet

sugar, Onc.Sharry baby and intergeneric hybrids like Brassidium, Brassias, Colmanara etc can be grown as their flowers are good.

#### 4. PEARL ORCHIDS NURSERY

Located in Moonupeedika, Thrissur district this is one of the largest and well known orchid farms in India initiated by Mohammed Moosa an ex-gulf business man. He has been collecting orchids for almost 20-25 years from different places during vacations. During his absence, his wife (Sabira Mohammed Moosa) used to care of the plants. During one of the vacation in 2001, the passion and love for orchids turned into a small farm 'Pearl Orchids'. After doing business in Middle East for almost 35 years came back to India in 2006 and started importing of orchid plants from different countries. **Sabira Mohammed Moosa** was recognized by the government for her hard-work in the form of the coveted 'udhyanashreshta' award, for the year 2006-07 given annually by the Kerala Government for the best floriculture farmer.

The principle markets for these plants being retail and wholesale growing-on nurseries. Other markets include hobby-collectors, general public, farmers and production for special retailers. Plants are imported from south East Asian countries from selected breeders to assure the best quality plants. Post quarantine facility has the capacity to accommodate 50,000 plants. Their main aim is to help enthusiasts to share the passion for orchids, to encourage excellence in commercial and hobby horticulture and encourage all those who are interested in gardening. Pearl Orchids have started their 2nd farm in Kozhinjampara, Palakkad on 2017 which is in 4 acres of land and 110 varieties of orchids are cultivated and traded.

#### High priced orchids

Phalanaeopsis Yang Yang Gelb Canary Orange, Phalanaeopsis Nobbys Green Finger X Bellina Alba, Phalanaeopsis Comingiana X Sib, Phalanaeopsis Mituo King#1, Phalanaeopsis Zheng Min Etching X Summer Dance Queen, Phalanaeopsis Joy Spring

Canary X Bellina Alba, Phalanaeopsis Super Zebra X Hieroglyphica, Phalanaeopsis Speciosa Purple X Vioacea Indigo, Phalanaeopsis Speciosa Purple Rose, Phalanaeopsis Speciosa Spot, Phalanaeopsis Mannii Black are high priced orchids in the nursery. The price ranged from 1500 to 3000.

### High volume traded orchids

Cultivars of Cattleya Sea Breeze, Cattleya Whynot Orange, Cattleya Wah Yuan Bay Red, Cattleya Maikai Purple, Cattleya Petch Paithon, Dendrobium, Vanda, Rhyncostylis were high volume traded orchids.

**Table 39. Checklist of orchids and other groups of ornamentals of the nursery**

Plants	Rate
1. Dendrobium Sweet Eyes	350
2. Dendrobium Orange	350
3. Dendrobium Woon Leng	400
4. Dendrobium Sonia Mutation Splash	500
5. Dendrobium Yellow 58	350
6. Dendrobium Enobi Splash	450
7. Dendrobium Popeye	350
8. Dendrobium Pink Bfc	350
9. Dendrobium Red Ladda	350
10. Dendrobium Orange	350
11. Dendrobium Blue Spin	350
12. Dendrobium Caesar Warawan	400
13. Dendrobium White Sonia	350
14. Dendrobium Thongchai Gold	400

15. Dendrobium Gift By God	400
16. Dendrobium Zedan Red	400
17. Dendrobium Sonia Mutation Splash	500
18. Dendrobium Seedling	150
19. Dendrobium Tone Pink	400
20. Dendrobium Sonia White	400
21. Dendrobium Popeye	400
22. Dendrobium Sampran Brown	400
23. Dendrobium Thongchai Stripe	400
24. Vanda Kasem's Delight X Peggy Foo (458)	750
25. Asco. Peggy Foo X V. Fuchs Delight (K-720)	750
26. Rhyncostylis Coelestis Blue	850

27. Rhyncorides Bangkok Sunset X Vandachostylis Pine River -1	750
28. Asco. Bangkhutien X Thai Spot (K-475)	850
29. Vanda White (560)	800
30. Vanda Kasem's Delight X Peggy Foo (K-275)	750
31. Vanda Kasem's Delight X Peggy Foo (K-275)	750
32. Vanda Kultana Oriental Aroma X V.Somthavil	300
33. Vanda Somthavil X V. Insignis	300
34. Vanda Tessellata Blue X Brown	300
35. V. Mimi Palmer X V. Tessellate Alba	300
36. Vanda Dr. Anek X Somsri	250
37. Vanda Pachra Delight	250
38. Vanda Somsri Pink X Siriporn Pink	250
39. Vanda Somsri Glory Blue	250
40. Rhyncorides Bangkok Sunset X Vandachostylis Pine River - 2	750
41. Asco. Chilly Red	750
42. Asco. Peggy Foo X V.Fuch's Delight (K-721)	850
43. Rhyncorides Bangkok Sunset X Pine River	750

44. Asctm,Miniatum Orange	950
45. Vanda K359	850
46. Rhyncorides Gigantea X Asco Bangkhutien	750
47. Caulocattleya Chantilly Lace	850-950
48. Cattleytonia Whynot Red	750-850
49. Tolumnia Jaieak Flyer Glues Kok 405	200
50. Tolumnia Jaieak Firm Super Brown Kok 407	200
51. Ionopsis Utricularioides	650
52. Oncidium Jairak Fragrance Ong Knot	650-750
53. Oncidium Jairak Fragrance Pra-Lak	650-750
54. Brassia Rex Hybrid	750
55. Oncidium Tzeng Wen Spots	850
56. Vanda Tessellata	850
57. Brassocattleya Yellow Bird	750-850
58. Cattleya Mem Malai Thong	750-850
59. Cattleya Papha Green	750
60. Cattleya Petch Paithon	750
61. Cattleya Sea Breeze	950-850
62. Cattleya Whynot Orange	750-850
63. Cattleya Wah Yuan Bay Red	750-850
64. Cattleya Maikai Purple	750

65. Mokara Dr. Anek Orange	
66. Mokara Madam Pannee	
67. Mokara Omyai Orange	
68. Mokara Pakay Petch	
69. Mokara Chao Praya Beauty	
70. Mokara Chark Kuan Pink	
71. Mokara Jintana	
72. Mokara Calypso Jumbo	
73. Phalanaeopsis Mannii Black	1500
74. Phalanaeopsis Javanica	1500
75. Phalanaeopsis Speciosa Spot	2500
76. Phalanaeopsis Hieroglyphica	1200
77. Phalanaeopsis Lueddemanniana	1200
78. Phalanaeopsis Speciosa Purple Rose	1750
79. Phalanaeopsis Speciosa Purple X Vioacea Indigo	1800-2500
80. Phalanaeopsis Gigantea X Amboinensis	2200
81. Phalanaeopsis Bellina X Amboinensis	1300
82. Phalanaeopsis Schilleriana	950
83. Phalanaeopsis Joy Spring Canary X Bellina Alba	1800

84. Phalanaeopsis Super Zebra X Hieroglyphica	1600
85. Phalanaeopsis Zheng Min Etching X Summer Dance Queen	2300
86. Phalanaeopsis Mituo King#1	1500
87. Phalanaeopsis Nobbys Green Finger X Bellina Alba	3000
88. Phalanaeopsis Yang Yang Gelb Canary Orange	3500
89. Phalanaeopsis Comingiana X Sib	2300
90. Po-Pha – 001 Victoria Glory	
91. Po-Pha – 008 Shin Hua Green Apple	
92. Po-Pha – 046 Little Gem	
93. Po-Pha – 072 Santa Claus	
94. Po-Pha – 118 Rainbow	
95. Po-Pha – 121 Chian Xen Grape	
96. Po-Pha – 127 Yellow Butterfly	
97. Po-Pha – 133 Profar Apple	
98. Po-Pha – 137 Yellow Butterfly	
99. Po-Pha – 143 Hathor Love	
100. Po-Pha – 144 Mask	
101. Po-Pha – 145 Charlie Chaplin	

102. Po-Pha – 146 Annunaki	
103. Po-Pha – 148 King Jupiter	
104. Po-Pha – 149 Artemis	
105. Po-Pha – 150 Limoncello	
106. Po-Pha – 151 Ice & Fire	
107. Po-Pha – 152 Desert Star	
108. Cattleya Amazing Thailand Rainbow	250

109. Cattleya Min Red Dragon	250
110. Cattleya Aurantica X Netrasiri Starbright	250
111. Cattleya Jiminey Cricket Superbug X Netrasiri Beauty	250
112. Cattleya Pkn Empress	250
113. Cattleya Nick 44	250
114. Tillandsia	
115. Carnivorous Plants	
116. Ferns	

## 5. AARSHASREE ORCHIDS, TRIVANDRUM

Raveendran Chennilode, Media person and broadcaster fascinated by Orchids started collecting Orchids and tried growing them. In 1985, a small orchid garden was set up in Chennilode, Trivandrum. Out of passion, he started delivering tips and information on All India Radio and other media portals on this ornamental plant. Soon this gained momentum, and he came to be known as the "Orchid Guru. Without an outside source of funding, initially, Aarshasree Orchids was born through Bootstrap Financing. As the business set in motion, the revenue was re-invested from customers back into the business to finance daily operations, development, and expansion plans. On the go, Aarshasree Orchids received microloans and small local grants.

**Activities:** Orchid cultivation, Orchid Training, Orchid promotion, Promoting Low Cost Tissue culture training, Orchid plants and Flower sales, Hardening of Tissue culture plants. From training in orchid cultivation, terrace gardens, tissue culture, orchid flower,

and plant packing techniques to assisting in orchid projects, this enterprise promotes low-cost tissue culture for the conservation of native orchids and their hybrids.

For the most common varieties propagation is from mother sources of orchids. In some cases both micro-propagation and vegetative propagation were also adopted. The vast majority of contemporary orchid trade involves artificially propagated plants and cut flowers cultivated in greenhouses. All wild orchids species are protected under rules. Therefore, no orchid can be exported in any form (living, dried, or otherwise processed) without permission. Varieties and list of species of Orchid garden cultivated commonly and traded are listed below

Folowing are some of the suggestions for conservation of wild orchids and regulating their trade:

- All species of orchids in Kerala should be strictly protected and conserved.
- Develop micro propagation techniques for mass prpogation
- Training initiatives and programs for customs officials and other stakeholders in orchid identification should be carried out in order to enforce regulations.
- Increase participation of NGOs and associations to participate in monitoring the trade of endangered species.
- Introducing new tools to identify orchids.
- More communications material, such as field guides and leaflets, should be produced and distributed for awareness, and information



**Table 40. Species cultivated**

1. <i>Aerides lawrancea</i>	35. <i>Coelogyne fuscescens</i>
2. <i>Aerides multiflora</i> ( <i>Multiflorum</i> )	36. <i>Coelogyne occulata</i>
3. <i>Aerides odorata</i> ( <i>Odoratum</i> )	37. <i>Coelogyne ovalis</i>
4. <i>Aerides racemiformis</i>	38. <i>Coelogyne stricta</i> ( <i>elata</i> )
5. <i>Aerides ringens</i>	39. <i>Cymbidium aloifolium</i> ( <i>pendulum</i> )
6. <i>Aerides rosea</i> ( <i>Fieldinghii</i> )	40. <i>Cymbidium cochleare</i>
7. <i>Aerides uniflora</i> ( <i>Longicornu</i> )	41. <i>Cymbidium devonianum</i>
8. <i>Anoectochillus</i>	42. <i>Cymbidium eburneum</i>
9. <i>Arachnis flos aeris</i>	43. <i>Cymbidium elegans</i>
10. <i>Ascocentrum ampullaceum</i>	44. <i>Cymbidium ensifolium</i>
11. <i>Bulbophyllum affine</i>	45. <i>Cymbidium iridiodes</i> ( <i>giganteum</i> )
12. <i>Bulbophyllum bisetum</i>	46. <i>Cymbidium lancifolium</i>
13. <i>Bulbophyllum careyanum</i>	47. <i>Cymbidium longifolium</i>
14. <i>Bulbophyllum cauliformum</i>	48. <i>Cymbidium mastersii</i>
15. <i>Bulbophyllum guttulatum</i>	49. <i>Cymbidium microrhizon</i>
16. <i>Bulbophyllum helenae</i>	50. <i>Cymbidium tigrinum</i>
17. <i>Bulbophyllum hirtum</i>	51. <i>Dendrobium amoenum</i>
18. <i>Bulbophyllum leopardinum</i>	52. <i>Dendrobium amplum</i>
19. <i>Bulbophyllum reptans</i>	53. <i>Dendrobium anceps</i>
20. <i>Bulbophyllum striatum</i>	54. <i>Dendrobium bellatullum</i>
21. <i>Bulbophyllum virescens</i>	55. <i>Dendrobium bensoniae</i>
22. <i>Calanthe biloba</i>	56. <i>Dendrobium candidum</i>
23. <i>Calanthe brevicornu</i>	57. <i>Dendrobium cappilippes</i>
24. <i>Calanthe choroleuca</i>	58. <i>Dndrobium chrysanthum</i>
25. <i>Calanthe herbacea</i>	59. <i>Dendrobium chrysotoxum</i>
26. <i>Calanthe masuca</i>	60. <i>Dendrobium clavatum</i>
27. <i>Calanthe puberula</i>	61. <i>Dendrobium crassinode</i>
28. <i>Cattleys skinneri</i>	62. <i>Dendrobium crepidatum</i>
29. <i>Cirrhopetallum guttulatum</i>	63. <i>Dendrobium crepidatum</i> v. <i>assamica</i>
30. <i>Coelogyne barbata</i>	64. <i>Dendrobium cumulatum</i>
31. <i>Coelogyne corymbosa</i>	65. <i>Dendrobium densiflorum</i>
32. <i>Coelogyne cristata</i>	66. <i>Dendrobium devonianum</i>
33. <i>Coelogyne flaccida</i>	67. <i>Dendrobium farmerii</i>
34. <i>Coelogyne flavida</i>	68. <i>Dendrobium fimbriatum</i>

69. <i>Dendrobium formosum</i>	104. <i>Kingdium (dorotis) taenialis</i>
70. <i>Dendrobium gibsonii</i>	105. <i>Ludisia discolor - jewel orchid</i>
71. <i>Dendrobium jenkinsii</i>	106. <i>Monomaria barbata</i>
72. <i>Dendrobium lindleyei (aggregatum)</i>	107. <i>Oncidium lanceanum</i>
73. <i>Dendrobium lituiflorum</i>	108. <i>Oncidium spacellatum</i>
74. <i>Dendrobium lituiflorum v.assamica</i>	109. <i>Paphiopedilum fairianum</i>
75. <i>Dendrobium longicornu</i>	110. <i>Paphiopedilum insigne</i>
76. <i>Dendrobium maphyllum ( pierardii)</i>	111. <i>Paphiopedilum spicerianum.</i>
77. <i>Dendrobium moschatum</i>	112. <i>Paphiopedilum venustum</i>
78. <i>Dendrobium nobile</i>	113. <i>Paphiopedilum villosom</i>
79. <i>Dendrobium ochreatum</i>	114. <i>Pectilis sussanae</i>
80. <i>Dendrobium parishii</i>	115. <i>Peristeria elata - dove orchid.</i>
81. <i>Dendrobium primulinum</i>	116. <i>Phaius flavum (maculatus)</i>
82. <i>Dendrobium primulinum v.assamica</i>	117. <i>Phaius mishmensis</i>
83. <i>Dendrobium terminale</i>	118. <i>Phaius tankervillae</i>
84. <i>Dendrobium transparens</i>	119. <i>Phalaenopsis manii</i>
85. <i>Dendrobium wardianum</i>	120. <i>Phalaenopsis parishii</i>
86. <i>Dendrobium williamsonii</i>	121. <i>Phalaenopsis parishii v lobbi</i>
87. <i>Epidendrum</i>	122. <i>Pleione hookeriana</i>
88. <i>Epidendrum ciliarii</i>	123. <i>Pleione humulis</i>
89. <i>Epidendrum floribundum</i>	124. <i>Pleione maculata</i>
90. <i>Epidendrum ibaguence</i>	125. <i>Pleione praecox</i>
91. <i>Epidendrum obrianum</i>	126. <i>Pholidota imbricata</i>
92. <i>Epigenium radicans</i>	127. <i>Pholidota undulata (rubra)</i>
93. <i>Eria amica (confusa)</i>	128. <i>Rncostylis retusa</i>
94. <i>Eria pubescens (flava)</i>	129. <i>Ryncostylis gigantea</i>
95. <i>Eria spicata (convalloriodes)</i>	130. <i>Satyrium nepalense</i>
96. <i>Esmeralda cathcartii</i>	131. <i>Schoerioches manipurensis</i>
97. <i>Esmeralda clarkei</i>	132. <i>Spathaglotis plicata</i>
98. <i>Gatrochillus acutifolium</i>	133. <i>Thunia alba</i>
99. <i>Gatrochillus calceolare</i>	134. <i>Thunia pulchera</i>
100. <i>Gatrochillus dasypogon</i>	135. <i>Thunia venosa</i>
101. <i>Goodyera hemesyana –</i>	136. <i>Tolumnias various colours.</i>
102. <i>Goodyera vittata</i>	
103. <i>Ionopsis utriculariodes</i>	

137.	<i>Vanda alpina</i>	142.	<i>Vanda pumila</i>
138.	<i>Vanda amesiana</i>	143.	<i>Vanda stangeana</i>
139.	<i>Vanda coerulescens</i>	144.	<i>Vanda teres</i>
140.	<i>Vanda cristata</i>	145.	<i>Vanda tessellata (roxburghii)</i>
141.	<i>Vanda parishii:</i>	146.	<i>Vanda testacea (parviflora)</i>

**Table 41 Sale of ornamental species**

Sl.NO	Local name	Scientific name	Quantity produced species wise/year	Expense for production/ plant Rs	Amount for establishment of nursery Rs in lakh	Selling price/ plant Rs	Remarks
1	Dancing girl	Oncidium	10000	25	1	100	Profitable
2	Annie black	Aranthera annie black	10000	50	10	100	Profitable
3	Dendrobium	Dendrobiums	20000	25	14	200	Profitable
4	Mokara	Mokara	1500	50	5.25	450	Profitable
5	Indoor plants	Different varieties	500 each	30	7	25 to 20000	Profitable

**Table 42 Most common species traded**

VANDACEOUS	ONCIDIUM ALLIANCE	PHALAENOPSIS & DORITONOPSIS	DENDROBIUMS	TERRESTRIAL ORCHIDS
Arachnis	Oncidium Hybrids	Whites	Pink Mix	Spathaglotis
Arantheras	Odontocidium	Yellows	Reds and Maroons	Jewel Orchids
Mokaras	Brassias	Reds	White Mix	Peristeria
Basket Vandas	Tolumnias	Pink Mix	Yellows	Cymbidiums
Terete Vandas	Miltassias	Stripes and Splashes	Blues	Paphiopedilums

Pencil Vandas	Baptisticidium		Stripes & Splashes	
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## PLANT/ ANIMAL EXTRACTS AND PRODUCTS

### 1. TMV AROMATICS (P) LTD

From its humble beginnings over half a century ago, TMV Aromatics Pvt Ltd has now grown to become one of the topmost player in India's natural essential oils and aromatic chemical industry.

#### **TMV natural oils & extracts (p) ltd**

TMV Natural oils & extracts Pvt Ltd deals with the manufacture, trade and export of spice oils, oleoresins, herbal extracts and natural food colours.

#### **TMV shenoi perfumers**

The company deals with perfumes from natural sources including 1.Detergent Perfumes 2.Deodorant Perfumes 3.Cosmetic Perfumes 4. Agarbati Perfumes 5. Soap Perfumes



**Value added product turmeric**

**Table 43 Plant extracts- TMV Natural oils & Extracts (P) LTD**

Natural Essential Oils	1. Lemongrass Oil 2.Palmarosa Oil 3. Cinnamon Leaf Oil 4. Citronella Oil 5. Eucalyptus Globulous Oil 6. Vetiver Oil 7. Ocimum Canum Oil 8. Davana Oil 9. Clove Oil 10. Tea Tree Oil 11. Ginger grass Oil 12.Rose Mary Oil 13. Patchouli Oil 14. Bergamot Oil 15. Basil Oil 16. Cajeput Oil 17. Geranium Oil 18. Lavender Oil 19. Lemon Oil 20. Lime Oil 21.Peppermint Oil
Spice Oils	Black Pepper Oil, Ajowan Oil, Nutmeg Oil, Mace Oil , Clove Bud Oil, Ginger Oil, Turmeric Oil, Cardamom Oil, Curcuma Aromatica Oil
Spice Oleoresins	1. Ajowan OR 2.Black Pepper OR 3.Cardamom OR 4. Curcuma Aromatic OR 5.Ginger OR 6. Mace OR 7. Nutmeg OR 8. Turmeric OR 9. Clove Bud
Natural Food Colors & Natural Extracts	1. Curcumin Powder 2.Curcumin Granular 3. Curcumin Water Soluble 4. Boswellia Granular 5. Boswellia Powder 6. Tribulus Terrestris Extract 7. Asparagus Extract 8. Amla Extract 9. Sida Cardifolia Extract
Resinoids	1. Resinoid Benzoin 2. Resinoid Olibanum 3.Resinoid Guggul

**Table 44 Products produced by TMV Shenoi Perfumers**

Sl.No	Products
1.	Lemongrass Oil
2.	Palmarosa Oil
3.	Cinnamon Leaf Oil
4.	Citronella Oil
5.	Eucalyptus Globulous Oil
6.	Vetiver Oil
7.	Ocimum Canum Oil
8.	Ocimum Sanctum Oil
9.	Davana Oil
10.	Clove Oil
11.	Tea Tree Oil
12.	Gingergrass Oil
13.	Rose Mary Oil
14.	Patchouli Oil
15.	Bergamot Oil
16.	Basil Oil
17.	Cajeput Oil
18.	Geranium Oil
19.	Lavender Oil
20.	Lemon Oil
21.	Lime Oil
22.	Peppermint Oil
23.	Geraniol Ex Palmarosa
24.	Methyl Terpenyl Ether Ex D'limonene
25.	Geraniol Ex Citronella
26.	Citronellal Ex Citrodora
27.	Citronellol Ex Citrodora
28.	Citral Ex Lemongrass Oil
29.	Vetiverol Pure
30.	Vetiveryl Acetate
31.	Rhodinol Ex Geranium
32.	Caryophellene Acetate

33.	Caryophellene Alcohol
34.	Detergent Perfumes
35.	Deodorant Perfumes

36.	Cosmetic Perfumes
37.	Agarbati Perfumes
38.	Soap Perfumes

## 2. CHITIN AND CHITOSAN

Chitin is a natural polymer with great potential as a biomaterial in the area of biotechnology, because it is biocompatible, bio reactive and bio degradable. Such characteristics enable Chitin for its diverse applications in areas such as agriculture, food, environmental, and as two areas with greater focus: pharmaceutical and health. Amidst all its unique properties, chitin and its derivatives are an excellent biomaterial with unlimited application possibilities. From the chemical industry, Agrochemicals to the Textile industry and Paper industry, Pharmaceutical's, Neautracueaticals, Oil and Gas Excavation, Water treatment etc. chitin and derivatives are used as biomaterials potential. Bio composites of chitin and mainly chitosan is widely studied and developed. Chitosan, because of its greater bioactivity and adhesiveness, becomes more interesting in areas of medicine and pharmacy and for tissue engineering. The USA, Japan, India, Canada, China, South Korea, Russia Norway and Other Asian countries generally use the reject of crustacean fishing waste for production of Chitin and Chitosan. The main industrial source used for the extraction of the biopolymer is the waste of the fishing industry, mainly the shell of prawns, crabs and lobsters. The production of chitin and its derivatives is estimated at 100 billion tons per year. The waste discarded by the fishing processing can reach 70% of the total weight of the material. The carapaces/ crustacean's have about 20-30% chitin. The estimated price of a normal grade chitin costs INR 220 per kilogram on the world market.

ISF CHITIN AND MARINE PRODUCTS LLP with an approximate capital investment of Rs 8.5 crores is a major producer and exporter of Chitin and Chitosan products in Kerala. The main products include Chitin powder (Rs 290 / Kilogram)N-Acetylglucosamine Conversion Raw Material (Rs 400 / Kilogram),Glucosamine Conversion Raw Material (Rs 220 / Kg), Chitosan oligosachharide, Chitosan powder, Organic manure. The Technical knowhow was obtained frm CIFT, Kochi.The Raw materials is the waste of Sea Food industry. The waste materials of crustaceans are sourced from Ernakulam, Alleppy, Kollam Dist of Kerala, Manadapam, Nagapattnam, Tuticorin in Tamil nadu State and Ratnagiri , Maharashtra. It is estimated that Alleepy, Ernakulam and Kollam Districts generates around 300 Mts of Sea Food Waste per Day. The sales volume during 2019-20 is

- 1) CHITIN- 360000 kgs INR 110448000
- 2) CHITOSAN-50000kgs INR 70800000
- 3) Chitosan Derivates-5000 kgs INR 29500000

There are two primordial steps to obtain chitin: De proteinization and De mineralization. In addition to these two main steps, the production can receive a step of De pigmentation and Deodorization, if necessary. The biotechnological process is the combination of the chemical process with the use of biological methods, with application of microorganisms to the system. The key steps involved are Peeling waste of Crustaceans like shrimps , prawns & crabs , washing and removing impurities, De Mineralisation, De Protienisation, Drying, Sorting, Grinding, Quality Analysis and Packing. The Chitin producers have turned out to be the back bone of Sea Food processing plants as these wastes are used for making value added products with export potential. The wild catch from the sea and other natural water sources are declining at a very drastic rate. This is effecting the Sea Food industry and the Chitin factories as well. The Kerala manufacturers now depend on the Aqua Culture prawns of the neighbouring states to supplement the raw material quantities to operate their factories in order to fill their operating capacities. This enhances the operating costs

factory owners compared to the other states. The raw material of Chitin is the peeling waste and perhaps have the highest deteriorating rate. Hence this emits high foul smell. It has to be procured at the earliest in closed container vehicle's and processed that the factory at the earliest. The maximum production will be limited to the total availability of this raw material at a given period of time pan the globe. This will not be sufficient to meet demand expected of Chitosan for all industries put together



**Production plant**





## **GEOGRAPHICAL INDICATIONS- A TOOL FOR BIODIVERSITY CONSERVATION**

The Agreement on Trade Related Aspects of Intellectual Property of the World Trade Organisation (WTO) provides GIs as an intellectual property right. India must enact national GI law as a WTO member, which it did in 2003 (the Geographical Indications of Goods (Registration and Protection) Act). Because TK is generally held jointly, GI provides collective rights, making it better suited to protecting and promoting it than most intellectual property rights. A geographical indication is a mark or symbol that identifies a product's geographical origin and links it to the key attributes associated with that location. Geographical indications (GIs) can assist communities promote and preserve markets for their biocultural products, and they're becoming increasingly popular as a tool for preserving and promoting traditional knowledge around the world. Increased market demand for GI products could provide new opportunity for indigenous and local people to benefit and earn more money.

The case studies examines the benefits and drawbacks of using geographical indications (GIs) to promote biocultural products in the marketplace. Branding and promotion of these items with distinct characteristics can boost demand for them, revitalising traditional manufacturing processes and skills. GI registration of biocultural products can also help conserve biodiversity. If products made out of biological resources obtain a GI and as a result sell at a premium or gain better market access, this could incentivise local people to collect sustainably from the wild, commence/continue farming traditional crops or livestock breeds, or experiment with the cultivation of species that are only found in the wild.

Navara was selected for detailed analysis because it is a unique variety of rice with a high medicinal value, endemic to the state, and because the acreage grown under this

variety has been declining over the years. The cost of production is high and the yield is lower than other rice varieties being cultivated in the area. This case shows that GIs could potentially be used to revitalise traditional crop varieties, but that they are unlikely to make a difference unless the variety already has good market potential.

## **BIORESOURCES BASED GIS OF KERALA**

**1. Alleppey Coir (Handicraft):** When craftsmen let the coconut husks rot in the lakes of Alappuzha and beat them into a pulp and weave them into sturdy ropes, they became a favourite item even in foreign countries. The GI tagged fibre rope has great export potential.

**2. Navara Rice (Agricultural):** The rice with medicinal property is recommended for children and sick people. The rice variety has been liberally used in ayurveda and folk medicine. It is known by a variety of names such as njavara, navira, njavira, namara, nakara and nakarapuncha. The crop is harvested two times a year.

**3. Palakkadan Matta Rice (Agricultural):** As the name suggests, this rice variety is produced in Kerala's Palakkad district. Thavalakannan, Chenkazhama, Aryan, Cheera, Ilappappoochamban, Chiteni, Iravappandy, Cheriya Aryan, Valiya Chamban, Chuvanna Modan, Kunhu Kunhu, Jyothi are some of the varieties of Palakkadan Matta rice. The rice is cultivated in a traditional organic way. It is also known as Kerala red rice and is known for its coarseness and health benefits

### **4. Malabar Pepper (Agricultural)**

The world came to the Kerala coast for pepper. Malabar pepper is still the hot favourite in kitchens across the globe

### **5. Monsooned Malabar Arabica Coffee (Agricultural)**

The robusta variety has many takers in the international market. Robusta is grown amid shady trees in Wayanad using traditional farming methods. Both the robusta and arabica varieties of Wayanad have been granted GI tags

### **6. Wayanaad Robusta Coffee (Agricultural)**

Wayanaad Robusta Coffee" is grown specifically in the region of Wayanad district which is situated on the eastern portion of Kerala and lies between the North latitudes 11° 27' and 11° 58' and the East longitudes 75° 47' and 76° 26' with an altitude ranging from approximately 700 M to 2100 M. The chlorogenic acid content ranges from 5.5 to 6.6mg/100 gm and the caffeine content ranges from 1.9 to 2.2 %. The trigonelline content varies from 2.8 to 3.3 %. As coffee is a beverage which gets the unique flavour and aroma only when it is roasted and brewed, the main differentiation lies in the organoleptic characters.



**Fig. Alleppey Coir**



**Fig. Navara Rice**



**Fig.. Palakkadan Matta**

**Rice**



**.Fig. Malabar Pepper**



**Fig. Monsooned Malabar**

### **Arabica Coffee**

**7. Alleppey Green Cardamom (Agricultural):** The most prized of all cardamom crops from the Western Ghats were meant for import during the era of the kings. Because they were shipped off to different places from Alappuzha, they were called Alappuzha green cardamom.

**8. Maddalam of Palakkad (Handicraft):** The percussion instrument is unique in that it is still made the traditional way as it was used to be made a hundred years ago. The drums are made of buffalo skin and chambak, karingali or jackfruit wood. The two heads of the maddalam produce different sounds

**9. Pokkali Rice (Agricultural):** This indigenous rice is a unique saline tolerant rice variety of Kerala. This is cultivated organically in the water-logged coastal regions of the state with extensive agriculture techniques. Presently, Pokkali paddy fields are spread about 5,000 hectares area in Alappuzha, Thrissur and Ernakulam districts. The single-season paddy is raised in saltwater fields between June and November followed by a season of fish-farming. After the harvest, the paddy stubble in the fields act as food and shelter for shrimp and small fish. Fish excreta and scales, along with the decomposed stubble, provide excellent natural manure for another season of Pokkali. In order to survive in the water-logged field, the rice plants grow up to 130-140 cm. The brand Pokkali has received a GI tag from the Geographical Indications Registry Office, Chennai .

**10. Vazhakulam Pineapple (Agricultural):** India's pineapple capital is Vazhakkulam in Ernakulam district. The village has cultivated pineapple since 1945. The cultivation gradually radiated to surrounding areas. Currently acres of farm land in Pathanamthitta, Kottayam and Kozhikode districts are dedicated to pineapple. Vazhakkulam pineapple was thrown into the limelight with the bestowal of a GI tag.

**11. Cannanore Home Furnishings (Handicraft)**

The specialty of Cannanore Home Furnishings fabrics are the compact structure and texture of cloth, unique colour combinations, wide width, skilled craftsmanship and colour fastness due to excellent dyeing quality. The land has very pure natural soft water source throughout the year, which is a boon for perfect dyeing of the first part of a very important process in Textiles. The products are distinctly recognizable due to the richness and the feel of life in it. With the traditional method by experienced hands, they can get any shade. The dyed colours can stand any international test requirements.

**12. Balaramapuram Sarees and Fine Cotton Fabrics (Handicraft)**

The Balaramapuram kaithari owes its existence thanks to the Travancore king who invited Shali weavers from Tamil Nadu to the quaint village near Thiruvananthapuram. The king, Balarama Varma, brought 10 weaver families from Tamil Nadu to settle in Anthikkatt near Neyyattinkara. The village gradually came to be known after the king and the hand loom product after the newly named village

**13. Kuthampully Sarees (Handicraft) Kasargod Sarees (Handicraft):** Kasaragod saree came into existence in 1938. There have been many cooperative societies which made this product. Earlier, the product had no brand name. People called it Kasaragod sarees as it was made in Kasaragod. These sarees received wide-spread appreciation from many markets in and outside the country. The origins of Kasaragod sarees lie in the traditional Karnataka textile methods.

**14. Central Travancore Jaggery (Agricultural)**

The Central Travancore jaggery aka "pathiyan" jaggery is made of sugarcane that thrive on the banks of the Pampa, Achankovil, Manimala and Meenachil rivers. Most of the

production is centred around the Thiruvandoor and Pandanad panchayats. This particular type of jaggery is thought to be medicinal and is an ingredient for several traditional medicines. It is made organically without the addition of any chemical additives. The Central Travancore jaggery comes looser than the other variations. It is flavoured with cardamom and cumin seeds. During the manufacturing process, the sugarcane juice is clarified with lime and okra juice. It comes in several forms, including a ball, powder or liquid. High in calcium, this jaggery is fragrant and colourful.

### **15. Wayanad Jeerakasala Rice (Agricultural) & Wayanad Gandhakasala Rice (Agricultural)**

The fragrant varieties of rice are endemic to Wayanad. The chilly climate of the hills is thought to impart the rice grains their aroma. The 'Jeerakasala' variety is short and it thrives with very little sunlight. As the name indicates, the slender rice grains resemble cumin seeds. They make delicious biriyani and ghee rice. The gandhakasala variety is stouter and shinier like hay. The plant grows up to four feet. The rice grains smell like sandalwood. They are precious because the yield is only half of ordinary crops. The unique crops are grown in the Chekadi and Thirunelli areas of Wayanad

Gandhakasala rice is a variety of rice cultivated by the farmers in Wayanad District in Kerala. This is a scented variety of rice grown mostly by the members of the tribal communities of in Panamaram, Sultan Bathery, and Mananthavady areas in Wayanad. Both varieties have been identified as having potential to compete with the well-known varieties of scented rice like basmati rice and jasmine rice

**16. Payyannur Parithra Ring (Handicraft):** The traditional ring made in Payyannur in Kannur district is considered sacred for the presence of a blade of grass with ritualistic importance. The ring made of gold and silver and the holy grass is symbolic of the divine trinity of Hinduism. The ring is worn on the right ring finger. The ring is supposed to protect the wearer from evil. The ring is put on only during rituals and it has to be taken off after the rites are finished.

**17. Chendamangalam Dhoties & Set Mundu (Handicraft) :** Chendamangalam had been the base of Paliath Achan family, who were the wealthy chief ministers to the Maharajas of Cochin. One of the Paliath Achans once met a weaver from Andhra Pradesh and was impressed by the quality of his handloom. He asked the weaver to stay at Chendamangalam and teach people how this was made. Earlier, the threads were brought from Tamil Nadu and Andhra Pradesh. Later, indigenous threads were made at Chendamangalam itself. As time passed, Chendamangalam handloom earned respect from people all over the country. The designs made using the age-old techniques still have an unparalleled appeal.

**18. Kaipad Rice (Agricultural) :** This unique rice is cultivated along the coastal brackish waters in the northern parts of Kerala. The Kaipad rice is known for its special organic cultivation technique called as paddy-shrimp cultivation or Kaipad farming. Rice cultivation and shrimp catching is done on the same field that forms the part of the extensive water-logging in the swampy low-lying areas. Kuthiru, Orkkayama, Orpandy, Kandorkutty, Mundon, Odiyan, Ezhom-1, Ezhom-2 are some of the varieties of the seeds.

**19. Chengalikodan Nendran Banana (Agricultural):** The sought-after golden bananas are named after a former feudal dynasty in the erstwhile princely state of Kochi. The lords of Thalappally in Kochi bore the title of Chengazhi Nambiars and their seat of power came to be called as Chengazhikkod. The place was also home to a particular variety of bananas which were offered to the Travancore Sree Padmanabha Swami Temple. The bananas are in demand during Onam. It is cultivated widely in Thayyur, Erumappetti and Kariyannur in Thrissur district

**20. Kuthampally Dhoties & Set Mundu (Handicraft):** The Kuthambulli village by the Bharathappuzha river on the Thrissur-Palakkad border has made a reputation with its garments. The weavers in the village trace their ancestry to royal weavers who served the Mysore kings. The Devanga community settled by the Bharathappuzha river on the request of the Kochi king about 400 years ago. About 500 families are in the business of weaving unique mundus and sets, Kerala's traditional attire.



**21. Brass Broidered Coconut Shell Craft of Kerala (Logo) (Handicraft):** Brass broidered coconut shell craft of Kerala is the craft of making beautifully carved and brass broidered products like cups, flower vases, snuff boxes, nut bowls, powder boxes and spoons using coconut shells as practiced by the artisans of Kerala in India. This art requires great skill on the part of the artisan as the shell is extremely hard. The main centres of production in Kerala are located in Thiruvananthapuram and Kozhikode Districts. Though the coconut shell craft is also prevalent in Goa, Tamil Nadu, Pondicherry, Andaman and Nicobar Islands and West Bengal, the brass broidered variety is practiced only in Kerala.

**22. Screw Pine Craft of Kerala (Logo) (Handicraft):** Screw pine craft of Kerala is the craft of making different types of mats and wall hangings using the leaves of the screw pine plant as paractised by artisans in Kerala. Weaving of mats using leaves of the screw pine plants is a craft practiced mostly by women in Kerala. This craft, which is practised by artisans in all the districts of Kerala, has been in existence as long ago as 800 years. The mats produced by screw pine have a significant role in the traditional customs of Kerala. Important visitors to homes were offered these mats as honoured articles to be sat upon. Finer varieties of these mats were also used as bed for sleeping.

**23. Nilambur Teak (Agricultural)**

The Connolly plantation at Nilambur in Malappuram district has the distinction of being the world's oldest teak plantation. The trees grow to a height of 50 metres. They are renowned for their distinct annual ring formation. The plantation is named after the man responsible for its establishment, former Malabar collector H V Connolly. They are also called Malabar teak.

**24. Marayoor Jaggery (Marayoor Sharkara) (Agricultural):** Kanthallur near Marayur in Kerala's eastern highlands is blessed with a climate that allows sugarcane cultivation through the year. That explains the abundance of jaggery named after Marayur. It does not have any salty taste and is rich in iron and calcium. Pure Marayur jaggery is very dark in colour, and it is known as black jaggery in several places. The jaggery ball has a unique texture because it is rolled by hand. The main ingredients in Marayur jaggery

is sugarcane juice and calcium and the sodium bicarbonate used to remove the impurities. Sugarcane farmers of Marayur make the jaggery in conventionally made moulds. It is called "achuvellam".

### **25. Tirur Betel Leaf (Tirur Vettila) (Agricultural)**

The betel leaves collected from the Thiroor, Thanoor, Thiroorangadi and Kuttippuram areas of Malappuram district are bigger and darker than the rest. The variety is much sought-after amid pan chewers in north India and even Pakistan. The Thiroor variety is also used for medicinal purposes to keep at bay bad breath and indigestion. The vines are grown in the rainy seasons, one crop for each monsoon.

### **26. Thazhappaya**

If mats are woven out of bamboo or palm leaves the world over, Kerala's famed thazhappaya is made of the leaves of the thazha plant, which is also called kaitha or attukaitha in local parlance. The leaves are shaven off to remove the thorny parts and then boiled in water before they are woven into mats. The leaves grow in bunches on top of the plant. Their flowers are fragrant. A village named Thazhava near Karunagappally in Kollam district is famous for thazhappaya making .

### **27. Onattukara sesame**

The sesame cultivated in the Onattukara region spanning the Mavelikkara, Karthikappally, Kunnathur and Karunagappally taluks in Alappuzha district has more medicinal value than ordinary varieties. Local farmers use a special seed named "ayali" for cultivation. Scientifically named *Sesamum indicum*, the seeds contain large amounts of oil, at least 50 percent and is rich in calcium, phosphorous and vitamins.

### **28. Edayur chilli**

Local cultivar of Edayur, Athavanad, Marakkara, Irimbiliyam, Kalpakanchery and Valanchery panchayats in Valanchery block and Moorkanad and Kuruva panchayats in Angadippuram block of Malappuram district. It has been cultivated in the area for at least 150 years. Large quantity of Edayur chilli has been sold to nearby markets for making "Kondattom" (sun-dried-curd-chillies). Edayur Chilli gardens are a common

sight in this area during the months of April till December. Edayur chilli is a unique cultivar of this area with very low pungency. The distinctiveness can be attributed to its genetic makeup, the specific environmental and soil conditions of the area and the traditional methods of cultivation.

## **29. Kuttiaattoor mango**

Popular and tasty traditional mango cultivar of Kuttiaattoor and the nearby gram panchayats of Kannur district. This mango has maximum spread in Kuttiaattoor panchayath. Even though this cultivar is most popularly known as Kuttiaattoor mango, it is also known as 'Nambiar manga', 'Kannapuram manga', 'Kunjimangalam manga' and 'Vadakkumbhagam manga' in small pockets of Kannur district.

This mango is famous for its appealing orange-yellow colour in addition to its excellent taste and flavour. The ripened fruits do not show speckles or patches on the skin, making it more appealing in the market. The distinctiveness of Kuttiaattoor mango is aided by the combination of specific environmental conditions of the area of its cultivation and varietal characters.

GI tag has been received for Edayur Chilli and Kuttiaattoor Mango through concerted efforts of IPR Cell of Kerala Agricultural University, State Department of Agriculture Development and Farmers' Welfare and farmers of Edayur Chilli and Kuttiaattoor Mango. Edayoor Chilli Growers Association, Edayur, Malappuram and Kuttiaattoor Mango Producer Society, Kuttiaattoor are the registered proprietors of Edayur Chilli and Kuttiaattoor mango respectively.

## GI Tags of Kerala



Alleppey Green Cardamom



Maddalam of Palakkad



Pokkali Rice



Vazhakulam Pineapple



Cannanore Home



Balaramapuram Sarees and



**Kuthampully Sarees**

**Jaggery**



**Central Travancore**



**Wayanad Jeerakasala Rice**



**Payyannur Parithra Ring**



**Chendamangalam Dhoties**

**& Set Mundu**



**Kaipad Rice**



**Chengalikodan Nendran Banana**

**(Handicraft)**



**Brass Broidered Coconut Shell  
Craft of Kerala**

**Set Mund**



**Screw Pine Craft of  
Kerala**



**Nilambur Teak  
Sharkara)**



**Marayoor Jaggery (Marayoor  
F**



**Tirur Betel Leaf (Tirur Vettila)**



**Thazhappaya**



**Onattukara sesame**



**Edayur chilli**



**Kuttiaattoor Mango**

## **CASE STUDIES**

### **1. NAVARA ECO FARM**

Navara Eco Farm is a 125 year old traditional family farm located in the rice belt of Kerala, Chittur of Palakkad district in the Western Ghats region. The Navara Rice is a the traditional medicinal and nutritional rice endemic to Kerala. This rice has a history

dating to "Susrutha Samhita" of 400-200 BC [mentioned as "Shashtika Rice"-the rice that matures in 60 days.] used in Kerala Ayurveda "Panchakarma" treatment for arthritis, paralysis, neurological complaints and polio in children effectively even now. It is also used as a health food for people of all ages starting from small babies to the elderly and has been found to promote immunity. Navara's various forms such as the grain; bran, powder, and root are used in the treatment of different ailments in Ayurveda. It is of two varieties – black glumed and golden yellow glumed.

### **Medicinal and Therapeutic Uses of Navara**

The following are the medicinal and therapeutic uses of Navara

**1. In Ayurveda Treatment:** Navarakizhi and Navaratheppu are two major treatments in the Panchakarma method of treatment for conditions such as arthritis, paralysis and neurological disorders. In Navarakizhi (or "Pindasweda" as it is referred to in Sanskrit) Navara rice is boiled in kurunthottikashayam (a decoction of sida root and milk). It is then enclosed in cloth pouches (kizhis) and is used for massaging. In Navaratheppu, a paste of boiled Navara rice of light warmth is applied on the body. Here again the rice is boiled in kurunthottikashayam. Various forms of Navara have distinctive and unique therapeutic uses in Ayurveda.

### **2. As Nutritional Rice and Health Food**

**Karkkidakakanji / Marunnukanji [Navara gruel].** Kerala receives the maximum amount of the south-west monsoon rains and body defenses are perceived to become weak. In this month, Navara is included in the diet to help develop immunity.

**3. Health Food for Babies-** Navara rice powder cooked with brown sugar and milk is found to be a nourishing food for babies.

**4.Navara Palkanji-** Boiled milk mixed with cooked **Navara rice** is easily digestible and used as a health food for older people

### **Navara Ecofarm**



The method of cultivation of this medicinal rice has to be necessarily organic to retain all its medicinal properties. Though Navara, the specialty rice of Kerala, has a history of about 2000 years of cultivation and use, high cost of cultivation and unremunerative price of the produce, has made Navara rice farming unviable. Additionally, pure planting materials of Navara was not easily available and the production of this rice variety had come down significantly in Kerala. It was during this period, starting from 1999 that Navara Eco Farm [NEF] started the conservation and revival of Navara Rice. NEF is an integrated farm growing 72 varieties of agricultural products including specialty rice like Navara and Palakkadan Matta, vegetables, spices, medicinal trees and plants, coconut, fruit trees and other trees. NEF maintains a herbarium of 200 plants ( Annexure 4). The entire Navara Eco Farm (NEF) is Certified Organic for India, EU and USDA from year 2006. To empower farmer groups, value addition of paddy to rice, rice flakes and rice powder, branding and marketing is undertaken and showcased as a model, to the farmers of Kerala.

### **Factors Affecting Navara Cultivation**

As per Shri P Narayanan Unny, owner of the farm, many traditional varieties had either become extinct or were not grown on a commercial scale inspite of its medicinal and therapeutic value. It is estimated that Navara cultivation has declined from approximately 2000 acres to less than 50 acres. It was also noticed that chemical farming of high yielding varieties of rice was unremunerative. A long term plan was made for the development of the farm with Kerala's unique medicinal and nutritional rice, Navara, as the focus.

- 1.** Navara rice is a seasonal crop and is cultivated only during the summer and the plant is very fragile and lodges even with dew. Therefore there is limitation of cultivating only one crop of Navara rice per year. Effective produce for sales is only once a year, one more crop is raised for generation of seeds, in balance six months of the year, pulses or millets are cultivated for crop rotation. This is to prevent seed contamination that would otherwise occur if any other variety of rice is cultivated. Additionally, the viability (germination) of the seed reduces after six months.

## **2. Necessity for employing Organic Farming methods for Navara and its impact**

To ensure that all the intrinsic medicinal and nutritional properties of the Navara rice are retained, it is imperative that Navara be grown organically, as otherwise, due to the use of chemical pesticides and fertilizers these properties will be adversely affected. The offshoot of organic farming is that

(i) **Low yield.** The yield by employing organic farming methods is comparatively very low.

(ii) **Labour intensive.** Organic Navara rice cultivation is labor intensive.

**3. Loss due to natural calamities**-for more than a decade now, weather has become unpredictable. In Palakkad the farming calendar was set based on the south-west and north-east monsoons. During the last decade the variation on the onset of the south-west monsoon has been so unpredictable that all the activities of rice farmers based on the "Njattuvela" which is a 13 1/2 day cycle based on the stars, has gone haywire resulting in huge losses to rice farmers. The pattern of rain has also changed from what used to be steady rains for days together helping the rice crop as well as helping the water table in the wells and ponds to go up helping irrigation of rice fields after monsoon as well as enhance drinking water availability. Now it rains heavily for a few hours in the course of the entire monsoon [termed as "cloud burst"] causing floods and the water runs off to the sea.

**4. Loss due to destruction of crop by wild animals:** Peacocks and wild boars destroy crops resulting in heavy losses to the farmers

**5. Migration to other farming activities** financial non viability led to migration of rice farmers to other farming activities. Fragmentation of rice fields has put the rice farmers in disadvantage as the holdings have become economically unviable.

**6. Poor financial viability** High cost of production without commensurate increases in sale prices has led to poor financial viability.

### **Milestones in Project Navara**

**1999** - Decided to start Navara cultivation on a large scale. **2000 – 2004** – Seed purification and area expansion. **2003** – Organic certification process for the Farm and all its constituent crops and trees, commenced. **2004** – Took initiative for Geographical Indication (GI) registration of Navara rice. **2005** – Organic production of Navara certified. **2005**- Formation of Navara Rice Farmers Society. **2006** - Entire farm was certified Organic. **Post 2006** - A package of practices for organic production of Navara developed. **2007**. Geographical Indication Registration for Navara was achieved on 3rd November 2007. This was the first agricultural product in India to be registered as GI under a farmer led initiative.

### **Challenges Faced and Solutions:**

**Non-availability of Pure Seed:** Pure Navara seed was not available as Navara cultivation was almost extinct. To address this, seeds were grown in an area of 15 cents and it took 3 years to purify the seeds during which time cultivation of other rice varieties were stopped and a major portion of plot was left fallow.

**Expansion of Area:** The area of cultivation was gradually extended from 15 cents to 8 acres over 4 years. To overcome threats from some seasonal changes staggered the cultivation of crop in the whole area into 2 - 3 phases.

**Organic Navara Cultivation:** Navara was traditionally cultivated organically. Due to its poor yield and the difficulties associated with controlling pests and diseases, conventional methods were widely regarded as the only option available. Moreover as Navara bran, root and hay are also used in Ayurveda, any chemical or pesticide residue in the course of conventional farming will be a health hazard.

**Organic Manure:** For organic manure, vermicomposting and other techniques of conversion of Kitchen waste to compost to provide the necessary manure for Organic Farming was undertaken.

**Pest Control:** Pest control in organic Navara rice farming is a major challenge. Tulsi (*Ocimum sanctum*) and Marigold was planted on the ridges of the plot to repel pests. A method was also devised and nets were used to catch and control

rice pests. The work force was employed in two shifts during the day, one from 6.30 am to 9.30 am and another from 3.30 pm to 6.30 pm, for 20-25 days from the time of flowering of the plant to the grain formation stages. Mr Narayanan Unni also pointed out the problems associated with rodents which create extensive damage to the crop and the workers methodically identify the burrows using hoes and eliminate the problem at source.

**Empowering Farmers:** Another important initiative was the formation of the “Navara Rice Farmers Society” to facilitate the empowerment of farmers as well as assuring authentic product to consumers.

**Geographical Registration of Navara as GI:** The claim for GI registration was published in GI Registry on 20th June 2007 (Journal 17.). A period of three months was given after the date of publication of the journal for any opposition of Navara Rice for which there were none. Finally, the long drawn out process which took more than three years, bore fruit with Navara Rice being provided Geographical Indication Registration on 3rd November 2007. This was the first agricultural product in India to be registered as GI under a farmer led initiative.

There was a lack of awareness among some of the stake holders and prospective consumers about Navara and the unique health benefits that it provides. It was felt that concerted efforts need to be taken to spread awareness. Brand UNF (Unnys Navara Farm) was launched to build awareness and develop loyalty of consumers. Launched two web sites on Navara ([www.njavara.org](http://www.njavara.org) and [www.navara.in](http://www.navara.in)), presently only [www.navara.in](http://www.navara.in) is operational. Navara Ecofarm participated in 181 events such as meetings, trade fairs, conferences, workshops, study missions and awareness programs including virtual meetings in the present COVID 19 scenario.

**Documentation, Standardization and Quality Control:** Besides producing certified organic and Geographically Indication registered Navara, the challenges and requirements of documentation, standardization and quality control were also addressed by collaborating and associating with a series of reputed, independent bodies. This is an ongoing process.

A five year project on "Collection and evaluation of medicinal rices, land races Kerala" was carried out by Department of Botany, Govt. Victoria College, Palakkad. Biochemical analysis and comparison of nutritional value of Navara was done in this project. Regional Research Laboratory, Trivandrum is experimenting on the nutritional and therapeutic values of Navara rice and rice bran. Kerala Agriculture University is also using Navara seed sourced from field for their evaluation purpose. Rajiv Gandhi Centre for Bio-Technology, Trivandrum is doing DNA fingerprinting of Navara. Department of Biochemistry, University of Kerala, Trivandrum, is doing a project on "Anti-inflammatory effect of Navara" using Navara roots and grain sourced from the farm.

### **Access to Plant Genetic Resources and Benefit Sharing**

Farmers play a critical role as conservers of bioresources and related traditional knowledge. To incentivise the farmers and communities involved in conservation of Bioresources that provide various benefits to the society, it is recommended that a designated fund to provide monetary benefits to such Farmers/ Farmer communities may be created. The objective of such a funding is to encourage farmers/producers who produce products which have unique and widespread applications, in addition to direct consumption and cultivation by using methods which conserve ecology, environment and maintain biodiversity contributing to Ecosystem Services. It is an accepted fact that it is extremely difficult to assess the actual as well as potential economic value of resources before arriving at appropriate terms of benefit sharing. Traceability is another important aspect that is difficult to establish with present technology and policies in vogue. In the particular cases of Navara Rice and Palakkadan Matta Rice Varieties Farmer Clusters have been formed for Navara and Palakkadan Matta. They are (a) The Navara Rice Farmers Society and (b) Company Ltd. GI legal framework shall ensure punitive action against infringement and also provide traceability.



## Navara farm

**Table 45 Economy of Navara cultivation**

Land	Expenses includes cost of cultivation, raw materials including seeds	Yield as raw paddy	Finished rice
1 ha	240000/-	1000 kg	500 kg
Market valueRs 520/kg			

## 2. NILAMBUR TEAK

Teakwood is a valuable multipurpose timber preferred for quality and decorative applications and exported for centuries from India. It is excellent for furniture, doors, decorative veneer, plywood and all sorts of constructions. Teakwood has high rating in most of the timber qualities such as strength, durability and workability. It has been described as one of the most durable timbers of the world. Traditional use of teak poles for electricity transmission and timber for railway sleepers are a time tested testimony of its suitability for outdoor uses. It is the best timber for ship building and even now sea-going dhows (uru) are built with teakwood in the traditional ship yards of Beypore near Calicut. In the earlier days, Indian, Arab and British merchant and naval ships were built with teak from Malabar. Among Indian timbers, only sandalwood and rosewood command a higher price than that of teakwood. Teak (*Tectona grandis* Linn.f) has a natural distribution range of South and South-east Asia. India has the

maximum genetic variability of teak with a natural distribution of over 8.9 million ha. For the first time, teak plantations were raised in India in 1842 in Nilambur. It is cultivated throughout the tropics in varying extent. Teak covers about 14% of the total tropical plantations. Extensive teak plantations exist in India outside the zones of its natural distribution. As on plantations in India covered 926,484 ha. Nearly 8,000 ha of teak plantations representing about ten percent of all teak plantations in Kerala exist in Nilambur North and South Divisions. The key objectives of the study are to understand the functioning and dynamics of the supply chain of Nilambur Teak (Malabar Teak) and to identify the key players in the supply chain of the cardamom.

### **Importance of Nilambur Teak**

Nilambur (Malabar) teak wood is obtained from the natural forests, teak plantations and homesteads in Nilambur and nearby areas of Malappuram district, Kerala, South India. The Nilambur region is traversed by a major river, the Chaliyar, which flows westward and drains into the Arabian Sea at Beypore. The rich alluvial deposits in the river banks of Chaliyar enhances the soil fertility and thus enhances the quality of Nilambur teak. Local belief, which is not scientifically validated, is that the unique golden brown colour of Nilambur teak is due to the presence of gold ore in the soils of Nilambur. Previous studies using AFLP markers indicate that natural teak population of Nilambur has a separate genetic identity among Southern Western Ghats populations matching with its popularly known phenotypic identity and wood quality. Wood quality parameters like specific gravity, resistance to deformation, heartwood colour and total extractive content were found to be superior for Nilambur teak.

The Kerala Agricultural University (KAU) along with the local self-government at Nilambur, the Kerala Forest Department, Kerala Forest Research Institute and the GI Registry, Chennai recently took an initiative for the registration of the Nilambur Teak, which enjoys a world-wide reputation for the log dimensions and desired wood figure and colour.

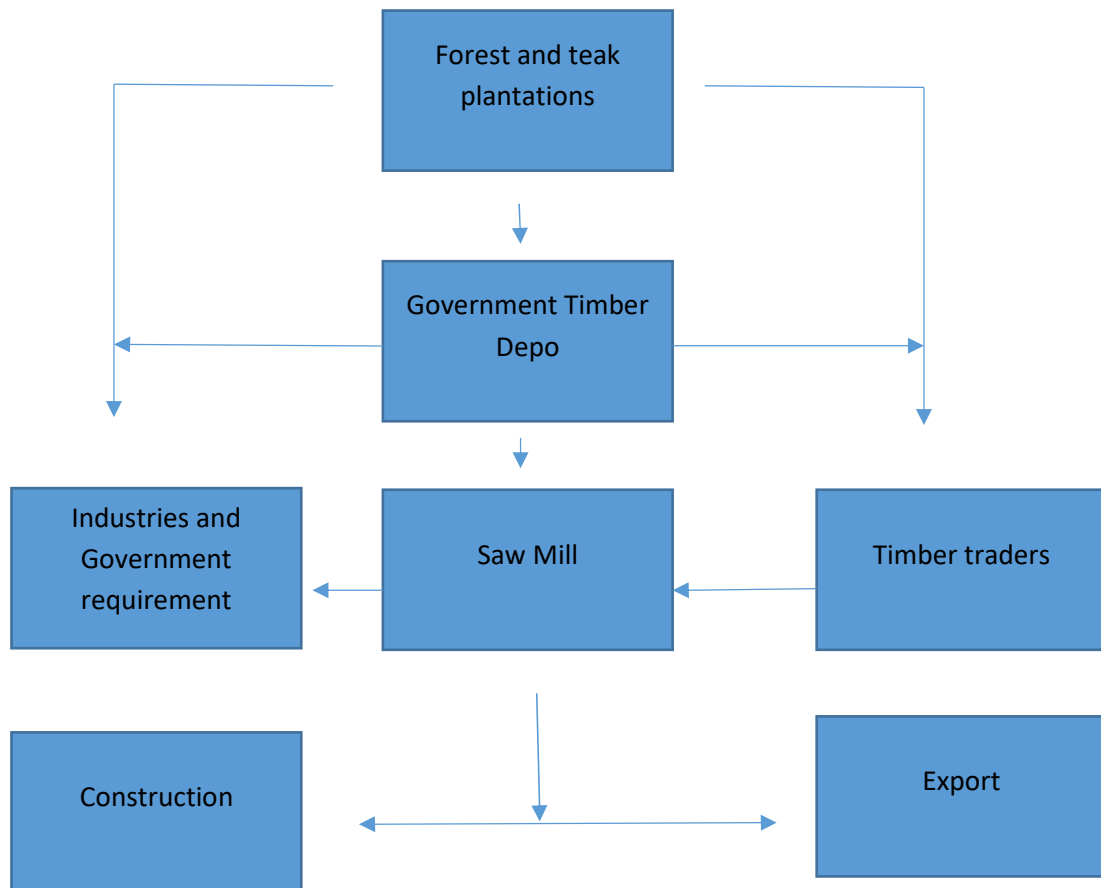
**Table 46. Properties of Nilambur Teak**

Sl. No.	Wood Property	Description
	<b>Physical</b>	
1	Colour	Heartwood golden brown or dark brown occasionally with black streaks with a waxy feel, lustrous, sapwood pale yellow or grey, well defined.
2	Odour	Distinct aromatic odour with the smell of leather
3	Weight	Moderately heavy (Air-dry specific gravity 0.55-0.70 with average value of 0.65)
4	Grain	Straight
5	Texture	Uneven; Coarse
	<b>Mechanical</b>	
1	Strength	Strong
2	Modulus of Rupture	106 (MOR) N/mm <sup>2</sup>
3	Modulus of Elasticity	10000(MOE) N/mm <sup>2</sup>
4	Maximum Crushing Stress	60.4 (MCS) N/mm <sup>2</sup>
5	Drying and shrinkage	Dries well but rather slowly with little or no degrade; Shrinkage- radial (2.3%), tangential (4.8%), volumetric (7.1%). High resistance to water absorption
	<b>Other properties</b>	
1	Durability	Very durable; highly resistant to termite damage.
2	Treatability	Extremely resistant
3	Working properties	Easily worked with both hand and machine tools. Planing easy; Boring- easy; Turning- rather easy; Nailing- good but pre-boring necessary; Finish-good

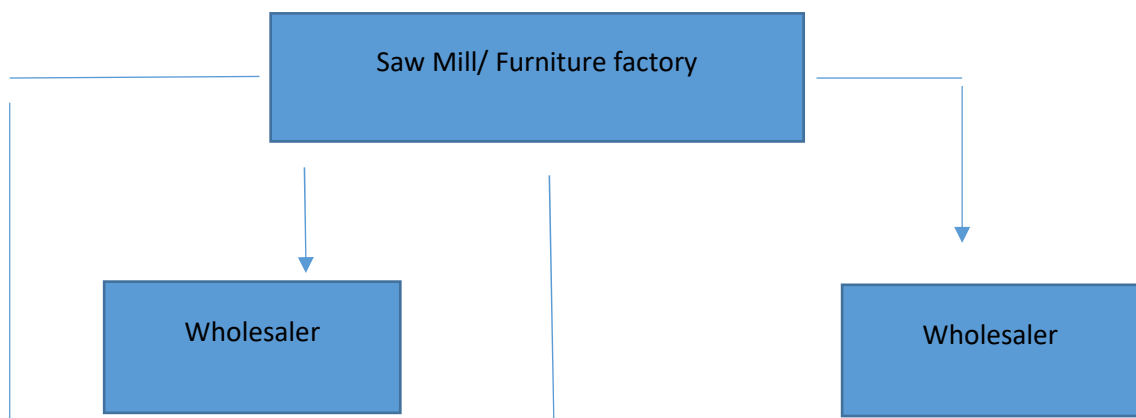
The GI tag is a mechanism instituted by the World Trade Organization (WTO) of the UN to prevent unfair competition in trade where the public can be misled about the real origin of goods. With the GI registration, Nilambur teak became the first forest species to secure the status. It is hoped that the initiative will boost the planting of teak and bring prosperity to the region yet again.

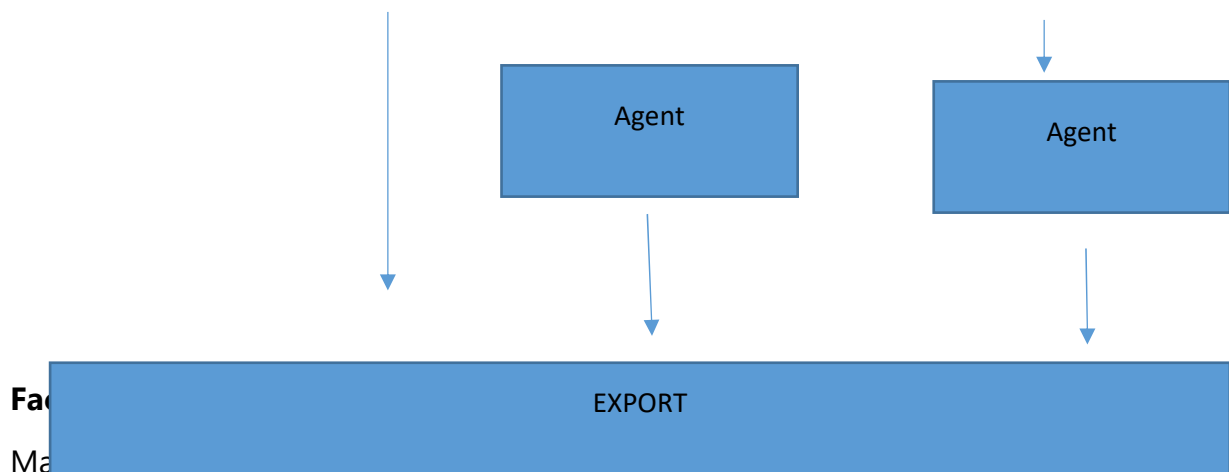


### Flow chart of Government Depo based Timber supply in Kerala



### Flow chart of Timber Export supply in Kerala





for their products. Most of these approaches to price setting, however, are variations of the following methods

1. Cost-oriented pricing
2. Demand – oriented pricing
3. Competition – oriented pricing

It is observed from the study that most of the timber traders in the study area fix prices for the different species of wood they market taking purchase cost as the base, to which they add all the items of cost enumerated above and a desired percentage of profit. While doing so they consider the demand for the product and also the prices fixed by the competitors for similar products and eventually they set the final price.

The expensive quality timber is being replaced in many parts of India by durable hardwoods from South East Asia as also West Africa and now some quantities of tropical hardwoods from Europe and USA as well. In a way it is better that part of teak market is being replaced by non-teak durable timbers as otherwise it will be difficult to meet the demand of Indian consumers for teak only. India is still the biggest market for teakwood. The production of teak wood from forests during the last few years was only about one fourth of the demand. Therefore, activities in promoting teak outside the forests such as home gardens, farmlands should be continued. This would fill-up the gap between future demand and supply from forest plantations for coming years to get the supplies.

### 3. VAZHAKULAM AGRO AND FRUIT PROCESSING COMPANY- PINEAPPLE

Pineapple (*Ananus comosus*, Bromeliaceae) is a tropical fruit having exceptional juiciness, vibrant tropical flavour and immense health benefits. India accounts for 7% of the world's pineapple production, through three states — Kerala, Tripura and West Bengal. The global trade is around 50% as fresh fruit, 30% as canned product and 20% as juice concentrate. World trade on fresh pineapple has shown 100 % increase during the last one decade. The produce of Kerala is very much in demand as a fresh fruit throughout India and also in foreign countries because it is considered the best in quality, sweetness and has good flavour. Even when Vazhakulam pineapple is exported, currently its destinations are limited to Gulf countries. In Kerala, pineapple is grown mainly as an intercrop in rubber and coconut, and also as pure crop in garden land and in converted paddy fields. Pineapple fruits are produced round the year. There is immense potential to increase the area under pineapple in Kerala as it can be grown as an intercrop in coconut and rubber plantations. Coconut is grown in about 8 lakh hectares and if pineapple is grown as an intercrop in coconut garden it will give an additional income, especially in root wilt affected areas it will be a solace to the farmers. Pineapple cultivation in rubber will give income to farmers during the period when there is no income from rubber. However, only less than two percent of the potential area in Kerala is cultivated with pineapple.

The major pineapple producing district of Kerala, Ernakulam accounts for more than 60% of the area under pineapple cultivation. In Ernakulam district pineapple cultivation is more concentrated in certain areas of Vazhakkulam. Pineapple has been commercially grown in Vazhakulam area for more than 50 years for its excellent fruit for fresh consumption. Vazhakulam area is ideally suited for the production of pineapple for table purpose. Vazhakulam is considered as the biggest pineapple market in India from where the fruit is being transported to all the South Indian states and most of the North Indian states. It is grown in the districts of Ernakulam, Kottayam, Pathanamthitta and the low elevation areas of Idukki district in Kerala. Vazhakulam

pineapple was registered as Geographical Indication (GI) No. 130 under Agricultural-Horticultural product at the GI Registry, Chennai on 4th September 2009. The registered proprietors of the intellectual property attached to Vazhakulam Pineapple are Nadukkara Agro Processing Co. Ltd (NAPCL), Avoly P.O., Muvattupuzha-686677; The Kerala Agricultural University, Vellanikkara, KAU Post, Thrissur-680656 and Pineapple Farmers" Association Vazhakulam-686670, Muvattupuzha, Kerala. Vazhakulam pineapple locally known as „*Kannara*’ is a Mauritius variety coming under the species *Ananas comosus*. The GI registration has boosted the export of pineapple from the state considerably, besides the high reputation fetching premium price in the international market. Vazhakulam pineapple locally known as ‘*Kannara*’ is a Mauritius variety coming under the species *Ananas comosus*. The popular products prepared using pineapple in this area are juice, squash, halva, jam, candy, vinegar, pickles, chutney and vine.

The produced pineapple in the study area has been distributed through different marketing channels. These are described in the following manner

Channel 1: Producer → Consumer

Channel 2: Producer → Retailer → Consumer

Channel 3: Producer → Processor → Consumer

Channel 4: Producer → Local assembler/broker → Retailer → consumer

Channel 5: Producer → Local assembler/broker → Processor → Consumer

Channel 6: Producer → Local assembler/broker → Whole seller → Consumer

Channel 7: Producers → Local assembler/broker → Whole seller → Retailer → Consumer

Channel 8: Producer → Local assembler/broker → Whole seller → Processor → Consumer

**Table 47. Major Vazhakulam pineapple producing areas**

<b>Ernakulam District</b>	<b>Idukki District</b>	<b>Kottayam District</b>	<b>Pathanamthitta District</b>
1. Manjalloor	49.Kumaramangalam	64.Bharananganam	104. Ranni
2. Avoly	50. Thodupuzha	65. Karur	105.Vadaserikkara
3. Ayavana	51. Manacad	66. Kozhuvanal	106. Chittar
4. Arakuzha	52. Edavetty	67. Kadanad	107. Seethathode
5. Kalloorkad	53. Muttom	68. Meenachil	108.Naranammoozh i
6. Muvattupuzha	54. Purapuzha	69. Mutholi	109. Vechoochira
7. Paipra	55.Karimkunnam	70. Melukavu	110. Konni
8. Maradi	56. Alakode	71. Munnilavu	111. Aruvapulam
9. Valakom	57.Velliamattom	72. Poonjar	112. Pramadam
10. Kothamangalam	58. Kudayathur	73. Eerattupetta	113. Mylapra
11. Nellikuzhy	59.Karimannoor	74.Poonjar- Thekkekara	114. Vallikode
12. Kottapady	60.Udumbannoor	75. Thalapulam	115. Thannithode
13. Pindimana	61. Vannapuram	76. Theekoi	116.Malayalapuzha
14. Keerampara	62. Kodikulam	77. Thalanadu	
15. Kuttampuzha	63. Arakulam	78. Thidanadu	
16. Kavalangad		79. Kanjirapally	
17. Varapetty		80. Erumely	
18. Pothanicad		81.Mundakayam	
19. Pallarimangalam		82. Parathode	
20. Paingottoor		83. Koottickal	
21. Asamannoor		84. Manimala	
22. Vengoor		85. Koruthode	
23. Mudakuzha		86.Chirackakadavu	
24. Koovapady		87. Kangazha	
25.Rayamangalam		88.Nedumkunnam	
26. Kalady		89. Vellavoor	
27.Malayattoor- Neeleswaram		90. Vazhoor	
28. Ayyampuzha		91. Ayarkunnam	
29.South Vazhakulam		92. Vijayapuram	
30. Vengola		93.Akalakunnam	
31.Kizhakambalam		94. Kooropada	
32. Poothrikka		95. Pambady	
33. Thiruvaniyoor		96.Pallikkathode	
34.Puthencruz- Vadavukode		97. Veliyannoor	
35.Mazhuvannoor		98.Kuravilangad	
36. Iykanad		99. Uzhavoor	
37. Kunnathunad		100.Ramapuram	
38. Elanji		101. Njeezhoor	

<b>Ernakulam District</b>	<b>Idukki District</b>	<b>Kottayam District</b>	<b>Pathanamthitta District</b>
39. Piravom 40. Thirumarady 41.Koothattukulam 42. Palakuzha 43. Maneed 44. Pampakuda 45.Ramamangalam 46. Edakkattuvayal 47. Mulanthuruthy 48. Amballoor		102.Thalayolaparambu 103. Velloor	

**Table 48: Economics of Pineapple Cultivation in Kerala**

SI.	Items	Expenses per acre (Rs.)			Total (rs.)	Expenses per hectare (Rs.)			TOTAL (Rs.)
		Ist year	IIInd year	IIIrd year		Ist year	IIInd year	IIIrd year	
<b>A. LABOUR REQUIREMENT</b>									
1	Land preparation & planting	20000			20000	50000			50000
2	Manuring	7600	7600	7600	22800	19000	19000	19000	57000
3	Weeding	15000	12000	12000	39000	37500	30000	30000	97500
4	Plant protection	2000	2000	2000	6000	5000	5000	5000	15000
5	Ethephon application & mulching	2400	3200	3200	8800	6000	8000	8000	22000
6	Harvesting & marketing	6000	7000	8000	21000	15000	17500	20000	52500
	<b>TOTAL</b>	<b>53000</b>	<b>31800</b>	<b>32800</b>	<b>117600</b>	<b>132500</b>	<b>79500</b>	<b>82000</b>	<b>294000</b>
<b>B.INPUT COST</b>									
	Planting material	40000			40000	100000			100000
	Organic manure	10000	10000	10000	30000	25000	25000	25000	75000
	Chemical fertilizers	15600	15600	15600	46800	39000	39000	39000	117000
	Plant protection chemicals	10000	5000	5000	20000	25000	12500	12500	50000
	Tools, implements etc	4000	4000	4000	12000	10000	10000	10000	30000
	<b>Total</b>	<b>79600</b>	<b>34600</b>	<b>34600</b>	<b>148800</b>	<b>199000</b>	<b>86500</b>	<b>86500</b>	<b>372000</b>
<b>C. Lease Amount</b>									

	Total Lease	40000	40000	40000	120000	100000	100000	100000	300000
	Total Expenditure	172600	106400	107400	386400	431500	266000	268500	966000
D.Yield/Income									
1	Fruit yield (kg)	10000	10000	7000	27000	25000	25000	17500	67500
2	Average price (Rs/kg)	20	18	16	18	20	18	16	18
3	Income on fruit (Rs)	200000	180000	112000	492000	500000	450000	280000	1230000
4	Income from suckers (Rs)		10000	8000	18000		25000	20000	45000
	Total Income	200000	190000	120000	510000	500000	475000	300000	1275000
	<b>Total Expenditure</b>	<b>172600</b>	<b>106400</b>	<b>107400</b>	<b>386400</b>	<b>431500</b>	<b>266000</b>	<b>268500</b>	<b>966000</b>
	<b>Profit/Loss</b>	<b>27400</b>	<b>83600</b>	<b>12600</b>	<b>123600</b>	<b>68500</b>	<b>209000</b>	<b>31500</b>	<b>309000</b>

### Vazhakulam Agro and Fruit Processing Company

- Under the Kerala Horticulture Development Programme, Nadukkara Agro Processing Company Limited (NAPCL), a modern fruit processing factory, for the commercial processing of pineapple, mango and other fruits was established in the heart of Kerala's Pineapple growing area Nadukkara, near Muvattupuzha in 2000 at a cost of Rs.21.5 crores.
- NAPCL was established as a public limited company with 582 farmers holding 70% share and the Government of Kerala 30% share. The plant has a state of the art technology and the latest equipment because of the support from the European Union during the initial period. During 2012 the Government took back the factory and Vazhakulam Agro and Fruit Processing Company Ltd was formed.
- The factory has aseptic packaging as well as canning units and its own brand of pineapple juice called "JIVE" and can process 70 t of pineapple per day. The company initially produced 200 ml Jive tetra-pack, 256 kg dump bag juice concentrate, besides ginger candy.
- Today, company markets seven different types of natural cool drinks under Jive brand without using any preservatives. They have become very popular as "the

drinks of nature'. The Jive plant has a production capacity of 6000 packs/hour. Capacity utilization is much more efficient as the factory also processes mangoes during off-season of pineapple.

- In the Ready-To-Serve fruit drinks plant, 6000 packets of Tetrapak packages per hour which are automatically packed to a tray and shrink – wrapped. Tropical fruits like pineapple, mango, papaya, jack fruit etc. can be candied using the “Kandimat” Technology. In the fruit candy plant, about 1200 Kg fruits could be sugar impregnated and candied per batch, each batch will take about 5 days to complete. The pack house constructed with financial assistance from APEDA can do packing of about 200 MT fresh pineapple fruits per day. Integrated pack house constructed here for pre-cooling and packing fresh pineapple and other fruits with financial assistance from APEDA with an outlay of Rs.370.80 Lakhs are an added facility to the vegetable and fruit exporting.
- They also provides for contract processing to other processors in the private sector. The company procures pineapple from the market when the price goes below a threshold level so as to maintain a reasonably good market price.
- Researchers from the Vazhakkulam Agro and Fruit Processing Company (VAFPC) are exploring the possibility of producing a Bromelain-enriched nutraceutical as well as pineapple leaf-based biodegradable, disposable cutlery and plates. This is done with the technical support from the Agro Processing Technology Division of CSIR National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram. Bromelain has therapeutic applications and is a natural mixture of proteolytic enzyme. It can be extracted from the fruit or the stem of the plant. The extract is found to reduce the side effects of antibiotics.

**Table 49 Quantity of value added products of pineapple (2019-20)**

Items	Quantity (per year)
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1. Pineapple concentrate pulp (Kg)	6354.12
2. Pineapple syrup 700ml bottle -nos	1075
3. Planters passion pineapple 200ml- nos	9584
4. Pineapple juice concentrate (kg)	6354.12
5. Pineapple candy 100g tube nos	3
6. Pineapple candy 250 g pouch nos	104
7. Pineapple candy export grade kg	57

**Table 50. Major Companies involved in Pineapple production and export**

Sl.No	Exporters details
1	AJ Exports and Imports Kaithamkattil Building, Mekkad P.O., Near Cochin International Airport, Angamaly, Ernakulam, Kerala, India – 683589 +91-9447933237, +91-484-2452333 +91-484-2452333 ajexportsandimportsindia@gmail.com
2	Thaza Exporters and Importers 16/9091, Kizhisseri, Malappuram, Kerala, India – 673641, +91-9746055444 thaazatraders@gmail.com, <a href="https://www.thaazaexportersimporters.com">https://www.thaazaexportersimporters.com</a>
3	Vazakulam Pineapple Growers and Processors Private Limited Door NO: MP-1/278/D, Methippara Estate, Muvattupuzha, Kerala 686670
4	Vazhakulam Pineapple Agencies Ummersons Building, MM Ali Rd, Palayam, Kozhikode, Kerala
5	Pineapple world Allal Varikkamkunnu Rd, Varikkamkunnu, Kerala 686605
6	AGA PINEAPPLE AGENCIES Vazhakulam, Kerala 686670
7	KCT Pineapple Exporter Kuruppanthara, Kottayam, Kerala 686001 <b>Ph:04829 244 785</b>
8	AnnA Pineapple Agencies Near south indian bank, vazhakulam p.o Muvattupuzha, Vazhakulam, Kerala 686670 Mob; 094475 23243
9	Christy Pineapples Market Landing Rd, Eerayil Kadavu, Kottayam, Kerala 686001
10	VAFPCL   Vazhakulam Agro & Fruit Pro. Co.Ltd Nadukkara, Avoly, Muvattupuzha, Kerala Phn: 0485 298 9095
11	Surya Pineapple Agencies Vazhakulam, Kerala 686670

12	Pineapple City Weigh Bridge, Thodupuzha - Muvattupuzha Rd, Vazhakulam, Kerala 686670
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This initiative is targeted to benefit the farmers through giving better returns for their produce and by making available healthy and nutritious value added products. Some of the major issues in this sector is low value for the produce during certain seasons making pineapple cultivation unviable.

#### 4. MARAYOOR JAGGERY

Marayoor sharakara or Marayoor Jaggery is known to be one of the sweetest jaggery available in India. Jaggery production is a cottage industry in this part of area. In certain part of Marayoor, the sugarcane production work shop would be within the house premises while in others it would be a common facility built by a group of farmer. The jaggery manufactured in this work shop is sold through tribal development co-operative society and other mediators.

#### **Cultivation-**

Sugarcane cultivation does not demand planting of seed year after year. Once planted, for the next 3-3 years the farmers only have to properly manure and take care of the crop. Individual farmers have almost 3-5 acres of farm. Crushed cane wastes are used as bio-fertilizer. They use local varieties and also bring from Tamil Nadu. Stumps were put parallel on fields. The field is irrigated thrice in a week for 2 months and then occasionally.





### **Preparation**

When the mature harvest sugar cane is brought into the production work shop, the cane is crushed and the extracted pulp put into a huge vessel and boiled. Dried leaves of sugar cane used to fire. Normally it will take 2-3 hours for thickening. When it boils a small quantity of slaked lime is poured into it and stirred well. When it thickens transferred into another large pan and allowed to solidify. After cooling, made into balls manually.





Crushing machine



Huge pan for preparation



Smoke exhaust

## Quality

Market price of the jaggery mainly depends up on the quality of the production procedure. Quality of the jaggery is determined by the sugar content and colour of jiggery is pale –green.



Jaggary balls



Crushed waste used as fertilizer

## **CONCLUSIONS**

GIs can help traditional knowledge holders get increased recognition for their traditional knowledge and higher benefits from its commercialisation through full benefit capture as opposed to relying on possible benefit-sharing by others. In many cases of GI products in India the small-scale producers and traditional knowledge holders do not get remunerated for their special expertise or knowledge. Other, more powerful actors in the supply chain, such as plantation owners, bottlers, middlemen and traders, who effectively control production and trade or employ knowledge holders as wage labourers – are able to obtain benefits from the GI status. GI Authority may explore the possibility to implement a mechanism similar to that developed by the Fairtrade Labelling Organisation (FLO), to ensure that the small producer or wage labourer whose traditional knowledge contributes to the special qualities recognised by the GI and is valued by the consumer, receives a premium or a fair price.

State governments have to play an important and pro-active role in protecting the intellectual property rights of authorised GI users. The government could promote participation of GI products in fairs and exhibitions. The government of Karnataka has created special manufacturing parks and provided artisans with space to work and produce and sell their wares and GI products are showcased here. The state government of Karnataka has also published a legal notice in the local news dailies announcing penal action against all traders and outlets selling any silk that is being passed off as 'Mysore silk.. Such initiatives can ensure adequate quality control, and require GI products to carry certification labels to assure the consumer of their purchase of authentic goods.

## Annexure 1

### Format for Bio-resources based organization

#### Case Study Report of -----

1. Industry/ cultivation Profile (establishment year, ownership etc)
2. District wise data
3. Cultivation expense/ha
4. Production steps (brief major), raw-materials, input-output transfer
5. Business trend and competition-
6. Raw materials (bio-resources) used-
7. Procurement of bio-resources (source end) and challenges-
8. Suggestions for enhancing the availability of quality raw-materials (bio-resources)
9. Anticipated policy support from the government
10. Conclusion
11. Policy matter if anything
12. All Products and its market rate-
13. Value added Production wise details

	Total area of cultivation	Total production
2015-16		
2016-17		
2017-18		
2018-19		
2019-2020		
2020-2021		



	Production quantity	Rate/ item (Based on size)
2015-16		
2016-17		
2017-18		
2018-19		
2019-2020		
2020-2021		

## Annexure 2 : Kudumbasree enterprises

<b>District wise Details of enterprises</b>				
<b>Sl. No</b>	<b>Name of the enterprise</b>	<b>No. of members</b>	<b>Year of starting</b>	<b>Brief description</b>
<b>District : Thiruvananthapuram</b>				
1	Plastic Shredding Unit	26	2017	Recycling of plastics to usable materials.
2	Green bytes	6	2017	Providing cut fruits and vegetables to needy.
8	Mushroom Cultivation unit	25	2016	25 women entrepreneurs started 5 mushroom cultivation unit with the support of district panchayath subsidy.
9	Paper carry bag unit	50	2016	50 women entrepreneurs started 5 Paper carry bag unit with the support of district panchayath subsidy and training.
1	Modern Agro Consulting Team	5	2014	Modern Agro Consulting Team members are engaged in terrace farming, seedlings, bio fertilizers and etc
1	Bhrahmi Unit	1	2015	Product - Aurvedic bhrahmi products
1	Bio Resource centre	5	2017	Outlet which sell seeds, seedlings, bio fertilizers and pesticides.
<b>District: Kollam</b>				
2	Lekshmi activity group	5	2008	Production & Sales of jackfruit pappad and Tapioca pappad
5	Quail Farming	4	2016	Making profit on sales of quail egg.

6	Thazha Handi craft- Mathru Bhavanam unit	1	2010	Traditionally making thazha mats, files and thazha handicrafts
<b>District : Pathanamthitta</b>				
5	Honey Processing Unit	10	2006	Honey Product and Processing Unit
8	Nature Bag	5	2014	Eco Friendly Bag Unit
9	Grow bag filling unit and Bio Pharmacy Unit	10	2015	Grow bag filling unit and Bio Pharmacy Unit
<b>District : Kottayam</b>				
2	Easy Cooky (Vegetable Cut Unit), Puthupally	3	2017	Product- Vegetable Cuts Packets
<b>District : Idukki</b>				
5	Roopa days Homestay	1	2017	Roopadays Homestay is strted as an innovative project by an NHG member in Vazhathope Gramapanchayth. Vazhathope is nearby Idukki dam. As it is a tourist place many tourists come here and use our homestay. An intersting thing is the entreprenur is one of Kudumbashree KAASS team member. other three 3 homestys are in pipe line
8	Amala Broom Unit	5	2016	Amala Broom unit started in the year 2016 by 5 NHG member in Ilaveezha poonchira.In Kudayathoor Panchayth, Ilaveezhapponchira is a hilly terian area and is a place of special grasses. By using this grass 5 women started to make brooms and branded it and soled throughout the

				district.Monthly turnover 5000/- per person
<b>District : Ernakulam</b>				
4	P&P Handicraft	1	2009	Making of Hand Made Handicraft Items
6	Nirmaliyam Soap Unit	3	2013	Nirmalyam Soap Making Unit Producing Variety Of Products Like Toilet Cleaner, Floor Cleaner, Soap, Dish Wash etc.
7	Megha Food Products	5	2009	Making Variety of Pickles & Snacks
8	Suriya Tamarind & Food Products	5	2012	Suriya Tamarind & Food Products Is A Food Processing Unit Producing Tamarind, Gamboge, Vinager Etc
9	Eladi Plus Herbal Soap	5	2009	Eladi Plus Herbal Soap Unit Is A Hand Made Herbal Soap Making Unit Situated At Koovappady
1	Painsree Satellite Unit	5	2011	Pineshree Food Processing Unit Producing Jam, Squash , Coconut Chips, Banana Chips, Pickle Etc.
1	Hasthakala	1	2009	Hasthakala Is A Bags & Apparel Amking Unit From Waste Materials
1	Karunya Floor Mat	7	2014	Karunya Is A Floor Mat Making Unit From Cotton Waste
1	Blessing Tailoring Unit	5	2013	Blessing Tailoring Unit Producing Eco Friendly Bags
2	Water Purifying and Distribution Unit	6	2016	Water Purifying and Distribution Unit
2	KudumbashreeTravels			
<b>District : Thrissur</b>				

3	Manjal Vanam, Pudukkad Constituency	350	2017	It is aimed to produce 10 lakh Prathibha Seed Turmeric with the help of JLG.
<b>District : Palakkad</b>				
1	NANMA Solid waste Management Unit	10	2012	Solid waste Management Unit Started in Alathur. They Convert the solid waste into Bio Fertilisers and Sell it. They Run a Plastic Shredding Unit also.
2	Srishti Handicrafts	6	2013	They Purchase Bamboo from Bamboo Corporation and convert them into Different type of Utility Handicrafts.
<b>District : Malappuram</b>				
1	Misty Fresh Drinking Water Unit	5	2015	They are 5 members working in the Unit. Its started for pure water.
2	Edayur Chilly	3	2017	More production in less area, crop cultivated within 4-6 months.it has more demand in the Market.
<b>District : Kozhikode</b>				
1	Theertham Drinking Water	5		Five members of Kudumbashree in Kozhikode Corporation North CDS started a drinking water project named "Theertham" in Kozhikode Corporation. The project aims to supply safe drinking water at low cost. These ME group supply the safe drinking water in Calicut Corporation area, 1 rupee per1 Litter.
3	Zoya Choclates & Cake unit West Hill		2016	Zoya Cakes and Choclote enterprises started at Kozhikode in 2016. Eight members of Kudumbashree included in this project. The various type of chocolates like the flavor of nuts, Badam,white chocolate, dark chocolate,milk chocolates are producing in the unit. Around 50000/- rupees earn as the sales turn over in a month. Mrs. Sulekha is

				the secretary of these enterprises. Booking No: 04954040229.
5	Sparsham Foot wear Upper stitching Marad			Kudumbashree district mission Kozhikode implemented a project named as "sparsham" for the victims of Marad Communal riots. The programme was implemented associated with the famous foot wear company VKC. The unit produces the upper part of the VKC chappals. There are 18 kudumbashree members working in the unit.
6	Navabharath Cloth Bag unit Kadalundi			During the time of Tsunami natural calamity, Kudumbashree district mission implement various livelihood programs for costal community. As the part of this programme 4 womens of kudumbashree members started a cloth bag making unit. Now these enterprises got more acceptability among the society due to the defects of plastic use.
1	Gramashree Organic Manure, Maruthonkara	8	2013	In 2013 a group of Kudumbashree Members started an Organic manure unit named as Gramshree. 8 members of Kudumbashree included in the unit. Organic Manure and coir pits are the main products of the unit.
<b>District : Wayanad</b>				
1	Keerthi Napkin unit	5	2016	manufacturing eco friendily napins. There is no chemical used they used only pine wood pulp to make napkin.
2	Mahathma Handicraft unit	5	2014	manufacturing babana fibre handicrafts like bag, floor mat etc.
3	Fathimma Dry flower unit	5	2006	manufacturing spatheof the aracanut dry flowers
4	Swaroopu Bamboo unit	5	2014	bamboo handicrafts making unit

6	Panchavarna Bag unit	5	2015	They produce mural paint bag ,purse,chappals and ornamants.
<b>District : Kannur</b>				
1	Ajashree Super Compost Unit	10	2012	Organic manure production
4	Gramashree Broom Making Unit	10	2017	Broom Making (ST Group)
<b>District : Kasaragod</b>				
1	Cds Resource Complex	15-20	2017	Convergence project of District, grama panchayaths and Kudumbashree mission. Selcting one CDS for pilot study. A complex consists of CDS office, Helpdesk for providing information regarding panchayth, Kudumbashree and other governemnt projects, selling various forms in less price, A marketing center for selling Kudumbashree products, A skill training center and library also. Estimated project cost of 60 lakhs.
2	Blossom T Shirt And Sportswear	5	2012	The one and only Jercy and Tshirt stiching Kudumbashre Unit in Kerala.
3	Safalam Cashew Juice	5	2010	Safalam Kayyur chemeni unit producing cashew apple juice
4	Trychoderma	5	2016	Unit producing trychoderma special bio fertiliser
8	Coir Pith Compost	5	2017	Utilising the availability of raw material in costal area and producing the fertiliser

**Annexure 3 Check list of registered Farmers Producer organization (FPOs) in various district of Kerala**

Sl.N o	Name of the FPO	Address	Activities/ Products
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<b>1. Thiruvananthapuram</b>			
1	Panasa Farmers Producer Company Limited	Santhigram, Kazhuvur. P.O. Pulluvila, Kanjiramkulam, Trivandrum 695526	Jackfruit value addition
2	New Change Toxin Free Food Products And Producer Company Limited	Dharul hudha Thalikulzhy P.O, Pulimath , Thiruvananthapuram 685606	Vegetables and food crops
3	Jaivamithra Toxin Free Food Products And Producer Company Limited	Kripalayam Thekkecheruvilaveedu 2, Vizhavor, Vilavoorkal Neyyattinkara , Thiruvananthapuram 695121	Virgin coconut oil, Vegetables, Honey and Org.Fertilizers
4	Sabarmathy Agri And Livestock Farmers Producer Company Limited	Building no. N.b 11/104, Sabarmathy Charitable Society Sabarmathy Lane, Venjarammoodu Thiruvananthapuram - 695607	Poultry inputs (Layer chicks, Hightech cage, feed, medicines), Goatery
5	Thiruvithamcore Honey Farmers Producer Company Limited	XVIII/656, Kerala Gandhi Smaraka Nidhi, Keezhathottam, Idichakkaplamoodu, Thiruvananthapuram - 695502	Honey
6	Harithodhayam Farmer Producer Company Limited	V.P No. 10/4 Temple Junction, Vilappilsala, Peyad P.O. Thiruvananthapuram	Tapioca Chips, Mushroom, Vegetable, Fruits
7	Travancore Agri Livestock Farmers Producer Company Limited	Room No.6/998, 1st loor Shahinammal Building Near South Indian Bank, Balaramapuram Thiruvananthapuram 695501	Goat farming
8	Ananthapuri Coconut Producer Company Limited	Oottiyarathala Veedu, Thalalay, Aralumoodu	Coconut oil, Coconut Chips, Neera, Neera Jam, Theeyal Mix



		Balaramapuram. Thiruvananthapuram 695123	
9	Agrithanima Farmers Producer Company Limited	Thudarvidhya Bhavan, Padipottupura Thottumukku Memala P.O, Vithura, Thiruvananthapuram 695551	Banana, Vegetables, Fruits, Honey
10	Kadali Farmer Producer Company Limited	C/o, CISSA Foundation for Development, Temple Junction, Vilappilsala Thiruvananthapuram 695573	Banana value added products
<b>2. Kollam</b>			
1	Venad Poultry Farmers Producer Company Limited	KP-XIV/542, Opposite Railway Station Kottarakara, Kollam - 691506	Poultry, Meat products, BV 380 Layer birds, Hi-tech cages
2	Jaivasamrudhi Toxin Free Food Products And Producer Company Limited Palaruvy Farmers Producer Company Limited	Beena Bhavan , Kadakkal P.O., Panthalamukku, Pullippara, Kollam - 691536	Mushroom, Vegetables and food crops
3	Punalur Farmers Producer Company Limited	386 Z, MG Complex, T.B. Junction, Valacode, Punalur, Kollam - 691331 386 Z, MG Complex, T.B. Junction, Valacode,	Organic manure, Seeds, Input supply, Advisory services
4	Green Orchid Farmers Producer Company Limited	259-A, Padama Rangam, Kadappakkada P O, Pattathanam, Kollam – 691008	Advisory to Orchid growers, Orchid sales, Input supply for Orchids, Gardening Consultation

5	Milkberg Dairy Farmer's Producer Company Limited	T.P.III/367, EK road, Meera Bhavan, Naduthery Thalavoor P.O. Kollam - 691514	Production and Marketing Cattle feed
6	Karshakajyothi Agro Producer Company Limited	NO. TP/IV/841, Eramath Puthenveedu, Manappally North P.O, Pavumba Village, Karunagapally, Kollam - 690574	Cocnut Oil, Coirpith, Mushroom, Honey
<b>3. Pathanamthitta</b>			
1	Konni Block Integrated Coir Co-Op Society Ltd	Konni, Pathanmathitta	Coir products, Coir training programmes
2	Sevensesbhadrath a Producer Company Limited	Door No: 09/112, Asirwad Group, Muthupezhumkal PO, Mlamthadom, Pathanamthitta – 689698	Honey
3	Konni Dairy Producer Company Limited	Asirwad group Muthupezhumkal, Mlamthdom Pathanamthitta – 689698	Honey, Dairy, Coir, Coconut fiber
4	Preeminent Farms Agro Farmer Producer Company Limited	216 A & 216 B, Koipuram, Thiruvalla, Pathanamthitta – 689531	Jackfruit value added products, Vermicompost, Honey
5	Pathanamthitta Honey Farmers Producer Company Limited	Kerala Gandhi Smaraka Nidhi Center, Adoor Pathanamthitta – 691523	Honey
<b>4. Alappuzha</b>			
1	Farmertree Producer Company Limited	515F/VIII, Nellikunnath aryad, Avalookunnu P.O. Alappuzha - 688006	Puttu podi, Paddy & wheat flour, Chilly & Turmeric powder

2	Kadalora Farmers Producer Company Limited	20/528-A, Eeesseril Arthungal P.O. Cherthala, Alappuzha - 688530	Vegetables, Poultry, Organic fertilizer
3	Kuttanad Agro Producer Company Limited	307, Pandyakal, XX/962 New Bazar, Alappuzha - 688001	Punja Puttupodi, Paddy products
4	Onattukara Spices Farmer Producer Company Limited	Building No.43, Parackattu Pallikkal PO, Bharanikkavu Village, Alappuzha - 690503	Turmeric & Ginger Seed, Turmeric powder, Ginger, Pepper, Garcinia
5	Onattukara Ethnic Foods Producer Company Limited	PB.No.3, Charummoodu Alappuzha - 690505	Rice, Sesame seeds and oil, Banana Powder & Chips, Dried Jackfruit, Tuber crops
6	Odanadu Farmers Producer Company Limited	1st Floor, RK Sadanam Pathiyoor, Keerikadu PO, Alappuzha - 690508	Copra, Coconut oil, Virgin coconut oil
7	Gramajyothei Farmer Producer Company Limited	Gandhi Smaraka Grama Seva Kendram S.L.Puram Road, Alappuzha - 688523	Dairy, Org.Vegetables & Banana
<b>5. Kottayam</b>			
1	Kottayam Agri Business Producer Company Limited	III/309, Manimalayar Rubbers (p) Vadavathoor P.O, Kottayam - 686010	Contract Planting (Rubber), Jackfruit & Tapioca products
2	Pala Agri Producer Company Limited	Mathews Complex New Bazar Road, Pala, Kottayam - 686575	Organic food products
3	Kanjirappally Agricultural And Dairy Producer Company Limited	1/207-B, Pathipallil Kalaketty P.O. Manjukulam, Kottayam - 686508	Cattle feed, Dairy

4	Neeloor Producer Company Limited	205, Neeloor Service Co Op Bank Ltd Neeloor, Kottayam – 686651	Dammer Honey, Jackfruit, Tapioca & Arrowroot products
5	Vadakkumkur Agricrops Producer Company Limited	III/309, Manimalayar Rubbers (p) Vadavathoor P.O, Kottayam - 686010	Organic Manure
6	Kanjirapally Fruits Producer Company Limited	Adoration Convent Building Near Karuna Bhavan Hospital, Koruthodu PO Pallippadi, Kottayam - 686513	Jackfruit & Tapioca products, Spices
7	Vembanadu Coastal Farmers Producer Company Limited	80IV, Thazhappaya Vyavasaya Building, Near Vechoor Panchayath office, Kudavachoor P.O. Vaikom, Kotayam – 686144	Coconut products, Organic Vegetables & Fruits
8	Kanjiramattom Agro Producer Company Limited	Kanjiramattoam P.O. Chengalam East Kottayam - 686585	Paddy, Arrowroot, Jack Fruit & Tapioca products, Coconut oil, Curry powder
<b>6. Idukki</b>			
1	Tillage Agro Producer Company Limited	Kakkombu R.P.S. Complex, 6/14 Muttom P.O Thodupuzha, Idukki - 685587	Nursery, Vegetables & Fruits Marketing
2	Karshakamithra Toxin Free Food Products And Producer Company Limited	Thengumpallil, Bathel P.O., Melechinar idukki – 685564	Spices, Org Vegetables & Banana, Coffe, Tea, Jaggery
3	Marayoor Valley Toxin Free Food Products And	177, Thadathil, 3 Erattayar, Nedumkandam	Org. Vegetables, Jaggery, Input supply (Cardamom

	Producer Company Limited	Idukki – 685514	
4	Sahya Farmers Producer Company Limited	11/258, Thankamany Service Co-operative Bank, Thankamany P.O, Idukki – 685609	Spices value addition, Flour mill, Coffee powder
5	Marayoor Agriculture Producer Company Limited	Room No. 424/6, 2nd Floor Service Co-operative Bank Building, Marayoor P O, Idukki - 685620	Jaggery, Vegetable, Seed, Honey, Tuber crops
6	Mankulam Agricultural Multi Purpose Producer Company Limited	Building No. 9/472 Mankulam PO, Thalumkandom, Idukki – 685565	Organic Spices, Cocoa, Jack Fruit & Banana products, Bakery Items
7	Green Vivo Agro Producer Company Limited	Building No. XIII/88-D, Poopara SHG, Poopara P.O, Idukki - 685619	Spices (Cardamom, Pepper, Ginger), Coffee & Agri inputs
8	High Range Organic Producer Company Limited	Room No. 818, Hops Open Market Building, N.H.Road, Adimali, Idukki - 685561	Org Spices (Cardamom, Pepper, Nutmeg, Clove), Garcinia Cocoa, Coffee
9	Thodupuzha Farmers Agro Producer Company Limited	XIII/645H, 645I, 645J, Kunnumpurath Bldg, Vannapuram P.O Thodupuzha, Idukki - 685607	Coconut oil, Dairy, Cattle feed, Arrowroot powder
10	Neyyassery Agro Food Producer Company Limited	1/126, Karimannoor Rubber Producers Society Neyyassery P.O, Thodupuzha, Idukki - 685581	Dried Tapioca, Jackfruit products, Coconut oil
11	Green Idukki Producer Company Limited	Door No. 585, Ward No. 1 St. Thomas Church Building	Dried Jack fruit, Jackfruit powder & Chips

		Mavady, Nedumkandom, Idukki - 685553	
12	Idukki Spices Producer Company Limited	Door No:36, Ward:15, Nellippuzhakkunnel Building Padamugham, Murickassery, Idukki - 685604	Spices trading & Cocoa Processing, Rubber, Tubers & Vegetables
13	Valara Spices Farmers Producer Company Limited	Room No.106, Kizhakkedath Building, Padicappu Road, Valara, Idukki - 685561	Spices value addition, Cocoa
14	Konnathady Attaining Mythical Environment Farmers Producer Company Limited	Arappanal Building, Konnathady P.O, Idukki - 685563	Spices, Cocoa, Nutmeg nursery, Cardamom drying unit, organic manure(nutrifish
15	Kumily Agro Spice Farmers Producer Company Limited	Bethel House, Valiyakandom, Kumily Idukki - 685509	Vermicompost production
16	Hill Range Tribal Farmers Producer Company Limited	Veliykkal House, Mathaipara P.O, Kannampady, Upputhara, Idukki - 685505	Honey, Grass Broom, Garcinia, Vegetables, Spices, Coffee, Cocoa, Banana, Tubers, Agri inputs
17	Kerala Agri Development And Sustainable Producer Co Ltd	X/129k Kads Building Thodupuzha Idukki 685584	Agricultural Products
18	Mannen Organic Farmers Producer Company Limited	V/130, VGP Building Thadiampadu P.O, Idukki - 685602	Fruits, Jaiva Rice, Toffee/Chocolate, Mace
<b>7. Ernakulam</b>			
1	Kothamangalam Agriculture	Mangattu, Nellimattam P.O. Kothamangalam	Nursery, Coconut oil, Flour mill, Dry meat & food products, Vegetables, Fruits,

	Producer Company Limited	Ernakulam - 686693	Garcinia, Nutmeg, Rubber scrap
2	Muvattupuzha Agro Producer Company Limited	6/586 Balabhavan Building, Nellad P O Muvattupuzha, Ernakulam - 686669	Nutmeg, Honey
3	Kalady Farmers Producer Company Limited	Nambiyattukudy House, Thannipuzha P.O, Parumbavoor, Ernakulam - 683550	Foodgrains - Rice
4	Nutmeg Farmers Producer Company Limited	Building . No VI/449, Manickamangalam P.O, Kalady, Ernakulam - 683574	Nutmeg and Mace
5	Periyar Valley Spices Farmer Producer Company Limited	Building No. II / 614 , Thakidiyil House, Near St. Augustines School Kothamangalam, Ernakulam - 686691	Nutmeg, Ginger, Cardamon
6	Pokkali Farmer Producer Company Limited	Building No. 11/298 –A Theruviparambil , Pizhala, Kadamakudi, Ernakulam - 683517	Value addition – Pokkali paddy & shrimp
7	Indian Organic Farmers Producer Company Ltd.	IV/170, Thottumugham P.O Aluva, Ernakulam - 683105	Organic produces
<b>8. Thrissur</b>			
1	Annamanada Farmers Producer Company Limited	V/23, AmbalaNada, Annamanada, Thrissur - 680741	Nutmeg, Spices, Puttupodi
2	Thrissur Paddy Farmers Producer Company Limited	First floor, L. J. plaza, Puranattukara .P O Thrissur - 680551	Paddy products, Cut vegetables, Super market, Hotel, Meat processing unit, Fisheries, Poultry

3	Pananchery Farmers Producer Company Limited	Room no 3/182/l, Pananchery Farmers Club Dream City, Pananchery Panchayath, Thrissr - 680652	Open Auction (Vegetables, Coconut, Fruits), Honey, Chips (Banana, Jackfruit & Chembu)
4	Kuttikad Farmers Producer Company Limited	4/400, Kuttikad Service Co-op Society Ltd, Kuttikad P.O, Chalakudy, Thrissur - 680724	Paddy, Spices & Coconut products
5	Yuvagramam Farmers Producers Company	Building No. XV/743 Koratty Thrissur 680308	
6	Mahila Rice Producer Company	Karyaden house kuzhur road, kuruvilassery P O Thrissur 680732 in	
<b>9. Palakkad</b>			
1	Susthira Farmers Producer Company Limited	8/463, Mundur, Palakkad - 678592	Matta Rice, Honey, Cocnut oil, Paddy products
2	Jan Kissan Producer Company Limited	16/632 Gangothri Trust Buliding, New Village, Nemmara P.O, Palakkad - 678508	Dairy items, Organic Rice, Paddy products Goatery, Poultry, Biofertiliser, Food items
3	Palakkad Sammisrakarshaka Producer Company Limited	No-371, A.K.Associates Building, Nalukettu inn ,Mambram Rd. Kinassery P.O, Palakakd - 678701	Coconut Oil, Honey, Tamarind, Puttu podi, Idiyapa podi
4	Thachanattukara Farmers Producer Company Limited	9/238, KTA Complex Palode, Mannarkkad Palakkad - 678583	Poultry, Vegetables, Organic manure
5	Eruthenpathy Farmers Producer Company Limited Sustainable And Integrated Farmers	13/233 Main Road, R V Pudur, Eruthenpathy Palakkad - 678555	Vegetables, Coconut



	Producer Company Limited		
6	Vadakarapathy Vegetable Farmers Producer Company Limited	10/439, Valliya kalliampara, Parisakkal P.O, Menonpara (via) Palakkad – 678556	Vegetables
7	Polima Farmers Producer Company Limited	Room No.38/464, 1st Floor, Sanjoe Tower Shornur Road, Opp.KSRTC Bus Stand, Palakkad - 678014	Jackfruit, Banana & Coconut products
8	Sreekrishnapuram Organic Farmers Producer Company Limited	1/96, Swadheena Arcade Hospital Junction, Kadampazhipuram Palakkad - 678633	Organic Vegetables, Tubers & Fruits, Packed food items
9	Palakkad Mango Valley Farmers Producer Company Limited	15/625,Kambarathc halla, GovindapuraP.O, Muthalamada Palakkad – 678507	Mango, Organic Products
10	Attappady Farmers Producer Company Limited	2/434, ASSO Seenkara, Thavalam PO, Pakkulam, Mannarkad Palakkad 678582	Goatery, Spices, Millets, Honey, Bamboo Rice, Coffee, Garcinia
11	Palakkad Paddy Farmers Producer Company Limited	10/774, Sree Lakshmi Tower, Pollachi Road, Kollengode Palakkad - 678506	Paddy seeds, Vegetables, Spice powder, Coconut oil, Agri inputs and grocery items
12	Siva Sakthi Coconut Producer Company Limited	Nallur Kalam, Moolathara, Meenakshi Puram Chittur, Palakkad - 678533	Fertilizers shops, Coconut nursery
13	Mannarkkad Farmers Producer Company Limited	Ayuna Arcade, Anakatti Road, Near Vaishak Hospital,	Vegetables, Organic Manure, Coconut oil

		Mannarkkad PO, Palakkad - 678582	
14	Sreekrishnapuram Agricultural Producer Company Limited	13/479, River View Building, Near VFCK Market, Karimpuzha, Palakkad - 679513	Agri Inputs, Nursery, Fishery, Food items, Paddy
<b>10. Malappuram</b>			
1	Edakkara Agro Producer Company Limited	Door no:9/1067, Marketing Centre Building, New Bus Stand, Edakkara Malappuram 679331	Mushroom, Puttu podi, Goatery, Poly house Fishery, Poultry & Hi tech Cage, Poultry Feeds
2	Thennala Agro Producer Company Limited	Building no 11/499, Thennala Gramapanchayath Kudumbashree office, Kozhichena, Valakkulam, Malappuram - 676508	Rice & other value added products
3	Mannarmala Milk & Agro Producer Company Limited	VPXIV/53, Vidhyaposhini Grandhalayam Peedikappadi ,Kariyavattom, Mannarmala, Perinthalamanna, Malappuram - 679325	Dairy, Curd, Sambaram, Fresh Milk, Ghee
4	Nilambur Teaktown Farmers Producer Company Limited Malappuram Agro Producer Company Limited	10/241, Pniel Building Edakkara Village, Nilambur Malappuram - 679331	Fisheries
5	Maranchery Kerasuraksha Agricultural Producer Company Limited	DOOR NO: VI /37, Near BINs Ayurvedic Hospital, Vadamukku Maranchery P.O, Malappuram - 679581	Nursery, Fertilizer, Coconut Products

<b>11.Kozhikode</b>			
1	Kozhikode Honey Producer Company Limited	MP 3/621A, Manasseri P.O, Mukkam, Kozhikode - 673602	Honey
2	North Malabar Farmers Producer Company Limited	T.P. 13/250, Integrated Development Centre, K.C.Tower, Near police station, Thamarassery Kozhikode - 673573	Org. Vegetables, Cocoa, Banana, Buffalo rearing
3	Blessed Farmer Producer Company Limited	D.NO.TP/7/396 X, Matha tower, Thamarassery, Kozhikode – 673573	Bakery items, Honey, Wheat & Rice flour, Spices, Coffee
4	Niravu Farmers Producer Company Limited	Parambath House Vengeri P.O, Kozhikode - 673010	Vegetables, Banana, Sugarcane, Jaggery, Rice, Bio gas plant consultant, Waste management
5	Hillgrown Farmers Producer Company Limited	Door No. KP.III.429, Chathangottunada P.O Kavilumpara (via) Kozhikode - 673513	Cocoa, Nutmeg, Garlic, Choclote, Coconut products
6	Calicut Producer Company	DOOR NO: 17/1667B AMRITHAKRIPA BUILDING, PAVAMANI ROAD, PUTHIYARA PO KOZHICODEL 673004	
<b>12.Wayanad</b>			
1	Wayanad Agriculture And Spices Producer Company Limited	Puthuparambil House, Nadavayal P.O, Panamaram	Wayanadan Thondi rice

2	Wayfarm Producer Company Limited	Vemom, Mananthavady Wayanad - 670645	Vegetables, jackfruit, processing
3	Waycafe Producer Company Limited	Kavalakkattu house P.O, Sasimala, Pulpally Wayanad - 673579	Coffee
4	Loga Farmer Producer Company Limited	P.P 16/332A, Moozhimala, Veliyambam P.O, Pulpally, Wayanad - 673579	Chips and vegetables
5	Bhoomika Farmers Producer Company Limited	Room no II/207, St. Thomas L .P. School, Perikkalloor, Wayanad - 673579	Poultry Farming, Shop-for Vegetables, Agricultural equipment and Grocery
6	Wayanad Tribal Farmers Producer Company Limited	18/347 House Kampetty P O, Varayal Wayanad - 670644	Spices
7	Sreyas Tribal Farmers Producer Company Limited	VII/589, Shreyas skill Training centre, Kaippanchery Rd,	Coffee, Pepper, Honey
8	Adima Tribal Farmers Producer Company Limited	4/571, Boys town Varayal P O Wayanad 673644	Coffee, Pepper, Rice, Pulses
9	Thirunelly Agri Producer Company Limited	Vayalorath Veedu, Trissilery, Wayanad - 670646	Paddy
10	Wynad Agri Marketing Producer Company Limited	Building NO.XIV 279(1) Kailas Kottaram, Bye pass road, Kalpetta, Wayanad - 673121	Coffee, Pepper, Traditional Rice Gandhakasala
11	Wayanad Natural And Holistic Farmers Producer Company Limited	NO-PP 10/1142, Eranallur, Panamaram, Wayanad - 670721	Tea, Coffee, rice, spices produced through Zero Budget Natural Farming technique
12	Waywin Producer Company Limited	Fourth Floor Kootarram Hieghts , opposite New bustand, Kalpetta ,Wayanad	Coffee, Spices, Vegetables
<b>13. Kannur</b>			

1	Anjarakandy Agro Farmers Producer Company Limited	XI/430, AFSC Bank Building Kavinmoola	Coconut, Nursery, Paddy products
2	New Model Farmers Producer Company Limited	Madampam Kaithapram P.O, Sreekandapuram, Taliparamba	Poultry farming, Bio Fertilizers
3	Kuttiattoor Mango Producer Company Limited	Building no. KP VI/429, Vaduvankulam P.O Kuttiattoor, Kannur 670602	Kuttiattoor mango, Jam, Pickle, Squash
4	Kurumathur Honey And Innovators Farmer Producer Company Limited	K P VI/566C, Panchayath Off. Chorukkala, Kurumathoor P.O, Kannur - 670142	Honey
5	Anthoor Vegetables And Fruits Innovators & Farmers Producer Company Limited	No.XXV/249F, Dharmasala Kanul P.O, Anthur, Kannur - 670562	Fruits And Vegetables
6	Mayyil Rice Producer Company Limited	MP VII 252, Panchayath Bus Stand Bldg	Rice, Puttu podi, Rice flakes, Pathiri podi
7	Cheruthazham Black Pepper Producer Company Limited	CP VII-205, Kulappauram, Near Samskarika Kendram, Vilayamkode P.O,	Black pepper, Turmeric, Organic manure, Nursery (Vegetable, Coconut)
8	Paithal Valley Agro Organic Producer Company Limited	EP/1/188, Maridiyil Bldg, Kudiyamala P.O, Kannur - 670582	Goat rearing, Honey
9	Kera Coconut & Agri Farmers Producer Company Limited	NO.PP 13/569, C Poyyil P.O, Pariyaram, Kannur - 670502	Coconut and its value added products
<b>14. Kasargod</b>			

1	Gramalakshmi Marketing Producer Company Limited	KBPW 4/294, Udayapuram P.O, Kodothe, Anandashrem, Kasargod - 671531	Cash crops, Coconut and spices
2	Tulunadu Farmer Producer Company Limited	1/230, Thannote Ravenashwaram P.O, Pallikkara, Kasargod 671316	Vegetable, Organic manure
3	Madhuvahini Producer Company Limited	No..X104, Karipodi, Bekal P.O, Kasargod - 671318	Honey, Arecanut & Coconut saplings, Leaf Plates, Organic manure
4	Ksheera Farmer Producer Company Limited	13/290, Sreenilayam, Thacharampoil, Valiyapoyil P.O, Kasargod - 671313	Goat rearing
5	Tulunadu Ecogreen Farmers Producer Company Limited	Room No.KMC 3/375, Adkathbail, Kasargod 671121	Honey, organic pepper, Fruits & Vegetable products
6	Konnakkad Chaitravahini Fpc	B7 75A & B, Konnakad Estate, Konnakad	Coconut value added products
<b>15. Lakshadweep</b>			
1	Bahr Azraq Farmers Producer Company Limited	Innechetta, Manniyam Amini Island Lakshadweep - 682552	Coconut and Tuna
2	Niravu FPO		Coconut value added products
<b>Coconut Producer Companies</b>			
1	Thejaswini Coconut Farmers Producer Company Limited	XIII/1613 A75, 2nd Floor, Thavakkal Shoping Complex, Keezhur Chavasseri, Iritty – 670703	Coconut value added products
2	Perambra Coconut FPO Limited	C.P.II-376/K7, First Floor, Thattassery Building, Cherupuzha P.O - 670511	Coconut value added products
3	Kozhikode Coconut FPO Limited	PP13/339A, Alankar Arcade, Perambra. PO., Perambra - 673525	Coconut value added products

4	Kadathanad Coconut Producer Company Limited	7/268 B, Puthumannil Thazham Poyil Thazham Road, Payimbra P O - 673571	Coconut value added products
5	Kuttiady Coconut Farmers Producer Company Limited	174/ XXVI, Karimbanapalam, Puthupanam P.O Vatakara - 673105	Coconut value added products
6	Vadakara FPO Limited	7/268 B, Puthumannil Thazham Poyil Thazham Road Payimbra P O - 673571	Coconut value added products
7	Nilambur Coconut FPO Limited		
8	Tirur Coconut Producer Company Limited		
9	Valluvanad CPC Limited	9/366(Q), UK Building, Edavannappara, Cheruvayur, Malappuram PO, 67364	Coconut value added products
10	Ponnani CPC Limited	Door No: VII/350A1, Karimbanakkal Complex, Thrissur Road, Edappal P.O - 679576	Coconut value added products
11	Malappuram CPC Limited	9/366(Q), UK Building, Edavannappara, Cheruvayur, Malappuram - 673645	Coconut value added products
12	Palakkad CPC Limited	10/728A, Little Tree, Urkulam, Muthalamada - 678507	Coconut value added products
13	Kodungallur CPC Limited	XVII/468 (XX/204) Kattanam, Pallickal P.O - 690503	Coconut value added products
14	Thirukochi CPC Limited	X/333,TKCPCL Factory Office, Onakkoor P O., Thoduvakuzhy, Muvattupuzha - 68666	Coconut value added products
15	Onattukara CPC Limited	XVII/468 (XX/204) Kattanam, Pallickal P.O - 690503	Coconut value added products

16	Karappuram CPC Limited	No. 540, Kanjikuzhy Block Panchayath Premises N.H.47, SN Puram P.O. - 688582	Coconut value added products
17	Kottayam CPC Limited	Erimattam Junction, Chakampuzha P.O, Ramapuram - 686574	Coconut value added products
18	Kaipuzha CPC Limited	No. T.P.44, Kuttikattuvilayil Building, Padinjattakara, Thevalakkara - 690524	Coconut value added products

National Bank for Agriculture and Rural Development, Regional office Trivandrum

#### Annexure 4 : Biodiversity of Navara Ecofarm

Sl.N	Name	Varities			
[A]	Navara rice – black				5.Cucumber
[B]	Navara rice-golden yellow				6.Cowpea
[C]	Palakkadan matta rice				7.Snakegourd
[D]	Coconut-west coast tall, chenthengu				8.Bittergourd
[E]	Bamboo				9.Ladies finger
[F]	Cows	1.Kasargod dwarf 2.Gir			10.Brinjal
[G]	Fish-thiloppia,brail				11.Tomato
[H]	Vegetables	1.Moringa 2.Spinach 3.Ashgourd 4.Pumpkin			12.Green chilli
					13.Kanthari
					14.Elephant foot yam
					15.Chinese potato
					16.Tapioca
					17.Radish
					18.Chembu
					19.Kothavara
					20.Chundaga
					21.Koval
					22.Chathurappayar
					23.Manathakkali



[I]	Medicinal trees and plants	1.Fig
		2.Neem
		3.Vilwam
		4.Kanikkonna
		5.Red sandal
		6.Pathimugham
		7.Danthappala
		8.Venga
		9.Peeli vaka
		10.Thoonga vaka
		11.Menhendi
		12.Arrow root
		13.Vatham kolli
		14.Nagadanthi
		15.Mimosa pudika
		16.Kurunthotti
		17.Karuka
		18.Muthanga
		19.Keezarnelli
		20.Cheroola
		21.Kanjunni
		22.Thiruthali
		23.Uzhinja
		24.Njerinjil
		25.Chittamruthu
		26.Kallurukki
		27.Mukkutti
		28.Aloevera
[J]	Spices	1.Ginger
		2.Mango ginger
		3.Turmeric
		4.Pepper
		5.Curry leaves
		6.Cinnamon
		7.Mint

		8.Tamarind
		9.Akil
		10.Betel leaves
[K]	Fruits	
	[ a] Mangoes	1.Banglora
		2.Malgoa
		3.Priyor
		4.Kalappadi
		5.Gomango
		6.Neelam
		7.Chandrakkar an
		8.Bennet alphonso
		9.Banganappalli
		10.Himayuddin
	[b]Jackfruit tree	
	[c]Pappaya	
	[d]Sappotta	
	[e]Pomagranate	
	[f]Gooseberry	
	[g]Arinelli	
	[h]Kadali vazha	
	[i]Njaval	
	[j]Elanthi	
	[k]Guava	
	[l]Seetha phal	
	[m]Orange	
	[n]Muzambi	
	[o]Lemon	
	[p]Malta lemon	
	[q]Vadukappuli lime	
	[r]Almond	

	[L]Trees	1.Palmyrah tree
		2.Teak
		3.Rosewood
		4.Kazhani
		5.Maruthu
		6.Manjappavatta
		7.Panjippoola
		8.Mulluppoola
		9.Velakam
		10.Plashu
		11.Kodukkappuli
		12.Manjarali
		13.Glyricedia
	[K]Flowers	1.Basel
		2.Thechi
		3.Mandaram

		4.Pichakam
		5.Nandiarvattom
		6.Shoe flower
		7.Marigold
		8.Rose
		9.Parijatham
		10.Chembakam
		11.Thumba
		12.Kakkappo
		13.Pavizhamalli
		14.Kanakambaram
		15.Poochedippoo
	[L] Creepers	1.Shathavari
		2.Kunnikkuru



## CASE STUDIES OF SUSTAINABLE USE OF BIODIVERSITY

KERALA STATE BIODIVERSITY BOARD  
KAILASAM, T.C. 24 / 3219,  
NO. 43, BELHAVEN GARDENS,  
KOWDIAR P.O., THIRUVANANTHAPURAM - 695 003