

TRADABLE/
COMMERCIALY
POTENTIAL FLORAL
BIORESOURCES
OF KERALA



**TRADABLE/ COMMERCIALY POTENTIAL
FLORAL BIORESOURCES OF KERALA**

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TRADABLE/ COMMERCIALY POTENTIAL FLORAL BIORESOURCES OF KERALA- Vol 3

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Project

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

Executive Summary

A study of tradable bioresources with the objective of identifying various floral bioresources being traded in the State, assessing its volume and economic potential as well as inventorizing the bioresource-based industries operating in the State was undertaken. Since the types of bio-resources are diverse, the entire tradable floral bio-resources has been broadly categorized under Forest and allied resources, Agriculture and Horticulture, Plantation and Agroforestry. The value added products developed from various cultivated crops are dealt with separately. Important bio-resources used in industries have also been documented and inventory of industries that use these bio-resources has been prepared as per the stated objective of the project and those are included in separate chapters. Special emphasis has been given to Ayush industries which is a major consumer of medicinal plants. An attempt has also been made to track the supply chain of medicinal plants and the trade of medicinal plants through raw drug dealers. The trade of cultivated crops and flowering plants through nurseries were also examined in detail. In addition the export of bioresources through various ports of Kerala was also studied.

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. The development of small, local businesses can be an important tool in such cases. 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.

An exhaustive inventory of the bioresources of the state and checklists prepared covered the following species. The number of species included is given in parentheses. Mushrooms (85), RET species (645), endemic plants (152), Trees of Kerala (855), Timber (161), Trees Outside the Forest (90), Bamboos & Reed species (55), Exotic fruit trees cultivated (26), Orchid (126), Orchids in forests having floricultural potential (16), cultivated crops and genetic resources conserved at ICAR-IISR, Kozhikode, NBPGR etc.

Primary and secondary data collected were well organised in a systematic manner followed by data consolidation and analysis and also projected to obtain state wise data in certain cases as Ayush industries. Appropriate methodology was adopted although pandemic situation (Covid19) created hard ship during the field work. The report was prepared based on the primary and secondary data collected, followed by organisation, consolidation and analysis of data. The methodology of study involved focus group discussions (FGD), in depth interviews & discussions with key stakeholders & informants. Information were collected through field visits and observation in the market/ study area/locations selected within the forest and outside forest areas. Explored and utilized the man power especially from the education departments, PG/UG students to collect adequate data based on standardized questionnaire and formats.

The study team met state level and district level officers of the various line departments/ research organizations etc. associated with promotion and management of bio-resources like forest, agriculture, horticulture, Ayush, Industry & Commerce, Ayurvedic drug controller, State Medicinal Plants Board, NABARD, KVIB, Various boards like Rubber, Tea, Coffee, Cocoa, Areca nut, Cashew, Spices, Research organizations like KFRI, JNTBGRI, Malabar Botanic Garden, Department of Botany, University of Calicut, ICAR-Central Plantation Crops Research Institute, ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), Kerala Agricultural University,

Kudumbashree, State Poverty Eradication Mission, ICAR-National Bureau of Plant Genetic Resource, Thrissur, College of Forestry, Vegetable and Fruit Promotion Council Keralam (VFPC) etc. Some of the secondary source of information are obtained from: Agricultural and Processed Food Products Export Development Authority (APEDA), Department of Economics and Statistics, Kerala, Directorate General of Commercial Intelligence and Statistics, MSME, KINFRA, Cochin Chamber of Commerce etc

FOREST RESOURCES

Kerala forest is rich in biodiversity and the major forest produce include Industrial wood, Plywood, Match wood, Bobbin wood, Packing case wood, Pulp wood, Timber, Fire wood, Billets, Sandal wood, Poles etc. Other important items covered are NWFP, Honey, Bee wax etc. Non Timber Forest Produce (NWFP) is one of the important components of biodiversity and it plays a very important role in sustainable rural/tribal livelihood in India. Collection and marketing of NWFP consists of a wide range of activities, which provide income generation and employment to the local communities. Forest division wise NWFP collection data was obtained by the study team directly. A total of 92 species are collected from forests and altogether total quantity is estimated as 367.30 tonne and total price as Rs 27.1 crores during the period 2015-2021. Since the year wise data is presented elsewhere in this report the five year data was considered. Apart from these, other 8 items collected as Bee wax, Honey (Big, Honey (small), Honey (Puttuthen), *Canarium strictum*, *Saccharum officinarum*, *Shorea robusta* were also analysed in terms of total quantity as 71.15 tonne and total price Rs 3.65 crores. *Karimkurunji*, *Kurumthotti*, *Chunda*, *Sopumka*, *Nellikka*, *Adalodakam*, *Kurumulak*, *Pachotti*, *Veleencha* and Kadukka are the major bioresources utilized. Tribal communities are exploited by various agencies while they collect and sell the NWFP for their livelihood. The marketing network of NWFP is mostly unorganized and is neither helpful for the conservation nor its support for improving the economic, food and health security of the tribal/ forest dependent

communities, due to various reasons. During the study we have prepared the passport script data of the entire Non Wood Forest Produce of Kerala State also.

Kerala State Federation of SC/ST Development Co-operatives Ltd (SC/ST Federation) is the Apex Cooperative Federation of the Scheduled Castes and Scheduled Tribes primary co-operative societies in the State of Kerala,. In Kerala 30 sangams functioning in 76 ranges are actively involved in the collection of NWFPs. Data analysed based on the consolidated data of NWFP collection shows that total number of plant species collected is 68 and total quantity 1676.20 tonnes and total price 13.10 crore. (2015-2019). NWFP sales data obtained from SC/ST federation reveals that total number of plant species brought under sales is 70 and total quantity is recorded as 940.80 tonnes with the total price of Rs10.12 crore (2015-2019). In addition to the cooperative sector, medicinal plants are also marketed by private traders. The private traders sell their products directly to the consumers. Generally, the auction of the Federation is attended by the first whole saler, which is procured by the second wholesaler. The latter either transports it to other states or sell sit to retailer medicinal manufacturers. In each stage of marketing, agents/traders incur marketing costs. Vanthen is one of the highly valued NWFP from Kerala. The procurement of Vanthen is very high in all the 3 years except 2015, in which Vanthen procurement was nil. Kurunthotti, Kalpasam, Cheenikka, Chunda are other items traded in huge quantities.

Vanasree Ecoshop is an initiative by the Forest and Wild life department of Kerala to improve the livelihoods of tribal communities by facilitating collection, processing, value addition and market access to the forest produce. 'Participatory Forest Management (PFM) initiatives instituted in the State during the late 1990s gave a new direction to the approach of the Forest Department and the Forest dependent communities in the management of NWFP. Scientific management of NWFP has been identified as a most significant step necessary for improving the livelihood of the forest dependent communities and for ensuring their meaningful participation in forest conservation. The profits from these outlets are being ploughed back to the

NWFP collectors through the Vana Samrakshana Samithies. There are 36 Vanasree Ecoshops in the State under Forest Development Agencies (FDA) including 2 mobile units.

The study analysed the trade performance of different Vanasree products and the livelihood of the indigenous communities of Kerala. Among the marketed 70 Vanasree products, 25 NWFP products marketed through the Eco Development Committee (EDC) were selected for detailed study. Private shops do not share their profit with the collectors, where as the society/VSS/EDC gives certain percentage of their profit back to the primary collectors in addition to the procurement price. But the financial constraints during the lean seasons are forcing the indigenous communities to sell their products to the private shops. Access to rich resource base, geographical advantages and the Government laws and regulations work in favour of Vanasree. Since the tribal community has exclusive rights over collection of NTFPs and many NWFPs including medicinal plants are endemic to Western Ghats, these work as barriers to entry for other players to set up local level production processes. List of threatened medicinal plants recommended for conservation, regulation and restrictions for collection, reintroduction and rehabilitation at *in situ* and *ex situ* level based on studies carried out under RKI Project (primary and secondary data) and also suggested species for notification under Section 38 of Biological Diversity Act level are also incorporated in this report.

CULTIVATED CROPS

Kerala is famous for homestead farming system, which integrates the home with useful fruit trees and shrubs, vegetables, tuber crops, spice crops, fodder crops, livestock, and poultry in a small (usually about 0.10 ha or more) area of land. A total of 452 crops belonging to 82 families are being grown in Kerala. Among these, 256 crops have edible uses (cereals and millets, pseudocereals, pulses, oil seeds, tuber crops, sugars and starches, fruits and nuts, and vegetable crops). A total of 118 fruits

and nuts have been recorded including 22 subtropical fruits. Others in the list are cereals and millets-11, pseudocereals-4, pulses-10, oil seeds-8, tuber crops-24, sugars and starches-8, vegetables-73, spices and condiments- 21, beverages-5, stimulants- 3, cut flowers-20, cut foliage plants-14, green manure crops-10, cover crops-4, fodder crops-42, fibre crops-6, rubber crops-1, essential oil yielding plants-7, medicinal plants-45, and crops of miscellaneous uses-18. Although 452 crops have been listed, area under cultivation is available for 69 crops only (GOK, 2021). However, area of minor crops are available as groups of 'other oil seeds', 'other tuber crops', 'other spices and condiments', 'other fruits', 'other vegetables', 'fodder crops', 'green manure crops', 'medicinal plants', and 'other crops and trees' indicating that such crops are grown in small scale, as a part of homesteads or along with other crops such as coconut in multiple cropping systems.

In Kerala, there are only four crops - coconut, rubber, rice, and banana (including plantain), which have an area above one lakh hectares. Crops occupying more than 10,000ha are 17 only. The maximum area is under coconut (1) followed by rubber (2) and rice (3). Other crops in the order of rank based on area occupied are banana and plantain (4), arecanut (5), jack fruit (6), coffee (7), black pepper (8), mango (9), cassava (10), cashew nut (11), cardamom (12), tea (13), nutmeg (14), papaya (15), drumstick (16), and cocoa (17). Plantation crop include tea, coffee, rubber, cocoa, coconut, areca nut, oil palm, palmyrah and cashew. These are high value commercial crops of economic importance and play a vital role in improving economy, especially in view of their export potential, employment generation and poverty alleviation particularly in rural sector. Kerala has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupied 7.11 lakh ha, accounting for 27.7 per cent of the total cropped area in the State

Safe to eat vegetable cultivation through good agricultural practices was promoted by the state. Agriculture Development and Farmers' Welfare Department, Vegetable and Fruit Promotion Council, Kerala, and State Horticulture Mission played a key role in promoting organic farming through adoption of organic village by cluster

approach. In 2019-20, organic cluster cultivation was promoted through formation of 200 GAP (Good Agricultural Practices) clusters in 5000 ha with a contiguous area of 25 ha per cluster and production of 25,000 MT. A total of 1405 GAP clusters extending to 64,095 ha exist in the State. Under Paramparagat Krishi Vikas Yojana, a total of 619 organic clusters extending to 12,380 ha have been established. The marketing of organic products was facilitated through ecoshops.

BIORESOURCES BASED INDUSTRIES

The Micro, Small and Medium Enterprises (MSME) sector is a major income generating and employment providing sector in Kerala and 5.62 per cent of MSME enterprises in India are in Kerala. The bioresources based industries coming under this sector are handicrafts, handloom, khadi, food processing industries, garment making and textile industries and industries related to coir/wood.

Ayush industries

Nearly about 500 classical preparations of ayush products are manufactured in Kerala. Apart from these proprietary/ patented medicines and other health care products/ OTC products, new gen products, nutraceuticals, cosmeceuticals etc. are produced by the Ayush manufacturing units in Kerala. Total there are 663 industries in the state, of which 40 are major (Turn over ≥ 3 crores), 60 were medium scale (1 to 3 Crores) and 563 are small scale (< 1 crore). Total 121 industries were sampled as part of this study of which 10 were major, 21 were medium scale and 90 were small scale. The data collected from the sample units are projected to the totality according to the size (Major/key, medium and small) of the industries. The total quantity estimated is 25,516.6 MT. Out of top 100 with regard to quantity 60 species are consumed above 100 MT annually. Rest of 40 species is between 96.3 and 60.6 MT consumed by the manufacturing units. There are 15 medicinal plants with an average price/ per kilogram between Rs.24653 to Rs.1000 and rest of the medicinal plant species is between Rs.989.00 and Rs.185.00.

Food processing

Agribusiness is an emerging field in Kerala ensuring substantial income and employment opportunity. The dominance of commercial and horticultural crops in Kerala offers a great possibility for a variety of agribusiness opportunities. Kerala offers tremendous prospects for the growth of food- and agro-based sectors, particularly those that have close ties to Kerala's agricultural and natural resources, as noted in the Approach Paper to the Thirteenth Five-Year Plan. Both supply and demand considerations contribute to Kerala's potential for the growth of agro-based enterprises. Kerala produces a wide range of agricultural goods, including rice, coconut, rubber, pepper, cardamom, bananas, and pineapple. Kerala has a sizable market for food and agricultural products on the demand side. Rural Kerala's average per capita consumption spending is about twice as much as rural India's average per capita consumption expenditure (in 2011-12, according to National Sample Survey data). However, there are also important challenges for the growth of agro and food-based industries in Kerala.

In reality, any strategy to resurrect agricultural production in Kerala must include the construction of processing enterprises, which would help to provide higher returns to farmers for their agricultural products. The role performed by small farmers who cultivate in homesteads or other small parcels of land is particular to Kerala's agricultural economy. However, the small size presents a problem for farmers as well as the processing companies when it comes to the collection and acquisition of agricultural products. Farmers of a variety of agricultural products frequently complain that they do not acquire enough of their products because there is not a strong enough network for the acquisition of agricultural products. Despite Kerala's reputation as a significant producer of a wide range of agricultural goods, virtually little of their processing is done there. Despite Kerala being a major producer of jackfruit, spices, and tapioca very little processing is done here. Kerala is a major producer of pineapple, Vazhakkulam in Ernakulam district has emerged as a leading centre in the country in the trading of pineapple. Despite the easy availability of

pineapple within the State, pineapple processing and value addition is limited. Food processing sector in Kerala has always made significant contribution to exports. Kerala has been a major exporter of spices, marine products, cashew, coffee and tea. Kerala accounts for nearly 20 % of the country's total food exports. Two thirds of Kerala's export income comes from processed food. About 65 % of the cashew exporting and processing units officially registered with the Cashew Export Promotion Council of India (CEPCI) are from Kerala. It is estimated that the sector employs about 3, 00,000 workers and 90 % of them are women. Cashew processing is concentrated mainly in the private sector.

Traditional industries

The State's long coast line, lakes, lagoons and backwaters provided natural condition required for retting, an important part in coir processing. The availability of coconut husks, the natural retting facilities present in the lakes, lagoons and backwaters and the traditional expertise of the people were the reasons for the concentration and the growth of the industry in the State, especially in the coastal areas. This agro-based rural industry provides subsistence to around 1.5 lakh families in the coastal belt of Kerala. Kerala accounts for about 85 % of the total production of coir in the country. In Textile sector Kerala does not produce the raw material needed for the spinning sector – cotton. Further, the yarn produced by the spinning mills in Kerala is processed outside the State. The handloom and powerloom industry provide employment to a sizeable section of the workforce in Kerala. In handlooms and other traditional sectors, both technological and organisational innovations are needed to increase productivity. One of the important challenges faced by coir industry in Kerala is the shortage of raw material, namely coconut husk, which is processed into coir fibre and coir products

Plant nurseries

A good number of nurseries have sprung up in the state during the past few years. As part of the present study total nurseries in the state has been identified as 1394. District wise Thiruvananthapuram -102, Kollam – 55, Pathanamthitta- 57, Kottayam -

121, Alappuzha -41, Ernakulum-162, Idukki -43, Thrissur -202, Palakkad -101, Malappuram-188, Wayanad -59, Kozikode-104, Kannur-53, Kasaragod- 106. In 2020, the survey results highlighted the impact of a year of flood and COVID-19 pandemic on the industry and its growth. The nursery survey was conducted in 760 plant nurseries in all the 14 districts of Kerala with the help of 14 NCC cadets from one college of each district, the project fellows and 14 district co-ordinators of KSBB. The survey focused on the economic status, available plant resources, their cultivation, trade, supply chain and also the constraints and challenges faced in the industry.

Highlights from the 2020-21 survey include:

1. Seedlings self-propagated (14.2%), Self-propagated & purchased with in state from large dealers (19.1%), Self-propagated & purchased from Govt. institutes (23.6%), Self- propagated & purchased from Govt. institutes & large dealers (26.3%) & Self- propagated & purchased within & from other states (16.8%)
2. The total number of plant species/varieties available in the nurseries were 1725 numbers
3. Grower - wholesale only (13%), Grower retail &/or whole sale (28%), Retail sale only (30%), Landscaper /Interior sale only (6%) & Agri sale only (23%)
4. Woody plants (plantation, shade) (30%), annuals (22%), perennials (12%), aquatic plants (7%), Special green house plants (5%), High decorative plants bonsai (6%), Lower plants like ferns, pine (6%) , Special plants like orchid, Anthurium (12%).
5. Approximate income generated was between Rs 3 – 5 crores.
6. Economic status in terms of annual turnover: between less than Rs.1lakh (183 nos.), between 1-5 lakh (180 nos.), between 5-10 lakh (349 numbers) and above 10 lakh (48 nos.)
7. Species/ varieties which are highly priced / traded in high quantity was also recorded district-wise. In Thiruvananthapuram nearly 65 species were high

priced eg. Bonsai Adenium yellow (Rs.2640), Araucaria, Chinese doll & Golden bachmarali palm valued at Rs.2000. Kollam had 11 species and Foxtail fern priced at Rs 1400/- was one of the highest. Only 3 species with high value was recorded from Pathanamthitta, 25 in Ernakulam district with highest price of Rs.3000 for miracle fruit plant. Idukki had 9 high priced items among which, *Crystosta chysrenda* and *Howea forsteriana* were Rs.800, Thrissur 11 items with *Durio zibethinus* having highest price of Rs.3000, Malappuram with 25 items of which cactus variety was noticed to be the highest with around Rs.4000. 8 items in Wayanad and Jade plant worth Rs.1500, was highest. Kozhikode with 6 items and the highest price was recorded for Durian fruit Rs.1300. Kannur with 12 items among which Birth star plant of Rs.1000 was highest. In Kasargode, Kepel worth Rs.1800 was the most highly priced variety among the 8 items.

8. In Thiruvananthapuram, 29 plant items were sold in large volume, among which Rubber RRI 105 and Rubber RRI 600 were sold in volume of around 45000 numbers annually. In Kollam, 101 plant items are traded of which rose variety was in high demand with over 12700 numbers sold / year. 27 plant items in Alappuzha and among them nandhiarvattom recorded the maximum with 1300 numbers sold yearly. In Pathanamthitta, 20 items with the maximum of 2550 numbers of *Tabernaemontana diverticata* sold / year. While, in Kottayam 156 items with 5600 numbers of rose varieties were sold annually. In Ernakulam Aglonima was sold about 2300 numbers in a year. In Idukki, 95 items and coconut was sold in bulk with 6500 numbers in a year. Thrissur with 14 items, Palakkad, 20 items with 2374 for bougainvillea. In Malappuram, 110 items with *Santalum paniculatum* was sold of 400055 numbers per year. In Wayanad, 44 items with pepper being sold around 40000 yearly. In Kozhikode 6 items and banana (njalippovan variety) was sold in large volume of 6500 numbers.

9. Some of the major concerns raised by the nursery owners includes change in economy (28.9%), labour (27.6%) high costs (11.8%) and competition (9.2%), finding reliable skilled employees, weather/climate change, fund flow, pest & diseases, government support
10. The sector employed nearly 32,000 individuals as full and part time laborers
11. The species recommended for revenue generation in the state were plantation crops like Rubber, coconut, pepper, banana varieties, ornamentals including rose varieties, aglonima, bougainvillea, bonsai of ficus, anthurium, orchids, etc.

Raw drug traders

Kerala state Biodiversity Board (KSBB) initiated a study of the trade of raw drug through Raw drug shops in Kerala where raw drugs both dry & fresh medicinal spices, value added products, and also base materials like various oils, clarified butter (ghee), honey etc are sold. A separate study was conducted on supply chain network of raw drugs mainly used for the preparation of various classical Ayurvedic drugs, proprietary drugs, health care products etc., in the AYUSH industry. The present study excluded the consumption of raw drugs (Dry & Fresh) by the tribal/folk healers of Kerala. It is suggested that this may be carried out during the second phase of the study. When the team started surveying with specific designed questionnaire initially there were lot of apprehension among the stakeholders and in many occasion they declined to interact with the survey team members because of their confusion related to imposing tax, and raising questions about the registrations, licensing etc.

Currently these shops are neither registered nor having license to trade the raw drugs because in the past it was considered only as a livelihood improvement for individuals who are engaged in the marketing of raw drugs locally known as Angadi Pachamarunnu Kada. Based on the annual turnover raw material shops are classified in to large, medium and small raw drug shops located in all districts of Kerala. Present studies reveal that the total number of Angadi Pachamarunnu kada in Kerala

is approximately estimated as 1100 (large scale 10, medium scale, 50 and small scale 1040). One of the key observation noted based on the study after interacting with selected raw drugs dealers, is that the annual turnover is above 5 crore (Wholesale/retails), medium level sellers (wholesale and retails), is below 5 to 1 crore and small scale is limited to below one crore and varies from 1 lakh to 50 lakh, 50 to 75 lakh & 75 to 99 lakh. Total quantity of raw materials traded (consolidated data of 7 districts) was 1, 77,603 kgs and the trade generated about Rupees 2, 92, 94034. Chappangam/Pathimugam, Erukku, Ilavarngam are the raw drugs exported through Angadi Pachamarunnu kada to Middle East countries to a rate of 2 fold (Rs 600 within India vs Rs1183 outside India). This reveals that we can identify more export potential plant species and generate more income on regular basis. Ilavarngam was imported to Kerala from Sri lanka because of the low price compared to the cinnamomum species available in Kerala. Karingali, Cheenikkaya, Incha, Vayambu, Kattarvazha, Chappangam, Kasthurimanjal and Nellikka species were traded above 3000 kgs per annum. 54 species such as Kunni, Vella Kunthirikkam, Thathiri etc were traded above 1000 kgs/annum. 188 species for example Chuuku, Kattinchi, Mullilam, Thumpoonalary, Amukkooram etc were traded below 1000 kgs/annum. Raw drugs such as Jathipathri, Jadamchi, Rakthachandanam, Sarppagandhi/amalppori, Chandhanam and Thakara represents high value species traded from Kerala.

Even though the marketing network is improved the physical and storage conditions have not improved much except the space of their warehouse. One of the important recommendation based on the study is Angadi pachamarunnu shops need a face lift and need to be converted in to smart Angadi Pachamarunnu shops in terms of its hygiene, storage conditions, introduction of good collection processing, storage and selling practise. It is also highly essential to introduce a registration and license to the raw materials shop keepers, under the local administration. This will help to regulate and improve the present status of the raw material shop with a view to maintain the standards of raw materials and labelling the expiry date of each species and value added products they sold.

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INTRODUCTION

The state of Kerala is endowed with a rich treasure trove of bioresources due to its unique geographic position leading to the development of highly varied agro-climatic regions ranging from lowland, mid land to high land.

Biodiversity: Kerala scenario

India, a megadiverse country with only 2.4% of the world's land area, harbours 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. Of the 36 global biodiversity hotspots, 4 are in India, represented by the Himalayas, the Western Ghats, the North-east, and the Nicobar Islands.

The Western Ghats, is recognized as one of the world's eight 'hottest hotspots' of biological diversity. Thirty-nine sites in the Western Ghats covering the States of Kerala, Karnataka, Tamil Nadu and Maharashtra were inscribed in the United Nations Education Scientific and Cultural Organization (UNESCO) World Heritage List in 2012, considering their outstanding universal value and high levels of endemism. Out of this, 19 of the serial sites inscribed on the UNESCO World Heritage List are located in Kerala. About 95 % of the flowering plants and about 90% of the vertebrate fauna in the Western Ghats are found in Kerala. The dominant forest type in this region is moist deciduous forest, which constitutes 21.13 % of the TGA, followed by semievergreen and evergreen forest, constituting 6.38% and 6.33% of the TGA, respectively. Western ghats harbour more than 7388 species of flowering plants, of which 5584 species are indigenous (India's Fifth National Report to Convention on Biological Diversity ,2014). Out of this 2242 species are Indian endemic and 1261 are Western ghat endemics. There are 5 national parks, 17 wildlife sanctuaries and one community reserve with a total area of 3213.24 sq km which cover 27.89 % of the total forest area and 8.26 % of the geographical area of state (www.forest.kerala.gov.in). Its 9,400 km² of forests include tropical wet evergreen and semi-evergreen forests, tropical moist and dry deciduous forests, and montane subtropical and temperate (*shola*) forests.

Kerala with 1.88 % of India's landmass harbours 28.41 % of flowering plant species and 26.59% of Pteridophytes recorded in India. The Kerala state harbours 11,840 taxa of plants, of which 5094 taxa of flowering plants under 1537 genera and 221 families are recorded (Sasidharan, 2012). The State also harbours 866 species of Algae, 4800 species of fungi, 520 species of lichens, 350 species of bryophytes, 332 species of pteridophytes and 4 species of gymnosperms. (ZSI 2020)

Trees outside forests cover very diverse land uses including agricultural plantation crops, home gardens, farm forestry, sacred groves and urban green spaces. The home gardens have become an important source of wood and other products. Further a large quantity of wood is produced from rubber plantations. The extent of trees outside forests is estimated at about 11,073 km². Home gardens are unique in many respects and have been an integral part of the land use and culture of Kerala. Trees constitute the dominant component of home gardens fulfilling a wide array of functions. Home gardens along-with rubber plantations have become the most important source of wood supply in the State, which is estimated to account for 82% of wood supply (46.6 % of wood supply is accounted by rubber estates and 35.3 % by home gardens). Forests account for only 1.6 % of the state's wood supply. Several factors have negatively impacted the supply of wood from sources outside the forests. Home gardens are undergoing major changes on account of fragmentation and the rapid growth of the real estate sector, resulting in removal of trees, thus undermining long term wood supplies. However with appropriate interventions there is enormous scope for increasing wood supply from home gardens.

The State is also having the highest population density implying tremendous pressure on its bioresources which provides all the basic needs for sustenance. Gradual change in lifestyle manifested by increasing consumerist tendencies coupled with overplay of market forces and near absence of a definite policy have resulted in altered production and utilization pattern of bioresources. It has led to overexploitation of certain bioresources and neglect of others causing disappearance of these resources where it was once abundant. Many varieties are under threat as well. Hence an

attempt was made by the Kerala State Biodiversity Board for an assessment of the State's bioresources to address the above concern. The Board has embarked upon a study of tradable bioresources with the objective of identifying various floral bioresources being traded in the State, assessing its volume and economic potential as well as inventorizing the bioresource-based industries operating in the State.

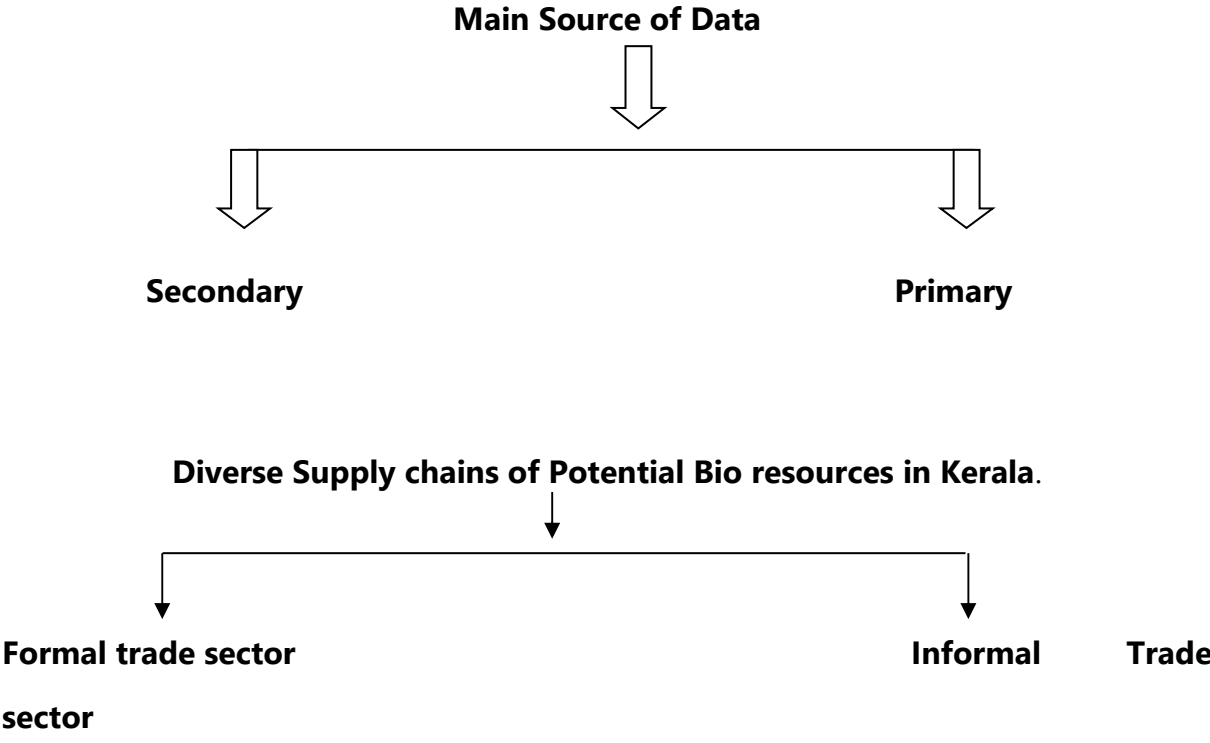
METHODOLOGY

Considering the constraints of taking up direct market survey as the only means of gathering information, a mixed method of collecting information from the market as well as collecting production data from the official sources of the state government was adopted to identify the tradable bio-resources of each district. Since the types of bio-resources are diverse, the entire tradable bioresources has been broadly categorized under Forest and allied resources, Agriculture, Horticulture, Plantation and Agroforestry. Some of the products like honey, lac etc. are collected from forest as well as from outside the forest and those have been covered under Forestry. In fact, medicinal plants also come under this category but being very important in terms of total volume and value added products in the state, and medicinal plants as an important input in industry, the same has been discussed separately. Important bio- resources used in industries have also been documented and inventory of industries that use these bio-resources has been prepared as per the stated objective of the project and those are included in separate chapters.

The methodology of study involved focus group discussions (FGD), in depth interviews & discussions with key stakeholders & informants. Information were collected through visits and observation in the market/ study area/locations selected within the forest and outside forest areas. Explored and utilized the man power especially from the education departments, PG/UG students to collect adequate data based on questionnaire and formats.



Source of Data



Following group of stakeholders' discussions were conducted for collection of primary / secondary data.

Discussions with line departments

- The study team met state level and district level officers of the various line departments/ research organizations etc. associated with promotion and management of bioresources like forest, agriculture, horticulture, Ayush, Industry & Commerce, Ayurvedic drug controller, State Medicinal Plants Board, NABARD , KVIB, Various boards like Rubber, Tea, Coffee, Cocoa, Areca nut, Cashew, Spices, Research organizations like KFRI, JNTBGRI, Malabar Botanic Garden, Department of Botany, University of Calicut, ICAR-Central Plantation Crops Research Institute, ICAR-Central Tuber Crops Research Institute (ICAR–CTCRI) Kerala Agricultural University, Kudumbashree, State Poverty Eradication Mission, ICAR-National Bureau of Plant Genetic Resource, Thrissur, College of Forestry, Vegetable and Fruit Promotion Council Keralam (VFPCK) etc.
- Some of the secondary source of information are obtained from: Agricultural and Processed Food Products Export Development Authority (APEDA), Department of Economics and Statistics, Kerala, Directorate General of Commercial Intelligence and Statistics, MSME, KINFRA, Cochin Chamber of Commerce etc



Interaction with Individual Traders

- In order to collect data, interviews were conducted with the following individual groups, agencies, VSSs, EDC, Plant collectors, Middle men, Shop keepers of raw material shops (Angadikkada), Plant nurseries etc
- Interviews were held with Angadikada (shop keepers selling raw materials) and traders in prominent markets of the respective districts

Visits to Markets/organizations

- Observational studies were conducted in major markets in the districts as well as many wholesale and special markets. Some are regulated markets under government management and others are private markets. Stratified sampling method was used for market identification. The first level of stratification was based on categories of bio-resources like agriculture, other resources etc. Then factors like diversity of products in each category, source areas and trading hubs were considered to identify markets to be visited. Information received from Agri-marketing department was also used for this purpose. The research team interacted with wholesalers as well as retailers in these markets.
- In many cases the meetings mentioned above were followed up with individual interactions (interviews) with respective trade bodies like Farmer producer's organizations, poultry federation, vegetable growers' association, as well as individual traders to understand the nature of trade and estimate the volume. Interviews with individual stockist and traders in prominent markets of the districts have also been conducted across categories. However, trade bodies and traders were mostly reluctant to share data on volume and value of trade in fear of being taxed by the government or getting caught unaware. These included Producer Societies/Grower's association, Farmers club, Individual producer/entrepreneur, Cooperative Societies, Industrial Associations, Society of artisans, Individual market based association,
- NGOs like Mithraniknethan, Santhigiri etc.

- Interaction were held with respective trade bodies like Girijan Co-operative Societies (Tribal Communities), SC/ ST Federations, etc. with a view to understand the nature of the trade (raw materials and finished products) and estimate the volume and price.

Interaction with Industries

- Ayurveda manufacturing units, Industry bodies and industry representatives along with District Industrial Centre, and District Khadi & Village Industries Officer of the districts.

Companies manufacturing products; oil mills; vermicompost manufacturers; floriculture and orchid growers and many food processing companies manufacturing diverse products from snacks to rice mills were met for estimating the value of industrial input taken from bio-resources. Executives from small, medium and large companies in these sectors were met for getting an all-round understanding and estimate. However, due to lack of awareness about Bio-diversity Act or its benefit, they were generally not co-operative to share data.



- Many craftsmen were also met to understand usage of bio-resources like jute, bamboo, cane, timber in producing different types of handcrafted and machine crafted items and their trade values.
- Interaction with the manufactures of value-added products such as oleoresin, perfumes, pine apple, tissue culture plantlets etc.

Industries/ Organizations contacted for primary survey- Case studies

- Aarshasree Orchids, Aarsha, Chennilode, Medical College.P.O. Trivandrum, Kerala
- Pearl Orchids Nursery, Moonupeedika, Thrissur
- L.J. International Ltd Biotech division, Kochi
- Mr. Kunnappally Siju, Panamaram
- Homegrown Biotech nursery, Vizhikkathod, Kanjirappally
- Eldhose P Raju, Ernakulam- Piravom Mamalassery

- Ganesh Kumar Anandhakrishnan Tripunithura, Kochi
- Ms Sayana, Kattakada, Trivandrum
- Musthafa Chakkaliparambil, Malappuram
- Mitraniketan, Thiruvananthapuram
- Muthalamada Mango Farm, Chittur, Palakkad
- Navara Eco Farm, Chittur, Palakkad
- Vazhakulam Pineapple Farm, Muvattupuzha
- Santhigiri, Pothencode, Trivandrum
- TMV Aromatics Pvt Ltd, Kochi
- Center for Research and development, Aralam, Kannur
- Kerala State Bamboo Corporation Ltd
- Govt. Orange & Vegetable Farm, Nellyampathy, Palakkad
- Kerala State Horticultural Products Development Corporation (HORTICORP)
Poojapura, Thiruvananthapuram. 695012
- Kerala state Farming Corporation
- Oil palm India LTD
- Plantation Corporation of Kerala LTD
- Rehabilitation Plantations LTD
- Harrisons Malayalam Limited (HML)



Data collection instruments and reporting

- Data collection formats designed and finalized to collect data on potential tradable bio resources/ NWFPs Angadikada, collectors from outside forest areas.
- Data collection and reviews: The received data were reviewed and scrutinized by the team with the help of subject experts to finalize the data on tradable potential bio-resources.
- Data consolidation & analysis: For production volume, the average of last five years as available and the market rate was taken to estimate the tradable values.
- Designed a goggle sheet for data collection for the necessary entries. Programme coordinators are entrusted with task of recording the information through voice message/note books/questionnaire & formats which was submitted along with monthly reports in the form of google sheets along with all photos, video clippings/ audio records etc.



Activities conducted

The major activities under this component include:

1. Trainings conducted to the project staff
2. Held consultation with line departments for collection of secondary data
3. Prepared format and Questionnaire for data collection.
4. Organized workshops with stake holders and key players.
5. Collected Secondary and Primary data
6. Conducted Focus Group Discussions (FGD), interaction, interviews with key stakeholders using questionnaire & formats
7. Data consolidation and analysis
8. Development of data base on tradable potential bio resources
9. Report preparation



Regional consultative workshop at Trivandrum with Ayurveda industry representatives



Round table discussion at Oushadhi



Regional consultative workshop, Thrissur



Regional workshop Kozhikode



Discussion with Aryavaidhya Pharmacy, Kottaikkal



Discussion with Sri. Prasanth, Secretary, Mattathur Labour society Moonnumuri, Thrissur (Dt)



Herbal Garden maintained by Kottaikkal Aryavaidhaysala,



Interaction with farmer- Mr.Mathew, Rajagiri Estate Muthalamada



Interaction with Sri. Brito, Trader of raw materials (Dry, Fresh & Medicinal spices) at Kozhinjampara



Cosmeceuticals shop -TMV Perfumes at Ernakulam



Interaction with T.M.V.Shenoi, M.D.,TMV Aromatics, Mfrs: perfumes aromatic chemicals essential oils, spice, oleo resins etc.



Interaction with Narayanan unii, farmer exclusively cultivating Njavara rice (rice having medicinal plant property) at Chittur, Palakkad District



Interaction with Smt.Nisha, CEO,KINFRA Head quarters,Palakkad



Interaction with Muraleedhar, CEO, Establishment, KINFRA-Palakkad



Govt. Ayurveda College, Thripunithura-Pharmacy section



Interaction with Dr. Sudhakar, Director
National research Institute
Panchakarma,CCRAS,AYUSH Ministry,
Govt. of India.



Ambujam Ayurveda Research Centre &
Clinic, Tripunitura



Interaction with, Dr. M.Latha, officer in charge and John Joseph, Senior Scientist NBPGRI



AGRICULTURE, FOREST AND OTHER LAND USES IN KERALA

3.1 LAND USE PATTERN

The total geographical area of the State is 38, 86,287 ha. Changes in land use and cropping patterns in Kerala pose a threat to the state's food security as well as its ecological sustainability. According to land use data from 2020-21, total cultivated area is 25.86 lakh ha (66.10 percent) of a total geographical area of 38.86 lakh ha. Non-agricultural land accounts for 11.86 percent of total land area, while forest land accounts for 27.83 percent. 2.42 percent of the land was cultivable waste, while 1.40 percent was currently fallow. The area under fallow lands, both current fallow and fallow other than current fallow, has decreased by 5.5 percent and 8.9 percent, respectively, compared to the land use pattern of 2019-20. The area under cultivable waste has also decreased by 5.9%. Cropping intensity went down from 127.66 percent to 126.23 percent. In comparison to 2019-20, the net area sown grew by 0.45% but the total cropped area decreased by 0.68 percent. One of the reasons for the decline in total cropped area could be the decline in the area sown more than once which is 4.7 per cent less than 2019-20. However, there is an increase of 1.1 per cent in the land put to non-agricultural uses and 12.9 per cent increase in land under miscellaneous tree crops. Geographical area in Kerala classified as per the various land usages is given in Table 3.1.



Table 3.1 Land use pattern

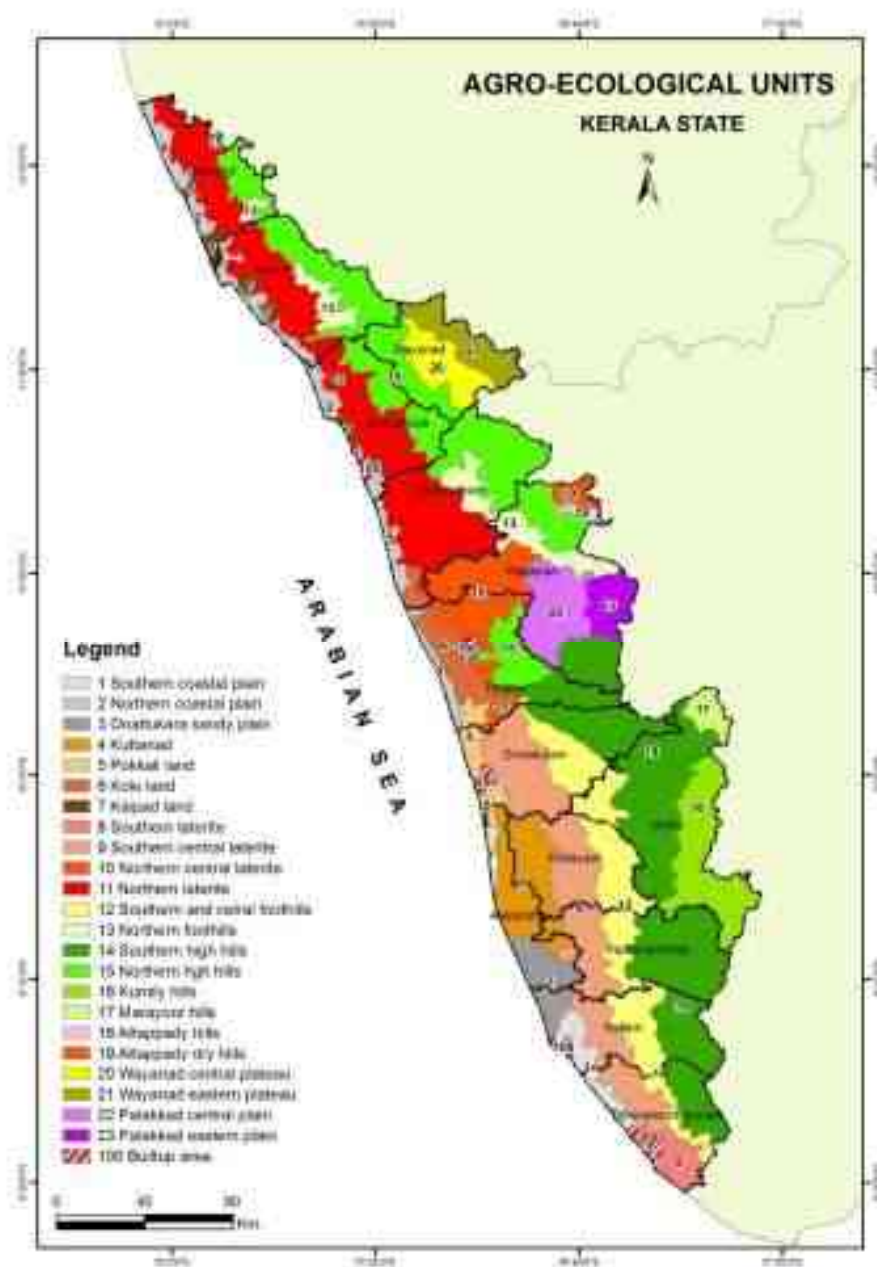
Sl.No	Category	2019-20	2020-21	Percentage to total Geographical Area
1	Forest	1081509	1081509	27.83
2	Land put to Non Agricultural Use	455897	460917.75	11.86
3	Barren and Uncultivable Land	10619	9529.43	0.25
4	Permanent Pastures and other Grazing Land	0	0	0
5	Land Under Miscellaneous Tree Crops	2143	2420.34	0.06
6	Cultivable Waste	99810	93973.75	2.42
7	Fallow Other Than Current Fallow	46931	42751.70	1.10
8	Current Fallow	57387	54255.40	1.40
9	Net Area Sown	2026064	2035128.32	52.37
10	Area sown than more than once	560388	533831.41	13.74
11	Total cropped area	2586452	2568959	66.10
12	Cropping intensity	127.66	126.23	
	Total	3886287		



Fig 3.1 Land use pattern of Kerala

3.2. AGROECOLOGICAL ZONES OF KERALA

The five agro-ecological zones of Kerala are (1) coastal plain, (2) midland plain (3) foothill (4) high hill and (5) Palakkad main. These zones are demarcated on the basis of soil structure, climate and other geographic features to ensure maximum productivity. Twenty-three agro-ecological units have been delineated in Kerala based on climate, land form and soils, with the panchayats as the primary unit. (www.keralasoilfertility.net)



3.3 FOREST

The forest area under the administrative charge of Kerala Forest Department is 11521.993 km² as on 2020 and forms 29.65% of the total geographical area of the State as against the National average of 23.24%. The per capita forest land of the State as per 2011 census is 0.035 Ha. The total plantation area is 1563.16 km² which accounts 13.57% of the total forest area.

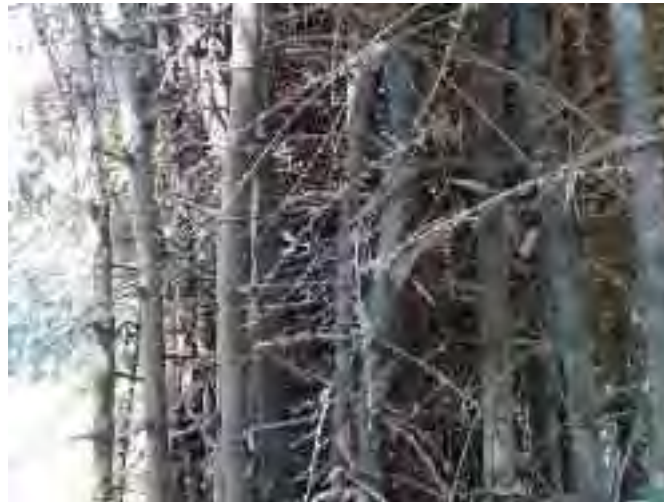


Table 3.2 Forest area according to utilization as on 31.03.2020

Sl.No	Mode of Utilization	Area (km2)	% Total
1	Dense Forests/Degraded Forest	9020.843	78.29
2	Plantation	1563.164	13.57
3	Area under lease	553.893	4.81
4	Forest land diverted under FC Act,1980	384.093	3.33
	Total	11521.993	

Table 3.3 Distribution of forest areas

Sl no	Type	Area (Km²)
1	Reserved forests	6450.839
2	Proposed reserve	279.495
3	Vested forest	1589.478
4	Ecologically fragile land	135.997
5	Protected area	3066.184
	Total	11521.993

Table 3.4 Kerala forest statistics at a glance

Total Forest Area	11520.058 km ²
Total Plantation Area	1562.856 km ²
Total Ecologically Fragile Land (EFL) Area	137.65 km ²
Extent of Diversion of Forest Land	383.49 km ²
Forest Cover (Forest Survey of India 2019)	21144 km ²
Tree Cover (Forest Survey of India 2019)	2936 km ²
Mangroves (Forest Survey of India 2017)	9 km ²
Carbon Stock in Forest (Forest Survey of India 2017)	212.96 million tonnes
Extent of Water Bodies within Forest (Forest Survey of India 2017)	373km ²
Encroachment	78.01km ²
Revenue from Forest (in crores)	287.20
Expenditure incurred (in crores)	569.89
Number of Wild life Sanctuaries	17
Number of National Parks	6
Number of Community Reserve	1
Number of Biosphere Reserve	2
Area under Sanctuaries & National Parks	3213.237km ²
Number of Forest Stations	124
Number of Check Posts	75
Number of Timber sales Depots	28
Number of Vanasree eco Shops	36
Number of Tribal Co-operative Societies	27
Number of Eco-tourism National Park and Wild life Sanctuaries Destination	60
Tourist Arrival in Eco tourism Destinations	5182389
Income Generated from Eco tourism Destinations	3662.50 lakhs
Quantity of Major Forest produce	
Timber	28286.077m ³
Firewood & Billets	5269.608 MT

Sandal Wood	98834.30 kg
Teak Poles	9090.895 MT
Length of Road in charge of forest Department	4845.66 km
Human Wild life incidents during the year under the Report	7890 Nos.
Compensation paid to victims of wild life attack	1115.03 lakhs
Estimation of some important wild life species	
Elephant (Dung count method -2017)	5706
Tiger (Tiger Census-2018)	190
Nilgiri Tahr (Est.population -2016)	1420
Number of fire incidents relating to forest fire	434
Total destructed area by fire	17.37 km ²
Financial loss of fire incidents	1.53 lakhs
No. of seedling distributed by the department	78.15 lakhs
Plantation under Kerala Forest Development Corporation	90.54 km ²
No. of Vana Samrakshana Samithies (VSS)	400
No. Of Eco Development Committees(EDC)	190
Forest Area under VSS/EDC	1860.20 km ²
Number of families under VSS/EDC	
SC	10524
ST	19093
Others	41886

(Kerala Forest Statistics 2019, Kerala Forest Department)

Details of Circle and Division wise distribution of forest area (km²) according to legal status are given as on 31.03.2019 (Annexure 3.1). Details of Forest stations, Range offices and Check posts are given in Annexure 3.2 and 3.3 .

3.4 FOREST PLANTATIONS

The total plantation area under the department as on 2019 is 156316.034 ha, Considering species wise distribution of plantation, Teak covers an extent of

77237.981 ha which is 49.61% of total plantation areas. Species wise distribution of plantation is given in Annexure 3.4. The annual revenue of the department comes mainly from the thinning and final felling of these plantations.

Distribution of Plantation Area

Sl. No.	Category	Area (Ha)
1	Territorial Divisions	132694.258
2	Protected area	23348.396
3	NSC, Kalady	242.967
	STATE TOTAL	156285.621

Plantations under Kerala Forest Development Corporation (KFDC)

A State owned public sector undertaking KFDC was setup on 24.01.1975 as an off-shoot of the forest department pursuant to their commendations of the National Agricultural Commission's Report 1972 to mobilize institutional finance to establish large scale forest plantations over 80000 ha for the development and establishment of wood based industries in the State.

Table 3.5 Species wise plantation area of KFDC

Sl. No.	Species	Area(Ha)
1.	Teak & Softwood	1282.430
2.	<i>Acacia auriculiformis/Manjium/Acacia crassicaarpa</i>	2010.951
3.	Eucalyptus	2547.505
4.	Cardamom	623.310
5.	Mahagony	9.400
6.	Bamboo	815.356
7.	Tea	100.670
8.	Coffee	597.427
9.	Cashew	339.483
10.	Rubber	57.936
11.	Pepper	3.800
12.	Red sandalwood	80.977
13.	Sandalwood	17.97
14.	Medicinal species	0.400

15.	Gmelina	40.454
16.	Residual Misc.	10.721
17.	Vagamon Orchidarium	15.220
18.	Eco-tourism zone	668.070
19.	Pine, Alnus, Casurina, Failed Eucalyptus,etc	92.783
20.	Unproductive/Swamp/ Rock/Buildings,etc	739.601
	TOTAL	10054.464

TRADABLE FLORAL BIORESOURCES

4.1 FOREST AND ALLIED RESOURCES

Forests produce have traditionally been divided as major and minor, the first category consists of timber, small wood and fuel wood while the second includes bamboos, oil seeds, grasses, fruits, leaves, resins, barks, exudates, honey, spices, medicinal plants, aromatic plants, animal products etc. These products have a number of direct and indirect uses and also would be able to generate significant income. A checklist of threatened plants, endemic plants, Tree species of Kerala, Timber yielding trees and uses and major species of trees found outside forest areas is given in Annexure 4.1 to 4.5. The Outturn of Timber as on 31.3.2020 is given in Annexure 4.6.

Table 4.1.1 Production of Major Forest Produce (2019-20 & 2020-21)

Sl.No	Item	Unit	2019-20	2020-21
1	Timber	Cum.	30274.605	20664.47 7
2	Firewood	MT.	4258.355	3350.75
3	Honey	Kg.	25661.100	26115.70 0
4	Reeds	MT.	653.960	918.940
5	Bamboo	MT.	1986.570	60.668
7	Eucalyptus	MT.	23.264	7.773
8	Sandalwood	Kg.	69692.000	77872.69 6
9	<i>Accacia auriculoformis</i>	MT	98.413	82.585
10	<i>Accacia manjium</i>	MT	2.604	13.18



The State had adopted Participatory Forest Management (PFM) as a strategy for the protection of forests and to manage the non-timber forest resources in a sustainable manner with the active participation of forest dependent communities. The participatory mechanism is activated through *Vana Samrakshana Samithies* (VSSs) and Eco Development Committees (EDCs) in Territorial Forest Divisions and Wild life Divisions respectively. The VSSs and EDCs are the grass root level organizations with forest dependent families as members, who participate in the planning and implementation of various forestry and community development programmes. VSSs and EDCs are federated at Forest Division level into Forest Development Agencies (FDAs) which are registered societies. Forest-dwelling Scheduled Tribes form an important characteristic of the forest landscape in Kerala. A total of 725 tribal settlements are distributed in 90 Ranges of Kerala Forest Department (Fig 4.1)



The marketing of Non-Timber Forest Produces, artifacts and handicrafts made by forest dependent communities is important for ensuring their profitability and sale volumes. Vanasree is a marketing initiative taken up by Kerala Forest Department for this purpose. There are 36 Vanasree Eco-Shops in the State under 22 FDAs which includes 2 mobile units. (Annexure 4.7). Details of VSS and EDC are given in Annexure 4.8 and Annexure 4.9

The Government of Kerala developed an online platform to ensure market access for non-wood forest produce and agricultural produce from tribal hamlets. The platform developed under Kerala Forest and Wildlife Department aimed at ensuring market access to non-wood forest produce (wild turmeric- Kasthoorimanjal, honey, handicrafts, bamboo products) and agricultural produce (tapioca, long beans, yam, and plantain) from tribal hamlet. The project was implemented in the forest ranges of Agasthyavanam Biological Park (ABP), Neyyar, and Peppara. The Forest Department staff procured the forest produce directly from tribal hamlets at market rates, to ensure livelihood. Through the WhatsApp group Vanika, these are delivered at the doorstep of prospective consumers on first come first serve basis to the city dwellers. The initiative ensured that the people living inside forest areas who would have otherwise lost their perishable products find a market.

In Kerala, 28 species of bamboo are found. Bamboos from Kerala forests are being supplied mainly for the pulp and rayon units under concessional rates. It is estimated that there are about one lakh people in the State dependent on bamboo for their livelihood. A unique feature of Kerala is that 67.3 per cent of the extracted bamboo comes from home gardens rather than from forests. The weaving sector artisans around Angamaly region is supported by the State Bamboo Corporation. Recent data from the Pachayats indicate that from the early seventies onwards there has been a great drain in the number of artisans from the sector to semi skilled and unskilled jobs in the tertiary sectors like construction etc.

(www.keralabamboomission.org, Economic Review 2020 of State Planning Board, Kerala)

4.1. 1. NWFP & OTHER TRADABLE FOREST BIORESOURCES

NWFP is defined as a product of biological origin other than wood derived from forest, other wooded land or trees outside the forests. Non-Timber Forest Produces earlier known as Minor Forest Produces (MFP), include all forest products, other than timber and firewood which are considered as the major produces (Annexure 4.10). Non Timber Forest Produce (NWFP) is one of the important components of biodiversity and it plays a very important role in sustainable rural/tribal livelihood in India. Collection and marketing of NWFP consists of a wide range of activities, which provide income generation and employment to the local communities. FRA 2005 classifies NWFPs into 16 categories. The plant products are classified into 8 categories (food; fodder; raw material for medicine and aromatic products; colorants and dyes; utensils, handicrafts and construction; ornamental plants; exudates and other plants products). The animal products are classified into 8 categories (living animals; hides, skins and trophies; wild honey and bee-wax; bush meat; raw material for medicines; raw material for colorants; other edible animal products and other non-edible animal products). (<http://www.fao.org/forestry/site/6388/en>)

Plant products of forest origin, other than timber and firewood, include mainly medicine and narcotic, gum and resin, tan and dye, oil and fat, spice and condiment, food and fodder ,fibre and floss and bamboos and canes, apart from certain specific products or uses of plants used for making platters and cups, plants used in religious contexts, and soon. Several plants belonging to NWFP group are also extracted or used on a large scale like bamboos, canes, medicinal plants, gums, tans, spices, etc. because of their excessive demand for industrial use.

Table 4.1.2 Classification of Non-Wood Forest Products

Plant products		Animals and animal products	
Categories	Description	Categories	Description
Food	Vegetal foodstuff and beverages provided by fruits, nuts,	Living animals	Mainly vertebrates such as mammals, birds, reptiles
Fodder	Animal and bee fodder provided by leaves, fruits etc.	Honey, beeswax	Products provided by bees.
Medicines	Medicinal plants (e.g., leaves, bark, roots) used in traditional medicine and/or by pharmaceutical companies	Bushmeat	Meat provided by vertebrates, mainly mammals
Perfumes and cosmetics	Aromatic plants providing essential (volatile) oils and other products used for cosmetic purposes	Another edible animal products	Mainly edible invertebrates such as insects (e.g., caterpillars), crabs and other “secondary” products of animals (e.g. eggs)
Dying and tanning	Plant material (mainly bark and leaves) providing tannins and other plant parts (especially leaves and fruits) used as colorants	Hides, skins	Hide and skin of animals used for various purposes
Utensils, handicrafts	Heterogeneous group of products including thatch, bamboo, rattan, wrapping leaves, fibres (e.g., Arouma, Bwa Flo, Silk cotton floss, Screw pine)	Medicine	Entire animals or parts of animals such as various organs used for medicinal purposes (e.g. caterpillars, crab legs, snake)
Construction materials	thatch, bamboo, fibres,		
Ornamentals	Entire plants (e.g., orchids, ferns, philodendron) and parts of the plants (e.g., pots made from roots) used for ornamental purposes	Colorants	Entire animals or parts of animals such as various organs used as colorants

Exudates	Substances such as gums (water soluble), resins (water insoluble) and latex (milky or clear juice),	Other nonedible animal	e.g., bones used as tools
Categories	Description	Categories	Description
Food	Vegetal foodstuff and beverages provided by fruits,nuts, seeds,roots	Living animals	Mainly vertebrates such as mammals, birds, reptiles
Fodder	Animal and bee fodder	Honey, beeswax	Products provided by bees.
Medicines	Medicinal plants(e.g. leaves,bark, roots) used in traditional medicine and/or by	Bush meat	Meat provided by vertebrates, mainly mammals
Perfumes and	Aromatic plants providing essential (volatile) oils and other products used for	Otheredible animal products	Products of animals (e.g.eggs)
Dying and tanning	Plant material (mainly bark and leaves) providing tannins and other plant parts (especially leaves and fruits) used as	Hides, skins	Hide and skin of animals used for various purposes
Utensils, handicrafts	Heterogeneous group of products including thatch,bamboo,rattan, wrapping leaves, fibres (e.g. Arouma,	Medicine	Entire animals or parts of animals such as various organs used for medicinal purposes
Construction	thatch,bamboo,fibres,		

Ornamentals	Entire plants (e.g.orchids, ferns,philodendron) and parts of the plants (e.g.pots made from roots) used for	Colorants	Entire animals or parts of animals such as various organs used as colorants
Exudates	Substances such as gums (water soluble),resins (waterinsoluble) and latex	Other nonedible animal	e.g.bones used as tools

Source: Adapted from FAO, 1995; Shiva & Verma, 2002

The Central government had introduced a minimum support price (MSP) for a select list of MFP through "Mechanism for Marketing of Minor Forest Produce through Minimum Support price and development of Value Chain of MFP" Scheme in 2011 to provide a social safety net to these underprivileged forest dwellers, and to aid in their empowerment. TRIFED, as the apex national organisation involved in the improvement of the livelihood and empowerment of these tribal people, is the nodal agency for the implementation of the scheme. The Van Dhan tribal start-ups, also a component of the same scheme, and has emerged as a source of employment generation for tribal gatherers and forest dwellers and the home-bound tribal artisans. State Forest Development Agency (SFDA), Kerala, functioning under the E&TW wing, had entered into an agreement with Tribal Co-operative Marketing Development Federation of India Ltd., New Delhi (TRIFED), to implement the Minimum Support Price (MSP) for Minor Forest Product (MFP). As per the agreement, TRIFED will give minimum support price (MSP) to honey collected by tribal communities in the State and also will help to sell their products and Vanasree products through the sale outlets of both Vanasree and TRIFED.

About 849 species with medicinal properties are recorded from Kerala (Annexure 4.11) of which 186 are used by tribal communities (Annexure 4.12). List of threatened medicinal plants associated with traditional knowledge in the state of Kerala is given in Annexure 4.13 and checklist of Bamboo and reeds are given in Annexure 4.14.

a. **Non Wood Forest Produce (NWFP) collection (division wise data)**

Methodology of the study involved interview and discussion with key stake holders and informants. In order to collect data, interviews were conducted with Divisional Forest Officers, Range Officers, SC/ST Federation, Individual groups, agencies, VSS, EDC, Oorukootam. The data collected includes available data on NWFP collected and marketed through various agencies as Forest Development Agencies (Vana Samrakshana Samithies VSS) and Eco Development Committees (EDC), Girijan Cooperative Society, Kerala State Federation of SC/ST, Vanasree, Eco shops, others as Tribal Cooperative Marketing Development Federation of India (TRIFED) under the Ministry of Tribal Affairs.

Secondary data was collected for last five years (2016-2020) from Kerala Forest department, primary data collection (2020-2021) was done by indepth interviews and discussion with key stakeholders using questionnaire. Data of trends in NWFP collection was compiled from selected VSS/EDC/ FDA from southern circle, high range circle, central circle and northern circle of Forest which covers all forest divisions of Kerala. In addition to this documentation of current selling practice of NWFP and supply chain were also carried out.

Detailed division wise data gathered on NWFP, honey, Bee wax another value added products for the last five years has been worked out and given in the below table.

Quantity and value of collection during the year 2015-2021

Division wise data collected from 22 divisions are consolidated and the species wise information projected including parts used, dry or fresh, quantity (kg), average prices, minimum price, maximum price and total price. The total quantity of 92 species altogether is estimated as 367.30 tonne and total price is 27.1 crores during the period 2015-2021. Apart from these, other 8 items collected which covers Bee wax, Honey (Big, Honey (small), Honey (Puttuthen), *Canarium strictum*, *Saccharum officinarum*, *Shorea robusta* were also analysed in terms of total quantity as 71.15 tonne, Total price 3.65 crores. All together total quantity is estimated as 438.45 tonne and total price 30.75 crores for the year 2015-2021.

NWFP – Top 10 high volume category (kg)

1. *Karimkurunji*
2. *Kurumthotti*
3. *Chunda*
4. *Sopumka*

5. Nellikka
6. Adalodakam
7. Kurumulak
8. Pachotti
9. Veleencha
10. Kadukka

other important species are:-

Acacia torta (2,455.80), *Aegle marmelos* (1,000.00), *Asparagus racemosus* (1,969.50), *Averrhoa bilimbi* (1,460.30), *Careya arborea* (1,234.00), *Cheenikai* (1,196.75), *Curcuma aromatic* (2,765.19), *Cyclea peltata* (2,839.15), *Desmodium gangeticum* (dry 1,810.50, fresh 178.33), *Entada rheedii* (1,299.95), *Garcinia gummy-gutta* (2,701.49), *Kattukurumulak valli* (2,980.00), *Nothapodytes nimmoniana* (3,345.50), *Parmelia perlata* (3,488.50), *Peenari* (1,903.00), *Pseudarthria viscida* (Dry 1,230.65, fresh 205.00), *Santalum album* (Dry 2,658.75, Fresh 791.00), *Trichosanthes cucumerina* (2,772.00), *Zanthoxylum armatum* (1,375.50)

Table 4.1.3 Quantity and value of NWFP collection during the year 2015-2021

Sl. No.	Scientificname	Partused	dry/fresh	Total Quantity(kg)	Average price	Minimum price	Maximum price	Total price(Rs.)
1	<i>Acacia caesia</i>	Stem/Bark/wood	Dry	5,381.83	88.43	32.50	220.00	475907
2	<i>Acacia sinuata</i>	Seed/Fruit	Fresh	17,617.00	40.00	40.00	40.00	704680
3	<i>Acacia sinuata</i>	Seed/Fruit	Dry	20,948.45	65.80	44.89	80.00	1378319
4	<i>Acacia torta</i>	Stem/Bark/wood	Dry	2,455.80	57.00	49.00	65.00	139981
5	<i>Aegle marmelos</i>	Root	Dry	1,000.00	25.00	25.00	25.00	25000
6	<i>Alpinia calcarata</i>	Rhizome	Dry	51.33	95.00	95.00	95.00	4877
7	<i>Anamirta cocculus</i>	Seed/Fruit	Dry	603.83	55.00	55.00	55.00	33211
8	<i>Asparagus racemosus</i>	Root	Dry	1,969.50	24.00	21.00	27.00	47268
9	<i>Averrhoa bilimbi</i>	Seed/Fruit	Fresh	1,460.30	50.00	50.00	50.00	73015
10	<i>Baliospermum montanum</i>	Root	Dry	630.75	60.00	60.00	60.00	37845
11	<i>Bamboosa vulgaris</i>	Seed/Fruit	Dry	12.00	120.00	120.00	120.00	1440

12	<i>Bambusa arundinacea</i>	Seed/Fruit	Dry	631.70	138.33	90.00	225.00	87385
13	<i>Caesalpinia sappan</i>	Stem/Bark /wood	Dry	23.75	1,350.0	200.00	2,500.00	32063
14	<i>Camellia sinensis</i>	Leaf	Dry	125.00	138.50	137.00	140.00	17313
15	<i>Canarium strictum</i>	Seed/Fruit	Dry	239.00	100.00	100.00	100.00	23900
16	<i>Careya arborea</i>	Stem/Bark /wood	Dry	1,234.00	34.50	34.50	34.50	42573
17	<i>Cheenkai</i>	Seed/Fruit	Dry	1,196.75	37.00	37.00	37.00	44280
18	<i>Chittaratha/Kolin ji</i>	Rhizome	Dry	104.00	82.50	82.50	82.50	8580
19	<i>Chrysopogon zizanioides</i>	Root	Dry	90.50	10.00	10.00	10.00	905
20	<i>Coscinium fenestratum</i>	Stem/Bark /wood	Dry	47.00	60.00	60.00	60.00	2820
21	<i>Curcuma angustifolia</i>	Root	Fresh	273.33	59.25	55.00	63.50	16195
22	<i>curcuma aromatica</i>	Flower	Dry	445.40	40.00	40.00	40.00	17816
23	<i>curcuma aromatica</i>	Rhizome	Dry	2,765.19	73.00	70.00	76.00	201859
24	<i>Curcuma caesia</i>	Rhizome	Dry	8.40	2,040.0	2,040.0	2,040.00	17136
25	<i>Curcuma longa</i>	Rhizome	Dry	38.23	230.00	160.00	300.00	8794
26	<i>Cyclea peltata</i>	Root	Fresh	25.53	265.00	265.00	265.00	6766
27	<i>Cyclea peltata</i>	Root	Dry	2,839.15	425.00	425.00	425.00	1206639
28	<i>Cymbopogon citratus</i>	Whole part	Dry	629.62	7,833.5	75.00	34,650.0	4932097
29	<i>Desmodium gangeticum</i>	Root	Dry	1,810.50	50.92	40.00	60.00	92184
30	<i>Desmodium gangeticum</i>	Root	Fresh	178.33	15.00	15.00	15.00	2675
31	<i>Elettaria cardamomum</i>	Seed/Fruit	Dry	196.83	1,186.8	150.00	2,450.00	233617
32	<i>Ensete superbum</i>	Seed/Fruit	Dry	171.00	37.50	37.50	37.50	6413
33	<i>Entada gigas</i>	Seed/Fruit	Dry	451.20	28.50	28.50	28.50	12859
34	<i>Entada rheedi</i>	Seed/Fruit	Dry	1,299.95	35.00	35.00	35.00	45498
35	<i>Eucalyptus globulus</i>	Leaf	Dry	476.89	615.83	100.00	935.00	293682
36	<i>Eucalyptus globulus</i>	Leaf	Fresh	27.88	4,757.5	1,515.0	8,000.00	132615
37	<i>Foeniculum</i>	Seed/Fruit	Dry	19.75	305.00	305.00	305.00	6024

	<i>vulgare</i>							
38	<i>Garcinia gummy-gutta</i>	Seed/Fruit	Dry	2,701.49	235.00	95.00	375.00	634850
39	<i>Hemidesmus indicus</i>	Root	Dry	278.85	725.00	725.00	725.00	202166
40	<i>Hydnocarpus kurzii</i>	Seed/Fruit	Dry	309.55	120.00	120.00	120.00	37146
41	<i>Hydnocarpus pentandrus</i>	Seed/Fruit	Dry	429.75	146.50	63.00	230.00	62958
42	<i>Illicium verum</i>	Flower	Dry	16.50	612.50	612.50	612.50	10106
43	<i>Justicia adhathoda</i>	Leaf	Fresh	23,480.80	11.00	11.00	11.00	258289
44	<i>Justicia adhathoda</i>	Root	Dry	553.67	25.00	25.00	25.00	13842
45	<i>Justicia adhatoda</i>	Leaf	Dry	489.00	24.50	24.50	24.50	11981
46	<i>Kakkumkai</i>	Seed/Fruit	Dry	22.00	25.00	25.00	25.00	550
47	<i>Karimkurinji</i>	Root	Dry	27,780.00	15.00	15.00	15.00	416700
48	<i>Kasthoori manjal</i>	Rhizome	Dry	242.50	67.00	67.00	67.00	16248
49	<i>Kattu kurumulak valli</i>	Stem/Bark /wood	Fresh	2,980.00	33.50	33.50	33.50	99830
50	<i>Kudampuli</i>	Seed/Fruit	Dry	65.00	225.00	225.00	225.00	14625
51	<i>Kurumthotty</i>	Root	Dry	1,168.60	41.00	41.00	41.00	47913
52	<i>Mangifera indica</i>	Seed/Fruit	Fresh	209.00	50.00	50.00	50.00	10450
53	<i>Marottikuru</i>	Seed/Fruit	Dry	23.00	82.50	82.50	82.50	1898
54	<i>Myristica dactyloides</i>	Flower	Dry	92.50	300.00	300.00	300.00	27750
55	<i>Myristica fragrans</i>	Seed/Fruit	Dry	39.95	275.00	275.00	275.00	10987
56	<i>Myristica malabarica</i>	Flower	Dry	887.52	350.00	350.00	350.00	310632
57	<i>Nilgirianthus ciliatus</i>	Root	Dry	7,075.80	19.50	14.00	25.00	137978
58	<i>Nothapodytes nimmoniana</i>	Root	Dry	3,345.50	37.50	37.50	37.50	125456
59	<i>Pachottitholi</i>	Stem/Bark /wood	Dry	1,180.20	45.00	45.00	45.00	53109
60	<i>Parmelia perlata</i>	Seed/Fruit		3,488.50	370.00	370.00	370.00	1290745
61	<i>Peenari</i>	Root	Dry	1,903.00	31.50	31.50	31.50	59945
62	<i>Phoenix loureiroi</i>	Seed/Fruit	Dry	218.00	2,775.0	2,775.0	2,775.00	604950
63	<i>Phyllanthus emblica</i>	Seed/Fruit	Dry	24,433.50	16.50	16.50	16.50	403153
64	<i>Phyllanthus emblica</i>	Seed/Fruit	Fresh	227.50	14.00	14.00	14.00	3185

65	<i>Piper nigrum</i>	Seed/Fruit	Dry	22,526.56	252.60	18.00	550.00	5690209
66	<i>Piper nigrum</i>	Stem/Bark /wood	Fresh	334.00	50.00	50.00	50.00	16700
67	<i>Pseudarthria viscida</i>	Root	Dry	1,230.65	57.50	57.50	57.50	70762
68	<i>Pseurarthria viscida</i>	Root	Fresh	205.00	15.00	15.00	15.00	3075
69	<i>Rotula aquatica</i>	Whole part	Dry	727.22	72.50	72.50	72.50	52723
70	<i>Santalum album</i>	Seed/Fruit	Dry	2,658.75	605.00	605.00	605.00	1608544
71	<i>Santalum album</i>	Stem/Bark /wood	Dry	791.00	161.25	22.50	300.00	127549
72	<i>Sapindus trifoliatus</i>	Seed/Fruit	Dry	291.00	14.00	10.00	18.00	4074
73	<i>Sida cordifolia</i>	Root	Dry	67,208.98	3,637.7	15.00	32,291.0 0	244487485
74	<i>Soapnut</i>	Seed/Fruit	Dry	32.50	22.50	22.50	22.50	731
75	<i>Solanum lasiocarpum</i>	Root	Dry	3,750.40	32.50	32.50	32.50	121888
76	<i>Solanum rudepannum</i>	Root	Dry	27,910.20	43.50	43.50	43.50	1214094
77	<i>Solanum torvum</i>	Root	Dry	17,365.55	27.25	11.50	45.50	473127
78	<i>Strobilanthes ciliata</i>	Root	Dry	36,168.33	15.00	7.00	22.50	542525
79	<i>Symplocos cochinchinensis</i>	Stem/Bark /wood	Dry	1,203.67	61.00	45.00	77.00	73424
80	<i>Symplocos racemosa</i>	Stem/Bark /wood	Dry	3,869.50	69.50	69.50	69.50	268930
81	<i>Syzygium aromaticum</i>	Stem/Bark /wood	Dry	15.00	1,500.0	1,500.0	1,500.00	22500
82	<i>Syzygium aromaticum</i>	Flower	Dry	89.87	1,025.0	940.00	1,125.00	92117
83	<i>Terminalia bellirica</i>	Seed/Fruit	Dry	634.00	11.00	11.00	11.00	6974
84	<i>Terminalia chebula</i>	Seed/Fruit	Dry	4,738.00	30.00	30.00	30.00	142140
85	<i>Tinospora cordifolia</i>	Stem/Bark /wood	Dry	21.00	8.00	8.00	8.00	168
86	<i>Tinospora cordifolia</i>	Stem/Bark /wood	Fresh	77.00	6.00	6.00	6.00	462
87	<i>Tribulus terrestris</i>	Seed/Fruit	Dry	7.45	1,325.0	300.00	2,350.00	9871
88	<i>Trichosanthes cucumerina</i>	Root	Dry	2,772.00	116.00	116.00	116.00	321552

89	<i>Trichosanthes dioica</i>	Whole part	Dry	71.86	125.00	125.00	125.00	8983
90	<i>Wrightia tinctoria</i>	Seed/Fruit	Dry	70.00	80.00	80.00	80.00	5600
91	<i>Wrightia tinctoria</i>	Leaf	Fresh	19.22	22,020.00	22,020.00	22,020.00	423224
92	<i>Zanthoxylum armatum</i>	Seed/Fruit	Dry	1,375.50	75.00	75.00	75.00	103163
			Total	367,285.5				271,174,267.00

Other Products (Forest) – 2015-2021

Name	Total Quantity(Kg)	Minimum price	Maximum price	Average price	Total price(Rs.)
Bee_wax	26.3	135	300	145.0	3813.5
Canarium_strictum	9,274.3	50	600	157.4	1459663.5
Honey (puttuthen)	3,174.3	400	800	616.7	1957590.8
Honey_Big	46,813.4	225	1,000	430.7	20161467.4
Honey_Small	11,057.4	300	1,800	1,146.6	12678193.7
Honey_Wax	717.4	300	350	315.0	225981
Saccharum officinarum	60.0	55	55	55.0	3300
Shorea robusta	25.8	70	200	127.9	3299.8
Total	71,148.9				36,493,309.7

Part used (100%)

Sl. No.	Scientificname	Parts used	Percent
1	<i>Illicium verum</i>	Flower	100
2	<i>Myristica dactyloides</i>	Flower	100
3	<i>Myristica malabarica</i>	Flower	100

Sl. No.	Scientificname	Parts used	percent
1	<i>Camellia sinensis</i>	Leaf	100
2	<i>Eucalyptus globulus</i>	Leaf	100

Sl. No.	Scientificname	Parts used	percent
1	<i>Alpinia calcarata</i>	Rhizome	100
2	<i>Chittaratha/Kolinji</i>	Rhizome	100
3	<i>Curcuma caesia</i>	Rhizome	100
4	<i>Curcuma longa</i>	Rhizome	100
5	<i>Kasthoori manjal</i>	Rhizome	100

Sl. No.	Scientific name	Parts used	percent
1	<i>Aanachunda</i>	Root	100
2	<i>Aegle marmelos</i>	Root	100
3	<i>Asparagus racemosus</i>	Root	100
4	<i>Baliospermum montanum</i>	Root	100
5	<i>Chrysopogon zizanioides</i>	Root	100
6	<i>Curcuma angustifolia</i>	Root	100
7	<i>Cyclea peltata</i>	Root	100
8	<i>Desmodium gangeticum</i>	Root	100
9	<i>Hemidesmus indicus</i>	Root	100
10	<i>Karimkurinji</i>	Root	100
11	<i>Kurumthotty</i>	Root	100
12	<i>Nilgirianthus ciliatus</i>	Root	100
13	<i>Nothapodytes nimmoniana</i>	Root	100
14	<i>Peenari</i>	Root	100
15	<i>Sida cordifolia</i>	Root	100
16	<i>Solanum rudepannum</i>	Root	100
17	<i>Solanum torvum</i>	Root	100
18	<i>Strobilanthes ciliata</i>	Root	100
19	<i>Trichosanthes cucumerina</i>	Root	100

Sl. No.	Scientific name	Parts used	percent
1	<i>Acacia sinuata</i>	Seed/Fruit	100

2	<i>Anamirta cocculus</i>	Seed/Fruit	100
3	<i>Averrhoa bilimbi</i>	Seed/Fruit	100
4	<i>Bamboosa vulgaris</i>	Seed/Fruit	100
5	<i>Bambusa arundinacea</i>	Seed/Fruit	100
6	<i>Canarium strictum</i>	Seed/Fruit	100
7	<i>Cheenikai</i>	Seed/Fruit	100
	<i>Elettaria</i>		
8	<i>cardamomum</i>	Seed/Fruit	100
9	<i>Ensete superbum</i>	Seed/Fruit	100
10	<i>Entada gigas</i>	Seed/Fruit	100
11	<i>Entada rheedii</i>	Seed/Fruit	100
12	<i>Foeniculum vulgare</i>	Seed/Fruit	100
13	<i>Garcinia gummy-gutta</i>	Seed/Fruit	100
14	<i>Hydnocarpus kurzii</i>	Seed/Fruit	100
	<i>Hydnocarpus</i>		
15	<i>pentandrus</i>	Seed/Fruit	100
16	Kakkumkai	Seed/Fruit	100
17	Kudampuli	Seed/Fruit	100
18	<i>Mangifera indica</i>	Seed/Fruit	100
19	<i>Marottikuru</i>	Seed/Fruit	100
20	<i>Myristica fragrans</i>	Seed/Fruit	100
21	<i>Parmelia perlata</i>	Seed/Fruit	100
22	<i>Phoenix loureiroi</i>	Seed/Fruit	100
23	<i>Phyllanthus emblica</i>	Seed/Fruit	100
24	<i>Soapnut</i>	Seed/Fruit	100
25	<i>Terminalia bellirica</i>	Seed/Fruit	100
26	<i>Terminalia chebula</i>	Seed/Fruit	100
27	<i>Tribulus terrestris</i>	Seed/Fruit	100

Sl. No.	Scientificname	partused	percent
1	<i>Acacia caesia</i>	Stem/Bark/wood	100
2	<i>Acacia torta</i>	Stem/Bark/wood	100
3	<i>Caesalpinia sappan</i>	Stem/Bark/wood	100
4	<i>Careya arborea</i>	Stem/Bark/wood	100
	<i>Coscinium</i>		
5	<i>fenestratum</i>	Stem/Bark/wood	100
6	<i>Kattu kurumulak valli</i>	Stem/Bark/wood	100
7	<i>Pachottitholi</i>	Stem/Bark/wood	100
	<i>Symplocos</i>		
8	<i>cochinchinensis</i>	Stem/Bark/wood	100
9	<i>Symplocos racemosa</i>	Stem/Bark/wood	100
10	<i>Tinospora cordifolia</i>	Stem/Bark/wood	100

Sl. No.	Scientificname	partsused	percent
1	<i>Rotula aquatica</i>	Whole part	100
2	<i>Trichosanthes dioica</i>	Whole part	100

- b. **Kerala State Federation of SC/ST Development Co-operatives Ltd** , known as **SC/ST Federation** in short, is the Apex Cooperative Federation of the Scheduled Castes and Scheduled Tribes primary co-operative societies in the State of Kerala, constituted and registered under Kerala State Cooperative Societies Act of 1969 on 22nd of July 1981. In Kerala 30 sangams functioning in 76 ranges are actively involved in the collection of NWFPs. (Annexure 4.15). This is the responsible agency for value addition and sale of NTFPs and value-added products. The value-added products are sold through various channels including bulk supply to different industries and sales outlets of the Federation. The Federation runs an ayurvedic medicine manufacturing unit in Thrissur under the brand name of Ayurdhara and some of the NTFPs are supplied to this unit.

Data analysed based on the consolidated data of NWFP collection shows that total number of plant species collected is 68 and total quantity 1676.20 tonnes and total price 13.10 crore. (2015-2019)

NWFP Sales data of SC/ST federation reveals that total number of plant species brought under sales is 70 and total quantity is recorded as 940.80 tonnes with the total price of 10.12 crore (2015-2019).



Table 4.1.4 Non- Wood Forest Produce (NWFP) collection as on 31.03.2020

Sl.No	Item	Quantity procured (kg)
1	Adalodakam Pacha	16374.00
2	Athithippali	3614.00
3	Broom Grass	43300.00
4	Cheenikka	64837.10
5	Chertuthekku	991.00
6	Cheruvazhuthana	20618.00
7	Cheruvazhuthana(Pacha)	20158.00
8	Cheruthen	543.00
9	Chittamruth (Dry)	191.00
10	Derba	543.00
11	Kakkumkai	3102.1
12	Kalpasam	6850.1
13	Karimkurinji	80671.0
14	Kasthurimanjal	564.5
15	Kattukurumulak vally	21629.10

Source:
State

16	Kattumanjal	108.00
17	Kattumulakinthand	12658.70
18	Kazhanchikkuru	75.00
19	Koppuvella	207.00
20	Kudampuli	171.00
21	Kunthirikkom	5196.50
22	Kurumthotti	15207.00
23	Kurumthotti (Pacha)	92944.00
24	Manjakoova	150.00
25	Malayinji	143.00
26	Marottikkuru	20.00
27	Moovila	5823.00
28	Manjavalli	417.00
29	Nannari/Naruneendi	42.60
30	Orila	3862.00
31	Orila Dry (Red)	300.00
32	Pachottipatta	13091.50
33	Padakizhangu	1336.85
34	Palmuthakku	112.00
35	Pathiripoovu	376.60
36	Pattincha/Incha	3180.00
37	Peenari	5030.00
38	Pollakai	83.00
39	Ponkorandi	1364.00
Sl.No	Item	Quantity procured (kg)
40	Rawhoney	2127.30
41	Sathavery	490.00
42	Seethari	42.00
43	Soappinkai	60.00
44	Thippali	63.00
45	Vanthen	25117.95
46	Vayanapoovu	100.00`
47	Wax (Bee wax)	118.30
	Total	474003,026

Kerala

Federation of SC/ST Development Co-operative Ltd.

Table 4.1.5 NWFP collection consolidated data2015-19 (Kerala State Federation of SC/ST Development Co-operatives Ltd)

Sl. No.	Scientific Name	Local name	Total Quantity	Min price	Max. Price	Mean price	Total Price
1	<i>Acacia sinuata</i>	Cheevakkai	137688	26.6	48.6	38.3	5273450.4
2	<i>Acacia torta</i>	Incha	6528.9	43.6	57.3	50.4	329056.6
3	<i>Alpinia calcarata</i>	Chittaratha	187.7	85.5	103.3	94.4	17718.9
4	<i>Anamirta cocculus</i>	Pollakuru	231.5	37.5	37.5	37.5	8681.3
5	<i>Bee wax</i>	Bee Wax	804.7	87.1	290.3	194.6	156594.6
6	<i>Bee wax</i>	Honey Wax	803.7	120	281	140.6	113000.2
7	<i>Caesalpinia bonduc</i>	Kazhanchikkuru	27.5	47.6	47.6	47.6	1309
8	<i>Calamus rotang</i>	Cane	52951	46.8	46.8	46.8	2478106.8
9	<i>Cinnamomum verum</i>	Vayana	100	900	900	900	90000
10	<i>Clerodendrum serratum</i>	Cheruthekku	2277.8	1253.7	1253.7	1253.7	2855677.9
11	<i>Curcuma aromatica</i>	Kasthurimanjal	12122.9	62.8	193.3	106.4	1289876.6
12	<i>Curcuma zedoaria</i>	Manjakoova	150	75	75	75	11250
13	<i>Cyclea peltate</i>	Padakkizhangu	1761.9	243	350	296.5	522403.4
14	<i>Desmodium gangeticum</i>	Orila	7239.9	97	97	97	702270.3
15	<i>Elettaria cardamomum</i>	Elakka	41	1600	1670	1630	66830
16	<i>Entada rheedii</i>	Kakkumkai	2365	20	32	25.6	60544
17	<i>Garcinia gummi-gutta</i>	Kudampuli	4285.5	115.5	1250.6	515.3	2208318.2
18	<i>Gmelina arborea</i>	Kumil	3804	18	18	18	68472
19	<i>Grewia tiliifolia</i>	Undakkai	38	22.9	22.9	22.9	870.2
20	<i>Gymnema sylvestre</i>	Chakkarakolli	2750	14	14	14	38500
21	<i>Hemidesmus indicus</i>	Nannari	17.8	275	275	275	4895
22	<i>Holostemmaada-kodien</i>	Adapathiyen	12.3	540	540	540	6642
23	Honey_big	Vanthen	99988.2	259.4	436.9	341.7	34165967.9
24	Honey_Small	Cheruthen	10795.1	937.3	1591	1230.4	13282291
25	<i>Hydnocarpus pentandrus</i>	Marotti	1416.3	73.3	120	95.4	135115
26	<i>Hydnocarpus pentandrus</i>	Nagadanthi	5412.5	318.6	318.6	318.6	1724422.5
27	<i>Imperata cylindrica</i>	Derbha	540.8	5.5	5.5	5.5	2974.4
28	<i>Ipomoea mauritiana</i>	Palmuthakku	3461	24.2	24.8	24.5	84794.5
29	<i>Ipomoea mauritiana</i>	Sathavari	610	42.7	78	60.4	36844
30	<i>Justicia adhatoda</i>	Adalodakam	10743.5	21.4	21.4	21.4	229910.9
31	<i>Kattuchena</i>	Kattuchena	25	23.8	23.8	23.8	595
32	<i>Kooramkolli</i>	Kooramkolli	1250	14.5	14.5	14.5	18125
33	<i>Munrochloa ritchiei</i>	Eramkol	18375	6.5	9.8	8.1	148837.5
34	<i>Nilgiranthus Ciliatus</i>	Karimkurinji	111345.8	15.7	24.1	19.9	2215781.4
35	<i>Parmelia dilatata</i>	Kalpasam	14249.2	97.7	260.3	179	2550606.8
36	<i>Piper longum</i>	Kattuthippali	1520.7	746.9	746.9	746.9	1135810.8
37	<i>Piper longum</i>	Thippali	250.5	38.5	38.5	38.5	9644.3

38	<i>Piper nigrum</i>	Kattukurumulaku	409244.7	16.3	142.4	59.7	24431908.6
39	<i>Piper nigrum</i>	Kattumulaku	10761.7	35.9	50	43	462753.1
40	<i>Piper nigrum</i>	Kurumulaku	656	38.4	38.4	38.4	25190.4
41	<i>Pseudarthria viscida</i>	Moovila	23358.4	16	52.6	37.3	871268.3
42	<i>Rauvolfia serpentina</i>	Amalpori	4.5	591.1	591.1	591.1	2660
43	<i>Rhaphidophora pertusa</i>	Athithipali	8976.5	46.1	64.1	55.1	494605.2
44	<i>Salacia oblonga</i>	Ekanayakam	2778	15	66.5	40.7	113064.6
45	<i>Salacia oblonga</i>	Ponkurandi	798	57.3	57.3	57.3	45725.4
46	<i>Sapindus emarginatus</i>	Soapinkai	20	25	25	25	500
47	<i>Sapindus emarginatus</i>	Urinchikkai	60	18	18	18	1080
48	<i>Shorea robusta</i>	Chenchelyam	823	94.4	94.4	94.4	77691.2
49	<i>Sida alnifolia</i>	Kurumthotti	138788.9	31	282.6	99.4	13795616.7
50	<i>Solanum anguivi</i>	Putharichunda	20742	26.1	31.3	28.4	589072.8
51	<i>Solanum melongena</i>	Vazhuthana	48317.4	14.4	43.1	28.7	1386709.4
52	<i>Solanum torvum</i>	Chunda	95195.7	24	38.1	31	2951066.7
53	<i>Spermacoce ocymoides</i>	Tharavella	511	29.3	29.3	29.3	14972.3
54	<i>Sterculia foetida</i>	Peenari	12710	32.6	42.8	39.4	500774
55	<i>Stereospermum chelonoides</i>	Pathiri	926.3	299.4	358.9	320.8	297157
56	<i>Strychnosnux-vomica</i>	Kanjiram	190151	0.1	63.3	31.7	6027786.7
57	<i>Symplocos cochinchinensis</i>	Pachotti Patta	15500.7	47.5	127.2	73.7	1142401.6
58	<i>Syzygium cumini</i>	Njaval	19	332.5	332.5	332.5	6317.5
59	<i>Terminalia bellirica</i>	Tannikkai	1028	23.8	23.8	23.8	24466.4
60	<i>Terminalia chebula</i>	Kadukka	485	36.5	36.5	36.5	17702.5
61	<i>Thysanolaena latifolia</i>	Choolpullu	83125	23	23	23	1911875
62	<i>Thysanolaena latifolia</i>	Choolpullu	86572	19.9	19.9	19.9	1722782.8
63	<i>Tinospora cordifolia</i>	Chittamruthu	163.5	18	18	18	2943
64	<i>Trichosanthes lobata</i>	Kattupadavalam	3,400.50	40	120	80	272040
65	<i>Vateria indica</i>	Koppuvella	61.9	155.6	155.6	155.6	9631.6
66	<i>Vateria indica</i>	Kunthirikkam	3384.2	70.6	1046.6	344.7	1166533.7
67	<i>Zanthoxylum rhetsa</i>	Mullilam	1026.9	50	800	425	436432.5
68	<i>Zingiber Zerumbet</i>	Kolinchi	390	30.7	72.6	56.1	21879
		Total	1676153				130870796.4
			1676.2				13.1

Table 4.1.6 NWFP sales consolidated data (Kerala State Federation of SC/ST Development Cooperatives Ltd)

Sl.No.	Scientific name	Local name	Quantity(kg)	Minimum price	Maximum price	Average price	Total Price
1.	<i>Acacia sinuata</i>	Cheevakkai	98,046.23	32	76	96.86	9,496,477.6
2.	<i>Acacia torta</i>	Incha	4,665.75	42	68	58.75	274,112.8
3.	<i>Alpinia calcarata</i>	Chittaratha	41.00	80	80	80.00	3,280.0
4.	<i>Amorphophallus paeoniifolius</i>	Kattuchena	25.00	25	25	25.00	625.0
5.	<i>Anamirta cocculus</i>	Pollakuru	665.00	37	37	37.00	24,605.0
6.	<i>Asparagus racemosus</i>	Sathavari	1,009.50	18	27	22.50	22,713.8
7.	<i>Bee wax</i>	Bee Wax	780.00	162	300	231.00	180,180.0
8.	<i>Boerhavia diffusa</i>	Thazhuthama	57.00	40	40	40.00	2,280.0
9.	<i>Caesalpinia bonduc</i>	Ayandikuru	11.00	110	110	110.00	1,210.0
10.	<i>Caesalpinia bonduc</i>	Kazhanchikkuru	23.25	50	100	75.00	1,743.8
11.	<i>Calamus rotang</i>	Chooral	52,951.00	58	58	58.00	3,071,158.0
12.	<i>Chava</i>	Chava	23,938.00	75	75	75.00	1,795,350.0
13.	<i>Clerodendrum serratum</i>	Cheruthekku	1,818.25	78	103	96.25	175,006.6
14.	<i>Coscinium fenestratum</i>	Manjavally	56.00	100	100	100.00	5,600.0
15.	<i>Curcuma aromatica</i>	Kasthurimanjal	690.75	76	85	80.75	55,778.1
16.	<i>Cyclea peltate</i>	Padakkizhangu	2,069.75	343	490	414.00	856,876.5
17.	<i>Dendrocalamus strictus</i>	Kooramkolli	1,160.00	15	18	17.00	19,720.0
18.	<i>Desmodium gangeticum</i>	Orila	6,984.75	46	81	58.50	408,607.9
19.	<i>Desmodium gangeticum</i>	Orilaveru	12,113.50	74	74	74.00	896,399.0
20.	<i>Elettaria cardamomum</i>	Cardomom	35.20	1,950	1,950	1,950.00	68,640.0
21.	<i>Entada rheedii</i>	Kakkumkai	1,090.50	6	51	33.25	36,259.1
22.	<i>Garcinia gummi-gutta</i>	Kudampuli	337.17	125	2,525	955.00	321,994.2
23.	<i>Gmelina arborea</i>	Kumizhinveru	5,738.00	15	15	15.00	86,070.0

24.	<i>Hemidesmus indicus</i>	Nannari	1,847.00	176	176	176.00	325,072.0
25.	<i>Holostemmaada-kodien</i>	Adapathiyam	10.00	650	650	650.00	6,500.0
26.	<i>Honey</i>	Puthuthen	94.00	340	340	340.00	31,960.0
27.	<i>Honey_Big</i>	Vanthen	99,828.00	234	495	382.67	38,200,848.0
28.	<i>Honey_Small</i>	Cheruthen	10,725.00	1,500	1,600	1,566.67	16,802,500.0
29.	<i>Hydnocarpus pentandrus</i>	Marottikuru	1,722.00	96	200	152.67	262,892.0
30.	<i>Imperata cylindrica</i>	Derbha	647.00	85	85	85.00	54,995.0
31.	<i>Ipomoea mauritiana</i>	Palmuthakku	1,434.50	25	43	34.00	48,773.0
32.	<i>Justicia adhatoda</i>	Adalodakam	11,217.00	4	28	21.00	235,557.0
33.	<i>Munrochloa ritchiei</i>	Eramkol	21,300.00	8	8	8.00	170,400.0
34.	<i>Nilgirianthus Ciliatus</i>	Karimkuringi	113,113.60	2	43	24.80	2,805,217.3
35.	<i>Ooram</i>	Ooran	1,336.00	80	80	80.00	106,880.0
36.	<i>Parmelia dilatata</i>	Kalpasam	9,734.57	330	477	396.00	3,854,888.4
37.	<i>Piper attenuatum</i>	Kattumulakinthandu	5,284.00	48	48	48.00	253,632.0
38.	<i>Piper longum</i>	Thippali	4,298.50	54	55	54.50	234,268.3
39.	<i>Piper nigrum</i>	Kattukurumulakuvalli	22,118.50	6	70	41.57	919,497.6
40.	<i>Piper nigrum</i>	Kattumulakinthandu	17,604.00	53	53	53.00	933,012.0
41.	<i>Pseudarthria viscida</i>	Moovila	20,078.50	78	88	81.50	1,636,397.8
42.	<i>Rauvolfia serpentina</i>	Amalpori	75.00	3	62	32.50	2,437.5
43.	<i>Rhaphidophora pertusa</i>	Athithipali	1,861.75	73	100	88.25	164,299.4
44.	<i>Rotula aquatica</i>	Kallurvanchi	10.00	125	125	125.00	1,250.0
45.	<i>Salacia oblonga</i>	Ponkurandi	298.00	75	90	82.33	24,535.3
46.	<i>Sapindus emarginatus</i>	Soapinkai	269.00	16	30	20.00	5,380.0
47.	<i>Sida alnifolia</i>	Kurumthotti	75,115.70	60	80	72.60	5,453,399.8
48.	<i>Solanum anguivi</i>	Putharichunda	4,662.00	40	53	47.67	222,222.0
49.	<i>Solanum melongena</i>	Cheruvazhuthana	34,477.50	56	71	63.50	2,189,321.3
50.	<i>Solanum torvum</i>	Chunda	88,059.00	46	55	51.00	4,491,009.0
51.	<i>Spermacoce ocymoides</i>	Tharavella	565.00	36	40	37.33	21,093.3

52.	<i>Sterculia foetida</i>	Peenari	7,117.17	42	53	48.00	341,624.0
53.	<i>Stereospermum chelonoides</i>	Pathiripoovu	407.84	70	474	308.75	125,919.8
54.	<i>Strychnos nux-vomica</i>	Kanjirakkuru	454.50	30	70	50.00	22,725.0
55.	<i>Symplocos cochinchinensis</i>	Pachotti patta	36,094.17	76	83	80.00	2,887,533.3
56.	<i>Syzygium cumini</i>	Njaval	19.00	350	350	350.00	6,650.0
57.	<i>Tamarindus indica</i>	Puliyila	1,583.00	7	7	7.00	11,081.0
58.	<i>Terminalia bellirica</i>	Tannikkai	914.00	12	25	18.50	16,909.0
59.	<i>Terminalia chebula</i>	Kadukkapoovu	670.00	58	58	58.00	38,860.0
60.	<i>Thysanolaena latifolia</i>	Broom Grass	122,400.00	30	62	46.00	122,400.0
61.	<i>Tinospora cordifolia</i>	Chittamruthu	2,291.50	22	38	30.00	122,400.0
62.	<i>Tragia involucrate</i>	Kodithuva	25.00	65	65	65.00	122,400.0
63.	<i>Trichosanthes lobata</i>	Kattupadavalam	3,266.90	140	265	217.60	122,400.0
64.	<i>Vateria indica</i>	Koppuvella	93.90	76	400	225.33	122,400.0
65.	<i>Vateria indica</i>	Kudampuli	500.00	180	180	180.00	122,400.0
66.	<i>Vateria indica</i>	Kunthirikkam	2,391.93	100	235	155.10	122,400.0
67.	<i>Vateria indica</i>	Seethari	129.50	49	110	79.50	122,400.0
68.	<i>Vateria indica</i>	Vella kunthirikkam	37.75	150	500	325.00	122,400.0
69.	<i>Zanthoxylum rhetsa</i>	Mullilam	250.00	72	72	72.00	122,400.0
70.	<i>Zingiber Zerumbet</i>	Kolinchi	69.67	70	110	91.67	122,400.0
			940,807.53				102,060,627.50

The Federation was entrusted with the right of monopoly procurement and marketing of medicinal plants from the forests. Though, there are 145 items in the NWFP list, the Societies and Federation are collecting only about 70 items that are in high demand in the market. The rest of the items are collected by tribes and others and sold to private traders in an unauthorized manner (Muraleedharan *et al.*, 1997). The marketing practice generally includes an auction/ quotation and negotiation of which auction is the most common practice of the Federation. The societies are permitted to sell items that are perishable at a price fixed by the NWFP committee. The price fixed by the committee is for two years. In addition to the cooperative sector, medicinal plants are also marketed by private traders. Unauthorized collection from the forest, homesteads, non-forest areas and imports constitute their supply. The private traders sell their products directly to the consumers. Marketing agents play an important role in the trade of medicinal plants in Kerala. The number of agents depends on the nature of the products. The agents who purchase products from the tribes work between the gatherers and society. Generally, the auction of the Federation is attended by the first wholesaler, who sell the products to the second wholesaler. The latter either exports it to other states or sells it to retailers or to medicinal manufacturers. In each stage of marketing, agents/ traders have to incur marketing costs. The marketing cost of the middlemen, their net margins and statutory taxes constitute the gross marketing margins.

Table4.1.7 Trends in species wise procurement and value of NWFP during 2010, 2015,2016 & 2018

Sl no.	Name of item	2010			2015			2016			2018		
		Quantity	Unit Price	Value (Rs)	Quantity	Unit Price	Value (Rs)	Quantity	Unit Price	Value (Rs)	Quantity	Unit Price	Value (Rs)
1	Adalodakam(Pacha)	3235	7	22645	19863	10	19863	10819	10.35	11199	23011	10	23011
2	Adalodakam(Dry)	0	0	0	0	0	0	0	0	0	678	25	16950
3	Adapthian	1.4	350	420	10	450	4500	0	0	0	5.9	540	3186
4	Amalpori	5	175	875	0	0	0	0	0	0	45	59.11	2660
5	Athithippali	1649	30.9	50975	377	50	18850	9056	60	54339	9465	64.68	61220
6	Cheenikka	75559.	51.1	3864299.	96958	28.33	274649	73253	29.76	218014	71239	43.38	309001
7	Cheruthekku	8436	19.95	16842	2902	46.24	13418	1835	46.86	85992	4008.2	378.01	151508
8	Cheruthekku Veru	8436	12	9912	0	0	0	0	0	0	0	0	0
9	Cheruthen	25258.	125.8	317764	21939.	200.26	439346	24675	231.04	570086	0	0	0
10	Cheruvazhuthana	0	0	0	0	0	0	27136	50.21	136251	0	0	0
11	Chittamrithu	524	10	5240	3759	8.48	31871	136	6	816	0	0	0
12	Chittaratha	0	0	0	0	0	0	0	0	0	159	92.87	14767
13	ChoolPullu	51700	4.85	24980	14819	14.31	212116	12769	17.57	224316	53060	20.5	108780
14	Chunda (Dry)		0	0	0	0	0	0	0	0	31133	47.46	147749
15	Chunda	20158	7.65	15472	30052	15.79	474601	99891	12.43	124196	16327	13.88	226670
16	Ekanayakam	0	0	0	0	0	0	1500	15	22500	0	0	0
17	Elakka	358.8	160.95	57749.	0	0	0	2	332.5	665	0	0	0
18	Kadukkathode	0	0	0	0	0	0	0	0	0	820	43	35260
19	Kakkumkai	344.5	10.1	3475.5	1503	12.61	18960	25	17.92	448	1763.6	28.54	50334
20	Kalpasam	9289	101.75	94536	9219.6	278.44	256714	9755.7	295.16	287946	10712	332.24	355900
21	Kandankooa	791.5	10.6	8400	0	0	0	0	0	0	0	0	0
22	Kanjirakuru	0	0	0	0	0	0	0	0	0	241	66.5	16026.
23	Karimkurinji/ Madurakurinji	28234	13.25	374825	55186	15.72	867647	87454	22.86	1999311	71111	18.58	1321416
24	Kalloorvanchi	0	0	0	10	100	1000	0	0	0	0	0	0
25	Kasthoorimanjal	54747	26.55	1452845.	1772	73.94	13101	1147	62.84	72079	1231	73.86	90923
26	Kattuchena	0	0	0	0	0	0	0	0	0	25	23.76	594

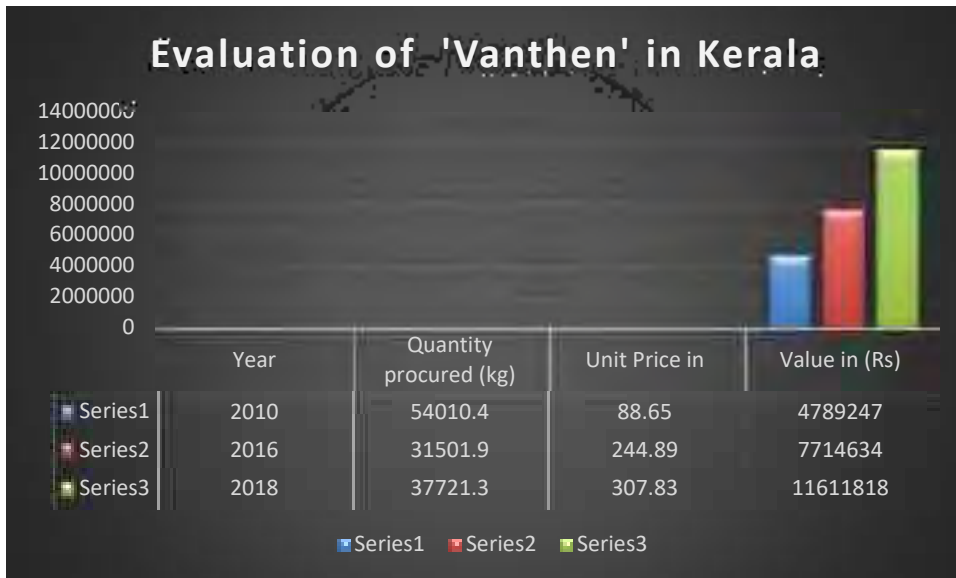
27	Kattukurumulaku	400	26.4	10560	0	0	0	3596	32.63	11734	0	0	0
28	Kattukurumulaku Valli	2775	12.3	34202	6174.5	23.08	14248	8361	39.51	33036	20041	40.76	81696
29	Kattupadavalam	1697	115.5	19613	232	161.91	37564	34.3	75.69	2596	5792.6	166.27	96312
30	KattuthippaliPacha	0	0	0	0	0	0	0	0	0	804	40	32160
31	Kazhanchikuru	0	0	0	2.5	18	45	0	0	0	44	95	4180
32	Kodithuva	0	0	0	25	81	2025	0	0	0	0	0	0
33	Kolinchi	1302	28	36456	150	70	10500	118	65	7670	16	90.25	1444
34	Koppuvella	186	34.2	6360	246	60	14760	28	60.39	1691	31	380	11780
35	Kooramkolli	0	0	0	0	0	0	0	0	0	1250	14.5	18125
36	Kudampuli	2151.5	58.9	12666	500	160	80000	0	0	0	55	272.5	14987.
37	Kumizhinveru	831	12.5	10387.	0	0	0	0	0	0	0	0	0
38	Kunthirikkam/	9496.5	52.05	494413.	8517.9	207.91	177092	4456.7	101.32	45155	9099.9	117.74	107144
39	Kurunthotti	33412	6.9	2305118.	44475	16.18	719682	26638	17.17	457475	41122	17.89	735799
40	Marottikuru	17570	38	66788	2883	79.94	23048	543	111.69	60650	745.8	149.57	11154
41	Mathurakurinji	30	31	930	0	0	0	0	0	0	0	0	0
42	Moovila	47162	18.3	86282	38133	44.13	168292	61844	62.04	383664	35193	53.77	189218
43	Mullilam	225	20	4500	250	50	12500	0	0	0	0	0	0
44	Nagadandhi	1606	27.3	43821	0	0	0	0	0	0	57	80	4560
45	Nannari/Naruneendi	0	0		1623.3	120.92	19629	10.5	250	2625	0	0	0
46	Njavanpoovu	0	0	0	0	0	0	0	0	0	19	332.47	6317
47	Orila Pacha	0	0	0	0	0	0	0	0	0	403	15	6045
48	Orila (dry)	22299	15.5	34569	13047.	47.82	62394	17117	48.93	83756	12058	51.18	61708
49	Pachottipatta	8908	28	25000	8544.5	45.45	388382.	13963	48.2	67303	8266	67.99	56199
50	Padakizhangu	3611.8	108.65	392468.2	3202.6	294.93	94454	430.5	194.63	83786.	3561.6	347.1	123622
51	Palmuthakku	2721	8.65	23566	75	5	375	4390	14.68	64451	2373	34.11	80949
52	Pathiripoovu	1607.5	136.65	219665.	738.1	342.81	25303	598.1	379.63	227057.	1015.6	325.9	33097
53	Pattincha /Incha	5023	26.85	13477	5293.5	40.66	21525	4938	55.93	27616	10965	58.49	64137
54	Peenari	9033	12.7	11474	11877.	29.94	35559	8591	33.72	28968	6315	39.87	25179
55	Pollakuru	72.5	8	580	667	29.18	19465	0	0	0	0	0	0
56	Ponkurandi	0	0	0	6	50	300	0	0	0	0	0	0

57	Puliyila	0	0	0	1583	4	6332	0	0	0	0	0	0
58	Putharichunda	22083	11.25	248263.	19490	16.58	32314	41687	14.25	59392	5040	16.17	81510
59	Sathavari	6746	11.7	78846	250	12	3000	0	0	0	0	0	0
60	Seethari	5	20	100	24	30	720	1015	85.36	86641	0	0	0
61	Soapinkai	0	0	0	265	11.62	3080	0	0	0	20	25	500
62	Thannikai	780	4	3120	800	10	8000	0	0	0	0	0	0
63	Thalipoovu	178	28.8	5124	0	0	0	0	0	0	0	0	0
64	Thannikkathodu	0	0	0	0	0	0	0	0	0	1028	23.75	24415
65	Tharavella	0	0	0	616	15	9240	253	28.5	7210	764	34.09	26044
66	Thelli	6706.1	32.55	218186.	0	0	0	0	0	0	0	0	0
67	Thippali	1540	23.5	36184	0	0	0	151	32	4832	0	0	0
68	ValampiriEdampiri	233	10.9	2543	0	0	0	0	0	0	0	0	0
69	Vanthen	54010.	88.65	478924	0	0	0	31501.	244.89	771463	37721.	307.83	1161181
70	Vellakunthirikom	0	0	0	0	0	0	0	0	0	32	475	15200
71	BeeWax	746.5	79.75	59536	0	0	0	272.4	283.19	77140	429	280.36	12027

Kerala Forest Statistic(Annual Reports 2010, 2015, 2016, 2018)

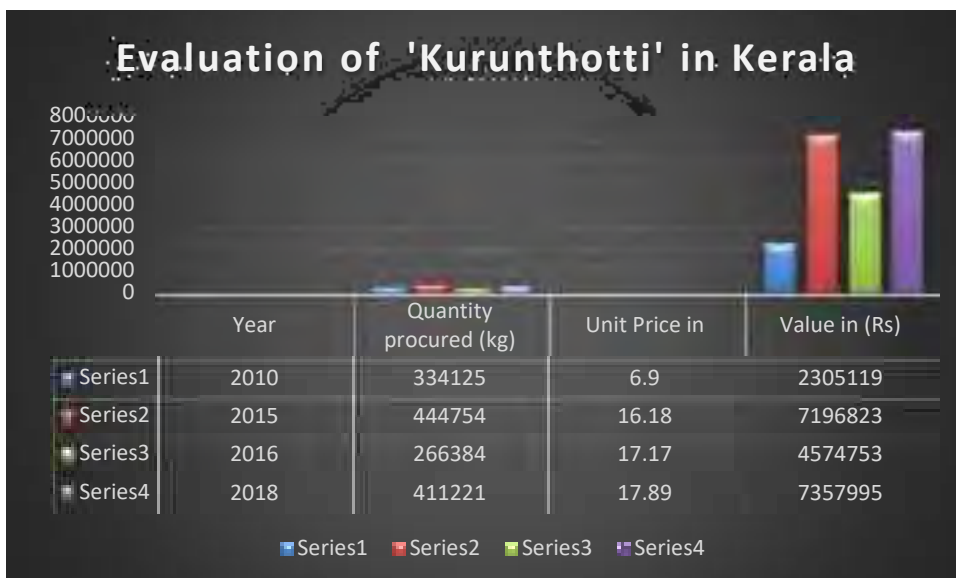
c. Top Non wood forest products of Kerala in terms of quantity collected and value

1. Vanthen (Large Honey)



Vanthen is one product in high demand and the demand for forest honey is increasing and also their unit price. The procurement of Vanthen is very high in all the 3 years except 2015, in which Vanthen procurement was nil.

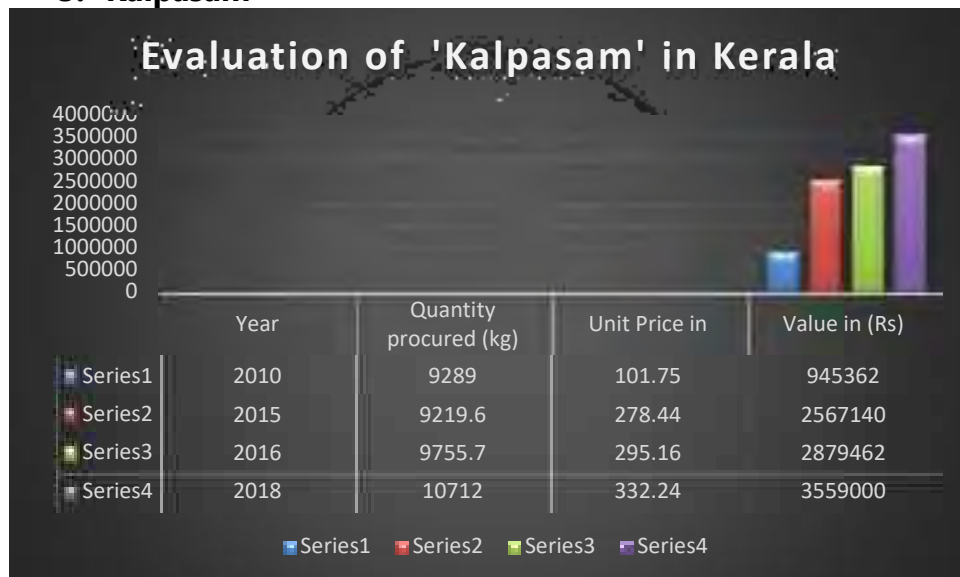
2. Kurunthotti



Kurunthotti is the second highest NWFP collected in huge quantity from the forest. The procurement very much declined in 2016 compared to previous years, which may be due to the fact that the unit price of Kurunthotti has not increased as much. In 2015,

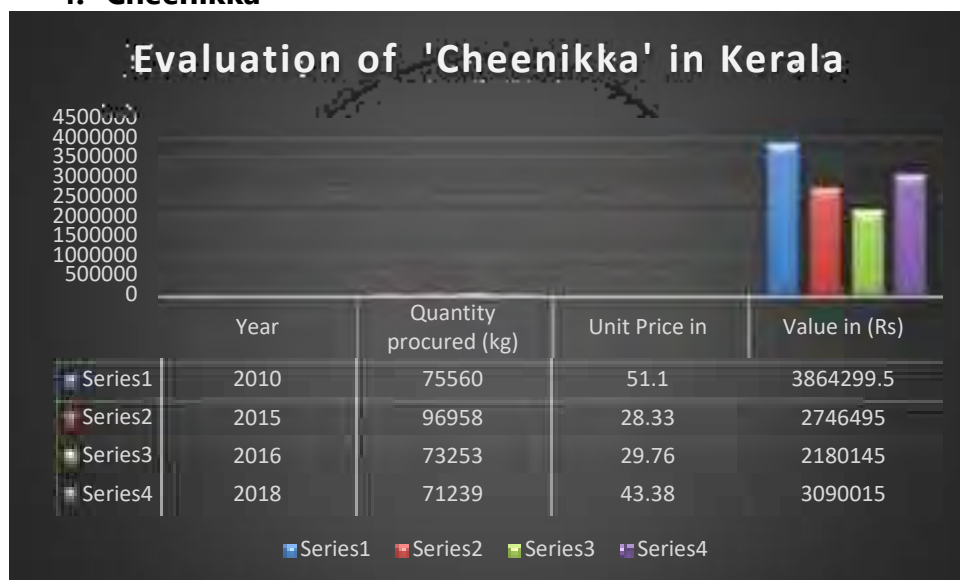
Kurunthotti was the highest profitable NWFP and in 2016 even though the procurement was less the item remained as the third most valued.

3. Kalpasam



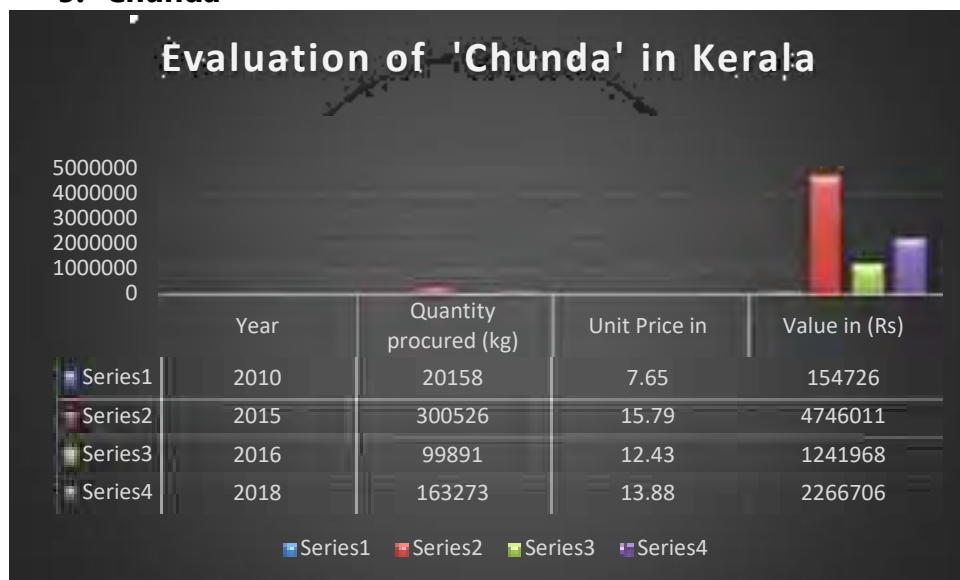
The procurement of Kalpasam is increasing yearly and also the unit price. According to the past reports the item always remains in the top five yielding products.

4. Cheenikka



Cheenikka is also one of the non-wood forest product collected in huge quantity. In 2010 the unit price was Rs 51.10 and in later years it decreased up to half the value. In 2018 the item regained its market value and became the fourth high profiting item

5. Chunda



Chunda is another NWFP collected in large quantities, but the unit price is not increasing that much.

4.2 MARKETING

Among the marketing agents, it was found that the Federation ensures maximum marketing margin followed by the first and second wholesalers in the sale of medicinal plants in Kerala. This is mainly due to the monopoly control over the collection and marketing of medicinal plants by the Federation. Since there are middlemen like the Federation, first and second wholesalers and retailers in the marketing chain of medicinal plants, marketing margins and final prices are high. For instance, the marketing margins of selected products vary from 32 % to 42%, while marketing costs range between 10 to 17 %. Thus the final prices of most of the NWFPs are significantly higher than the collection charges. Medicinal plants trade in Kerala is a very prospective one and the price of most of the items is on the increase. The price increase is partially due to an imbalance between supply and demand. However, plenty of medicinal plants are also available outside forests and hence, this has been discussed separately in the report of "Angadikada". The medicinal plants collected from outside the forests, private garden, homesteads, wastelands and common properties are sold directly to the

dealers and medicine manufacturing firms. There are a few weekly markets in Kerala where the medicinal plants brought by the collectors and growers are sold in auction through commission agents. The farmers who cultivate medicinal plants say they are not getting a reasonable price for their crop. This is mainly because they have to compete with the products collected from the wild, where. Furthermore, the ultimate consumer of medicinal plants, the medicine manufacturing industry in Kerala is interested in sources which ensure the steady supply of the required raw drugs. This situation is exploited by the raw drug dealers by offering a low price to the farmers. For avoiding exploitation, a "Vanasree Cell" has been set up in the Forest Department, for helping the tribal people. Many successful initiatives emerged in many parts of the state in the field of scientific collection, sustainable harvesting, value addition and marketing of produce like honey, black dammer, kokkum etc. collected by VSS and EDC, the Forest Department itself started marketing Value added products as "Vanasree" products.

Vanasree Ecoshops of Kerala

Vanasree Ecoshop' is a novel initiative by the Forest and Wildlife department of Kerala to improve the livelihoods of tribal communities by facilitating collection, processing, value addition and market access to the forest produce which has been traditionally collected from interiors of pristine evergreen forests. 'Participatory Forest Management (PFM) initiatives instituted in the State during the late 1990s gave a new direction to the approach of the Forest Department and the Forest dependent communities with the management of NWFP. Scientific Management of NWFP has been identified as a most significant step necessary for improving the livelihood of the forest dependent communities and for ensuring their meaningful participation in forest conservation. Developing scientific collection protocols, setting up facilities for storage, developing value addition process and marketing of NWFP have been inseparably intertwined with the principles and practice of PFM in the state. After formation of Adivasi Vana Samrakshana Samiti's by forest department in the tribal areas with strategy for the collection, value addition and marketing of forest produce,

the income of tribal people has increased substantially. During the year 2011-2012, Vanasree Ecoshops are started in various places to enable the Vana Samrakshana Samithies to sale processed and semi-processed nontimber forest products collected by Adivasis from forest areas. The profits from these outlets are being ploughed back to the NWFP collectors through the Vana Samrakshana Samithies. Forest Department and the forest dependent communities, ensure that the marketed "Vanasree" products are sustainably harvested, hygienically processed and the packaged in eco-friendly materials. In this endeavour, they target better livelihood for thee lakh people who constitute the forest dependant population. There are 36 Vanasree Ecoshops in the State under Forest Development Agencies (FDA) including 2 mobile units.

Table 4.1.8a Buying and Selling price of value added products marketing through Ecoshops and Vanasree outlets in the year 2019-2020

	Name of the product/Items	1. Achencoil			2. Alappuzha Soci Fo			3. Chalakkudy		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	Alappey Boat Medium (Handycraft)	0	0	0	0	0	0	4529	1310700	1358700
2.	Amukkuram podi	0	0	0	100 gm	0	75	0	0	0
3.	Bee Wax Whole Sale	0	0	0	0	0	0	1189	126560	190240
4.	Big Honey	0	0	0	0	0	0	0	0	0
5.	Black Dammer	52.5	150	320	0	0	0	0	0	0
6.	Cardamom	0	0	0	50 gm	0	250	0	0	0
7.	Cardamom 50gm	0	0	0	0	0	0	38.1	72300	76200
8.	Cardamom 100gm	0	0	0	0	0	0	516	204700	205200
9.	Cheenikai Whole Sale	0	0	0	0	0	0	768	26900	38400
10	Cheruthen	8 kg	800	1200	750 gm	0	1340	0	0	0
11	Cheruthen 500gm	0	0	0	0	0	0	0	0	0
12	Cheruthen	0	0	0	0	0	0	1116	72310	78120

	100gm									
13	Cheruthen 250gm	0	0	0	0	0	0	475	11440	19000
14	Cheruthen loose	0	0	0	0	0	0	286	4580	5720
15	Cloth Bag Stawberry	0	0	0	0	0	0	1123	5500	22460
16	CLOVE	0	0	0	200gm	0	155	0	0	0
17	Coaltar	0	0	0	0	0	0	546	135750	136500
18	Coconut Chattukam	0	0	0	0	0	0	541	65910	70330
19	Coffee Powder 250gm	0	0	0	0	0	0	332	22270	56440
20	Dandapala Oil 100gm	0	0	0	0	0	0	606	22770	54540
21	DENTHAPALA OIL	0	0	0	300ml	0	410	0	0	0
22	Elephant Rosewood 2 Inch	0	0	0	0	0	0	1417	85020	85020
23	Eucaliptus 100gm	0	0	0	0	0	0	417	16705	27105
24	Eucaliptus 50gm	0	0	0	0	0	0	27	37500	40500
25	Eukaliptus Oil	0	0	0	50 ml	0	0	0	0	0
26	Ginger Pickle 150gm	0	0	0	0	0	0	25	17647	63025
27	Green tea	0	0	0	50 gm	0	50	0	0	0
28	Green Tea 100gm	0	0	0	0	0	0	21	12600	12600
29	Honey 250gm	0	0	0	0	0	0	75	61000	75000
30	Honey 500gm	0	0	0	0	0	0	3542	49473	81466
31	House boat	0	0	0	0	0	0	303	4450	7575
32	INCHA	0	0	0	100 gm	0	40	0	0	0
33	Incha 50gm	0	0	0	0	0	0	74	2220	2220
34	Kalloorvanchi	0	0	0	80 gm	0	70	0	0	0
35	Karutha kunthirikkam	0	0	0	250 gm	0	100	0	0	0
36	Karuvapatta	0	0	0	50 gm	0	45	0	0	0
37	Kasthurimanjal 50gm	0	0	0	0	0	0	18	1600	1800
38	Kerala Sandal Soap 150gm	0	0	0	0	0	0	20	2800	4000
39	Kerala Sandal Soap 75gm	0	0	0	0	0	0	21	12000	12600

40	Kerala Sandal Trio Classic	0	0	0	0	0	0	25	0	15125
41	Manjal podi	0	0	0	100 gm	0	25	0	0	0
42	Marayoor sharkkara	0	0	0	1 kg	0	95	0	0	0
43	Mulayari	0	0	0	50 gm	0	250	0	0	0
44	Nayakaruna podi	0	0	0	200 gm	0	80	0	0	0
45	Nerinjil	0	0	0	100 gm	0	35	0	0	0
46	Njeringil 50gm	0	0	0	0	0	0	0	0	0
47	Oil bottle	0	0	0	250 gm	0	100	0	0	0
48	Pathimugam	0	0	0	70 gm	0	70	0	0	0
49	Pathimugham 50gm	0	0	0	0	0	0	19	500	4750
50	Pathiripoovu Wholesale	0	0	0	0	0	0	37	4400	14800
51	PEPPER	0	0	0	100 gm	0	35	0	0	0
52	Pepper 100gm	0	0	0	0	0	0	50	7800	10000
53	Pepper 75gm	0	0	0	0	0	0	0	0	0
54	Pepper powder	0	0	0	750 gm	0	75	0	0	0
55	Pulthailam	0	0	0	150	120	170	0	0	0
56	Pulthailam 100gm	0	0	0	0	0	0	121	12000	12100
57	Pulthailam 50gm	0	0	0	0	0	0	153	4437	4437
58	Pure Sandal Powder 20gm	0	0	0	0	0	0	50	1600	1600
59	Pure Sandal Powder 20gm	0	0	0	0	0	0	75	1820	2625
60	Pure Sandal Powder 20gm	0	0	0	0	0	0	169	9464	9464
61	Red sandal powder	0	0	0	100 gm	0	140	0	0	0
62	Red sandal wood	0	0	0	1148 gm	0	4 /gm	0	0	0
63	Rosewood Elephant Penholder	0	0	0	0	0	0	64	10560	10560
64	SANDAL OIL	0	0	0	50 gm	0	2521	0	0	0
65	Sandal powder	0	0	0	20 gm	0	605	0	0	0
66	Sandal powder	0	0	0	0	0	60	0	0	0
67	Sandal Powder	0	0	0	0	0	0	0	0	0
68	Sandal soap	0	0	0	450 gm	0	180	0	0	0
69	Sandal wood	0	0	0	363 gm	0	23/gm	0	0	0
70	Sandal Wood	0	0	0	0	0	0	50	7740	9000

	1gm									
71	Sandal Wood Oil 2gm	0	0	0	0	0	0	200	4900	5000
72	Sandal Wood Powder 100gm	0	0	0	0	0	0	7.2	2880	2880
73	Sathavari Pickle 150gm	0	0	0	0	0	0	79	33575	33575
74	Snake Boat 4 Men Mini	0	0	0	0	0	0	1	0	360
75	Tea powder	0	0	0	250 gm	0	75	0	0	0
76	Tea powder	0	0	0	50 gm	0	60	0	0	0
77	Tea powder	0	0	0	400 gm	0	75	0	0	0
78	Tea Powder 250gm	0	0	0	0	0	0	2	110	220
79	Thalipodi 50gm	0	0	0	0	0	0	1	0	880
80	Thelly 100gm	0	0	0	0	0	0	2	180	180
81	Then nellikka	0	0	0	150 gm	0	150	0	0	0
82	Theyila	0	0	0	0	0	0	0	0	0
83	Thrill Chempakam	0	0	0	0	0	0	3	270	270
84	Thrill Exotic	0	0	0	0	0	0	1	180	180
85	Tiger Tree	0	0	0	0	0	0	1	0	60
86	Vanthen	435 kg	300	500	500 gm	0	300	0	0	0
87	Vep	0	0	0	0	0	0	1	180	180
88	Viswas Gold Tea Powder 250gm	0	0	0	0	0	0	1	0	90
89	wash well soap	0	0	0	120 gm	0	15	0	0	0
90	Washwell	0	0	0	0	0	0	1	0	360
91	White Dammer	396	200	220	100 gm	0	50	0	0	0

Table 4.1.8b

	Name of the product/Items	4. Konni			5. Kothamangalam			6. Malayattoor		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	3 in 1 Sandal Soap	0	0	0	67	148.5	165	0	0	0
2.	Black Dammer	0	0	0	0	0	0	34	45	50
3.	Cheruthen	0	0	0	80	900	1000	0	0	0

	500gm									
4.	Cheruthen 100gm	0	0	0	104	180	200	0	0	0
5.	Cheruthen 250gm	0	0	0	112	450	500	0	0	0
6.	CLOVE	0	0	0	0	0	0	2	72	80
7.	Cocumpodus 250gm	0	0	0	0	0	0	2	90	100
8.	Cofee powder	0	0	0	0	0	0	27	90	100
9.	DAMMER	2000gm	1031	0	0	0	0	0	0	0
10	DENTHAPALA OIL	400	815	0	166	72	80	0	0	0
11	Eucaliptus 100gm	0	0	0	116	90	100	0	0	0
12	Eukaliptus Oil	100	355	0	0	0	0	78	108	120
13	Foot crack balm	0	0	0	0	0	0	0	0	0
14	Foot crack relief	2043	60	0	0	0	0	0	0	0
15	Grambu	0	0	0	35	72	80	0	0	0
16	Green tea	0	0	0	45	0	0	6	36	40
17	Green Tea 100gm	0	0	0	0	0	0	0	0	0
18	Green tea tin	0	0	0	0	0	0	13	45	50
19	Honey (Big)	1600 gm	2600	0	0	0	0	0	0	0
20	Honey 250gm	0	0	0	213	117	130	0	0	0
21	Honey 500gm	0	0	0	416	225	250	0	0	0
22	INCHA	206	0	20/PKT	97	27	30	13	36	40
23	Joint pain balm	180 gm	1498	0	0	0	0	0	0	0
24	Kalloorvanchi	0	0	0	160	0	0	5	54	60
25	Kalluvazhakaya	0	0	0	0	0	0	11	54	60
26	Kasthoori Mangal	928 gm	900	0	203	36	40	3	4.5	5
27	KUDAMPULI	788 gm	185	0	18 Kg	315	350	0	0	0
28	Kudampuli 250g	0	0	0	0	0	0	0	0	0
29	Kudampuli 250gm	0	0	0	156	162	180	0	0	0
30	Kudampuli Pta	0	0	0	0	0	0	0	0	0
31	KUNTHIRIKKAM	250	0	75/pkt	112	0	0	0	0	0
32	Kurumthen	0	0	0	0	0	0	0	0	0
33	Lemon grass oil	0	0	0	0	0	0	98	126	140
34	Lemongrass(No)	0	0	0	0	0	0	0	0	0
35	Lip balm(No)	170	695	0	0	0	0	0	0	0
36	Mango pickle	0	0	0	45	100	120	5	72	80
37	Oil bottle	0	0	0	0	0	0	12	54	60
38	Organic pepper	100	200	0	0	0	0	0	0	0
39	Pain balm	130	785	0	0	0	0	0	0	0

40	PEPPER	0	0	0	23	0	0	0	0	0
41	Pulthailam 100gm	0	0	0	178	90	100	0	0	0
42	Sandal oil 5gm	0	0	0	0	0	0	1	2268.9	2521
43	Sandal oil 5ml	0	0	0	0	0	0	3	1350	1500
44	Sandal powder	0	0	0	58gm	0	0	0	0	0
45	Sandal powder	0	0	0	0	0	0	0	0	0
46	Sandal Powder	0	0	0	0	0	0	0	0	0
47	Sandal soap	0	0	0	0	0	0	0	0	0
48	Sandal soap 150g	0	0	0	170	50.4	56	12	50.4	56
49	Sandal soap 75g	0	0	0	89	26	19	11	26.1	29
50	Sandal soap Family	0	0	0	0	0	0	54	148.5	165
51	Sandal soap Family 3X1	0	0	0	0	0	0	33	117	130
52	Sandal wood	0	0	0	0	0	0	156	20/g	23/g
53	Small honey 100g	0	0	0	0	0	0	5	180	200
54	Small honey 250gm	0	0	0	0	0	0	45	450	500
55	T shirt kids	279	130/pc	36270	0	0	0	0	0	0
56	T shirt kids Discount	36	110/pc	3740	0	0	0	0	0	0
57	T shirt W collar	180	230/pc	41400	0	0	0	0	0	0
58	T shirt W collar Disount	12	210/pc	2520	0	0	0	0	0	0
59	T shirt w/ o Collar disount	14	170/pc	2380	0	0	0	0	0	0
60	T shirt w/o Collar	170	190/pc	32300	0	0	0	0	0	0
61	Tea powder	0	0	0	0	0	0	23	54	60
62	Tea powder Tin	0	0	0	0	0	0	32	54	60
63	Thali podi	0	0	0	56	0	0	2	45	50
64	Vydehi oil	200 gm	15	200 /PKT	0	0	0	0	0	0
65	Wild honey 250gm	0	0	0	0	0	0	115	135	150
66	Wild honey 500gm	0	0	0	0	0	0	145	270	300
67	Wild pepper	0	0	0	0	0	0	5	90	100
68	Wild pepper tin	0	0	0	0	0	0	4	135	150

Table 4.1.8b

		7. Marayoor D	7. Marayoor D 2	8. Munnar Div
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	Name of the product/Items	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	Achar	0	0	0	7	72	80	0	0	0
2.	Cardamom	5.6	0	1500	0	0	0	0	0	0
3.	Cheruthen 250gm	0	0	0	6	450	500	0	0	0
4.	Eukaliptus Oil	124	0	1800	49	108	120	1700	0	950
5.	Green tea	0	0	0	5	36	40	0	0	0
6.	Honey (Big)	284.3	0	600	0	0	0	0	0	0
7.	INCHA	0	0	0	11	36	40	0	0	0
8.	Kasthoori Mangal	200	0	60	0	0	0	0	0	0
9.	Kudampuli 250g	0	0	0	12	90	100	0	0	0
10.	KUNTHIRIKKAM	0	0	0	22	45	50	0	0	0
11.	Lemon grass oil	447.2	0	2000	0	0	0	1428	0	2000
12.	Little bee honey	0	0	0	0	0	0	200	0	1500
13.	MARAYOOR JAGGRY	200	0	60	0	0	0	0	0	0
14.	Marayoor sharkkara	1150	0	75	0	0	0	0	0	0
15.	Nellika then	0	0	0	2	135	150	0	0	0
16.	Oil bottle	0	0	0	22	54	60	0	0	0
17.	Pulthailam	0	0	0	55	108	120	0	0	0
18.	sandal oil 2g	0	0	0	4	540	600	0	0	0
19.	Small Bee Honey	40.4	0	1400	0	0	0	0	0	0
20.	SMALL HONEY	0	0	0	0	0	0	0	0	0
21.	Small Honey	0	0	0	0	0	0	0	0	0
22.	Small honey 100g	0	0	0	0	0	0	0	0	0
23.	Small honey 250gm	0	0	0	0	0	0	0	0	0
24.	Snake Boat 4 Men Mini	0	0	0	0	0	0	0	0	0
25.	Soap 165	0	0	0	17	148.5	165	0	0	0
26.	Soap 180	0	0	0	1	162	180	0	0	0
27.	Soap 29	0	0	0	2	26.1	29	0	0	0
28.	Soap 32	0	0	0	40	28.8	32	0	0	0
29.	Theyila	0	0	0	20	54	60	0	0	0
30.	Van then-250g	0	0	0	54	135	150	0	0	0
31.	Vanthen 500gm	0	0	0	45	270	300	0	0	0
32.	WILD HONEY	0	0	0	0	0	0	1900	0	700

Table 4.1.8c

	Name of the product/Items	9. Nilambur South			10. Nilambur North			12. Parambikulam		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	Bee Wax Whole Sale	16 kg	0	200/kg	0	0	0	0	0	0
2.	Cardamom 50gm	0	0	0	27	150	175	0	0	0
3.	Cheruthen	139 kg	0	1800	5kg	1000	1750	0	0	0
4.	Clove 50 gm	0	0	0	50 no	72	80	0	0	0
5.	DAMMER	0	0	0	2kg	160	300	0	0	0
6.	Dantha pala Oil (100ml)	0	0	0	10	550	1000	0	0	0
7.	DENTHAPALA OIL	0	0	0	0	0	0	1700 bottles	48	80
8.	Eucaliptus 50gm	0	0	0	15	90	100	0	0	0
9.	Honey (Big)	0	0	0	50	425	800	0	0	0
10.	INCHA	0	0	0	100 gm	35	40	0	0	0
11.	Kalloorvanchi 50gm	0	0	0	1	63	70	0	0	0
12.	Kasthurimanjal Podi	0	0	0	30 gm	45	50	0	0	0
13.	KUDAMPULI	66 kg	0	300	0	0	0	0	0	0
14.	Kurumthen	0	0	0	0	0	0	400kg	450	850
15.	Lemon grass oil	0	0	0	0	0	0	1000bottles (50ml)	80	100
16.	Malamthen	0	0	0	0	0	0	1500kg	450	750
17.	PEPPER	0	0	0	200	500	600	450kg	600	700
18.	Pulthailam 50gm	0	0	0	4	162	180	0	0	0
19.	Sandal Wood 1gm	0	0	0	15	18	23	0	0	0
20.	Sandal Wood Powder 100gm	0	0	0	4	190	200	0	0	0

21	Tea Powder 250gm	0	0	0	3	180	200	0	0	0
22	Thalipodi 50gm	0	0	0	5	45	50	0	0	0
23	WILD HONEY	449	0	800	0	0	0	0	0	0

Table 4.1.8d

	Name of the product/Items	13. Periyar			14. Punalur			15. Ranni		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	3 in 1 Sandal Soap	0	0	0	120	238	280	0	0	0
2.	Abhayarishtam	0	0	0	20	59.6	72	0	0	0
3.	Amukkuram podi	0	0	0	20	67.5	75	0	0	0
4.	Aranyam Magazine	0	0	0	22	45	50	0	0	0
5.	Balarishtam	0	0	0	10	66.23	80	0	0	0
6.	Black Dammer	0	0	0	0	0	0	300	0	350
7.	Burncare oinment	0	0	0	15	37.23	45	0	0	0
8.	Cardicare Tab	0	0	0	5	165.46	200	0	0	0
9.	Cashew plain 240	0	0	0	32	1578	2192	0	0	0
10.	Cashew plain 320	0	0	0	25	1249	1726	0	0	0
11.	Cashew Roasted 240	0	0	0	39	1537	3198	0	0	0
12.	Cashew Roasted 320	0	0	0	17	460	662	0	0	0
13.	Chavanaprasam	0	0	0	15	107.55	130	0	0	0
14.	Cheruthen	0	0	0	300	243	270	0	0	0
15.	Currymanjal Podi	0	0	0	50	22.5	25	0	0	0
16.	Dantha pala Oil (100ml)	0	0	0	0	0	0	10	600	1000
17.	Dantha pala Oil (200ml)	0	0	0	0	0	0	23.4	0	1000
18.	DENTHAPALA OIL	0	0	0	124	108	120	0	0	0
19.	Dhanwatharam Kuzhamb	0	0	0	5	103.48	125	0	0	0
20.	Dhanwatharam thailam	0	0	0	10	116.72	141	0	0	0
21.	Dhashamoolam	0	0	0	20	86.1	104	0	0	0
22.	Dhashamoolarishtam	0	0	0	40	80.29	97	0	0	0
23.	Eucalyptus oil(No)	0	0	0	0	0	0	50	0	100

24.	Foot crack balm	0	0	0	110	36	40	0	142	35
25.	Grambu	0	0	0	75	67.5	75	0	0	0
26.	Hair Oil	0	0	0	30	135	150	0	0	0
27.	Haritha Hair Oil (100ml)	0	0	0	0	0	0	4.1	0	0
28.	Haritha Hair Oil (200ml)	0	0	0	0	0	0	3.4	0	20
29.	Honey (Big)	0	0	0	0	0	0	232.5	0	500
30.	Honey (Small)	0	0	0	0	0	0	27	0	1400
31.	Honey 250gm	225	0	120.5	0	0	0	0	0	0
32.	Jeerakarishtam	0	0	0	15	91.06	110	0	0	0
33.	Joint pain balm	0	0	0	100	36	40	2	36	40
34.	Kairali Soap (No)	0	0	0	0	0	0	240	18	20
35.	Kalloorvanchi	0	0	0	0	0	0	18	0	70
36.	Karutha kunthirikkam	0	0	0	100	90	100	0	0	0
37.	Karuvapatta	0	0	0	70	40.5	45	0	0	0
38.	Kasthurimanjal Podi	0	0	0	100	31.5	35	0	0	0
39.	Kerala Sandal Soap(No)	0	0	0	0	0	0	148.5	162	180
40.	Kottamchukkadi thailam	0	0	0	10	88.57	107	0	0	0
41.	KUDAMPULI	0	0	0	70	108	120	350	0	360
42.	Kudampuli Pta	0	0	0	50	180	200	0	0	0
43.	Lemon grass oil	0	0	0	0	0	0	55	0	180
44.	Lip balm(No)	0	0	0	60	36	40	0	157	35
45.	Lipocare Tab	0	0	0	5	248.19	300	0	0	0
46.	Marayoor sharkkara	0	0	0	140	58.3	95	0	0	0
47.	Mask	0	0	0	500	8	10	0	0	0
48.	Mosqitorepelent Balm	0	0	0	60	36	40	0	0	0
49.	Mosquito repellent balm(No)	0	0	0	0	0	0	0	157	35
50.	Murivenna oil	0	0	0	15	91.06	110	0	0	0
51.	Murivenna Oinment	0	0	0	10	24.83	30	0	0	0
52.	Mustharishtam	0	0	0	5	64.56	78	0	0	0
53.	Naikurunapodi	0	0	0	50	72	80	0	0	0
54.	Nerinjil	0	0	0	50	31.5	35	0	0	0
55.	Oushadi baby oil	0	0	0	5	91.01	110	0	0	0
56.	Oushadi bliss balm	0	0	0	20	24.83	30	0	0	0
57.	Oushadi cough syrap	0	0	0	15	45.5	55	0	0	0
58.	Oushadi facepack	0	0	0	25	99.28	120	0	0	0
59.	Oushadi Hairtone	0	0	0	5	136.5	165	0	0	0
60.	Oushadi toothpowder	0	0	0	15	28.95	35	0	0	0

61.	Pain balm	0	0	0	150	36	40	0	36	40
62.	Pathimukam Chips	0	0	0	250	9	10	0	0	0
63.	PEPPER	0	0	0	30	67.5	75	0	0	0
64.	Pepper 100gm	260	0	35	0	0	0	0	0	0
65.	Pepper powder	0	0	0	30	67.5	75	0	0	0
66.	Premehaoushadi choornam	0	0	0	10	198.55	240	0	0	0
67.	Premehaoushadi Tab	0	0	0	5	215.11	260	0	0	0
68.	Pulthailam	0	0	0	150	198	250	0	0	0
69.	Pure sandal powder	0	0	0	20	540	600	0	0	0
70.	Rasnadi choornam	0	0	0	10	36.42	44	0	0	0
71.	Rekthachandanam podi	0	0	0	90	126	140	0	0	0
72.	Rhumnjith ointment	0	0	0	10	28.96	35	0	0	0
73.	SANDAL OIL	0	0	0	40	900	1000	0	0	0
74.	Sandal Powder	0	0	0	30	180	200	0	0	0
75.	Sandal wood	0	0	0	1638	20.7	23	0	0	0
76.	Sanitizer	0	0	0	310	20	35	0	0	0
77.	Sanitizer	0	0	0	140	15	20	0	0	0
78.	Sanitizer	0	0	0	40	0	70	0	0	0
79.	Thrill Family Pack(No)	0	0	0	0	0	0	0	117	130
80.	Trio Sandal Soap	0	0	0	24	134	165	0	0	0
81.	Trio Sandal Soap	0	0	0	144	145.2	180	0	0	0
82.	Tshirt(No)	0	0	0	0	0	0	413	0	0
83.	Unpacked Black Dammer	0	0	0	0	0	0	230	200	300
84.	Unpacked incha	0	0	0	0	0	0	70	50	70
85.	Unprocessed Honey	0	0	0	0	0	0	697.5	300	350
86.	Unprocessed Honey (Small)	0	0	0	0	0	0	7	1000	1050
87.	Vaidehi Hair Oil (100ml)	0	0	0	0	0	0	6	0	1000
88.	Vaidehi Hair Oil (200ml)	0	0	0	0	0	0	7.4	0	1000
89.	Vanthen	0	0	0	150	270	300	0	0	0
90.	Vanthen 500gm	250	0	270	0	0	0	0	0	0
91.	Vathamukthi thailam	0	0	0	30	135	150	0	0	0
92.	VEP Soap	0	0	0	288	20.17	25	0	0	0
93.	Vilwadilehyam	0	0	0	5	68.71	83	0	0	0
94.	White Dammer	0	0	0	150	45	50	0	0	0
95.	Wild honey 500gm	300	0	150	0	0	0	0	0	0

Table 4.1.8e

	Name of the product/Items	16. Shendurney			17. Silent Valley			19. Thenmala VS		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	AROMATIC TURMERIC	0	0	0	0	0	0	14.5KG	360/KG	400/KG
2.	Black Dammer	6.25	2250	2500	0	0	0	0	0	0
3.	CLOVE	0	0	0	0	0	0	17KG	900/KG	1000/KG
4.	DAMMER	0	0	0	0	0	0	107KG	540/KG	600/KG
5.	DENTHAPALA OIL	0	0	0	0	0	0	17.800KG	900/KG	1000/KG
6.	Eukaliptus Oil	0.5L	900	1000	0	0	0	0	0	0
7.	Foot crack relief	0	0	0	0	0	0	0	0	0
8.	GARCINA PODS	0	0	0	0	0	0	53.450GM	315/KG	350/KG
9.	Honey (Big)	12.5	6525	7250	2065.4	500	800	0	0	0
10.	Honey (Small)	45	54675	60750	0	0	0	0	0	0
11.	INCHA	0	0	0	0	0	0	2.2KG	360/KG	400/KG
12.	Karimanjal podi	5	1125	1250	0	0	0	0	0	0
13.	Kasthoori Mangal	5	1575	1750	0	0	0	0	0	0
14.	Kerala Sandal tri	48 pkt	7776	8640	0	0	0	0	0	0
15.	KUDAMPULI	12.5	5400	6000	115.1	230	340	0	0	0
16.	KUNTHIRIKKAM	0	0	0	106.1	150	280	0	0	0
17.	Lemon grass oil	5	9900	11000	0	0	0	0	0	0
18.	MARAYOOR JAGGRY	0	0	0	0	0	0	102KG	90/KG	100/KG
19.	Marayoor sharkkara	25	2137.5	2375	0	0	0	0	0	0
20.	Pathimugam	2	900	1000	0	0	0	0	0	0
21.	Pathiripoovu Wholesale	0	0	0	0	0	0	0	0	0
22.	PEPPER	2.5	1687.5	1875	0	0	0	346KG	540/KG	600/KG
23.	Rakthachandana powder	2.5	3150	3500	0	0	0	0	0	0
24.	SANDAL OIL	0	0	0	0	0	0	58GM	270/GM	300/GM
25.	SMALL HONEY	0	0	0	0	0	0	52.5KG	1620/KG	1800/KG
26.	TURMERIC	0	0	0	0	0	0	18.700KG	270/KG	300/KG
27.	VIRGIN COCONUT OIL	0	0	0	0	0	0	16KG	1368/KG	1520/KG
28.	WILD HONEY	0	0	0	0	0	0	342.5KG	594/KG	660/KG

Table 4.1.8f

	Name of the product/Items	20. TVM F HQ			20 TVM Kottoor			21. Vazhachal		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	Agasthya Hair Oil	0	0	0	71	9585	10650	0	0	0
2.	Amakkuram 50gm	20	120	75	0	0	0	0	0	0
3.	Big Honey	0	0	0	34	44739	49710	0	0	0
4.	Black Dammer	0	0	0	0	0	0	39.5	170	340
5.	Blackdammer 250 gm	505	250	100	0	0	0	0	0	0
6.	Cardamom 50gm	0	120	75	0	0	0	0	0	0
7.	Chandhanapodi 100gm	0	0	1500	0	0	0	0	0	0
8.	Chandhanathadi kaathal 1kg	0	0	2000	0	0	0	0	0	0
9.	Chandhanathylam 2gm	0	0	600	0	0	0	0	0	0
10.	Chandhanathylam 5gm	0	0	1500	0	0	0	0	0	0
11.	Chandhanathylam 10gm	0	0	3000	0	0	0	0	0	0
12.	Cheruthen 500gm	341	900	675	0	0	0	0	0	0
13.	CLOVE	0	0	0	17	11813	13125	0	0	0
14.	Clove 50 gm	60	100	75	0	0	0	0	0	0
15.	Honey (Big)	0	0	0	0	0	0	1463	450	650
16.	INCHA	0	0	0	0	0	0	12	90	200
17.	Kalloorvanchi	0	0	0	0	0	0	52.7	80	300
18.	Karimanjal 100gm	668	125	25	0	0	0	0	0	0
19.	Karuvapatta 50gm	129.	400	45	0	0	0	0	0	0
20.	Kasthoorimanjali 100gm	307	160	35	0	0	0	0	0	0
21.	Kasthoorimanjali kizhang	0	0	300	0	0	0	0	0	0
22.	KUDAMPULI	0	0	0	17	18576	20640	0	0	0

23	Kudampuli 250gm	692	250	120	0	0	0	0	0	0
24	KUNTHIRIKKA M	0	0	0	74	3330	3700	0	0	0
25	MARAYOOR JAGGRY	555 3	0	95	0	0	0	0	0	0
26	Mulayari 250GM	0	260	120	0	0	0	0	0	0
27	Naykuruna paripp upodi 50gm	24.5	130 0	80	0	0	0	0	0	0
28	Njerinjil 50gm	35	300	35	0	0	0	0	0	0
29	Painbalm 10gm	0	0	35	0	0	0	0	0	0
30	Pathimukham 20gm	0	210	10	0	0	0	0	0	0
31	PEPPER	0	0	0	10 0	9000	10000	0	0	0
32	Pepper 75gm	445	775	75	0	0	0	0	0	0
33	Pepper powder	0	0	0	95	6413	7125	0	0	0
34	Raamacham 10gm	0	250	10	0	0	0	0	0	0
35	Shathaavari acchaar 125gm	0	0	75	0	0	0	0	0	0
36	Shikkakai 100gm	0	0	200	0	0	0	0	0	0
37	Small Honey	0	0	0	59 3	21481 2	13868 0	0	0	0
38	Thakkolam 50gm	0	550	30	0	0	0	0	0	0
39	Turmetic Powder	0	0	0	57	1796	1995	0	0	0
40	Vanthen 500gm	296 2	300	290	0	0	0	0	0	0
41	White dammer 100gm	104	300	50	0	0	0	0	0	0

Table 4.1.8g

	Name of the product/Items	22. Wayanad Wildlife			23. TVM (Neyyar -pepp)			24. Kozikkode		
		Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price	Qty per kg	Buying price	Selling price
1.	3 in 1 Sandal	0	0	0	10	135	150	0	0	0

	Soap									
2.	Agasthya Hair Oil	0	0	0	16	135	150	0	0	0
3.	Amukkuram podi	0	0	0	1	63	70	0	0	0
4.	Black Dammer	0	0	0	19	90	100	0	0	0
5.	DENTHAPALA OIL	0	0	0	11	108	120	0	0	0
6.	Honey (Big)	0	0	0	0	0	0	100 Kg	600	800
7.	Honey 250gm	0	0	0	0	0	0	400 no	0	250
8.	Honey 500gm	0	0	0	0	0	0	399 no	0	500
9.	Kasthoori Mangal	0	0	0	10	31	35	0	0	0
10	KUDAMPULI	0	0	0	8	108	120	0	0	0
11	Naikurunapodi	0	0	0	13	72	80	0	0	0
12	Pathimugam	0	0	0	15	9	10	0	0	0
13	PEPPER	0	0	0	10	67	75	0	0	0
14	Pepper powder	0	0	0	13	67	75	0	0	0
15	Van then-250g	0	0	0	19	108	120	0	0	0
16	Vanthen	5450.4	350	750	0	0	0	0	0	0
17	WILD HONEY	4021	350	700	0	0	0	0	0	0

Vanasree/ Eco shop Products of Kerala

Vanasree products are classified into five categories such as Personal care products, Household products, Health products, Groceries and Others.

Table 4.1.9 Vanasree products from Eco shops of Kerala under various categories

Personalcare	Household	Health	Groceries	Others
Agasthya hair oil	Amukkurampodi	Abhayarishtam	Achar	Alappey boat
Aromaticturmeric	Black dammer	Beewax	Bamboo rice	Aranyam magazine
Haritha hair oil	Cheenikai	Burncare oinment	Cardamom	Cloth bag
Dandapala oil	Karuvapatta	Big honey	Cashewplain	Coconut vessels
Kairalissoap	Lemon grassoil	Chavanaprasam	Cashew roasted	House boat
Kalloorvanchi	Marottikkuru	Cherurthane	Clove	Mask
Kasthoorimanjal	Mosqito repellent balm	Eucalyptus	Cofee powder	Pen holder

Kerala sandalfamily	Pathimugam	Foot crack balm	Gingerpickle	Tshirt
Kerala sandaltrio	Pathiripoovu	Joint pain balm	Greentea	
Pure sandal powder		Lip balm	Kadumangapick	
Raamacham		Murivennooil	Kudampuli	
Raktha chandana powder		Naikurunapodi	Mangopickle	
Redsandal			Marayoor sharkkara	
Redsandal powder			Navararice	
Sandaloil			Nellikathen	
Sandal powder			Nellikapickle	
Thalipodi			Pepper	
Vep soap			Sathavaripickle	
			Teapowder	
			Thennellika	

Trade performance of Major Vanasree Eco shop Products of Kerala

The study analysed the trade performance of different Vanasree products involved in the marketing of NTFP's to the livelihood of the indigenous communities of Kerala. Among the marketed 70 Vanasree products, 25 NWFP products marketed through the Eco Development Committee (EDC) were selected. Private shops do not share their profit with the collectors, where as the society/VSS/EDC gives certain percentage of their profit back to the primary collectors in addition to the procurement price. But the financial constraints during the lean seasons are forcing the indigenous communities to sell their products to the private shops. In this study we analysed the annual trade performance of 25 Vanasree products.

Trade performance of Major Vanasree Eco shop Products during 2019-20



	<p>Honey (Big, Vanthen) Present in: 19 FDA division/24 FDA Quantity:1763 Kg per year (Approx.) Rate :1080 Rs/1 Kg</p>
	<p>Honey (Small, Cheruthen) Present in:14 FDA division/24 FDA Quantity:505 Kg per year (Approx.) Rate : 350 Rs/100 gm</p>
	<p>Incha (1kg, 50gm) Present in: 8FDA division/24 FDA Quantity:7.2 Kg per year (Approx.) Rate :135 Rs/Kg</p>
	<p>WhiteDammer Present in: 5FDA division/24 FDA Quantity:1.5 Kg per year (Approx.) Rate :198 Rs/Kg</p>
	<p>BlackDammer Present in: 5FDA division/24 FDA Quantity:156 Kg per year (Approx.) Rate :320 Rs/Kg</p>

	<p>Kudampuli(Garcinia) Present in: 10FDA division/24 FDA Quantity:297.2 Kg per year (Approx.) Rate :80 Rs/200gm</p>
	<p>Grampoo (Clove) Present in: 12FDA division/24 FDA Quantity:30.2 Kg per year (Approx.) Rate :90 Rs/100gm</p>
	<p>Dhanthapala 100ml Present in: 5FDA division/24 FDA Quantity:2224 bottles per year (Approx.) Rate :1000 Rs/100ml</p>
	<p>Dhanthapala 100gm Present in: 4FDA division/24 FDA Quantity:319 Kg per year (Approx.) Rate :120 Rs/100gm</p>
	<p>Pepper100gm Present in:12 FDA division/24 FDA Quantity:954 Kg per year (Approx.) Rate :85 Rs/100gm</p>

	<p>Virgincoconut oil Present in: One FDA division/24 FDA Quantity:16 Kg per year (Approx.) Rate :1520Rs/1Kg</p>
	<p>Cardamom Present in: 7FDA division/24 FDA Quantity:57.8 Kg per year (Approx.) Rate :1440 Rs/1Kg</p>
	<p>Marayoorsharkkara Present in: 6FDA division/24 FDA Quantity:2170 Kg per year (Approx.) Rate :85Rs/1Kg</p>
	<p>Karuvappatta Present in: 3FDA division/24 FDA Quantity:7.7 Kgperyear (Approx.) Rate :27 Rs/100gm</p>
	<p>Eucalyptus oil Present in:5 FDA division/24 FDA Quantity:1.5 Kg per year (Approx.) Rate :90 Rs/50gm</p>

	<p>Kasthoori Manjal Present in: 10FDA division/24 FDA Quantity:4.1 Kg per ryear (Approx.) Rate :50 Rs/100gm</p>
	<p>Manjal Present in:7 FDAdivision/24 FDA Quantity:76.5 Kg per year (Approx.) Rate :25 Rs/100gm</p>
	<p>Red Sandal Powder(100gm) Present in: 7FDA division/24 FDA Quantity:0.1 Kg per year (Approx.) Rate :126 Rs/100gm</p>
	<p>Red Sandalwood(100gm) Present in: 7FDAdivision/24 FDA Quantity:1.14 Kg per year (Approx.) Rate :14 Rs/100gm</p>
	<p>Puresandal powder Present in: One FDA division/24 FDA Quantity:5.8 Kg per year (Approx.) Rate :450 Rs/20gm</p>

	<p>Sandalwood Present in: One FDA division/24 FDA Quantity:0.4 Kg per year (Approx.) Rate :21 Rs/100gm</p>
	<p>SandalwoodOil Present in: One FDA division/24 FDA Quantity:0.4 Kg per year (Approx.) Rate :540 Rs/2gm</p>
	<p>Thali podi Present in: 4FDAdivision/24 FDA Quantity:2.9 Kg per year (Approx.) Rate :50 Rs/50 gm</p>
	<p>Pathimukham Present in:6 FDA division/24 FDA Quantity:6.8 Kg per year (Approx.) Rate :540 Rs/Kg</p>
	<p>LemonGrass oil Present in:10 FDA division/24 FDA Quantity:115Lper year (Approx.) Rate :90 Rs/50ml</p>

4.3. CURRENT STATUS OF HONEY TRADE NETWORK IN KERALA – CASE STUDY

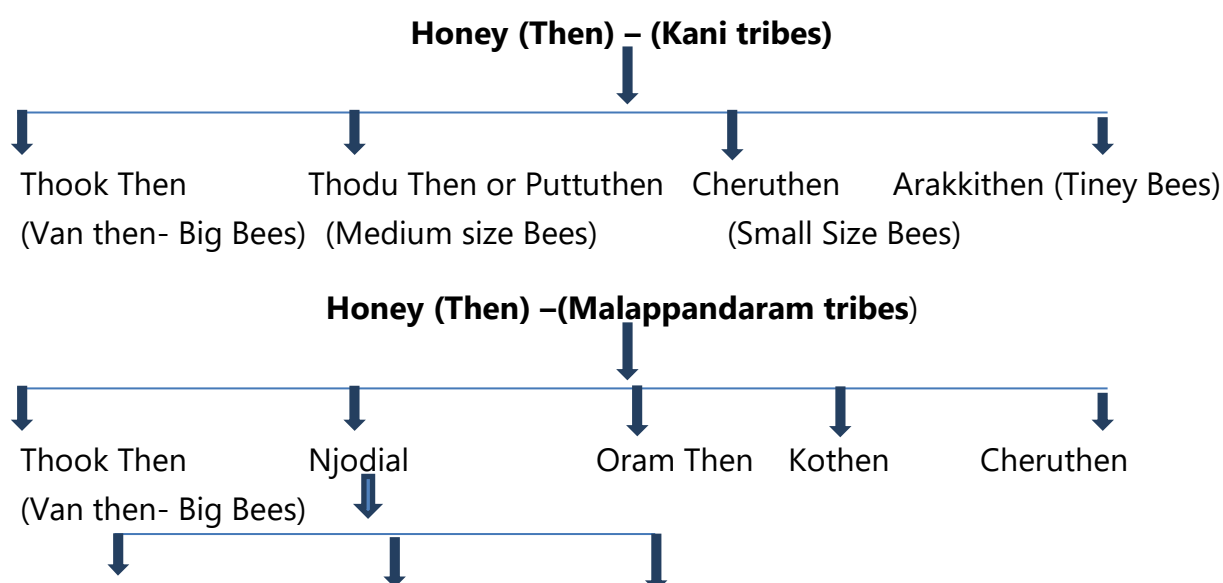
Medicinal and Food value of Honey

Honey, Bee wax are two important NWFP items in Kerala. Healing property of honey was known to the Tribal communities of Kerala and they use honey as food and medicine.

One table spoon honey (21gms) provides about 64 calories and 17 g of sugar including fructose, glucose, maltose and sucrose, but no fiber or protein. It contains several vitamins and minerals. It is having wound healing properties and used is also used for administering Ayurvedic medicines. Honey contains various bio active compound and is one of the best anti-oxidant agent. It also contains phenolic compound and flavonoid. It also contain trace amount of enzymes, amino acids, vitamin B, C and Minerals. Honey is a good anti-bacterial and anti-fungal agent, also having wound healing property and enhance immunity, digestion and gut health and sore throat.

Honey and Tribal communities of Kerala

Kani tribals, is one of the prominent tribal community in the southernmost part of Kerala residing in and around the forest areas of Agasthyahills. They categorized honey into four types and described its benefits including bee wax. Honey has been classified based on the size of the bees.



Chen njodial Karim njodial Njodial
(These categorization is based on the colour of the bee)

Each Honey varieties have different colour, smell, taste and properties. These properties are entirely different form each other based on the nectar from different flowers.

Eg.I.

- 1) Nector collected from the flower of kanjiram (*Strychnos nux-vomica*)
- 2) Nector collected from Bahdraksham/ Kanamaram- (*Elaeocarpus tuberculatus*).Taste of this honey is bitter and is used by diabetic patients and is also having wound healing properties.

Eg.II

Nector collected from Manjakdampu- (*Neolamarckia cadamba*)is having the property to produce intoxication after the consumption.

List of the flowering trees, usually frequented by the honey bees to collect nectar

1. Kudappunna, 2. Mulliavu, 3. Kopala, 4.Perumaram, 5. Karpakam, 6. Pongu, 7. Venga, 8. Kunthirikamaram (Black & Wight), 10. Elavu, 11. Ilippa, 12, Chhenmaram, 13. Karingali, 14. Pezhu, 15. Kanjiram, 16. Mulluvenga, 17. Manja Kadambu etc.

Honey gathered from kudapunna is having excellent smell. Similarly honey collected from Elavu has dark red colour. Thook then is having the color of sandal wood, colour of the cheruthen resembles that of black tea. According to tribal communities small bees usually make their hives in large trees, and it is very difficult to collect the honey. Vachupootu (Locking system) is one of the procedure adopted to ensure the ownership right of particular hive in which they make natural steps to climb tree. This is called locked system to establish to ownership of the hive. If someone damages the lock, other member of the community is not authorized to collect honey from those particular trees. This is according to their customary law practiced by the communities from the time immemorial. Honey is normally collected from large trees during the night. They apply the paste of fresh rhizome or leaves of Kattinji (Zingiber zerumbet) over the whole body and scalp and hold a fire stick made with the leaves of the same species which produce fumes. After the honey collection, they remove the whole hive and transfer the related materials in to the basket. The bee wax is separated according to their traditional method.

AGRICULTURE AND HORTICULTURE

4.2.1. AGRO BIODIVERSITY OF KERALA

Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and those that constitute the agro-ecosystem: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes. It plays a crucial role in achieving food security, eradicating hunger, improving human nutrition and provides essential functions in the agricultural landscapes.

Kerala is famous for homestead farming system, which integrates the home with useful fruit trees and shrubs, vegetables, tuber crops, spice crops, fodder crops, livestock, and poultry in a small (usually about 0.10 ha or more) area of land. A total of 452 crops belonging to 82 families are being grown in Kerala. Among these, 256 crops have edible uses (cereals and millets, pseudocereals, pulses, oil seeds, tuber crops, sugars and starches, fruits and nuts, and vegetable crops). A total of 118 fruits and nuts have been recorded including 22 subtropical fruits. Others in the list are cereals and millets–11, pseudocereals–4, pulses–10, oil seeds–8, tuber crops–24, sugars and starches–8, vegetables–73, spices and condiments– 21, beverages–5, stimulants– 3, cut flowers–20, cut foliage plants–14, green manure crops–10, cover crops–4, fodder crops–42, fibre crops–6, rubber crops–1, essential oil yielding plants–7, medicinal plants–45, and crops of miscellaneous uses–18 (Thomas, 2022). Although 452 crops have been listed, area under cultivation is available for 69 crops only (GOK, 2021). However, area of minor crops are available as groups of 'other oil seeds', 'other tuber crops', 'other spices and condiments', 'other fruits', 'other vegetables', 'fodder crops', 'green manure crops', 'medicinal plants', and 'other crops and trees' indicating that such crops are grown in

small scale, as a part of homesteads or along with other crops such as coconut in multiple cropping systems. The cultivated crops of Kerala are given in Annexure 4.16. The details of accessions of Agricultural crops, spices, minor fruits, wild relatives of agricultural crops conserved at ICAR NBPGR regional station, Thrissur and ICAR-IISR, Kozhikode is given in Annexures- 4.17 to 4.20. A checklist of dye yielding plants is given in Annexure 4.21.

Crops cultivated in Kerala

Seasonal crops: Paddy, pulses, tapioca, vegetables, sweet potato, tubers, groundnut, ginger, turmeric, cotton, tobacco, onion, tur, etc.

Annual crops: Sugarcane, banana, plantain, pineapple, betel leaves, etc.

Perennial crops: Coconut, arecanut, cashew, mango, jack, tamarind, pepper, rubber, tea, coffee, cardamom, cloves, nutmeg, cinnamon, cocoa, papaya, etc.

Cropping Pattern

In Kerala, there are only four crops - coconut, rubber, rice, and banana (including plantain), which have an area above one lakh hectares. Crops occupying more than 10,000ha are 17 only. The maximum area is under coconut (1) followed by rubber (2) and rice (3). Other crops in the order of rank based on area occupied are banana and plantain (4), areca nut (5), jack fruit (6), coffee (7), black pepper (8), mango (9), cassava (10), cashew nut (11), cardamom (12), tea (13), nutmeg (14), papaya (15), drumstick (16), and cocoa (17).

Table 4.2.1. Area under major crops in Kerala

Sl. No.	Crop	Area(ha)	Sl. No.	Crop	Area(ha)
	Cereals & Millets			Fruits & Nuts	
1	Rice	198180	1	Cashew nut	39898
2	Wheat (Emmer)	1	2	Mango	78554
3	Maize	113	3	Banana	60678

4	Sorghum	285	4	Plantain	56199
5	Little millet	57	5	Jack fruit	93209
6	Finger millet	213	6	Pine apple	9625
	Pulses		7	Papaya	18550
1	Red gram	313	8	Orange	240
2	Gram	600	9	Lemon	1150
3	Other pulses	1347	10	Other fruits	12927
	Oil seeds			Total fruits	371030
1	Coconut	760776		Vegetables	
2	Sesame	208	1	Drumstick	16977
3	Ground nut	117	2	Amaranth	1956
4	Sunflower	1	3	Bitter gourd	1936
5	Other oil seeds	2241	4	Snake gourd	994
	Tuber Crops		5	Okra	1462
1	Cassava	62070	6	Brinjal	1270
2	Elephant foot yam	6049	7	Green chillies	1621
3	Colocasia	6336	8	Bottle gourd	224
4	Greater yam	1419	9	Little gourd	1662
5	Lesser yam	187	10	Ash gourd	1067
6	Sweet potato	194	11	Pumpkin	1258
7	Koorka	993	12	Cucumber	1024
8	Potato	490	13	Veg. cowpea	5128
9	Other tuber crops	478	14	Carrot	953
	Sugars and Starches		15	Beet root	3
1	Sugarcane	950	16	Cabbage	150
2	Palmyrah	1873	17	Beans	1154
	Spices & Condiments		18	Onion	11
1	Black pepper	83765	19	Tomato	464
2	Cardamom	39697	20	Other vegetables	1225
3	Cinnamon	92		Total vegetables	41053
4	Nutmeg	23329		Beverage crops	
5	Tamarind	9962	1	Coffee	85880
6	Vanilla	53	2	Tea	35871
7	Clove	854	3	Cocoa	14276
8	Ginger	2819		Other Crops	
9	Turmeric	2277	1	Rubber	551200
10	Garlic	191	2	Cotton	54
11	Others	1413	3	Lemon grass	101

	Stimulants		4	Fodder crops	6307
1	Tobacco	8	5	Green manure crops	19712
2	Arecanut	96921	6	Medicinal plants	1328
3	Betel leaf	259		Other crops & trees	126213
				Teak	26786

Table 4.2.2. Area under Cultivation and Production of Principal Crops

Sl.No	Crops	Area (ha)		Production (T)		Productivity (kg/ha)	
		2019-20	2020-21	2019-20	2020-21	2019-20	2020-21
1	Rice	19105 1	201865	587078	626888	3073	3105
2	Pulses including Tur	2260.46	2005.95	2103	1922.94	965.9	958.6
3	Pepper	83765	82124.36	34545	33590.933	412	409
4	Ginger	2819	2700.40	11917	12095.265	4227	4479
5	Turmeric	2277	2216.84	6653	7420.478	2922	3347
6	*Cardamom	39697	39143	10076	20570	254	526
7	Areca nut	96921	96570.49	92755	103158.596	957	1068
8	Banana	60678	57694.67	548425	544188.717	9038	9432
9	Other Plantains	56199	53568.83	406902	412864.399	7240	7707
10	Cashew nut	39898	37923.31	19444	20908.992	487	551
11	Tapioca	62070	64245.99	2592633	3027749.827	41770	47127
12	**Coconut	760776	768809.0 4	4814	4788	6328	6228
13	***Coffee	85880	85880	65459	68545	762	798
14	\$Tea	35871.16	35871.16	59260	66850	1652	1864
15	# Rubber	551030	550650	533500	519500	1559	1534
	Millets						
16	Ragi	213	230.26	261	329.55	1225	1431
17	Small millets	57	51	43	37.70	778	739
18	Sweet potato	194	309.04	2782	4356.53	14340	14097
19	Other tubers	15462	14640.4				

Note** Production in million nuts, Productivity in nuts per ha, ^^ Paddy wetland area only

Source * Spices board, # Rubber Board, *** Coffee Board, and Tea Board, Directorate of Economics and Statistics

In the gross cropped area of 25.69 lakh hectares in 2020-21, food crops comprising rice, pulses, tapioca, ragi, small millets, sweet potato and other tubers occupied 11.03 per cent. In 2020-21, food crops except pulses and small millets showed an increasing trend in production. The production of rice, tapioca and sweet potato recorded an increase of 6.8 per cent, 16.8 and 56.6 per cent respectively compared to 2019-20. The area under rice, tapioca and sweet potato has recorded an increase of 5.7, 3.5, 59.3 per cent respectively. In the case of spices, pepper showed a decline in production, while production of ginger and turmeric showed an increase.

4.2.2 AGRICULTURAL CROPS- PRODUCTION DATA

a. Cereals and Millets

Paddy The total paddy area during the year 1961-'62, was 7.53 lakh hectares and in 1975-'76 it was 8.76 lakh hectares. Thereafter a steady decrease in paddy cultivation and reached to 2.29 lakhs hectares during the agricultural year 2007-08. The area under **paddy** cultivation during 2015-16 was 1, 96,870 ha decreased by 1289 ha (0.65%) than 2014-15. 5930.67 ha denoted dry land paddy cultivation in 2015-16.

In 2020-21, the area under rice cultivation in the State was 2.02 lakh ha, an increase of 5.7 per cent compared to 2019-20. The production and productivity of rice increased to 6.27 lakh tonnes and 3,105kg/ha respectively which is an increase of 6.8 per cent and 1.04 per cent over 2019-20. Rice occupied 7.86 per cent of the total cultivated area in the State in 2020-21. On analyzing the area under cultivation for the last 10 years, the area under paddy cultivation was highest in 2011-12 recording an area of 2.08 lakh ha with a production of 5.69 lakh tonnes. A steady increase in production and productivity is

noticed from 2017-18 onwards. The highest production and productivity was recorded in 2020-21.



Table 4.2.3 Area, Production and Productivity of Rice in Kerala and India

Sl. No	Year	Area ('000 ha)		Production ('000MT)		Productivity (kg/ha)	
		Kerala	India	Kerala	India	Kerala	India
1	2011-12	208.16	43970	568.993	102750	2733	2337
2	2012-13	197.277	42410	508.299	104399	2577	2462
3	2013-14	199.611	43900	564.325	106500	2827	2424
4	2014-15	198.159	43860	562.092	105480	2837	2390
5	2015-16	196.87	43500	549.275	104410	2790	2400
6	2016-17	171.398	43990	436.483	108500	2547	2494
7	2017-18	189.086	43770	521.31	112910	2757	2578
8	2018-19	198.026	44160	578.256	116480	2920	2638
9	2019-20	191.051	43780*	587.078	118870*	3073	2715*
10	2020-21	201.865	n.a	626.888	122270*	3105	n.a

Directorate of Economics and Statistics.

Table 4.2.4 District-wise Area, Production and Productivity of Rice in Kerala

Sl. No.	District	Area (ha)				Upland paddy area (ha)				Production (MT)			Productivity (kg/ha)				
		2017-18	2018-19	2019-20	2020-21	2017-18	2018-19	2019-20	2020-21	2017-18	2018-19	2019-20	2020-21	2017-18	2018-19	2019-20	2020-21
1	Thiruvananthapuram	1737	1969	1809	2130	14	70	54	17.02	4551	5167	4541	5659.6	2620	2624	2510	2657
2	Kollam	1923	1975	2098	2355	243	160	106	241	4302	4514	4183	5218.93	2237	2286	1994	2216
3	Pathanamthitta	3087	3169	3503	3751	14	31	2	1.04	8843	11676	11383	11143.6	2865	3685	3250	2971
4	Alappuzha	36325	38623	35653	40048	4068	3650	4683	296	105676	128560	112593	125803	2909	3329	3158	3141
5	Kottayam	17426	22172	17625	18491	44	51	1115	1199	49509	61917	50051	54268.1	2841	2793	2840	2935
6	Idukki	825	676	603	804	13	12	14	16	2293	1562	1467	1899.68	2779	2310	2433	2363
7	Ernakulam	5414	5002	4644	4719	26	43	2	22	12888	11191	10859	10971.3	2380	2237	2338	2325
8	Thrissur	21478	21982	22632	23902	86	150	114	44	69114	69454	76556	87655.3	3218	3160	33383	3667
9	Palakkad	75276	76943	76783	76754	139	179	178	162	198626	215285	248199	246992	2639	2798	3232	3218
10	Malappuram	7790	8206	8626	9379	74	134	177	161.4	23571	26984	28214	30504.3	3026	3288	3271	3252
11	Kozhikode	2528	2175	2128	2097	236	154	276	188	3960	3439	2867	2663.16	1566	1581	1347	1270
12	Wayanad	8026	7762	7326	8065	0	0	0	0	21792	22340	19513	23088.4	2715	2878	2658	2863
13	Kannur	5190	5140	5352	6319	157	191	363	727	11318	11143	11804	14408.5	2181	2168	2205	2280
14	Kasaragod	2061	2234	2269	3051	35	57	45	101	4867	5024	4848	6611.48	2361	2248	2137	2167

	State	189086	198026	191051	201865	5149	4882	7129	3175.46	521310	578256	587078	626888	2757	2920	3073	3105
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Palakkad, Alappuzha, Thrissur and Kottayam accounted for about 78.9 per cent of the total area of rice in the State, (38 per cent, 19.8 per cent, 11.8 per cent and 9.2 per cent respectively). These districts contributed 82 per cent of the total rice production in the State. Palakkad and Alappuzha Districts stood first and second with respect to area and production of rice in the State.

An increase in production is seen in all the districts except Pathanamthitta, Palakkad and Kozhikode compared to 2019-20. The highest increase in area of 18 per cent was in Kannur district and the highest increase in production of 36.3 per cent was in Kasaragod district. The highest increase in productivity of 11 per cent was in Kollam district followed by Thrissur district. In addition to wetland cultivation, upland paddy cultivation was undertaken in an area of 3,175.5ha producing 6,846 tonnes. The productivity of upland rice was 2,156kg per ha. The area under upland rice decreased by 55 per cent compared to 2019-20 .About 96.7 per cent of the paddy area extending to 1.95 lakh ha was cultivated with high yielding varieties and 6,587ha with local varieties.

Other Cereals/ Millets

Area of cultivation of Cholan /Jower (including cattle feed) during 2019-2020 at Palakkad was at the maximum of 285 ha. The production and productivity were also improved i.e., 235 tonnes & 825Kg/ha respectively.

Ragi/Finger Millet (Koovaraku) was cultivated at Idukki at its maximum i.e., 76 ha and Palakkad 97 ha when compared to 2018-19. The respective values of production and productivity in the districts were 140 tonnes (enhanced) & 1842 Kg/ha; 121 tonnes&883Kg/ha. The state total was 261 tonnes.

Similarly, Maize was cultivated at Idukki 16 ha and Palakkad 97ha. Production at Idukki was 42 tonnes (decreased), Palakkad 98 tonnes (increased). The mean productivity of the state was 1239 Kg/ha.

Small Millet (Thina/Chama) was cultivated only at Palakkad 57 ha (increased). Production of Thina was 43 tonnes (increased as compared to 2018-19) and productivity was 778Kg/ha.

Wheat was cultivated at Idukki 1 ha. The production was 2 tonnes and productivity was 2000Kg/ha

Table 4.2.5. Production (tonnes) of millets and cereals during 2019-2020

Districts	Cholam /Jower Including cattle feed	Ragi/ Finger Millet (Koovaraku)	Maize	Small Millet (Thina/ Chama)	Wheat	Other grains
Pathanamthitta						
Idukki		140	42		2	
Palakkad	235	121	98	43		
Malappuram						
Wayanad						
State Total	235	261	140	43	2	

b. Major spices of Kerala

The important spices and condiments crops being cultivated in Kerala are pepper, ginger, turmeric, cardamom, tamarind, cloves, cinnamon, nutmeg, garlic etc. Major contribution of spices & condiments was from Idukki district in all the years.

Pepper contributes to 32% area to the total area of spices. The total area under the cultivation of spices& condiments during the agricultural year 2015-16 was 2, 68,222 ha, 2016-17 was 2, 66,130 ha, 2017-18 was 2, 60,787 ha, 2018-19 was 2, 58,373.96 ha., 2019-20 was 2, 61373.

The area under cultivation of pepper during 2019-20 was 83765 ha. Idukki stands 1st position with an area of 42,822 ha and the contribution to state total was 51.12 %. Wayanad stands next in position in area during the last 10 years. Pepper cultivation was

least in Alappuzha and the contribution during the year 2019-20 was only 690 ha (approximately 0.82 %).The area under pepper in the State was 82,124 ha in 2020-21 which is a decrease of 1,640 ha compared to 2019-20. The production and productivity declined by 2.7 per cent and 0.7 per cent respectively to 33,591 tonnes and 409 kg per ha in 2020-21.

Table 4.2.6 Area of cultivation (ha), Production (T) and Productivity (Kg/ha) of pepper (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	2293	972	424	2177	846	389	1978	690	349	2003.4	670.013	334	1942	604	
Kollam	3330	1093	328	3180	898	282	2911	836	287	2870.15	860.83	300	2846	849	311
Pathanamthitta	1707	599	351	1683	537	319	1687	621	368	1593.19	505.582	317	1617	520	298
Alappuzha	616	134	218	605	135	223	619	125	202	609.1	116.73	192	690	133	322
Kottayam	3215	1150	358	3248	1012	312	3174	1277	402	3014.99	1214.543	403	3023	1009	193
Idukki	42694	25495	597	43790	18726	428	44533	24911	559	43103.78	23980.979	556	42822	20560	334
Ernakulam	1867	527	282	1866	467	250	1767	454	257	1843.53	440.890	239	1895	426	480
Thrissur	1790	479	268	1901	480	252	1793	559	312	1741.71	502.973	289	1741	462	225
Palakkad	2510	954	380	2488	1000	402	2319	897	387	2653.7	1095.317	413	2674	1002	375
Malappuram	2938	460	157	2641	584	221	2718	523	192	2368.33	478.060	202	2674	550	206
Kozhikode	3474	934	269	3755	1059	282	3666	635	173	3590.41	953.456	266	3432	880	256
Wayanad	12498	6593	528	10565	4136	391	10782	3414	317	9939.49	3123.148	314	10307	3694	358
Kannur	4269	1553	364	4394	2447	557	4348	1477	340	4341.42	1428.848	329	4742	2140	451
Kasaragode	2747	1189	433	2914	1738	596	2846	1536	540	3088.21	1404.592	455	3360	1716	511
State Total / Average	85948	42132	490	85207	34065	400	85141	37955	446	82761.4	36775.9	444	83765	34545	412

Source: Department of Economics and Statistics, Kerala State

Ginger

The total area of **ginger** during 2015-16, 2016-17, 2017- 18 and 2018-19 was 4,986, 5,151, 4,370 and 3275.09 ha. On analyzing the area of last 10 years, ginger was maximum during 2006-07 and the area was 11,082 ha. The **production of ginger** shows a decreasing trend from the previous year. The production of Ginger was decreased to 22,044 tonnes during 2015-16 compared to 22,989 tonnes of 2014-15 which again decreased to 20,478 tonnes during 2016-17, 18979 tonnes during 2017-18. . In 2018-19 production in tonnes and yield rate in Kg/ha Cured Ginger were 15124 and 461.80. The % of variation was -20.31.

Table 4.2.7 Area of cultivation (ha) and Production (T) of ginger (2015-2020)

Districts	2015-16		2016-17		2017-18		2018-19		2019-20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Thiruvananthapuram	95	346	89	261	73	224	72.12	214	62	178
Kollam	318	743	350	722	322	731	327.42	855	305	797
Pathanamthitta	295	928	317	993	301	1368	280.72	1155	271	1333
Alappuzha	81	291	79	259	79	300	55.25	132	75	283
Kottayam	111	359	122	382	120	391	115.71	380	113	367
Idukki	540	2948	553	2699	552	2947	489.21	2370	481	2710
Ernakulam	98	283	101	278	105	296	77.55	204	81	208
Thrissur	50	130	48	127	55	166	43.01	119	36	93
Palakkad	1106	5526	1158	4926	429	1884	193.12	742	160	708
Malappuram	53	117	50	115	41	115	31.9	73	26	66
Kozhikode	42	135	62	143	78	292	59.21	193	37	120
Wayanad	2125	9959	2156	9353	2109	9781	1456.17	8400	1111	4794
Kannur	57	223	53	184	73	350	51.34	202	43	188
Kasaragode	15	56	13	36	33	134	22.36	85	18	72
State Total	4986	22044	5151	20478	4370	18979	3275.09	15124	2819	11917

Turmeric

The area under **turmeric** in 2015-16 was 2,603 ha and was increased 5.38% than 2014-15. The area under cultivation was maximum in Palakkad during 2015-16 and was 22.13% of the total cultivation in the state, In 2016-17 it was 2,632 ha and was increased 1.11% than 2015-16. In Palakkad during 2016-17 it represented 22.57% of total state area. In 2017-18 it was 2,778 ha and has increased by 5.58% as compared to 2016-17. The area under cultivation of turmeric was highest in Palakkad and was 23.58 %. During 2018-19 it was 2,483.71 ha and has decreased by 10.59 % as compared to 2017-18. The area under cultivation of turmeric was highest in Palakkad i.e., 474.86 ha during 2018-19 and was 19.12 %.



Table4.2.8. Area of cultivation (ha), Production (T) and Productivity (Kg/ha) of turmeric (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	73	185	3642	72	156	2167	70	150	2145	64.8	128	1972	61	129	2115
Kollam	240	387	2336	263	370	1407	257	417	1622	283.13	520	1836	299	584	1953
Pathanamthitta	83	183	3146	89	180	2022	99	376	3819	103.22	295	2862	110	396	3600
Alappuzha	43	88	3593	44	85	1932	49	94	1922	39.27	64	1620	47	98	2085
Kottayam	97	247	3234	103	246	2388	104	262	2526	108.52	290	2670	108	290	2685
Idukki	188	767	5459	185	725	3919	192	801	4169	188.02	672	3577	191	758	3969
Ernakulam	246	674	2888	247	685	2773	246	701	2845	217.9	583	2674	189	481	2545
Thrissur	77	164	2600	69	144	2087	75	178	2375	77.76	177	2279	66	149	2258
Palakkad	576	1689	4996	594	1562	2630	655	2366	3611	474.86	1428	3008	391	1225	3133
Malappuram	326	778	2208	354	733	2071	312	949	3045	292.63	649	2218	264	724	2742
Kozhikode	286	859	3214	272	681	2504	353	1136	3218	292.78	812	2775	251	769	3064
Wayanad	192	577	4687	167	385	2305	147	343	2335	147.22	369	2505	108	257	2380
Kannur	143	430	3912	144	483	3354	182	913	5022	161.38	609	3773	155	684	4413
Kasaragode	33	84	3733	29	71	2448	37	136	3722	32.22	98	3030	37	109	2946
State Total /Average	2603	7112	4421	2632	6506	2472	2778	8822	3177	2483.7	6694	2695	2277	6653	2922

Source: Department of Economics and Statistics, Kerala State

The production of turmeric decreased to 6,506 tonnes during 2016-17 where as it was 7,112 tonnes during 2015-16. The production of turmeric increased to 8822 tonnes during 2017-18 where as it was 6506 tonnes during 2016-17. In 2018-19 production in tonnes and yield rate in Kg/ha cured turmeric were 6694; and 269.50 respectively. The % of variation was -24.12.

Cardamom cultivation is found only in 7 districts in Kerala; it occupied about 14.81% area under the cultivation of Spices & Condiments and has 3rd largest area among them. In 2015-16, the total area of cultivation was 39,730 ha. On analyzing the area of last 10 years, cardamom was maximum in 2011-12 and the area was 41,600 ha. It occupied about 14.68% area under the cultivation of Spices & Condiments. For the year 2016-17, the total area of cardamom cultivation was 39,080 ha. 14.99% area was under the cultivation. For the year 2017-18, the total area of cultivation was 39,080 ha. 15.05% area was under the cultivation. For the year 2018-19, the total area of cardamom was 38,882 ha.

Major cultivation was in Idukki district and the contribution to total area is 79.65 %. Wayanad contributes 10.60 % area and it has 2nd position in area. The state **average production & productivity** from 2015-2019 were 19500, 17417, 18350 and 11535tonnes; 491, 439, 470 & 297 Kg/ha respectively. In 2019-20, the prices of cardamom had increased by Rs.1388.19 per kg to reach Rs. 2908.50 per kg compared to the previous year. After reaching an all-time high export of 5.68 thousand tonnes in 2017-18, estimates of exports for 2019-20 reveal a decline to 2.09 thousand tonnes, a difference of 0.76 thousand tonnes compared to the previous year. The value realization was higher by Rs.70.04 crore at Rs. 426.29 crore and in unit value realization, the increase was Rs. 789.67 per kg at Rs. 2,039.67 per kg. (Source: UPASI Annual report 2020). Kerala holds the major share in cardamom production contributing to 89.7 % of

the total production. The cardamom production in the State has declined by 12.6 % in 2019-20 compared to 2018-19 recording 10076 metric tonnes. Decline in production incurred was due to the floods in the State (Source: Vegetable and Fruit Promotion Council, Kerala).

Table 4.2.9. Cardamom cultivation (ha), production (Ton) and Productivity (kg/ha)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Idukki	31810	18530	583	31165	16505	530	31166	17914	575	30968	11243	363	31166.00	9785	314
Kottayam	85	5	59	85	5	59	86	4	47	86	3	35	86.00	1	12
Kozhikode	220	5	23	220	3	14	220	2	9	220	1	5	195	1	5
Malappuram	70	2	29	70	1	14	70	1	14	70	1	14	65	1	15
Palakkad	2760	290	105	2755	290	105	2754	69	25	2754	67	24	2754.00	65	24
Pathanamthitta	665	8	12	665	8	12	664	5	8	664	5	8	1328.00	25	19
Wayanad	4120	660	160	4120	335	81	4120	355	86	4120	215	52	4103	198	48
State Total/ Average	39730	19500	491	39080	17147	439	39080	18350	470	38882	11535	297	39697	10076	254

Source: 1. State Agri/Horticulture Departments/DASD Kozhikkode
2. Department of Economics and Statistics, Kerala State

Table 4.2.10. Area of cultivation (ha), Production (T) and productivity (kg/ha) of tamarind (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19	2019-2020		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Area	Production	Productivity
Thiruvananthapuram	849	3398	4002	766	2961	3866	676	2728	4038	668.52	623	2517	4040
Kollam	512	1068	2086	484	1231	2543	407	1050	2577	399.04	383	987	2577
Pathanamthitta	213	571	2681	205	540	2634	212	610	2878	204.88	206	593	2879
Alappuzha	505	1192	2360	526	1262	2399	507	1219	2407	520.59	522	1255	2404
Kottayam	466	2204	4730	434	1798	4143	438	1645	3755	415.81	391	1467	3752
Idukki	471	1820	3864	433	1229	2838	436	1892	4337	335.93	303	1395	4604
Ernakulam	633	1452	2294	589	1412	2397	594	1469	2473	557.49	580	1436	2476
Thrissur	1347	4162	3090	1473	4518	3067	1306	3978	3045	1197.03	1135	3456	3045
Palakkad	3584	15255	4256	3818	15394	4032	3338	14816	4439	3014.59	3302	14654	4438
Malappuram	1445	3778	2615	1266	2815	2224	1260	3074	2440	1327.72	1197	2921	2440
Kozhikode	733	1645	2244	749	1633	2180	702	1362	1941	619.43	615	1194	1941
Wayanad	102	419	4108	86	350	4070	71	212	3008	68.7	68	204	3000
Kannur	506	2091	4132	525	1617	3080	447	1567	3504	445.8	433	1516	3501
Kasaragode	184	677	3679	195	738	3785	212	844	3978	208.89	204	811	3975
State Total	11550	39732	3440	11549	37498	3247	10606	36466	3438	9984.42	9962	34406	3454

Tamarind is cultivated throughout in Kerala. The total area was 11,550 ha during 2015-16, 11,549 ha during 2016-17. On analyzing the area of last 10 years, tamarind was maximum during 2006-07 and the area was 16,876Ha. The total area of tamarind was 10,606 & 9,984.42 ha during 2017-18 and 2018-19 respectively. Palakkad represents the major area with 3014.59 ha. It represents 30.19% of total area of cultivation of tamarind trees. The state average production & productivity from 2015-2018 were 39732, 37498, 36466 tonnes & 3440, 3247, 3438 Kg/ha respectively.

The total area of tamarind was 9,962 ha during 2019-20. Major cultivation of tamarind was in Palakkad and the area was 3302 ha. It represents 33.15 % of total area of cultivation of tamarind trees. Wayanad was the least tamarind cultivating district (2.05%).

Nutmeg

In 2015-16, the area under nutmeg cultivation was 21,678 ha where as for the last year it was 20,627 ha (increase of 5% this year). During the year 2016-17, the area under nutmeg cultivation was 22,065 haan increase of 1.79 % from previous year. During the year 2017-18, it was 22,701 ha, 2018-19, was 22,770.67 ha whereas during 2019-20 it was 22,701 ha. The state average production & productivity from 2015-2019 were 14902, 13746, 14682 and 14598 tonne; 687, 623, 647 & 641 Kg/ha.

During the year 2019-20, the area under nutmeg cultivation was 23,329 ha, an increase of 2.45 % from the previous year. Nutmeg cultivation increased by 206.92 % in Kerala from the year 2001-02. Thrissur (29.05%), Ernakulam (28.45%) &Idukki (17.75%) stands in 1st three positions in area under nutmeg cultivation.

Table 4.2.11 Area of cultivation (ha) and Production (tonnes) of nutmeg (2015-2020)

Districts	2015-16		2016-17		2017-18		2018-19		2019-20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Thiruvananthapuram	132	63	101	40	92	41	85.25	38	87	38
Kollam	75	33	71	29	81	34	79.53	30	85	37
Pathanamthitta	521	273	529	222	591	282	554.81	246	586	209
Alappuzha	320	108	328	114	328	153	304.06	102	345	113
Kottayam	2136	1516	2209	1305	2456	1482	2649.88	1591	2448	1444
Idukki	3221	1997	3440	1933	3693	2636	3652.14	2187	4172	3558
Ernakulam	6614	5751	6575	4967	6378	5020	6671.32	5362	6637	5214
Thrissur	6796	4171	6920	4011	6976	3944	6896.96	4068	6777	3448
Palakkad	357	141	354	173	348	169	365.88	167	413	150
Malappuram	367	155	425	177	493	178	469.34	222	479	172
Kozhikode	543	268	609	447	777	394	582.34	315	782	350
Wayanad	160	60	122	46	105	45	112.53	25	87	31
Kannur	277	162	224	122	241	154	209.95	112	302	140
Kasaragode	159	204	158	160	142	150	136.69	133	159	106
State Total	21678	14902	22065	13746	22701	14682	22770.67	14598	23329	15010

Clove

The area under clove during 2015-16, 2016-17, 2017-18 and 2018-19 was 1082, 1068, 1015 & 881.92 ha. The area under cultivation was maximum in Idukki district during 2015-16, 16-17, and was 767, 799, 788 & 674.66 ha of the total cultivation in the state. Ernakulam and Malappuram represented the minimum area of cultivation. The production of clove during 2015-16 was 78 tonnes during 2015-16. In 2016-17, the production of was slightly decreased to 77 tonnes. The production again decreased 72 tonnes during 2017-18. In 2018-19, the production of turmeric was further decreased to

63.396 tonnes. The productivity during 2016-17 & 2017-18 were 72 & 71 Kg/ha respectively.

Table 4.2.12. Area of cultivation (ha), Production (T) and Productivity (Kg/ha) of clove (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	24	2		17	1	59	13	1	77	11.84	0.916	77	19	1	53
Kollam	13	1		12	1	83	8	1	125	9.62	1.203	125	11	1	91
Pathanamthitta	11	1		10	1	100	9	1	111	8.25	0.916	111	9	1	111
Alappuzha	2	1		3	2	667	1	1	1000	1.13	1.13	1000	1	1	1000
Kottayam	117	10		81	7	86	82	7	85	79.87	6.789	85	79	7	89
Idukki	767	49		799	51	64	788	50	63	674.66	42.504	63	650	41	63
Ernakulam	4	1		6	2	333	5	2	400	4.42	1.768	400	6	2	333
Thrissur	10	2		9	2	222	6	1	167	3.93	0.656	167	4	1	250
Palakkad	9	2		6	1	167	5	1	200	7.3	1.46	200	3	1	333
Malappuram	4	1		4	1	250	5	1	200	4.33	0.866	200	2	0.4	200
Kozhikode	45	3		61	4	66	43	3	63	29.8	1.877	63	30	2	67
Wayanad	38	2		24	1	42	28	1	43	19.68	0.846	43	16	1	63
Kannur	10	1		10	1	100	11	1	91	17.42	1.585	91	17	2	118
Kasaragode	28	2		26	2	77	11	1	91	9.67	0.88	91	7	1	143
State Total / State Average	1082	78		1068	77	72	1015	72	71	881.92	63.396	72	854	62.4	73

Source: Department of Economics and Statistics, Kerala State

The area under **Vanilla** during 2015-16, 2016-17 was 121 and 120 ha. The area under cultivation was highest in Idukki during 2015-16; 2016-17 was 82 and 71 Ha. The area under Vanilla during 2017-18 decreased to 70 ha as compared to 2016-17. The area under Vanilla during 2018-19 was 49.59 ha and has decreased. The area under cultivation was highest in Idukki district 16.03 ha during 2018-19. In 2019-2020 the total area of cultivation was 53 ha.

Table 4.2.13 Area of cultivation (ha) of vanilla (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	0	3	0	0.81	1
Pathanamthitta	0	1	1	0.83	
Alappuzha	3	0	0	0	
Kottayam	13	15	15	13.04	13
Idukki	82	71	32	16.03	13
Ernakulam	1	1	1	0.5	2
Thrissur	1	2		0.19	
Palakkad	2	1	1	1.22	
Malappuram	1	0	1	0.37	
Kozhikode	4	6	4	1.71	4
Wayanad	5	5	3	2.13	2
Kannur	6	12	11	11.18	17
Kasaragode	3	3	1	1.58	1
State Total	121	120	70	49.59	53

Source: Department of Economics and Statistics, Kerala State

Total area of **Cinnamon** cultivation was highest at Thrissur for the years 2015-16, 2016-17, 2017-18 and 2018-19 were 27, 23, 25, and 25.81 ha respectively. Similar data for Idukki was 24, 24, 22 and 23.88 ha. The lowest was represented by Thiruvananthapuram i.e., 1, 1, 0 and 0.04 ha. The state average was 122, 113, 102 and 107.76 for the years 2015-16, 2016-17, 2017-18 and 2018-19. Total area of Cinnamon cultivation during 2019-2020 was 92 ha.

Table 4.2.14 Area of cultivation of Cinnamon (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	1	1		0.04	
Pathanamthitta	1	1	1	1.35	2
Alappuzha	7	6	6	5.84	5
Kottayam	5	5	4	5.91	5
Idukki	24	24	22	23.88	21
Ernakulam	8	6	6	5.82	5
Thrissur	27	23	25	25.81	21
Palakkad	1	2	2	1.59	1
Malappuram	7	8	6	7.71	6
Kozhikode	21	22	20	18.71	16
Wayanad	9	7	4	3.18	3
Kannur	9	7	6	7.75	7
Kasaragode	2	1		0.17	
State Total	122	113	102	107.76	92

Source: Department of Economics & Statistics, Kerala State

Garlic cultivation was restricted only at Idukki only. The area of cultivation during 2015-16, 2016-17, 2017-18 and 2018-19 were 62, 77, 71 and 69.61 ha respectively. The data for production and productivity were 375,380,398 and 345 tonnes; 6048, 4935, 5606 and 4956 Kg/ha respectively.

c. Fresh fruits

Fresh fruits representing 33.66% area of food crops during the agricultural year 2015-16. The important fresh fruits cultivated are jack, mango, banana, plantain, pineapple,

papaya, etc. The total area of fresh fruits during the year 2015-16 was 3, 30,644 ha, during 2016-17 was

3, 27,210 ha. Fresh fruits represent 34.06% area of food crops were cultivated during 2017-18 and the area was 3, 28,219 ha. Fresh fruits represent 33.88% area of food crops during 2018-19 in an area of 3, 19,281.79 ha and Palakkad contributed 12.30%. A checklist of exotic fruits cultivated is given in Annexure 4.22.

The area of jack cultivation during 2019-20 was 93,209 ha. It occupied 28.15 % of the category of fresh fruits and it has top position in this category. Idukki, Malappuram and Kannur stands in 1st, 2nd and 3rd positions with 18.27%, 10.2 % and 10.18 % area respectively during 2019-20. Production of Jack (Million numbers) during 2015-2019 were 285, 281, 309, 260 & Productivity were 3066, 3055, 3376, 2860 in Kg/ha.

Mango

The area under cultivation of **mango** during 2015-16 was 79,992 ha (24.19% of the category), 2016-17 was 79,496 ha.. During 2017-18 it was 78,492 ha and during 2018-19 was 78,154.88 ha. Production of mango 414544, 420048, 489650 tonnes & Productivity were 5182, 5284, 6238 Kg/ha (2015-18). The area under cultivation of mango during 2019-20 was 78,554 ha. It occupied 23.72 % of the category of fresh fruits and it has 2nd top position in this category. Palakkad, Kannur and Kozhikode stand in 1st, 2nd and 3rd position with 12.81%, 11.13 % and 11.02 % areas respectively.

The area of **banana** cultivation during 2015-16 was 59,835ha. On analyzing the area of last 10 years, banana was maximum during 2013-14 and the area was 62,261 ha. The area of banana cultivation during 2017-18 was 62108 ha and during 2018-19 was 52,898.61 ha. Area decreased by 4.70% to 54455 ha during 2017-18 from that in 2016-

17. The area of plantain cultivation during 2018-19 was 56,211.29 ha. It occupied 17.61%.

The area under cultivation of **pineapple** during 2015-16, 2016-17, 2017-18 and 2018-19 were 7,911(occupied 2.39%), 8,045 (occupied 2.46%), 8823 (occupied 2.69%) & 9,152.55 (occupied 2.87%) ha. It forms 7th top position in fresh fruits category. A decrease of 2% in area was observed in 2015-16 from that in 2014-15. On analyzing the area of last 10 years, pineapple was maximum during 2006-07 and the area was 12,486 ha. An increase of 1.69% in area was observed in 2016-17 under pineapple cultivation from that of 2015-16. The area under cultivation of pineapple was maximum in Ernakulam (58.73% during 2018-19). Production were 65482, 65978, 82934 and 93007.801 tonnes and productivity were 8277, 6927, 9399, 10162 Kg/ha (2015-19).

Table 4.2.15. Area of cultivation (ha), Production (Million Nos.) and Productivity (kg/ha) of Jackfruit (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	6853	27	3940	6686	25	3739	6309	26	4121	6520.74	21	3220	6520	26	3988
Kollam	6687	24	3589	6648	27	4061	5940	25	4209	6016.95	20	3324	5876	19	3233
Pathanamthitta	2883	9	3122	2917	8	2743	3023	11	3639	3058.53	10	3270	3238	11	3397
Alappuzha	2714	6	2211	2730	3	1099	2923	7	2395	2825.02	2	708	2714	6	2211
Kottayam	4008	14	3493	3941	17	4314	4148	16	3857	4065.22	14	3444	4042	14	3464
Idukki	15428	60	3889	15884	57	3589	16984	66	3886	16732.68	61	3646	17028	57	3347
Ernakulam	4108	13	3165	4036	15	3717	3868	15	3878	3797.46	14	3687	3787	15	3961
Thrissur	4757	15	3153	5070	18	3550	5230	21	4015	5166.54	17	3290	4980	16	3213
Palakkad	6744	20	2966	6955	18	2588	6943	23	3313	6668.98	19	2849	6708	21	3131
Malappuram	8698	25	2874	8600	19	2209	8511	22	2585	8183.35	18	2200	9510	24	2524
Kozhikode	10137	21	2072	9710	21	2163	9318	22	2361	9331.78	17	1822	9151	24	2623
Wayanad	8632	15	1738	7426	17	2289	6856	16	2334	6916.1	13	1880	7086	15	2117
Kannur	8551	25	2924	8504	24	2822	8505	28	3292	8619.18	22	2552	9487	26	2741
Kasaragode	2769	11	3973	2875	12	4174	2980	11	3691	3005.37	12	3993	3082	12	3894
State Total / State Average	92969	285	3066	91982	281	3055	91538	309	3376	90907.9	260	2860	93209	286	3068

Table 4.2.16 Area of cultivation (ha), Production (T) of Mango (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area			Area	Production	Productivity
Thiruvananthapuram	4707	24871	5284	4695	29461	6275	4575	31345	6851	4827.62			4781	32755	6976
Kollam	5651	37136	6572	5750	46476	8083	5017	45703	9110	5090.31			5153	46944	6561
Pathanamthitta	1806	8129	4501	1885	8472	4494	1953	10359	5306	2025.2			2153	11424	4822
Alappuzha	4633	21264	4590	4819	17008	3529	4518	26247	5810	4510.31			4366	25366	2909
Kottayam	2864	15264	5330	2805	16677	5945	3022	25068	8296	3022.56			2979	24714	4821
Idukki	6224	45095	7245	6280	44675	7114	6229	58160	9337	5450.8			5316	49635	4769
Ernakulam	4491	29059	6470	4503	30172	6700	4395	32800	7462	4268.29			4304	32116	6938
Thrissur	7021	38762	5521	7275	43646	5999	7376	45347	6148	7037.06			6961	42796	6759
Palakkad	10006	44596	4457	9892	52660	5323	9942	54436	5475	10067.5			10062	55089	9199
Malappuram	8570	43017	5019	8245	23355	2833	8120	33393	4114	7696.68			7734	31810	5675
Kozhikode	8380	39509	4715	8335	31731	3807	8218	42951	5226	8541.72			8656	45236	6070
Wayanad	5107	15373	3010	4264	15517	3639	4456	19164	4301	4637.27			4586	19724	13140
Kannur	7830	42961	5487	7829	48685	6219	7806	52003	6662	8164.44			8745	58259	7594
Kasaragode	2702	9508	3519	2919	11513	3944	2865	12674	4423	2815.12			2758	12199	9954
State Total	79992	414544	5182	79496	420048	5284	78492	489650	6238	78154.88			78554	488067	6953

Table 4.2.17 Area of cultivation (ha), Production (T) of Banana (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	2676	18338	6853	2776	19826	7142	2917	21240	7284	3114	27818.147	8933	3507	32030761.076	9134
Kollam	2884	20399	7073	2747	19511	7103	3397	23599	6948	3455	25970.833	7516	3465	23678.09	6834
Pathanamthitta	2059	16375	7953	2076	16528	7961	2205	16528	7497	2215	17322.444	7820	2246	18086.22	8053
Alappuzha	476	4135	8687	519	3743	7212	577	4386	7603	318	1937.911	6085	377	2343.855	6209
Kottayam	2948	23625	8024	2750	21749	7909	3073	25818	8402	3252	29188.160	8974	3316	32500.15	9800
Idukki	3486	30115	8639	3495	29359	8400	3419	33165	9700	3320	29604.958	8918	3391	33622.165	9917
Eranakulam	4993	46730	9359	5158	47781	9263	5278	49510	9381	4981	35128.826	7053	5520	47861.372	8671
Thrissur	2165	19803	9147	2213	19069	8617	2180	19431	8914	1702	8203.624	4820	2196	17786.239	8101
Palakkad	15736	152109	9666	15199	139231	9161	16722	186572	11157	11998	102811.983	8569	12710	114043.826	8973
Malappuram	7762	64990	8373	7120	58564	8225	7572	60912	8044	5683	40493.548	7125	5591	48924.412	8750
Kozhikode	1938	17723	9145	1864	17264	9262	1673	14032	8390	1455	12981.503	8924	1737	13652.335	7862
Wayanad	9739	92295	9477	8555	71357	8341	10003	83517	8349	8861	74562.156	8415	13734	133596.792	9297
Kannur	2328	22503	9666	2022	18342	9071	2405	20336	8456	1886	17313.030	9181	2249	23238.938	10331
Kasargode	645	7015	10876	664	6998	10539	687	6783	9872	658	5722.549	8695	639	7059.831	11048
State Total	59835	536155	8961	57158	489322	8561	62108	565829	9111	52898.61	429059.672	8111	60678	548425.301	9038

Table 4.2.18 Area of cultivation (ha), Production (T) and Productivity (Rs/Kg) of plantain (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	7120	64661	9082	6748	60035	8897	7384	59730	8089	7748.81	65560.783	8461	7720	73583	9531
Kollam	5231	40324	7709	5376	42801	7961	5427	46028	8481	5845.56	44018.474	7530	5633	42546	7553
Pathanamthitta	1988	21582	10856	2073	21036	10148	2182	21848	10014	2182.39	19088.922	8747	2308	22143	9594
Alappuzha	2121	14927	7038	2158	14126	6546	2225	14166	6367	2120.02	13212.688	6232	2250	15088	6706
Kottayam	2894	20987	7252	2820	21968	7790	2917	21650	7422	2848.39	22279.665	7822	2719	21509	7911
Idukki	3903	39164	10034	4040	38110	9433	4037	31914	7905	3768.1	28524.192	7570	3701	31538	8521
Ernakulam	4650	35881	7716	4481	35158	7846	4440	40981	9229	4651.69	37871.769	8142	4666	37364	8006
Thrissur	5259	33229	6319	5407	28579	5286	5205	31476	6047	5049.56	34401.612	6813	4895	34563	7061
Palakkad	9629	58353	6060	9285	55411	5968	6179	37320	6040	7658.46	50333.424	6572	8022	58176	7252
Malappuram	4294	27379	6376	4549	28463	6257	4431	25882	5841	4428.8	24832.602	5607	4207	25748	6120
Kozhikode	3587	18626	5193	3609	17885	4956	3569	16546	4636	3519.03	15290.520	4345	3496	15797	4517
Wayanad	1413	10764	7618	1214	7608	6267	1198	8358	6974	1142.65	6537.955	5722	1219	8006	6568
Kannur	3334	14325	4297	3150	13669	4339	2987	12636	4230	2950.3	11512.412	3902	3268	11836	3622
Kasaragode	2260	11424	5055	2230	10957	4913	2274	11148	4903	2297.53	9637.031	4195	2095	9005	4298
State Total/Average	57683	411626	7136	57140	395806	6927	54455	379683	6972	56211.29	383102.049	6815	56199	406902	7240

Table 4.2.19 Area of cultivation (ha), Production (T) and Productivity (Rs/Kg) of pineapple (2015-2020)

Districts	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Thiruvananthapuram	141	1039	7369	132	953	7220	112	834	7435	94.2	717.510	7617	102	749	7343
Kollam	122	873	7156	111	810	7297	102	752	7369	95.25	652.299	6848	79	590	7468
Pathanamthitta	151	928	6146	150	945	6300	202	1203	5955	192.59	990.801	5145	198	932	4707
Alappuzha	78	491	6295	55	335	6091	55	362	6616	57.74	427.178	7398	53	258	4868
Kottayam	1085	7670	7069	1167	10926	9362	1493	14225	9526	1586.84	15155.713	9551	1947	16434	8441
Idukki	1159	9752	8414	1190	10890	9151	1312	12037	9173	1302.33	13808.750	10603	1233	10941	8873
Ernakulam	4569	41307	9041	4662	37757	8099	5012	50313	10039	5375.62	58571.596	10896	5390	54633	10136
Thrissur	61	371	6082	60	442	7367	78	607	7736	65.98	473.175	7171	76	551	7250
Palakkad	85	385	4529	78	365	4679	70	333	4773	50.62	285.962	5649	123	651	5293
Malappuram	133	863	6489	96	633	6594	56	344	6154	39.73	215.712	5429	50	259	5180
Kozhikode	134	745	5560	163	912	5595	130	729	5605	113.92	718.885	6310	152	798	5250
Wayanad	33	141	4273	30	155	5167	29	139	4712	23.81	506.891	4690	23	112	4870
Kannur	116	633	5457	109	536	4917	123	737	6006	100.31	506.891	5053	140	782	5586
Kasaragode	44	284	6455	42	319	7595	49	319	6575	53.61	371.665	6933	59	343	5814
State Total	7911	65482	8277	8045	65978	8201	8823	82934	9399	9152.55	93007.801	10162	9625	88033	9146

The area under cultivation of papaya during 2015-16 was 19,076 ha. On analyzing the area of last 10 years, it was maximum during 2008-09 and the area was 18,080 ha. The area under cultivation during 2016-17 was 19,694 ha.,during 2017-18 was 19188 ha during 2018-19 was 18,583.33 ha and occupied 5.82%. Production were 113075, 116262, 113439, 110547.764 tonnes and productivity were 5928, 5903, 5912, 5949 Kg/ha (2015-19).



Pusa Dwarf



Pusa Majesty



Pusa Giant



Pusa Delicious



Mahabindu



Solo



Ranchi



COI

The area under cultivation of papaya during 2019-20 was 18,550 ha. It occupied 5.60% in the category of fresh fruits and it has 5th top position in this category. The cultivation of papaya decreased in the year 2019- 20 by 0.18 % from 2018-19.

Table 4.2.20 Area of cultivation (ha) of papaya (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	1787	1766	1685	1778.21	1760
Kollam	1416	1461	1360	1415.83	1393
Pathanamthitta	735	749	766	803.05	847
Alappuzha	1075	1104	1149	1084.17	1125
Kottayam	1140	1158	1190	1282.79	1236

Idukki	1037	1061	1069	917.09	895
Ernakulam	1316	1378	1258	1236.93	1253
Thrissur	1473	1471	1452	1348.57	1309
Palakkad	1439	1582	1524	1460.03	1416
Malappuram	2532	2618	2593	2303.09	2296
Kozhikode	2012	2160	2061	1926.39	1887
Wayanad	413	378	375	366.99	352
Kannur	1945	2031	1857	1785.34	1924
Kasaragode	756	777	849	874.85	857
State Total	19076	19694	19188	18583.33	18550

Other fresh fruits like Lemon, Rambuttan, Mandarin orange, mangostin, etc are included and the area during 2015-16 was 11,572 ha, 2016-17 - 12,105 ha, 2017-18 = 12092 ha and 2018-19 11,969.39 ha. In addition to the native traditional fruits, Kerala cultivated many other fruits including exotic fruits. Other fruits grown in Kerala includes Mangosteen, Litchee, passion fruit, Guava, Longan, Dragon fruit, Jaboticaba, Santol, Langsat, Avocado, Pomelo, Soursop, Egg fruit, Wax apple, Mameysapote, The state total area of cultivation during 2015-16, 2016-17, 2017-18 and 2018-19 were 11572, 12105, 12092, and 11969.39 ha.

Lemon

Table 4.2.21 Area of cultivation (ha) of lemon (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	20	20	15	20.82	22
Kollam	25	23	24	22	21
Pathanamthitta	19	19	19	19.36	20
Alappuzha	19	16	20	18.99	20
Kottayam	30	31	33	31.61	32
Idukki	106	99	117	94.46	86
Ernakulam	24	24	23	22.22	25
Thrissur	27	27	27	21.15	24
Palakkad	91	94	78	75.33	70

Malappuram	46	53	44	47.97	42
Kozhikode	19	19	18	15.22	23
Wayanad	43	35	32	33.52	28
Kannur	98	92	84	91.7	88
Kasaragode	23	23	21	21.28	25
State Total	590	575	559	535.83	526

Table 4.2.22 Area of cultivation (ha) of small lemon (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	21	20	20	23	24
Kollam	28	27	27	27	24
Pathanamthitta	19	19	20	19	21
Alappuzha	26	21	25	24	26
Kottayam	45	42	47	45	47
Idukki	170	166	163	142	138
Ernakulam	28	28	29	27	36
Thrissur	24	30	28	24	23
Palakkad	78	87	80	73	70
Malappuram	69	65	66	62	67
Kozhikode	34	35	37	28	30
Wayanad	44	37	30	36	38
Kannur	53	47	46	56	53
Kasaragode	26	28	28	26	27
State Total	665	652	646	617.4	624

Table 4.2.23 Area of cultivation (ha) of other fruits in Kerala (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	596	604	551	505.51	536
Kollam	434	422	404	457	481
Pathanamthitta	670	720	791	895	942
Alappuzha	547	578	587	653.62	648
Kottayam	626	687	763	793.99	832
Idukki	1160	1258	1262	1193.12	1206

Ernakulam	940	1003	1047	1044.63	1181
Thrissur	1088	1235	1306	1188.91	1344
Palakkad	1408	1362	1197	1214.57	1362
Malappuram	1270	1372	1376	1394.48	1413
Kozhikode	730	702	756	793.99	945
Wayanad	329	332	254	260.05	269
Kannur	1060	1062	1076	904.79	1027
Kasaragode	714	748	722	689.14	741
State Total	11572	12105	12092	11969.39	12927

d. Tuber crops

Tapioca the major food crops in Kerala is cultivated extensively. Analyzing the cropping pattern of the last 15 years it was seen that major portion of land under tapioca cultivation has been shifted to rubber. During 1975-76, the area was 3.27 lakh hectares. Thereafter the area decreased. The total area during the year 2019-2020 was 62070 ha. Area of tapioca represents 6.5% area of food crops during 2019-2020 and is cultivated in all seasons. The area under cultivation of tapioca in 2019-2020 autumn, winter & summer seasons were 11941 ha (19.24%), 18220Ha (29.35%) and 31909 ha (51.41%) respectively.

There was an increase of 0.32% in the total area during 2019-2020 as against 2018-19 and 44.18 % area reduced as compared to 2001-02. Kollam , Thiruvananthapuram &Kottayam stands in 1st, 2nd & 3rd positions with area of 21.24 %, 20.14 % and 9.92 % respectively during 2018-19. Tapioca cultivation was the least in Kasargod district and the contribution was only 0.71%.

Production in tonnes and yield rate in Kg/ha during 2014-15 were 29, 43,919 & 38,996; 2015-16 = 26, 62,610 & 38,363, % of variation -10; 2016-17 = 25, 29,729 &36,842, % of variation -4.99; 2017-18 = 2697319 & 38427, the % of variation 6.62. The total production of tapioca during 2018-19 was 2325007 tonnes, and decrease of 13.8 % in production.

Table 4.2.24. District wise production of tapioca in 2015-2020 (Tonnes)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	536295	520143	538976	475449.148	450923
Kollam	530802	440856	489453	450759.454	49352.5
Pathanamthitta	209948	227557	226994	209528.367	235264.6
Alappuzha	87777	101377	85719	58912.438	92015.25
Kottayam	220466	238833	265419	259500.917	292209.2
Idukki	319317	297870	294788	242395.074	264562.3
Ernakulam	239195	229893	268937	201364.585	281988.7
Thrissur	54613	47502	56168	41411.944	44709.11
Palakkad	62312	55271	55781	55374.026	108325.5
Malappuram	198203	185880	202502	176373.567	150841.3
Kozhikode	39368	42128	46865	36255.342	46644.61
Wayanad	77868	61696	69714	40549.188	50893.35
Kannur	66455	67051	80930	64443.089	61046.37
Kasaragode	19991	13672	15073	12690.175	13856.74
State Total	2662610	2529729	2697319	2325007.31	2592633
				4	

Elephant foot yam, colocasia, yam, sweet potato, etc are included in the category of tubers. The total area of tubers during 2018-19 was 16,020.82 ha, where as it was 18,451 ha during 2017-18. Major cultivation of tubers was in Kollam and the contribution to total area of tubers was 17.53 % during 2018-19. Colocasia has 1st position in area under the cultivation of tubers and the % of colocasia to the total area of tubers was 41.05%.

Table 4.2.25 Area of cultivation (ha) of Colocasia during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	714	667	517	486.75	428
Kollam	1393	1420	1302	1268.41	1270
Pathanamthitta	1202	1190	1182	1128.6	1117
Alappuzha	830	792	759	580.19	700
Kottayam	492	485	482	395.14	383
Idukki	647	601	623	567.02	557
Ernakulam	238	214	201	184.43	172

Thrissur	205	179	175	140.12	121
Palakkad	538	499	431	378.47	317
Malappuram	659	558	541	428.98	373
Kozhikode	471	438	538	454.95	398
Wayanad	198	209	201	160	119
Kannur	398	364	383	322.78	305
Kasaragode	100	75	83	81.32	76
State Total	8085	7691	7418	6577.16	6336

Table 4.2.26. Area of cultivation (ha) of Elephant Foot yam during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	398	388	328	313.1	297
Kollam	1019	1090	1016	1005.86	973
Pathanamthitta	1157	1120	1078	993.07	983
Alappuzha	675	627	604	473.79	560
Kottayam	511	486	526	400.29	407
Idukki	702	685	670	552.57	520
Ernakulam	223	218	225	214.37	204
Thrissur	81	80	85	46.3	43
Palakkad	426	353	506	588.51	424
Malappuram	492	557	775	497.78	634
Kozhikode	200	212	271	185.47	178
Wayanad	1117	862	858	737.55	686
Kannur	98	100	123	116.17	107
Kasaragode	44	36	33	32.71	33
State Total	7143	6814	7098	6157.54	6049

Table 4.2.27 Area of cultivation (ha) of Yam (Kachil) during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	59	66	53	46.67	42
Kollam	467	481	451	414.89	422
Pathanamthitta	421	425	425	397.32	391
Alappuzha	154	152	138	135.02	164

Kottayam	93	89	87	72.63	69
Idukki	176	168	177	162.03	161
Ernakulam	28	26	26	19.82	19
Thrissur	9	7	7	6.39	6
Palakkad	32	29	27	21.63	22
Malappuram	69	61	63	47.67	42
Kozhikode	36	28	34	26.25	26
Wayanad	45	39	48	48.25	33
Kannur	22	19	20	16.43	17
Kasaragode	6	5	6	6.53	5
State Total	1617	1595	1562	1421.53	1419

Table 4.2.28 Area of cultivation (ha) of Sweet Potato during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	17	10	10	11.94	11
Kollam	2	4	2	2.09	2
Pathanamthitta	1	2	2	1.53	
Alappuzha	4	5	4	4.38	7
Kottayam	1	0	1	0.23	
Idukki	4	4	5	4.5	6
Ernakulam	4	4	3	3.17	3
Thrissur	4	3	4	2.26	3
Palakkad	55	42	105	51.22	36
Malappuram	81	61	65	44.62	47
Kozhikode	13	10	11	10.59	10
Wayanad	7	7	4	2.8	3
Kannur	30	26	22	19.92	21
Kasaragode	56	42	57	51.16	45
State Total	279	220	295	210.41	194

Table 4.2.29. Area of cultivation (ha) of Koorka during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	15	8	1	0.96	2

Kollam	3	5	4	1.76	1
Pathanamthitta	3	4	3	1.78	2
Alappuzha	2	2	2	2.25	7
Kottayam	2	1	0	0.53	
Idukki	18	23	28	22.84	16
Ernakulam	39	50	60	38.61	51
Thrissur	310	195	175	167.06	112
Palakkad	909	966	948	648.37	762
Malappuram	44	39	31	33.99	27
Kozhikode	11	9	8	4.8	7
Wayanad	5	4	3	1.53	1
Kannur	5	9	6	4.52	4
Kasaragode	2	2	2	1.51	1
State Total	1368	1317	1271	930.51	993

Table 4.2.30 Area of cultivation (ha) of Nanakizhangu during 2015-20

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	16	18	14	24.35	14
Kollam	65	60	56	56.59	52
Pathanamthitta	64	66	65	59.01	60
Alappuzha	39	44	42	33.91	37
Kottayam	5	5	4	4.18	5
Idukki	3	3	3	2.89	2
Ernakulam	3	3	1	2.07	1
Thrissur	1	0		0.06	0
Palakkad	28	18	30	16.42	7
Malappuram	17	14	11	11.16	4
Kozhikode	6	5	7	3.38	3
Wayanad	0	0	0	0.04	0
Kannur	3	2	2	1.32	2
Kasaragode	1	1	0	0	0
State Total	251	239	240	215.38	187

e. Vegetables

Drumstick, amaranthus, bitter gourd, snake gourd, ladies finger, brinjal, green chillies, bottle gourd, little gourd (koyal), ash gourd, pumpkin, cucumber, payar. are the important vegetables cultivated.

The production which was 7.25 lakh metric tonnes from an area of 52,830 ha in 2016-17 increased to 15.7 lakh metric tonnes from an area of 1.02 lakh hectare during 2020-21.

The area and production of vegetable in 2020-21 increased by 5.9 per cent and 5.4 per cent compared to the area and production of 2019-20 which was 96,313 hectare and 14.9 lakh tonnes respectively.

Table 4.2.31. Area of cultivation of vegetables

Districts	Ivy gourd	Leafy amaranthus	Ash gourd	Bitter gourd	Bottle gourd	Brinjal	Ladies finger	Snake gourd	Pumpkin	Cucumber	Drumstick	Green chilly
Thiruvananthapuram	52	271	4	87	1	86	81	87	14	99	2056	162
Kollam	179	199	37	117	6	135	95	47	62	18	1507	211
Pathanamthitta	144	87	58	95	1	90	70	73	49	32	525	55
Alappuzha	196	309	62	206	2	167	131	213	73	97	621	115
Kottayam	325	113	48	172	1	140	105	148	51	34	618	114
Idukki	144	87	42	469	1	96	62	28	74	17	558	106
Ernakulam	136	138	75	68	20	71	85	119	69	94	643	58
Thrissur	65	96	58	77	4	72	88	36	52	30	1152	136
Palakkad	100	149	284	263	24	208	422	106	207	91	2086	250
Malappuram	66	104	197	75	148	40	102	73	353	187	2556	54
Kozhikode	43	102	41	60	5	23	48	23	47	68	1641	126
Wayanad	35	60	51	137	3	32	12	5	96	8	414	64
Kannur	106	182	4	58	1	64	86	18	74	180	1906	106
Kasaragod	101	59	37	42	7	46	75	18	37	69	694	64

State Total	1662	1956	58	1936	224	1270	1462	994	1258	1024	16977	1621
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(Source: Department of Agriculture Development and Farmers Welfare)

High altitude vegetables: Total area of cultivation (ha) of **Beet root** for the years 2015-16, 2016-17, 2017-18 and 2018-19 were 2, 1, 1 & 2.39 respectively. Idukki represents the major area of cultivation i.e., 1, 1, 1, & 1.59 ha followed by Palakkad 1 (2015-16) 0.48 ha (2018-19). Thrissur&Ernakulam initiated the cultivation only from 2018-19 (0.02 and 0.1 respectively). 197, 197, 192, 167.3 ha of land represents the cultivation of **cabbage** in Kerala. 171, 172, 192 & 141.56 ha of area was represented by Idukki, followed by Wayanad (14,150 & 17.13 ha) and Kannur (3, 2, 0, 1.88 ha). Kasaragode started cabbage cultivation to 0.36 ha during 2018-19 periods.

Carrot was cultivated mostly from Idukki 1812, 1686, 1662, 997.29 ha for the years 2015-16, 2016-17, 2017-18 and 2018-19 followed by Wayanad 0.08 ha (2018-19) only. Total area of cultivation of **Cauliflower** was 18, 20, 18, 19.41ha for the years 2015-16, 2016-17, 2017-18 and 2018-19 respectively. Wayanad (5, 6, 7, 8.56 ha) Idukki (3, 2, 2, 1.2 ha) Kannur (2, 3, 2, 2.02 ha) represents 1, 2 and 3rd position respectively and 2018-19 Kasaragode started cultivation (0.67 ha). **Onion** represents a total area of cultivation 27, 31, 9 & 5.21 ha during 2015-16, 2016-17, 2017-18, 2018-19 respectively. Palakkad showed cultivation from 2015-16, 2016-17, 2017-18, 2018-19 with 27, 31, 9 & 4.28 ha respectively. Thiruvananthapuram (0.09 ha), Idukki (0.69 ha), Wayanad (0.19 ha) started onion cultivation during 2018-19.

Potato was cultivated only from Idukki and Palakkad (2015-16 only). Idukki showed a total area of cultivation 490, 556, 516 & 536.9 ha. Production in the state was 6581, 8823, 7303 & 7381.3 tonnes. State total cultivation of **Tomato** during 2015-16, 2016-17, 2017-18, 2018-19 in terms of area was 612, 437, 382 & 402.68 ha respectively.

Palakkad stands first in terms of area of cultivation i.e., 499, 292, 227 & 239.3 ha, followed by Idukki 32, 39, 45, 44.23 ha. Wayanad occupied the third position with 18, 22, 20 & 21.86 ha. Kasaragode the least with 2, 2, 3, 4 ha.

Other vegetables: Vegetables other than specified above were cultivated in the state with a total area of 1063, 1081, 1275 & 1680.73ha respectively during 2015-16, 2016-17, 2017-18, 2018-19. Palakkad (346, 294, 199, 165.93 ha), Kannur (142, 132, 130, 161.05 ha), & Kottayam (102, 1042, 112, 121.87 ha) stands in the positions 1, 2 and 3rd in terms of area of cultivation. Kollam forms the lowest i.e., 3, 5, 5 & 5.84 ha.

f. Oil seeds

The important **oil seeds** being cultivated are coconut, groundnut, sesamum, etc. Coconut represents 99.8% of the category of oilseeds. The total area under the cultivation of oil seeds during the agricultural year 2015-16 was 7, 91,640 ha. On comparing with 2014-15, a decrease of 0.47% can be seen in this category from 2015-16. During 2016-17 it was 7, 84,326.696 ha. On comparing with 2015-16, a decrease of 0.92% can be seen in this category in 2016-17. In 2017-18 it was 7, 62,718.1 ha. On comparing with 2016-17, a decrease of 2.76% can be seen in this category in 2017-18. During the agricultural year 2018-19 it was 7, 63,507.10 ha. On comparing with 2017-18, a slight increase of 0.10% can be seen in this category in 2018-19.

The area under cultivation of **groundnut** during the agricultural year 2015-16 was 449Ha. The area during the 2018-19 was 187.3 ha. During 2018-19, the area was decreased by 31.64% than 2017-18 and 92.32% area reduced from 2001-02. Production of ground nut were 619, 505, 382 & 239.4 tonnes and productivity 1379 (15-16), 1411 (16-17), 1394 (17-18), 1278 Kg/ha (18-19).

Sesamum occupied only 187 ha of area in Kerala during 2015-16. Area under sesamum decreased by 79% from 2001-02.

Table 4.2.32 Area of Cultivation (ha) of Sesame (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	1	0.14	0.08	0.081	0.06
Kollam	23	34.37	31.39	67.677	54.35
Pathanamthitta	0	0.36	1.35	0.243	1.4
Alappuzha	18	98.69	109.1	216.199	80.46
Kottayam		0			0.3
Idukki	0	0	0	0.34	0
Ernakulam		1.61	4.49	4.288	2.07
Thrissur	2	2.05	12.75	8.699	12.47
Palakkad	24	25.252	19.83	15.397	6.47
Malappuram	109	15.22	59.89	63.849	50.24
Kozhikode		0.004	0.024	0.413	0
Wayanad	1	1	0.2	0.121	0.12
Kannur	2	0	0	0.35	0
State Total	187	178.696	239.104	377.657	207.94

Table 4.2.33 Production (Tonnes) of Sesame (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	0.21	0.12	0.53	0.033	0.05
Kollam	8.186	13.394	32.25	56.879	50.7
Pathanamthitta	0	0.014	0.162	0.098	1.03
Alappuzha	6.101	41.446	36.698	67.483	54.14
Idukki	0	0	0	0.13	0.22
Ernakulam	0.471	0.246	0.333	0.736	0
Thrissur	0.81	0	2.28	13.789	0.27
Palakkad	3.395	1.653	5.937	3.77	1.29
Malappuram	27.465	3.065	11.845	14.473	2.05
Kozhikode	0	0	0	0.159	19.51
Wayanad	0.434	0	0.074	0.046	0
Kannur	0.631	0	0	0.156	0
State Total	47.703	59.938	89.632	157.752	129.4

Table 4.2.34 Productivity (Kg/ha) of Sesame (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	210	857	663	407	833
Kollam	356	390	1027	840	933
Pathanamthitta	0	39	120	387	737
Alappuzha	339	420	336	312	673
Ernakulam	67	153	74	172	132
Thrissur	405		179	1585	103
Palakkad	141	65	289	289	316
Malappuram	252	201	198	227	388
Kozhikode	0	0	0	385	
Wayanad	434	335	370	380	733
Kannur	316		0		
State average	255		375	418	622

Source: Department of Economics and Statistics, Kerala state

g. Cotton, betel leaves, tobacco and lemon grass are other crops evaluated. The total area under this category during 2015-16, 2016-17, 2017-18 and 2018-19 were 580, 496, 563 and 413.86 ha respectively, where as it was 633 ha during the last year 2014-15. The respective area by Betel leaves were 57%, 52.62, 47.60 and 58.23% area under this category followed by lemon grass (22, 28.83, 35.7 and 25.65 %).

Area of **cotton** during 2015-16 and 2016-17 was 109, 80 ha and was cultivated only in Palakkad district and was reduced by 36% and 26.62% as compared to 2014-15 and 2015-16 respectively. During 2001-02, 3760 ha area was under cultivation in Kerala. Area during 2017-18 and 2018-19 was 84 and 59.4 ha. Cotton cultivation was slightly increased to 5% from 2016-17, while reduced to 29.29% from 2017-18. State production of cotton during 2015-16, 2016-17, 2017-18 and 2018-19 were 196, 120, 132 and 89.51 No. of bales of 170 Kg. each respectively. **Betel Leaves** area under cultivation during 2015-16 was 333 ha and Malappuram stands top with 47% area (increased by 1.8% from 2014-15), while decreased by 46% from that of 2006-07 which was the maximum during

the last 10 years. Area during 2016-17 was 261 ha and Malappuram with 37.93% area. The area decreased by 21.62% this year from 2015-16. Area during 2017-18 was 268 ha and Malappuram with 48.51% area. The area under betel leaves increased by 2.68 %. Area during 2018-19 was 240.99 ha and Malappuram with 102.08 ha area.

State average production of betel during 2018-19 was 11113.75 tonnes as compared to 2017-18 (9651.817 tonnes). Malappuram stands 1st with 3707.503 tonnes. The area under betel leaves increased this year as compared to 2017-18 (3654.704 tonnes). In 2015-16 and 2016-17 production were 12657.143 and 10690.364 ha respectively. Area of **lemmon grass** during 2015-16 was 129 ha and Idukki stands 1st with 70% area. Area of lemon grass increased by 5% from 2014-15. Area during 2016-17 was 143 ha and Idukki with 72.73% area. Area of lemon grass was increased by 10.85% from 2015-16. Area during 2017-18 was 201 ha and Idukki with 56.72 % area. Area of lemon grass was increased by 40.56% from 2016-17. Area during 2018-19 was 106.2 ha and Idukki with 95.29 % area. Area of lemon grass was decreased by 47.16 % from 2017-18.

In Kerala, **tobacco** was cultivated only from Kasargod and the total area of cultivation decreased year by year. During 2015-16 there was 9 ha of tobacco cultivated as compared to 13 ha in 2014-15. During 2016-17 there was 12 ha. As compared to 2015-16 (9 ha), in 2016-17 there was a marginal increase in the area of Tobacco. During 2017-18 10 ha of Tobacco was cultivated as compared to 2016-17, during 2017-18 there was a slight decrease of 2 ha in the area of Tobacco. During 2018-19, 7.28 ha of Tobacco was cultivated as compared to 2017-18, during 2018-19 there was a decrease of 2.72 ha in the area of Tobacco. The state productivity was 1667, 1500, 1600 and 1600 Kg/ha in 2015-16, 2016-17, 2017-18 and 2018-19 respectively.

Table4.2.35.Area of cultivation, Production and productivity of tobacco (2015-2020)

District	2015-16	2016-17	2017-18	2018-19	2019-20
	Area of cultivation (ha)				
Kasargode	9	12	10	7.28	8
State Total	9	12	10	7.28	8
	Production (Tonnes)				
Kasargode	15	18	16	11.65	14.4
State Total	15	18	16	11.65	14.4
	Productivity (Kg/ha)				
Kasargode	1667	1500	1600	1600	1800
State average	1667	1500	1600	1600	1800

h. Pulses

Pulses such as beans, black gram, cow pea, green gram, horse gram, red gram and payar (achinga) are cultivated in autumn, winter and summer seasons. The area under the cultivation of pulses shows a decreasing trend. During 1975-76, the total area of pulses including tur was 37,485 ha, while it was drastically reduced during 2015-16 as 3,764 ha where as it was 3,601 ha during 2014-15. Major cultivation of pulses and tur in the state is in Palakkad and the contribution to state total was 32.83%. The total area of pulses including tur during 2019-2020 was 2260.46 ha, whereas during 2018-19 it was 2,489.49 ha. Similarly, the production and productivity during 2019-2020 were 2103 tonnes and 930 Kg/ha respectively.

Total area of Payar cultivation was 7695, 7150 & 7051 ha during 2015-16, 2016-17, 2017-18 respectively. Palakkad displayed an area of cultivation 1427, 1230 & 1076 ha followed by Ernakulam (1043, 1057, 1102 ha) and Malappuram (1002, 775, 826 ha). Last

position was occupied by Kasaragode (121, 100 & 123 ha). The area of Cowpea cultivation during 2018-19 was 5803.05 ha. It represents 13.88% of total vegetables. Palakkad district stands 1st in cowpea cultivation with an area of 910.11 ha and it represents 15.68% of the total area of cowpea. Ernakulam and Malappuram districts stand at 2nd and 3rd positions with 15.37% and 12.22% respectively. Cowpea cultivation was least in Kasargode district with 1.64 % of the total area. Production at Palakkad was 5469 tonnes followed by Ernakulam and Malappuram 5036 and 4187 tonnes respectively. Kozhikode represents the least with 786 tonnes.

Table 4.2.36 Production (Tonnes) of cowpeas during 2018-2020

Districts	2018-19	2019-20
Thiruvananthapuram	1903	1800
Kollam	1783	1819
Pathanamthitta	986	917
Alappuzha	3328	3500
Kottayam	2302	2011
Idukki	3075	3070
Ernakulam	5036	4271
Thrissur	1925	1943
Palakkad	5469	5271
Malappuram	4187	3882
Kozhikode	786	629
Wayanad	2298	2170
Kannur	1758	1499
Kasaragode	1010	924
State Total	35846	33706

Black gram was cultivated during 2015-16 with a state average of 555 ha. Kannur (314 ha), Palakkad (147 ha), Kasaragode (29 ha) top in the list. Kottayam, Malappuram and Wayanad showed an area of cultivation of 1 ha each. Total state in area of Green gram

cultivation was 168 ha. Kannur (109 ha), Alapuzha (35 ha) Thiruvananthapuram (6 ha) the main districts of cultivation. Malappuram and Wayanad represented by 1 ha each.

Horse gram was cultivated 88 ha in Palakkad, 16 ha in Kannur, 6 ha in Kasaragode. Malappuram and Wayanad were represented by 1 ha each. State Total area of cultivation in the state was 112 ha.

Red gram was cultivated during 2015-16, 2016-17, 2017-18 and 2018-19 with a total area of 1431, 176, 207 & 266 ha. The districts involved were Palakkad 957, 176, 207, 266 ha, 2015-16 at Wayanad 473 ha, Thrissur (1 ha). The production at Palakkad was 234, 278, 323 and 437.90 tonnes. 610 tonnes was showed by Wayanad. The state average production was 1845, 176, 323 & 437.9 tonnes.

Table 4.2.37 Area of cultivation (ha) and Production (Tn) of red gram during 2015-2020

Districts	2015-16		2016-17		2017-18		2018-19		2019-20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Pathanamthitta									2	2
Ernakulam		1		0						
Thrissur	1	1	0	0						
Palakkad	957	234	176	278	207	323	266	437.90		520
Wayanad	473	610	0						311	
State Total	1431	1845	176	278	207	323	266	437.90	313	522

Other pulses

In addition to the above mentioned item, certain other pulses are also cultivated in the state. The details regarding the total area of cultivation and production of these pulses are given in the tables (Table 4.18 and 4.19).

Table 4.2.38 Area of cultivation (ha) and Production (T) of other pulses during 2015-2020

Districts	2015-16		2016-17		2017-18		2018-19		2019-20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Thiruvananthapuram	41	155	47	46	26	25	138.79	161.478		
Kollam	21	106	40	18	35	16	22.78	12.614	20	11
Pathanamthitta	0	7	3	1	6	2	1.06	0.496		
Alappuzha	0	37	4	3	26	20	23.40	11.5		
Kottayam	0	127	0	0	13	10	0	0		
Idukki	115	345	61	242	68	270	72.72	287	79	293
Ernakulam	0	268	32	13	36	15	35.46	10.28	35	12
Thrissur	0	15	0	0	0	0	0	0		
Palakkad	0	261	110	144	159	208	397.8	303.8	248	218
Malappuram	80	326	0	0	8	2	13.29	2.819	29	42
Kozhikode	0	6	8	4	15	8	3.00	3.000	4	1
Wayanad	0	8	870	680	855	669	936.00	594.40	806	531
Kannur	0	605	359	225	516	324	546.39	71.312	105	71
Kasaragode	0	154	28	57	22	45	32.99	28.791	21	28
State Total	257	2420	1562	1433	1785	1614	2223.49	1425.024	1347	1207

i. Sugar Crops cultivated in the state are sugarcane and palmyrah. The total area of sugar crops during 2015-16 was 3,871.59 ha and was decreased by 3.5% from 2014-15. 2016-17 it was 3,362.502 ha and was decreased by 13.15% from 2015-16. During 2017-18 it was 3,082 ha and was decreased by 8.34% from 2016-17. 2018-19 it was 2,897.48 ha and was decreased by 5.99% from 2017-18.

Marayoor and Kanthalloor of Idukki district of Kerala are known for its extensive sugarcane cultivation i.e., more than 2500 acres of land is under sugarcane cultivation. A product of such cultivation is the world famous - Marayoor Jaggery. Jaggery is the term

for dark brown sugar balls made of condensed sugar cane juice. In sugar cane farms, manufacturing units are set up and the Jaggery is manufactured by the farmers, who mostly belong to the Muthuva tribes. The peculiar geographical location of Marayoor, which nestles amid the forests of the Western Ghats, gives the sugar cane a distinct geographical identity.



Sugarcane plant



MarayoorJaggery

Cultivation, production and productivity

Sugarcane

Table 4.2.39 Area (ha) and Production (T) of Sugarcane (2015-2020)

Districts	2015-16		2016-17		2017-18		2018-19		2019-20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Thiruvananthapuram	0.09	0	0	0	0	0	0	0	0	0
Kollam	0.18	0	0	0	0	0	0	0	0.3	3.312
Pathanamthitta	6.98	57.966	10.17	112	8.14	84	10.198	68.021	11.63	135.89
Alappuzha	44.01	385.266	40	322	28	230	29.000	153.700	36.01	270.47
Kottayam	6.78	56.536	8.23	64	12.78	106	15.430	109.388	15.71	124.93
Idukki	875.79	9827.148	829	9351	918.0	10309	888.000	9776.880	849	11283
Ernakulam	0.31	0	0.004	0	0.16	0	0.008	0.068	4	
Thrissur	0.09	0.086	0	0	0	0	0	0	0	
Palakkad	422.75	3448.074	171.45	1423	77.51	746	66.603	494.539	30.82	247.71
Malappuram	0.46	0	0	0	0	0	0.121	1.029	0.12	1.045

Kozhikode	0.1	0	0.008	0	0.004	0	0	0.01	0.087	
Wayanad	0.67	0	0	0	0.45	0		0.0	0	
Kannur	2.79	37.434	3.64	41	2.63	36	2.520	26.260	2.44	16.862
Kasaragode	0.59	0	0	0	0	0		0		
State Total	1361.59	13812.510	1062.502	11313	1048	11511	1011.88	10629.885	950	12084

The total area under cultivation of **sugarcane** during 2015-16 was 1,361.59 ha. On analyzing the area of last 10 years, sugarcane was higher during 2008-09 and the area was 3,392 ha and minimum in 2006-07 with area 1161 ha. The total area under cultivation of sugarcane during 2016-17 was 1,062.502 ha. Total area under cultivation during 2017-18 was 1,048 ha. For the last 10 years, it was the maximum during 2008-09 with area 3,392 ha and minimum in 2017-18. The total area of sugarcane during 2018-19 was 1,011.88 ha.

State production of sugar cane during 2015-16 was 13812.510 tonnes, 2016-17 was 11313 tonnes, 2017-18 was 11511 tonnes and 2018-19 was 10629.885 tonnes. Idukki represents top in production i.e., 9776.880 tonnes.

Palmyrah is cultivated in all districts and the contribution of this crop to total area of sugar crops was 64.83%. The area under cultivation of palmyrah during 2015-16 was 2,510 ha and it covered 2,497 ha in 2014-15. On analyzing the area of last 10 years, it was maximum during 2007-08 and the area was 4,468 ha. The area during 2016-17 was 2,300 ha and it covered 2,510 ha in 2015-16. In 2017-18 it was 2,034 ha and it covered 2,300 ha in 2016-17. During 2018-19 it was 1,885.6 ha and it covered 2,034 ha in 2017-18. Palakkad recorded more cultivation with an area of 825.15 ha and it was 43.76% to the total area of palmyrah in the state.

The area under cultivation of palmyrah during 2019-20 was 1,873Ha and it covered 1886 ha in 2018-19. Palakkad has more cultivation of Palmyrah with an area of 800 ha and it was 42.71% to the total area of palmyrah in the state.

Table 4.2.40 Area of cultivation (ha) of Palmyrah (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
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Thiruvananthapuram	38	32	25	25.38	28
Kollam	12	13	14	16	11
Pathanamthitta	50	51	56	53.17	82
Alappuzha	15	10	12	11.35	11
Kottayam	209	193	185	162.64	161
Idukki	181	167	166	146.84	144
Ernakulam	124	119	117	120.82	113
Thrissur	137	125	109	102.29	100
Palakkad	1192	1122	869	825.15	800
Malappuram	251	225	240	220.36	239
Kozhikode	128	127	111	100.59	104
Wayanad	61	52	73	62.48	37
Kannur	91	40	41	12.98	17
Kasaragode	21	24	16	25.55	26
State Total	2510	2300	2034	1885.6	1873

j. Fodder and forage plants

Area of fodder species during 2017-18 and 2018-19 were 5277 ha and 5803.69 ha respectively. Palakkad (1958, 1821, 1245 and 1677.92 ha) and Idukki (1505, 1606, 1615, 1439.37 ha) occupied the top slots, while Kozhikode the least with 67, 76, 69 and 64.18 ha respectively from 2015-16, 2016-2017, 2017-18 and 2018-19.

Table4.2.41 Area of cultivation (ha) of Fodder plants (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	109	107	105	118.32	126
Kollam	146	154	160	177	182
Pathanamthitta	168	166	177	162.25	173
Alappuzha	117	110	178	166.16	165
Kottayam	266	282	289	345.08	323
Idukki	1505	1606	1615	1439.37	1431
Ernakulam	247	311	359	406.01	532
Thrissur	81	94	102	125.99	97
Palakkad	1958	1821	1245	1677.92	1875

Malappuram	97	95	81	107.94	146
Kozhikode	67	76	69	64.18	94
Wayanad	517	573	624	750.22	824
Kannur	173	151	183	156.32	201
Kasaragode	101	104	90	106.93	138
State Total	5552	5650	5277	5803.69	6307

During 2018-19, area under **forage plants** decreased to 19500.81 ha from 2017-18. Malappuram (4259, 4326, 4121 and 3949.85Ha) and Palakkad (3033, 4452, 2937, 3224.92 ha) occupied the top slots in total area of fodder cultivation in the state. Thiruvananthapuram represented less in cultivation i.e., 552, 539, 517 and 479.8 respectively from 2015 to 2019.

Table 4.2.42 Area of cultivation (ha) of Forage plants (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
Thiruvananthapuram	552	539	517	479.8	488
Kollam	848	841	799	900	908
Pathanamthitta	933	929	922	913.81	978
Alappuzha	559	570	665	709.94	771
Kottayam	597	561	570	537.99	577
Idukki	1700	1709	1872	1554.04	1496
Ernakulam	569	552	570	559.13	553
Thrissur	1519	1584	1668	1615.84	1668
Palakkad	3033	4452	2937	3224.92	3074
Malappuram	4259	4326	4121	3949.85	3761
Kozhikode	1469	1398	1374	1451.14	1370
Wayanad	613	547	566	610.37	635

Kannur	1287	1164	1195	1087.45	1299
Kasaragode	1828	1949	1909	1906.53	2134
State Total	19766	21121	19685	19500.81	19712

k. Cultivated Medicinal plants

Area of medicinal plants during the year 2018-19 was 622.78 ha, whereas for the year 2017-18 it was 1136 ha. During 2018-19, area under medicinal plants decreased by 45.18 % from 2017-18. Total medicinal plants cultivation in the state during 2019-2020 was 1328 ha, Idukki with 249 ha.

Table 4.2.43. Area of cultivation (ha) of Medicinal plants (2015-2020)

Districts	2015-16	2016-17	2017-18	2018-19	2019-2020
Thiruvananthapuram	54	25	53	17.62	55
Kollam	40	17	51	14	57
Pathanamthitta	63	44	87	35.2	87
Alappuzha	90	31	76	15.55	68
Kottayam	69	36	97	31.61	98
Idukki	377	305	128	225.53	249
Ernakulam	99	28	92	15.77	84
Thrissur	235	49	130	30.04	128
Palakkad	995	31	88	27.66	99
Malappuram	104	40	81	54.27	58
Kozhikode	82	48	77	24.17	74
Wayanad	114	108	27	92.16	97
Kannur	83	235	91	27.09	102
Kasaragode	30	15	56	12.11	72
State Total	2435	812	1136	622.78	1328

l. Flower trade in Kerala

Total area of cultivation during 2014-15 was 13.37 ha with yield of loose and cut flowers were 0.05 MT and 32.86 lakhs respectively. In 2015-16 area of cultivation was reduced to 12.88 ha with yield 0.02 MT and 0.59 lakhs respectively. In 2018-19 the cultivated area

increased to 53.26 ha with yield of loose and cut flowers were 0.08 MTs and 44.84 lakhs. A checklist of ornamental plants of Kerala is given in Annexure 4. 23 and plants suitable for interior decoration in Annexure 4. 24. A checklist of orchids, lotus cultivars and water lily cultivars is given Annexure 4.25 to 4.27

Table 4.2.44 Area of cultivation and yield of loose and cut flowers from 2014 to 2019

Year	Area (ha)	Yield (loose flowers) MT	Yield (Cut flowers) in lakhs
2014-15	13.37	0.05	32.86
2015-16	12.88	0.02	0.59
2016-17	26.56	0.03	0.67
2017-18	19.15	0.03	0.9
2018-19	53.26	0.08	44.84

4.3. PLANTATION AND AGROFORESTRY

Plantation crops include tea, coffee, rubber, cocoa, coconut, areca nut, oil palm, palmyrah and cashew. These are high value commercial crops of economic importance and play a vital role in improving economy, especially in view of their export potential, employment generation and poverty alleviation particularly in rural sector. Coconut, cashew nut, cocoa, areca nut, oil palm and palmyrah come under Ministry of Agriculture while tea, coffee and rubber are dealt by Ministry of Commerce. Kerala has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupied 7.11 lakh ha, accounting for 27.7 per cent of the total cropped area in the State. The plantation crops covered in this section are rubber, areca nut, cashew nut, tea, coffee and cocoa.

Table.4.3.1 .Major Plantation Producing districts in Kerala

No	Plantation Crops	Districts
1	Arecanut	Kasaragod, Kannur, Malapuram, Palakkad, Kozhikode, Wayanad, Ernakulam, Thrissur
2	Cashewnut	Kasaragod, Kannur, Malappuram, Kozhikode, Palakkad, Thiruvananthapuram, Kollam
3	Cocoa	Idukki, Kottayam, Malappuram, Trissur, Kozhikode, Kasaragod
4	Coconut	Alappuzha, Ernakulam, Idukki, Kannur, Kasaragod, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad, Pathanamthitta, Thiruvananthapuram, Thrissur, Wayanad

Table. 4.3.2. Commercial Varieties of Plantation Crops

No	Plantation crops	Varieties
1	Areca nut	Mangala, Sumangala, Sreemangala, Mohitnagar, Swarnamangala, VTLAH-1, VTLAH-2

2	Cashew nut	Madakkathara-1, Kanaka, Dhana, Amrutha, Priyanka, Madakkathara-2, K-22-1, Vridhachalam-3
3	Cocoa	VTLCC-1, VTLCH-1, VTLCH-2, VTLCH-3, VTLCH-4, CCRP-1, CCRP-2, CCRP-3, CCRP-4, CCRP-5, CCRP-6, CCRP-7, CCRP-8, CCRP-9, CCRP-10
4	Coconut	West Coast Tall, Andaman Ordinary, KalpaPratibha, KalpaDhenu, KalpaMitra, Kalparaksha, KalpaSamrudhi, KalpaSankara, Kalpasree, Kalpatharu, Chandra Kalpa, Kera Chandra, Chowghat Orange Dwarf, Chowghat Green Dwarf, Malayan Orange Dwarf, Malayan Green Dwarf, KeraSankara, Chandra Sankara, Chandra Laksha, Kerasagara, KeraKeralam, Keraganga, Anandaganga, Kerasree, Kerasowbhagya

4.3.1 CULTIVATION & PRODUCTION OF MAJOR PLANTATION CROPS 2020-21

In the case of plantation crops, coffee, tea and cardamom have shown increase in production while rubber has shown a marginal decline in production. The production of cashew nut increased by 7.5 per cent. Coconut contributed to 29.9 per cent of the total cropped area followed by rubber with 21.43 per cent and rice with 7.86 per cent. Cash crops cashew, rubber, pepper, coconut, cardamom, tea and coffee constituted 62.3 per cent and rubber, coffee, tea and cardamom was 27.7 per cent of the total cropped area. Area of areca nut cultivation during 2019-2020 was 96921 ha as compared to 2018-19 (95739 ha). Production and productivity of the crop was 92755 tonnes and 957 kg/ha respectively as compared to 99925 and 1044 during 2018-19. Cashew nut cultivation during 2019-2020 was 39898 ha as compared to 2018-19 38781 ha. Production and productivity of the crop was 19444 tonnes and 487 kg/ha respectively as compared to 15635 and 403 during 2018-19. The production of raw cashew nuts in India declined from 742 thousand metric tonnes in 2018-19 to 702.8 thousand metric tonnes in 2019-20. However, the area under cashew cultivation recorded an increase from 1105.4 thousand ha to 1,125.06 thousand ha in the respective years. Among the cashew

growing States in India, Maharashtra stands first in production contributing a share of 25.7 % followed by Andhra Pradesh contributing to 16.4 %. Kerala occupies sixth position in the country. In the last one decade in Kerala, there has been a continuous and considerable decline in both area and production of cashew. The production which stood at 34.75 thousand MTs in 2010-11 declined to 19.44 thousand MTs in 2019-20, with a decline in the area from 43.85 thousand ha to 39.89 thousand ha during the same period. Productivity of the crop which was around 793 Kg /ha in 2010-11 also showed a decline to 487 Kg /ha in 2019-20 seriously affecting the prospects of the crop. The area and production increased by 2.9 % and 24.4 % respectively in 2019-20 compared to 2018-19. Even though the cashew kernel exports from India in 2019-20 indicated an increase of 954 tonnes at 67,647 tonnes, the value realization witnessed a decline of Rs. 566.82 crore compared to 2018-19. The total realization was Rs.3867.17 crore. The contribution of Kerala to cashew export in 2019-20 was 45.05 % in terms of quantity as well as realized value. India imported 9.38 lakh tonnes of raw cashew nut worth Rs. 8861 crore of which import to Kerala was 13202 MTs worth Rs.125.5 crore.

A total of 85880 ha area of coffee cultivation was recorded from Kerala during 2019-2020. 66825 tonnes of coffee production with productivity of 762 Kg/ha was recorded from Kerala i.e., 22.3% as compared to 84976 ha, 64676 tonnes and 761 Kg/ha respectively during 2018-19. Among the coffee producing States, Kerala stands second next to Karnataka in the country. Domestic coffee production for the year 2019-20 was estimated at 299.3 thousand tonnes (post monsoon estimates) with Arabica production of 90,400 tonnes (30.2 %) and Robusta at 208.9 thousand tonnes (69.8 %). This represents an overall decrease of the total production as well as with in the break-up of Arabica and Robusta production by 20.2 thousand tonnes, 4.6 thousand tonnes and 15.6 thousand tonnes respectively compared to 2018-19. The export performance of the Indian coffee sector in 2019-20 saw a dip in the quantum exported, value realization and unit value.

The export performance in terms of quantity exported decreased by 26.92 thousand tonnes to 327.07 thousand tonnes, value realization decreased by Rs. 698.90 crore to Rs. 5,209.16 crore and the unit value realization decreased by Rs. 7.63 /kg.

Tea cultivation during 2019-2020 was 35871.16 ha as compared to 2018-19 36474 ha. Production and productivity of the crop was 59260 tonnes and 1652 kg/ha respectively as compared to 60760 tonnes and 1666 kg/ha during 2018-19.

Kerala accounted for 4.35 per cent of the total domestic production of tea in the country in 2019-20. The area under tea declined by 1.65 per cent in 2019-20 to 35871 ha compared to 2018-19. Tea production has recorded an increase of 40.8 per cent over the past ten years. The domestic export in 2019-20 was placed at 240.02 million kg which was lower by 14.48 million kg compared to 2018-19 while the unit value increased from Rs. 216.38 per kg in 2018-19 to Rs.226.14 per kg (Source: Tea Board). The total realization of tea export in 2019-20 was Rs 5427.78 crore which is lower by 1.3 % over 2018-19. The first five months of 2020 showed decline in total quantity exported and in value terms.

Area of Rubber cultivation during 2019-2020 was 551030 ha as compared to 2018-19 551200 ha. Production and productivity of the crop was 533500 tonnes and 1559 Kg/ha respectively as compared to 492500 and 1549 during 2018-19. In Kerala, the area under rubber decreased by 170 ha in 2019-20 while the production increased by 8.32 percent to 5.33 lakh tonnes compared to 2018-19. Annual average price for domestic RSS 4 grade rubber for the year 2019-20 was Rs. 13,522 per 100 Kg compared to Rs. 12,595 / 100 Kg in 2018-19. Natural Rubber (NR) production in the country in 2019-20 was 7.12 lakh tonnes compared to 6.51 lakh tonnes in 2018-19 recording a growth of 9.4 %. Out of the 663,250 ha of tappable area under Natural Rubber only 488,000 ha has contributed to the NR production in 2019-20. However, the share of untapped area

declined to 26.4 % in 2019-20 from 29.8 % in 2018-19. Rubber, tea, coffee and cardamom together occupy 7.12 lakh ha, accounting for 27.5 % of the total cropped area in the State. Kerala's share in the national production of rubber is 74.9 %, cardamom 89.7 %, coffee 21.87 %, and tea 4.35 % in 2019-2020.

Coconut The coconut palm is one of the useful trees in the world, grown in more than 90 countries of the tropical. It provides food, drink and shelter and also provides raw material to number of industries intimately connected with domestic as well as economic life. All the plant parts of this wonder palm are useful to mankind in one way or other. On account of this, the palm has been regarded as Kalpvriksh (Tree of heaven). In India, coconut is grown mainly along the coastal regions. Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, Odisha, Maharashtra, Goa, Assam, Puducherry, Lakshadweep and Andaman & Nicobar Islands are major coconut growing states. Gujarat, Madhya Pradesh, Bihar and North Eastern region have also gained momentum in its cultivation. The area under coconut which has been declining since 2013-14 has marginally increased by 1.06 per cent in 2020-21 compared to 2019-20. However, the production and productivity had declined by 0.54 per cent and 1.58 per cent respectively. Coconut, cultivated in 7.69 lakh ha occupies 29.9 per cent of the gross cropped area. Comparing the data over the last ten years, decline of 6.3 per cent, 19.4 per cent and 13.9 per cent is observed in the area, production and productivity of coconut respectively compared to 2011-12. During 2020-21 coconut was cultivated in an area of 768.8 ('000ha), production was 4788 million nuts and productivity was 6228 nuts/ha

Table 4.3.3 Area, Production and Productivity of Coconut in Kerala and India

Sl. No	Year	Area ('000 ha)		Production (million nuts)		Productivity (nuts/ha)	
		Kerala	India	Kerala	India	Kerala	India
1	2011-12	820.867	2070	5941	23351	7237	11277
2	2012-13	798.162	2136	5799	22680	7265	10615
3	2013-14	808.647	2140	5921	21665	7322	10122
4	2014-15	793.856	1975.81	5947	20439	7491	10345
5	2015-16	790.223	2088*	5873	22167*	7432	10614*
6	2016-17	781.496	2082*	5384	23904*	6889	11481*
7	2017-18	760.443	2096*	5230	23798*	6878	11350*
8	2018-19	760.947	2150*	5299	21288*	6964	9897*
9	2019-20	760.776	2173*	4814	20308*	6328	9345*
10	2020-21	768.809	2189*	4788	21206*	6228	9687*

Source: Directorate of Economics and Statistics, * Coconut Development Board Statistics

Table 4.3.4. Area, production and yield of coconut (2018-19 & 2019-2020)

Sl No:	Name of the districts	2018-19			2019-2020		
		Area (ha)	Production (Lakh nuts)	Yield (Nuts /ha)	Area (ha)	Production (Million nuts)	Yield (Million Nuts /ha)
1	Alappuzha	33755	1920	5688	34205	200	5847
2	Ernakulam	39275	1740	4430	40580	159	3918
3	Idukki	14514	590	4065	13613	56	4114
4	Kannur	83663	5010	5988	86877	412	4742

5	Kasargod	65999	6500	9849	63303	543	8578
6	Kollam	45473	3190	7015	45348	291	6417
7	Kottayam	25514	1240	4860	25221	102	4044
8	Kozhikode	115706	7900	6828	114865	741	6451
9	Malappuram	104685	9120	8712	105381	778	7383
10	Palakkad	55502	4410	7946	57428	454	7906
11	Pathanamthitta	15816	940	5943	16056	76	4733
12	Thiruvananthapuram	71158	4910	6900	70373	424	6025
13	Thrissur	79766	4960	6218	77785	525	6749
14	Wayanad	10121	560	5533	9741	53	5441
	Kerala	760947	52990	6964		4814	6328

Source: 1. Coconut Development Board, Government of India, Ministry of Agriculture & Farmers Welfare, 2. Department of Economics and Statistics, Kerala state

Areca nut: Areca nut or betel nut is a cash crop in the Western Ghats, East Coast and North Eastern regions of India. Areca plant is a tall stemmed erect palm, reaching varied heights, depending upon the environmental conditions. Areca nut has an ethnic component in religious, social and cultural celebrations and economic life of people in Kerala. Areca nut is also used in ayurvedic and veterinary medicines. Although production of areca nut is localized in a few states, the commercial product is widely distributed all over the country. India is the largest producer and consumer of areca nut in the world. Karnataka is the major areca nut growing state followed by Kerala and Assam. It is grown on a limited scale in Tamil Nadu, Meghalaya, West Bengal, Maharashtra and Goa.

Cashew nut: Cashew has assumed an important place in the Indian economy. Cashew cultivation is confined mainly to the peninsular India. Major cashew producing states are Karnataka, Kerala, Maharashtra along the West Coast and Odisha, Andhra Pradesh and Tamil

Nadu along the East Coast. It is also grown to a limited extent in Goa, Andaman & Nicobar Islands, Madhya Pradesh, Manipur, Meghalaya, Assam and Tripura. The area, production and productivity of cashew have been increasing as a result of identification of superior clones, standardization of vegetative propagation techniques and near self-sufficiency in quality planting material. As compared to the previous year, an increase in production and productivity by 7.5 per cent and 13 per cent respectively is recorded in the State in 2020-21. However, the area declined by 5 per cent compared to 2019-20.

Table 4.3.6 Cultivation & Production of raw cashew nut in Kerala, 2013-14 to 2019-20

Sl. No	Year	Area ('000 ha)		Production ('000 MT)		Productivity (kg/ha)	
		Kerala	India	Kerala	India	Kerala	India
1	2011-12	54.05	991	36.74	692	680	749
2	2012-13	52.09	982	37.92	728	728	741
3	2013-14	49.10	1006	33.38	736	680	732
4	2014-15	45.44	1027	29.72	725	654	705
5	2015-16	43.09	1034	24.73	670.3	574	648
6	2016-17	41.66	1035	27.94	779	671	752
7	2017-18	39.72	1062	25.63	817	645	753
8	2018-19	38.78	1105.47	15.63	742.7	403	707
9	2019-20	39.89	1125.06	19.44	702.9	487	n.a
10	2020-21	37.92	1158.5	20.91	738.01	551	n.a

Source – Directorate of Cashew and Cocoa Development (DCCD), Government of India

Table 4.3.5. District wise area and production of Arecanut in Kerala

District	2015-16			2016-17			2017-18			2018-19			2019-20		
	Area (ha)	Production (TN)	Productivity (kg/ha)	Area (ha)	Production (TN)	Productivity (kg/ha)	Area (ha)	Production (TN)	Productivity (kg/ha)	Area (ha)	Production (TN)	Productivity (kg/ha)	Area (ha)	Production (TN)	Productivity (kg/ha)
Thiruvananthapuram	1036	643	621	1004	599	597	891	495	556	901	462	513	894	427	478
Kollam	1931	1070	554	1866	1135	608	1635	1063	650	1620	1045	645	1608	876	545
Pathanamthitta	1114	697	626	1067	578	542	1053	643	611	988	623	631	982	513	522
Alappuzha	1325	467	352	1321	437	331	1304	352	270	1370	385	281	1363	358	263
Kottayam	1614	1121	695	1483	1051	709	1409	1072	761	1392	1081	777	1372	771	562
Idukki	2244	1597	712	2017	1973	978	1928	1626	843	1784	1395	782	1752	939	536
Ernakulam	4134	3460	837	4069	3109	764	3946	2779	704	4108	3033	738	4101	2181	532
Thrissur	6271	6098	972	6096	4861	797	5925	4610	778	5644	4759	843	5641	2978	528
Palakkad	8900	8850	994	9033	7459	826	7283	6146	844	7961	6346	797	7960	4021	505
Malappuram	17895	23359	1305	18379	16519	899	17929	15997	892	17956	14521	809	18007	8805	489
Kozhikode	10134	10347	1021	10261	7386	720	9445	9468	1002	10038	8473	844	9987	6040	605
Wayanad	13461	7428	552	12079	7241	599	12147	4916	405	11852	3679	310	11651	2375	204
Kannur	9386	14173	1510	9543	12684	1329	9493	12026	1267	9362	9532	1018	9338	6903	739
Kasaragod	19681	53143	2700	19478	51807	2660	20192	47323	2344	20764	44592	2148	20764	25836	1244
State	99126	132453	13451	97696	116839	12358	97696	116839	12358	95740	99926	11136	95420	63023	7751

Table 4.3.7 Total area of cultivation, production, productivity of Cashew nuts

District	2015-16			2016-17			2017-18			2018-19			2019-2020		
	A	Pdn	Pdty	A	Pdn	Pdty	A	Pdn	Pdty	A	Pdn	Pdty	A	Pdn	Pdty
Thiruvananthapuram	1213	267	220	1043	255	244	845	198	234	839.01	207.031	247	1262	1162	213
Kollam	2334	644	276	2307	671	291	1803	452	251	1671	455.317	272	2925	2384	236
Pathanamthitta	447	112	251	437	105	240	439	108	246	411.7	87.376	212	3315	3212	214
Alappuzha	1805	248	137	1718	248	144	1663	283	170	1617.02	332.189	205	1257	1176	131
Kottayam	375	102	272	362	95	262	376	113	300	345.34	99.199	261	1181	1062	174
Idukki	1147	376	328	1117	340	304	1034	326	316	944.56	191.445	203	2165	2064	284
Ernakulam	433	118	273	446	114	256	469	133	284	394.87	99.464	252	889	780	299
Thrissur	1661	462	278	1511	491	325	1381	449	325	1296.37	398.254	307	1401	1084	287
Palakkad	2051	406	198	1951	471	241	1147	214	187	1130.28	210.040	186	4460	4213	144
Malappuram	2313	480	208	2035	445	219	1939	322	166	1635.3	257.091	157	3122	2890	152
Kozhikode	1981	626	316	1756	553	315	1594	436	274	1542.24	298.892	194	1417	1234	205
Wayanad	716	291	406	574	206	359	542	194	357	469.29	152.594	325	1020	858	346
Kannur	19769	16744	847	19411	19148	986	19570	18601	950	19242.93	8568.56	445	8633	8423	646
Kasaragod	6845	3857	563	6993	4802	687	6918	3800	549	7240.75	4286.607	592	3486	3222	504
State	43090	24733	574	41661	27944	671	39720	25629	645	38780.66	15635.059	402	36533	33764	487

A -Area (ha), Pdn -Production (tonnes), Pdty Productivity (kg/ha)

The cashew industry is a major traditional agrobased industry in Kerala. Kerala State Cashew Development Corporation (KSCDC) and Kerala State Cashew Workers Apex Co-operative Society (CAPEX) are the two State Government agencies involved in the processing of cashew in the State. Kerala State Agency for the Expansion of Cashew Cultivation (KSACC) and Kerala Cashew Board (KCB) are the other two State Government agencies in the sector. Cashew Export Promotion Council of India (CEPCI) and the Directorate of Cashew and Cocoa Development (DCCD) are the other agencies involved in cashew promotion.

There are several cashew processing units in Kollam District, which has earned it the name of 'cashew capital of the world'. It is estimated that there are more than 800 formal and informal cashew processing units in Kerala. About 65 % of the cashew exporting and processing units officially registered with the Cashew Export Promotion Council of India (CEPCI) are from Kerala. It is estimated that the sector employs about 3, 00,000 workers and 90 % of them are women. Cashew processing is concentrated mainly in the private sector.

The co-operative sector has limited presence in cashew processing. There are two public institutions engaged in the cashew processing industry in Kerala, namely Kerala State Cashew Workers Apex Industrial Co-operative Society Ltd (CAPEX) and Kerala State Cashew Development Corporation (KSCDC). In 2019-20 cashew kernel export from Kerala was 30,478 MT valued at Rs. 1,742.54 crore. At the same time, India's export of cashew kernel in 2019-20 was 67,647 MT valued at Rs. 3,867.17 crore. The share of Kerala in export of cashew kernel from India was 45.05 % in terms of quantity and 45.06 % in terms of value. The area under cultivation of cashew was 37.92 ('000 ha), production 20.91 ('000 MT) and productivity 551 kg/ha.

Coffee

Kerala is the second largest coffee producing state in India, contributing to over a fifth of the country's total production and employing over 44,000 people. Wayanad, Travancore and Nelliampathi have high concentration of coffee plantations.

Kerala accounts for 19% of the total area under coffee plantation in the country. Wayanad, Travancore and Nelliampathi have 85,000 hectares under coffee plantation, roughly 2% of the state's land area. However, it is distributed across 77,475 holdings, most of them were less than 10 hectares.

Coffee is grown in Wayanad as a single crop as well as with pepper. The area under coffee in Wayanad is more than 33% of the total farm area of the district. The main areas of coffee estates in Wayanad were Mananthavady, Thirunelly, Sultan Bathery and Vythiri other than some in Panamaram, Vazhavatta and Kolagappara. The distribution of coffee growing areas according to the coffee board is such that Meppadi has the highest acreage of around 5562 ha followed by Noolpuzha 2900, Ambalavayal 2400, and Tavinjal 2000 while Mullenkolly with 50 ha is the smallest panchayat area of Wayanad. There is a very small 10-acre farm at Coffee Aroma resort which is merely an added attraction to this tourist place away on the slopes of the Chembra Peak. The Coffee Board of Kerala used to control selling of the product till 1996. It has changed since. Plantation owners can directly sell it to buyers now.

Vandiperiyar region **Idukki** of the district is a famous trade centre. The small town of Murikkady is famous area for coffee estates spread all the way up to Thekkady. The Murikkady has a special place in the area because of the scent of spices in the air.

Coffee Plantation in Odamedu Odamedu is situated at a distance of 8 km from the town of Kumily. This and the nearby place Vellaramkunnu are areas of coffee estates.

Coffee Plantation in Peermade The town is a localized expression of the name of a Sufi saint Peer Muhammad. This area is famous for its coffee and tea estates. A special factor of growing of coffee in Kerala is that more than 77000 coffee farmers of Kerala are holders of small estates.

Table 4.3.8 Production of Arabica & Robusta (2015 to 2021)

	Wayanad			Travancore			Nelliampathy		
	Production Tons								
	Arabic a	Robust a	Total (In Mt)	Arabic a	Robust a	Total (In Mt)	Arabic a	Robust a	Total (In Mt)
2015 -16	0	57300	57300	990	7370	8360	1150	1650	2800
2016 -17	0	52416	52416	925	7385	8310	1150	1600	2750
2017 -18	0	56425	56425	960	6350	7310	1200	1775	2975
2018 -19	0	53336	53336	960	7395	8355	1200	1775	2975
2019 -20	0	54676	55,22 5	800	7,350	8,15 0	1,000	1,550	2,55 0
2020 -21	0	59,500	59,50 0	850	6,900	7,75 0	1,050	1,500	2,55 0

Domestic coffee production for the year 2019-20 was estimated at 299.3 thousand tonnes (post monsoon estimates) with Arabica production of 90,400 tonnes (30.2 per cent) and Robusta at 208.9 thousand tonnes (69.8 %). This represents an overall decrease of the total production as well as within the breakup of Arabica and Robusta production by 20.2 thousand tonnes, 4.6 thousand tonnes and 15.6 thousand tonnes respectively compared to 201819 (Economic Review 2020, Kerala State Planning Board).

Tea cultivation in Kerala

The tea cultivation in Kerala State was mainly confined to Idukki, Wayanad, Kollam, Thiruvananthapuram, Thrissur, Mallapuram and Palakkad districts. Out of the aforesaid districts, Idukki and Wayanad districts shares almost 85 to 90% of the total tea production in Kerala, of which, Idukki district alone shares approximately 75% of the total tea cultivation in Kerala.

Area of cultivation (ha), Production (Tonnes) and Productivity (Kg/ha) of the state

Thiruvananthapuram, Kollam, Idukki, Thrissur, Palakkad and Wayanad are the major districts cultivating tea. Total area of cultivation (ha) in the state during 2015-16, 2016-17, 2017-18, 2018-19, 2019-2020, 2020-21 were 30205, 30205, 30205, 36473.93, 35871 and 35871 ha respectively. The respective production was 57898, 61505, 62230, 60760 59260 and 66850 tonnes. State average yield were 1917, 2036, 2060 and 1652. Idukki stands top in cultivation (21970-25508), production (40287-43310) and state mean yield (1834-1698) (5.33, 5.34, and 5.35).

Table 4.3.9 Area of cultivation (ha)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
	Area of cultivation (ha)				
Thiruvananthapuram	962	962	962	835.59	913
Kollam	606	606	606	548.71	574
Idukki	21970	21970	21970	25588.03	25508
Thrissur	530	530	530	529.76	530
Palakkad	831	831	831	777.89	788
Wayanad	5306	5306	5306	8193.95	7558
State Total	30205	30205	30205	36473.93	35871

Table 4.3.10 Production (Tonnes)

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
	Production (Tonnes)				
Thiruvananthapuram	26	94	53	50	55
Kollam	149	169	162	170	100
Idukki	40287	44991	44540	46130	43310
Thrissur	1691	1733	1737	880	1770
Palakkad	1695	2080	2133	2050	2170
Wayanad	14050	12438	13605	11480	11860
State Total	57898	61505	62230	60760	59260

Rubber

All districts in Kerala cultivate rubber. Total area of cultivation (ha) in the state during 2015-16, 2016-17, 2017-18, 2018-19, 2019-2020 and 2020- 21 were 550640, 551050, 551115, 551200,551030 and 550650 ha respectively. The respective production was 438630, 540400, 540685, 492500, 533500 and 519500 tonnes. Kottayam stands top in cultivation from 2015-2020 (114400, 114410, 114440, 114340 and 114340) and production in tonnes (88700, 110000, 110100, 96400 and 96400)

Table 4.3.11 District wise area and yield of Rubber (2015-2019)

Districts	2015-16		2016-17		2017-18		2018-19	
	Area (ha)	Prod (Ton)	Area (ha)	Prod (Ton)	Area (ha)	Prod (Ton)	Area (ha)	Prod (Ton)
Alappuzha	4500	3620	4500	4500	4500	4500	4580	3500
Ernakulam	60140	48550	60170	60000	60170	60050	60140	50150
Idukki	40580	32050	40590	39300	40600	39395	40570	32800
Kannur	48050	39020	48070	49000	48080	49000	48050	44820
Kasargod	33910	25850	33920	32300	33920	32300	33995	31365
Kollam	37240	31600	37260	37800	37270	37780	37350	37300
Kottayam	114400	88700	114410	110000	114440	110100	114340	96400
Kozhikode	21920	19000	21930	23000	21930	22950	21930	22300
Malappuram	42750	32450	42770	40000	42775	40040	42765	39975
Palakkad	37860	29100	37870	36300	37870	36400	37870	33800
Pathanamthitta	50680	44510	50900	53800	50900	53800	50890	49610
Thiruvananthapuram	32160	25080	32200	31000	32200	31070	32330	30480
Thrissur	15660	12900	15660	15600	15660	15600	15620	13800
Wayanad	10790	6200	10800	7800	10800	7700	10770	6200
Kerala	550640	438630	551050	540400	551115	540685	551200	492500

Cocoa: Though introduced in India in the early half of the last century, gained commercial cultivation only in 1970s. Cocoa is grown as a companion crop in irrigated

coconut and areca nut gardens in Kerala and Karnataka. Cocoa is being grown in some pockets of Tamil Nadu and Andhra Pradesh also.



Cocoa, (*Theobroma cacao* L.)

All districts in Kerala cultivate cocoa. Total area of cultivation (ha) in the state during 2015-16, 2016-17, 2017-18, 2018-19 and 2019-2020 were 13924, 14404, 14522, 13891.11 and 14276 harespecively. The respective production was 15349, 12867, 14533, 13400.531, and 17325 tonnes.Kottayam stands top in cultivation from 2015-2020 (9059, 9459, 9715, 9342.01 and 9610) and production in tonnes (11170, 8886, 10319, 9509.046 and 1 3448).

Table 4.3.12 District wise area of cultivation of cocoa

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
	Area of cultivation (ha)				
Thiruvananthapuram	74	66	59	60.44	54
Kollam	8	7	10	8.45	11
Pathanamthitta	350	333	335	318.59	309
Alappuzha	72	86	84	53.76	63
Kottayam	842	876	921	875.17	889
Idukki	9059	9459	9715	9342.01	9610
Ernakulam	1052	1092	1047	1073.53	1092
Thrissur	86	46	52	43.07	32
Palakkad	121	198	157	152.65	205
Malappuram	58	50	66	78.04	74
Kozhikode	759	839	766	806.54	847
Wayanad	774	610	614	420.8	348

Kannur	389	409	386	376.61	475
Kasaragode	280	333	310	281.45	267
State Total	13924	14404	14522	13891.11	14276

Table 4.3.13 District wise production (Tonnes) of cocoa

Districts	2015-16	2016-17	2017-18	2018-19	2019-20
	Production (Tonnes)				
Thiruvananthapuram	41	38	35	39.491	38
Kollam	3	3	15	5.547	9
Pathanamthitta	360	317	352	374.298	446
Alappuzha	143	117	102	71.116	76
Kottayam	809	793	833	880.844	872
Idukki	11170	8886	10319	9509.046	13448
Ernakulam	740	809	788	782.232	827
Thrissur	46	26	28	26.304	19
Palakkad	88	153	134	173.642	200
Malappuram	15	12	45	33.643	41
Kozhikode	696	607	655	657.852	595
Wayanad	636	466	652	359.329	295
Kannur	343	337	329	245.221	303
Kasaragode	259	303	246	241.966	156
State Total	15349	12867	14533	13400.531	17325

Major Plantations in Kerala

1. Kerala state Farming Corporation
2. Oil palm India LTD
3. Plantation Corporation of Kerala LTD
4. Rehabilitation Plantations LTD
5. Harrisons Malayalam Limited (HML)

1.Kerala State Farming Corporation

Rubber Plantation: Out of 2360 ha of Land leased out from Government, Kerala State Farming Corporation has planted rubber during 1982 & 1983 in a total area of 1820.85 ha. The total area was bifurcated into Group 'A' and 'B' estates. Chithalvetty and Kumaramkudy estates come under Group 'A' whereas Group 'B' comprises of Mullumala, Kottakkayam, Ambanar and Cheruppittakavu estates. Apart from Rubber, the Corporation has 229.84 ha of Cashew Plantation. The swamps and marshy land extending to 50 ha unsuitable for Rubber & Cashew cultivation has been planted with coconut, pepper and Areca nut. A total area of 260.09 ha comprising of roads, buildings, Factory and Rocky patches was left as ends.

2. Oil Palm India Ltd

Oil Palm India Limited has got a total planted area of 3646 Hect. of plantation spread over in three estates viz. Yeroor, Chithara and Kulathupuzha in Kollam District, Kerala.

Yeroor Estate: Total area of the estate was 2029.87 ha, comprising of 5 divisions, planted with imported material from different sources. Total population of palms was 2, 38048.

Chithara Estate: Total area is 1615.70 ha, comprising of 4 divisions, planted with both imported and Indigenous material from Thodupuzha developed by CPCRI Regional Station, Palode (presently DOPR, Research Centre).Total population of palms was 21,3396.

3. Plantation Corporation of Kerala Ltd: Extensive estate holdings of the PCK have made it one of the largest plantation owners in the country. From a total 14,020 ha as much as 6,458 ha were under rubber. Cashew plantations make up 6,361 ha and oil palm in 705 ha while the rest area is planted with cinnamon, arecanuts, coconut, pepper, Garcinia, teak and other miscellaneous trees. Thus rubber and cashew are the two major crops raised by the Corporation. The Rubber Plantations are the backbone of the Company. Spread over 6452 ha in 8 estates in virgin fertile forest land leased out from Forest Department and planted with high yielding varieties of rubber.

Kodumon Estate: The estate is located in Pathanamthitta District in Kerala spread over 1202 ha.

Chandanapally Estate: The estate is located in Pathanamthitta District in Kerala spread over 1655 ha.

Thannithode Estate: The estate is located in Pathanamthitta District in Kerala spread over 668 ha.

Kallala Estate: The estate is located in Ernakulam District in Kerala spread over 1592 ha.

Athirappilly Estate: The estate is located in Ernakulam District in Kerala spread over 2195 ha.

Nilambur Estate: The estate is located in Malappuram District in Kerala spread over 573 ha. and clefts inside Nilambur wild life sanctuary.

Perambra Estate: The estate is located in Kozhikode District in Kerala spread over 943 ha. on the bank of Peruvannamoozhi river and Dam.

Cashew Plantations: The Company has 6361 ha of Cashew Plantation.

Mannarghat Estate: The estate is located in Palakkad District in Kerala. The estate was spread over 544 ha.

Alakode Estate: The estate is located in Kannur District in Kerala. The estate was spread over 80 ha.

Cheemeni Estate: The estate is located in Kasaragod District in Kerala. The estate was spread over 856 ha.

Kasaragod Estate: The estate is located in Kasaragod District in Kerala. The estate was spread over 2190 ha. **Rajapuram Estate:** The estate is located in Kasaragod District in Kerala. The estate was spread over 1523 ha.

Kulatupuzha Estate: Kulathupuzha Estate of the company is situated in Pathanapuram Taluk, the eastern part of Kollam district of Kerala. The total area of the estate was 1337 ha and of which, 1308 ha was planted with rubber and 29 ha of area which was under the high tension lines were planted with dwarf variety cashew plants. The Estate comprises of six units having an average area of 200 to 250 ha and each unit was headed by an Asst. Manager. The felling and replanting of old plantations which were raised during 1970's, were started during the year 2001 and till the year 2013, 912.88 ha of area was felled and replanted with high yielding clones like RR11 105, RR11 414, RR11 430, PR 207, PB 260 etc.

4. Harrisons Malayalam Limited (HML) spread over 20 Estates, 8 rubber factories and 12 tea factories along with a number of blending and processing units in the three southern states of Kerala, Karnataka and Tamil Nadu. The company operates 13 Tea estates with a planted area of about 6000 ha and 11 Tea factories. The grades produced are Whole leaf, Broken, Fannings and Dust. The company also produces a limited quantity of Organic Orthodox/CTC teas from its Touramulla estate.

VALUE ADDED PRODUCTS FROM CULTIVATED CROPS

5.1 VALUE ADDED PRODUCTS FROM CEREALS

1. PADDY

a. Rice Straw - Straw is produced by harvesting of paddy. 1 ton of paddy crop produces 290 kg straw which produce 100 kwh of power calorific value = 2400 kcal/kg. Straw is widely used for mulch, mushroom production, packing material, briquettes, ropes, vermi compost, pellets, paper, bio gas production & animal feeding.



Rice straw



Straw as substrate for mushroom cultivation Rice straw as packing material



Rice straw products

Packing Materials: The compaction resistance and resiliency of rice straw makes it good packing material.

Erosion control and soil stabilization: Effective material in commercial erosion control practices. Bales of rice straw can be shredded on site and blown into roadside cuts and fills to provide soil stabilization.

Sewage sludge mixing: Rice straw would be a suitable bulking agent for sewage sludge composting and disposal. Chopped or fiberized straw would increase both absorbency and acceleration of decomposition.

b. Compressed rice straws

Produced for homogenous fuel with a high energy density in square, rectangle, cubed shapes with dimension of $50 \times 50 \times 50 \text{ mm}^3$



Rice Husk Particle Board



Rice straw board

c. Rice Husk - generated during the first stage of rice milling, when rough rice and paddy rice is husked and the grains are threshed. 1 ton of paddy produces 220 kg husk. Uses include Fuel - Gaseous fuel, Husk briquette, Husk board etc



Rice husk

d. Husk ashuses- Carrier for bio fertilizer organisms, Sodium silicate Activated carbon (Fig. 4.10)



Rice husk –vermicompost, activated charcoal and boards

e. Rice bran - the layer between the inner grain and the outer hull of whiter rice is called as bran. Used for manufacture of Edible grade oil, Industrial grade crude oil, free fatty acid manufacture, Plasticizers, Tocoferol, Rice bran wax.



Rice bran powder

Rice bran oil



Rice bran wax

2. RAGI OR FINGER MILLET The seeds of ragi finds applications in a variety of value added products such as ragi flour, ragi cookies, ragi cake, ragihalwa, ragimurukku etc

Table 5.1. Value added products of Ragi

Sl. No.	Ragi value added product	Ingredient
1	Multi-grain flour /Composite flour	Cleaned finger millet seed (30%) and cleaned wheat seed (70%)
2	Ragi Malt Weaning food	Sprouted finger millet seed (70%) and sprouted green gram seed (15%) and chickpea sprouted seed (15%)
3	Ragi Laddoo	Flour of finger millets, Chickpea and wheat, Rawa of wheat, molasses/ sugar, Ghee, Cardamom, Mawa, Dry nuts

4	Ragi Cake	Flour of finger millets& wheat, milk powder, dry fruits, soda, vanilla accence, katri, baking soda, sugar
5	RagiAnrasa	Flour of finger millets & rice, sesamum, dry coconut, molasses
6	RagiShakkarpara	Flour of finger millets & wheat, rawa of wheat, sugar and clarified butter
7	RagiPapchi	Flour of finger millets & wheat, sugar and clarified butter
8	Ragi Cookies	Flour of finger millets & wheat, soda, salt, baking powder, caraway, clarified butter
9	Ragi Donuts	Flour of finger millets & wheat, milk, baking powder, soda, sugar, milk maid
10	RagiKhurmi	Flour of finger millets & wheat, sesamum, refined oil, molasses, groundnut
11	RagiMurku	Flour of finger millets, gram & rice, chilli powder, salt, caraway, sesamum
12	RagiSev	Flour of finger millets, gram & rice, chilli powder, salt, caraway, sesamum
13	RagiBarfi	Flour of finger millets, rawa of wheat, sugar, dry nut, dry coconut, milk, clarified butter
14	RagiHalwa	Flour of finger millets, pulse of moong bean and gram, cardamom, milk, dry nut, sugar, clarified butter
15	RagiGulsel	Flour of finger millets & rice, pumpkin, sugar, cardamom, dry nut, milk, dry coconut, clarified butte



Ragi seeds and flakes



Value added products of Ragi



5.2 VALUE ADDED PRODUCTS FROM TUBERS

1. TAPIOCA [CASSAVA]

1. Sago It is used as a snack food in preparation of porridge and also popular as an infant food. It is estimated that 1.5 lakh tonnes of sago is produced in our country. Motidana, medium dana, badadana and nylon sago are the four different types of sago produced commercially as a food item in the preparation of snacks, sweets etc **Sago Wafers is a** product made at a cottage level in many parts of state.

2. Cassava dried chips Cassava chips are most commonly available product of cassava. The shelf life of cassava can be increased by processing it into chip.

3. Cassava flour Cassava chips are used for the preparation of cassava flour which is consumed in the same manner as rice flour It is used in the preparation of gums, corrugated box making industries, animal feed preparations etc.

4. Cassava papad Cassava papad is an important snack food item prepared from cassava flour.

5. Wafers In this case a starch cake containing approximately 40% moisture is used instead of sago. Wafers can be made into different shapes and sizes, such as round, square, floral patterns, etc. The product on frying expands three to fourfold.

6. Fried chips Fried chips are made by deep frying thin French fries made from cassava. The roots are washed thoroughly and the peel and rind removed. The roots are then sliced as thinly as possible.

7. Cassava butter cake Cakes also have high consumer preference compared to other products. Cassava flour is the main ingredient used for preparation of cake.

8. Cassava coconut cookies It is another value added product from cassava that have a high market value

9. Functional pasta from cassava Pastas are other products which can be produced from cassava. Functional pasta is a normal pasta product which provides additional benefits. There are different types of functional pasta as Protein- enriched sweet potato pasta, Whey protein enriched pasta, Fish powder enriched pasta

10. Cassava pakkavada This is a hot snack food having good texture and taste made out of cassava flour.

11. Cassava sweet fries Sweet snack food made out of cassava flour, maida, baking soda and oil.

12. Cassava nutrichips High protein snack food made out of cassava flour by mixing with other ingredients like maida, groundnut paste, egg, salt, sugar, sesame, coconut milk, baking soda and oil.

13. Cassava crisps This is a soft and good textured crispy snack food made from cassava flour, maida, rice flour, bengal gram flour, salt, baking soda, turmeric powder and oil..

14. Sweeteners

Liquid glucose and dextrose Cassava starch is a raw material for the production of liquid glucose and dextrose.

Fructose syrup Fructose syrup has gained importance in view of the fluctuating prices of sugars and the potential harmful effects of synthetic sweeteners.

Maltose is obtained commercially from starch by enzyme treatment. The maltose syrup is used in brewing, baking, soft drink manufacture, canning and confectionery industries.

15 Poultry and animal feed from cassava

16. Cassava starch

Cassava Starch Cassava roots are washed by hand and peeled with hand knives, the product is sun-dried. This simple process is used by many people in the rural areas of the tropics.

Cassava starch based adhesives Adhesives can be made from cassava starch using simple low-cost technologies. These include gums made by gelatinizing starch by heat treatment without any additives as well as those made by extraneous addition of different kinds of materials.

Gums without additives The simplest liquid starch pastes are made by cooking starch with water, with preservatives being added later. These are useful in bill pasting, bag making and in tobacco products.

Gums prepared using different chemicals Various chemicals may be added during the preparation of the gums. These include inorganic salts like calcium and magnesium chlorides, borax, urea, glycerol, carboxy methyl cellulose and carboxy methyl starch.

Modified starches Cassava starch is modified by chemical or physical means to improve its functionality for industrial applications. The commercially converted starches are acid modified, oxidized and dextrinized starches. The undesirable properties of cassava starch, such as high breakdown in viscosity and cohesiveness of starch paste, can be modified through physical and chemical treatments.

Cold water miscible starch The cold water miscible starch finds application in textile industries, for home use in starching the clothes and also for preparing some specialty foods. It is produced using alcohol / alkali and precipitation by alcohol. It is easily and completely soluble in cold water having good and stable viscosity.

17. Biodegradable plastic CTCRI technology to produce biodegradable polymers incorporating cassava starch has given new hope to tackling the problem of environmental pollution due to the extensive use of plastics effectively.

18. Cassava alcohol

Cassava can be used for production of ethanol. CTCRI has perfected and patented the process for alcohol production from cassava.

19. Cassava leaf products

Cassava leaves can be used for the production cattle feed. It is also used in the production of bio-pesticides like Nanma and Menma produced by CTCRI.



Tapioca dried chips



Tapioca flour



Sago from tapioca



Tapioca chips



Tapioca pasta

Water soluble starch



Biopesticides from Cassava

5.3. VALUE ADDED PRODUCTS FROM SPICES

1. Cardamom

Oleoresin Solvent extraction of ground spice yields 10 % oleoresin. Cardamom oleoresin is used for flavouring food after being dispersed in salt, flour etc. One kilogram of oleoresin replaces 20 kg ground spice.

Decorticated seeds / seed powder Decorticated seeds command a lower price due to rapid loss of volatile oil during storage and transportation. Seed powder is marketed to a limited extent

Essential Oil Cardamom essential oil is extracted from the seeds of cardamom. Oil is highly effective in curing muscular and respiratory spasms, thereby giving relief from muscle pulls and cramps, asthma, and whooping cough.

2. Cinnamon

Oleoresin Cinnamon oleoresin is prepared by extracting cinnamon bark with organic solvent. Oleoresin yield varies from 10 to 12 per cent. The oleoresin is dispersed on sugar, salt and used for flavouring processed foods

Cinnamon bark oil A pale yellow liquid possessing the delicate aroma of the spice is obtained by steam distillation of quills (0.2 to 0.5%). Its major component is cinnamaldehyde (55%) but other components like eugenol, eugenyl acetate, ketones, esters and terpenes also impart the characteristic odour and flavour to this oil.

Cinnamon bark oil is used in flavouring bakery foods, sauces, pickles, confectionery, soft drinks, dental and pharmaceutical preparations and also in perfumery.

Cinnamon leaf oil Cinnamon leaf oil is produced by steam distillation of leaves yielding 0.5 to 0.7% oil. It is yellow to brownish yellow in colour and possesses a warm, spicy but rather harsh odour. The major constituent is eugenol (70 to 90 %) while the cinnamaldehyde content is less than five per cent. The oil is used in perfumery and flavouring, and also as a source of eugenol.

Cinnamon root bark oil The root bark contains 1.0 to 2.8% oil containing camphor as the main constituent. Cinnamaldehyde as well as traces of eugenol are found in the oil, having less commercial relevance.



Value added products of cinnamon

3. Garlic

Some of the products developed from Garlic includes Braided garlic, Garlic scapes, Gourmet garlic powder, Pickled garlic, Garlic pesto sauce, Garlic vinegars, Garlic jelly and Garlic insecticide

4. Ginger Ginger oil is prepared commercially by steam distillation of dried powdered ginger. The yield of oil varies from 1.3 to 3.0 per cent. The major use of ginger oil is as a flavouring agent for beverages, both alcoholic and non-alcoholic. Zingiberene is a monocyclic sesquiterpene that is the predominant constituent of the oil of ginger, from which it gets its name. It can contribute up to 30% of the essential oils in ginger rhizomes. This is the compound that gives ginger its distinct flavoring

Ginger oleoresin Oleoresin from ginger is obtained conventionally by extraction of dried powdered ginger with organic solvents like ethyl acetate, ethanol or acetone. Commercial dried ginger yields 3.5-10.0 per cent oleoresin. Ginger oleoresin is a dark brown viscous liquid responsible for the flavour and pungency of the spice.

Glazing and preservation of ginger Preserved ginger in its crystalline form is used as a sweetmeat when preserved in syrup. It is mainly used as a dessert in its own right although it is also some time incorporated in such products as cakes, fruits salads, yoghurt and ice cream.

Ginger powder Powder ginger has very good domestic as well as export market. It can be used as pharmaceuticals for the production of herbal medicines in the treatment of cold fever. It can be used as additive for the food supplement.



Value added products of ginger

5. Nutmeg

Oleoresin Nutmeg and mace oleoresins are prepared by extracting the ground spice with organic solvents. Yield of oleoresin is 10-12 % for nutmeg and 10-13 % for mace. Mace oleoresin possesses a fine, fresh fruity character.

Nutmeg butter Nutmeg contains 25-40 per cent of fixed oil that can be obtained by pressing the crushed nuts between plates in the presence of steam or by extracting with solvents. The product, known as nutmeg butter, is a highly aromatic, orange coloured fat with the consistency of butter at ambient temperature.

Nutmeg oil This is obtained as pale yellow to white volatile liquid possessing a fresh warm aromatic odour. The yield ranges from 7 to 16 %. The unshelled nuts are coarsely crushed in a mechanical cracker and steam distilled.

Mace oil The mace yields 4-17 % colourless to pale yellow liquid possessing organoleptic properties similar to nutmeg oil. Nutmeg and mace oil are also used for flavouring



Value added products of Nutmeg

6. Black pepper

Black pepper of commerce is produced from whole, unripe but fully developed berries. White pepper is prepared from ripe berries or by decorticating black pepper. Decorticated black pepper, Dehydrated green pepper, Canned green pepper, Bottled green pepper, Cured green pepper, Freeze-dried green pepper are also manufactured

Pepper oil Black pepper is crushed to coarse powder and steam distilled to obtain 2.5 to 3.5 per cent colorless to pale green essential oil which becomes viscous on ageing. It is used in perfumery and in flavouring. Oil can also be distilled from white pepper but high price of white pepper and low oil yield do not favour its commercial production

Pepper oleoresin Extraction of black pepper with organic solvents like acetone, ethanol or dichloro-ethane provides 10-13 per cent oleoresin possessing the odour, flavour and pungent principles of the spice.

7. Tamarind

The fragrant oils made from tamarind extract has a sour and sweet essence. It is incorporated as a fragrance ingredient in a variety of products such as soaps, candles, air fresheners, bath oils, aromatherapy products, incense sticks, laundry products etc.



Value added products from tamarind

8. Turmeric

Oleoresin: This is obtained by the solvent extraction of the ground spice with organic solvents like acetone, ethylene dichloride and ethanol for 4-5 hours. It is orange red in colour. Oleoresin yield ranges from 7.9 to 10.4 per cent. One kg of oleoresin replaces 8 kg of ground spice.

Turmeric powder: It is a major ingredient in curry powders and pastes. In the food industry, it is mostly used to colour and flavour.

Curcumin: Turmeric contains curcuminoids, which are bioactive compounds,. Research suggests that curcumin can help in the management of oxidative and inflammatory conditions, metabolic syndrome, arthritis, anxiety, and hyperlipidemia. It may also help in the management of exercise-induced inflammation and muscle soreness, thus enhancing recovery and subsequent performance in active people



Value added products of Turmeric

9. Clove

Clove bud oil: The essential oil is obtained by steam distillation of buds or whole cloves. On distillation, about 17 per cent essential oil is obtained which is a colourless or yellow liquid possessing odour and flavour characteristic of the spice. Finest oil contains 85-89 per cent eugenol. Clove bud oil is used for flavouring food and in perfumery.

Clove stem oil: Clove stem oil is obtained from dried peduncles and stem of clove buds (5-7%) on steam distillation. The eugenol content of the oil ranges from 90-95 per cent. This oil possesses a coarser and woodier odour than bud oil.

Clove leaf oil: Clove leaves on distillation yield 2-3 per cent oil as a dark brown liquid with a harsh woody odour. When rectified, it turns pale yellow and smells sweeter with a eugenol content of 80 to 85 per cent.

Oleoresin: Clove oleoresin may be prepared by cold or hot extraction of crushed spices using organic solvents like acetone giving a recovery of 18-22 per cent. The oleoresin is chiefly used in perfumery and when used for flavouring it is dispersed on salt, flour etc.



10. Vanilla

Vanilla extract or Pure vanilla powder made from vanilla beans can be sprinkled on baked goods like chocolate chip cookies, doughnuts, or toast for sweet, fragrant flavor. It can be added to coffee, or to infuse homemade pancake or waffle mixes.

5.4. VALUE ADDED PRODUCTS FROM PLANTATION CROPS

1. COCONUT

Every part of the coconut tree is used in various fields such as coir, coir pith, soil care etc. and several value added products are made from the edible part



Coconut chips



Virgin Coconut oil



Kalparasa

jaggery

Coconut



Coco cream, Coco chocolate and Kalpakrunch



Coconut milk Desiccated coconut



Coconut oil



Copra



Tender coconut water and its products



Neera and other products



Coconut palm sugar



Coconut flower syrup



Coconut biscuit



Coconut shell products



Coconut shell powder



Activated carbon from coconut shell



Coconut waste for mushroom cultivation

Coconut sap based products

Kalparasa (coconut sap) Neera in Sanskrit means life essence of coconut tree. It is the phloem sap extracted from the unopened inflorescence. From the cut end of the inflorescence the sap oozes out. The trickled sap is traditionally collected in earthen pot and during the process it gets fermented. Lime coating inside the collection pots to a certain extent prevents fermentation but not fully in the traditional technique.

Coconut sugar and jaggery Coconut sap contains about 15% sugars and considerable amount of nutrients, which can easily be converted to various value added products. Coconut sugar and jaggery are obtained by evaporating the water of unfermented sap at 115°C. The viscous liquid, fairly thick hot (Brix 60 to 70°) is cooled to get coconut honey or syrup. Further, on heating the sap becomes more viscous and thicker in consistency, and is poured to moulds of either coconut leaf or steel to obtain jaggery

Kernal based products

Coconut Milk It is the oil-protein-water emulsion obtained by squeezing fresh grated coconut kernel. The undiluted and diluted forms are called coconut milk and the concentrated form is coconut cream. It is obtained by extraction of fresh coconut wet gratings with or without water. This is an instant product, which can either be used directly/diluted with water to make various preparations such as fish & meat

dishes, curries, sweets, deserts, puddings, cocktails, cakes, cookies, coconut jam, ice creams etc.

Coconut Skimmed Milk It is a solution of the soluble components of coconut after the cream is separated in a cream separator. Skimmed milk is a good source of quality protein suitable for the preparation of many useful food products or as supplemental protein source.

Spray Dried Coconut Milk Powder This is the best method for the preservation of coconut milk. Spray dried coconut milk powder is reconstituted into coconut milk by adding water which can be used to make various food preparations

Copra Two types of copra, namely the milling and the edible, are made in India. The milling copra is used to extract oil while the edible copra is consumed as a dry fruit. Edible copra is made in the forms of balls and cups.

Coconut Oil Coconut oil is unique cooking oil as it contains short and the medium chain saturated fatty acids. It finds extensive use in the food industry due to its characteristics such as easy melting behaviour, resistance to oxidative rancidity, pleasing flavour and good digestibility. Coconut oil is preferred as a fat in the preparation of filled milk, infant milk powder, ice-cream, confectionery and bakery products. Because of its stable character, coconut oil is the preferred fat for deep frying.

Virgin Coconut Oil Virgin coconut oil is the oil obtained from fresh, mature endosperm (kernel-meat) of the coconut by mechanical or natural means, with or without use of heat, no chemical refining, bleaching or deodorizing and maintains the natural aroma and nutrients.

Snow Ball Tender Nut (SBTN) Snow ball tender nut is a tender coconut without husk, shell and testa which is ball shaped and white in colour. Coconut of 7–8 months age in which there is no decrease in quantity of tender nut water and the kernel is sufficiently soft is more suitable for making SBTN.

Coconut chips The dehydrated coconut chips are in ready-to-eat form and can be used as snacks. It could also be used at any time just like fresh kernel after

rehydration of the chips. Fresh kernel of matured coconut containing reasonable amount of water are to be used for the production of the sweet coconut chips.

Coconut water based products

Tender coconut water The water of tender coconut (TCW) is a sterile, nutritious and thirst quenching health drink with therapeutic properties.

Coconut inflorescence based food products

Neera: The vascular sap collected from immature unopened coconut inflorescence is popularly known as Neera in fresh form. It is a sugar containing juice and is a delicious health drink and a rich source of sugars, minerals and vitamins. It is sweet and oyster white in colour and translucent. It is tapped from the coconut inflorescence and is filtered, pasteurized and bio preservatives added to preserve the product.

Coconut Palm sugar: the jaggery is crystallized to produce fine granules of sugar. Transition of coconut jaggery into a ground granule sweetener is more accepted by global markets

Coconut flower syrup: a product similar to jaggery with high content of minerals. It is a rich source of potassium, sodium, free from total fats and cholesterol. It is produced when fresh Neera is heated and concentrated into syrup.

Coconut convenience food products

Coconut biscuits are ready to eat snack products prepared from maida and coconut powder. It can be prepared in different flavors through addition of cocoa, butter; ginger etc. The product has a shelf life of three months under ambient conditions.

Coconut candy is prepared from grated coconut mixed with coconut milk. It has high fiber content and helps prevent intestinal sluggishness.

Coconut chocolate: a sweet confectionery item prepared from coconut gratings sugar, milk butter with a coating of chocolate. It is rich in protein, carbohydrate and fiber. It can be made more delicious through addition of cashew, badam and other dry fruits.

Coconut Burfi: a snack prepared by roasting coconut gratings.

Coconut Shell Based products

Coconut shells are used for various ornamental purposes including, handicraft items, kitchen utilities, flower pots etc.

Mushroom cultivation using coconut by-products

Methods to cultivate mushroom using by-products of coconut as substrate have been developed at CPCRI, Kasaragod. Among the cultivated mushroom, Oyster mushroom –is the ideal one for cultivation on coconut by-products because of their ability to utilize lignin rich materials and the favourable climatic conditions in the coconut growing areas. Coconut bunch waste, leaf stalk, mixtures of leaf stalk + coir pith in 1:1 ratio and bunch waste + coir pith in 1:1 ratio were found to be better substrates for mushroom cultivation. On an average, mushroom yields of 590 and 570 g can be obtained per kg dry weight of leaf stalk and bunch waste in a cropping period of 73 and 60 days, respectively.

2. PALMYRA PALM

Various products are prepared from the palmyrah tree such as edible products from sap and fruit, other products from leaf and fibre

 A collection of products derived from palm sap, including several bottles of varying sizes and colors (dark brown, light brown, and clear), a large pile of brown granular material, and a circular logo or label in the background.	 A collection of products derived from palm fruit, including several bottles of varying sizes and colors (yellow, orange, and red), several small white bowls containing different colored powders or granules, and a glass dish containing a brown substance.
Sap based products	Fruit based products

	
<p>Food based products</p>	<p>Tuber based products</p>
	
<p>Leaf based products</p>	<p>Fiber based products</p>

Value added products of Palmyrah

3. ARECANUT

The main constituents of arecanut are polyphenols, fat polysaccharides, fibre and protein. Besides these, nuts contain alkaloids viz. arecoline (0.1 - 0.7%) and others in trace amounts such as arecadine, guvacoline and guvacine. It was found that tannins, a by-product from the processing of immature nuts find use in dyeing clothes, tanning leather, as a food colour, etc. The nuts contain 8-12% of fat, which can be extracted and used for confectionery purposes. The refined fat is harder than cocoa

butter and can be used for blending. The medicinal properties were described as effective against leucoderma, leprosy, cough, fits, worms anemia, obesity.

Dried Ripe Nuts: Popular trade type of arecanut is the dried whole nut known as chali or kottapak. The dried nuts are dehusked and marketed as whole nuts. Depending on the size and quality, grades are made and marketed. The main producing areas of chali are Kerala, Karnataka, Assam and Maharashtra.

Kalipak: a form of processed arecanut which is the tender nut processed red type - 'kempadike' or 'kalipak'. Kerala and Karnataka are the main processing centres of kalipak. The nuts of 6-7 months maturity is soft. Outer skin is dark green in colour at this stage.

Scented Supari: Dried arecanuts are broken into bits, blended with flavour mixture and packed. The flavouring of supari varies with region and is a closely guarded secret. Scented suparis popular in north and central India is of two types: the one made from chali and the other from kalipak. Saccharin is used for sweetening the supari. Additives such as colour and flavour are added to improve the taste and appearance. The kalipaks and scented suparis are mainly used as a masticatory, whereas chali and ripe arecanuts which leave a large fibrous residue in the mouth are used along with betel leaf and slaked lime. Readymade combination of these are often flavoured with spices such as cloves, coconut gratings and sugar crystals. In North India, the paan-beedas contain katha, the extract of *Acacia catechu* also. About 75% of the marketed produce is consumed after processing, either as kalipak or chali.

Arecanut husk: Many processes have been developed for utilization of areca husk for making hard boards, plastic and brown wrapping paper. It is used as a substrate for mushroom cultivation.

Areca leaf sheath: A process has been developed for making ply boards from areca leaf sheath. Two plies of processed arecanut leaf sheaths in combination with an ordinary wood veneer as core glued with urea formaldehyde resin are used for

making the ply boards. The leaf sheath is made into cups, plates, and bags for holding plantains, sweetmeats, and fish. The flower sheath is made into dishes

Areca nut stem and leaf: Areca nut stem forms a useful building material in the villages and is widely used in areca nut growing area for a variety of construction purposes. The leaves are good source of organic manure. The timber can also be used in making a variety of utility articles such as rulers, shelves and waste paper baskets.

Tanins are obtained as a by-product from the process of preparing immature betel nuts for masticatory purposes. It was found that tannic acid from the nut, when mixed with ferrous sulphate in warm distilled water gave black writing ink of acceptable quality. Other uses of tannin are as adhesive in plywood industries and as a textile dye.

Fats: The nuts contain 8-12 per cent fat. Fat from arecanut, can be extracted by solvent extraction using hexane. Areca fat has comparable characteristics with hydrogenated coconut oil. Simple blending of areca fat with butter fat and cocoa fat at 3:1 ratio followed by inter esterification of areca fat and cocoa fat at 1:1 ratio gave good products acceptable in confectioneries.

4. CASHEW NUT

The cashew tree is a multipurpose species, and cashew products have a wide range of uses. Almost all parts of the cashew tree are reported to have ethnomedicinal properties. The kernel of the cashew nut, the pseudofruit (cashew apple) and the leaves are edible. Once extracted from the nut, the kernels are roasted. The kernels are a nutritious food as they contain large amounts of fats, protein, carbohydrates, vitamins and minerals. Dried and fried cashew nut possesses pleasant taste and flavour. They are mostly eaten fried, and are sometimes salted or sugared. They are used in large quantities by sweet meat dealers and confectioners. More than 70 % of

the cashew nut production of India is from the West Coast, Ratnagiri, North Kanara and Malabar districts in Madras, Cochin, Travancore.

Cashew apples (pseudofruit) can be eaten fresh in salads, pressed to make juices, cooked in syrup or made into jams to preserve them.

Cashew pulp is the residue of the separation of the nut from the pseudofruit, and cashew bagasse (cashew pomace, cashew apple waste) is the residue of the juice extraction from the pseudofruit. Both products are suitable for livestock feeding.

Cashew nut oil meal, or cashew nut oil cake, is the residue of the oil extraction from kernels. It is suitable for livestock feeding.

Cashew tree timber provides good firewood and can make valuable charcoal. The nut shells can be burnt to produce heat to be used in the processing of Cashew Nut Shell Liquid.

Cashew Nut Shell Liquid (CNSL), or cashew shell oil, of the fruit mesocarp is a mixture of 70% anacardic acid (a salicylic acid analog, and a strong skin irritant) with 18% cardol, and 5% cardanol. The two latter components are caustic phenolic substances that readily polymerize and are used for epoxy resins, varnishes, and many high-tech materials that can withstand high temperatures, such as brake linings. CNSL is also used as a pesticide against termites in timber, and the bark gum is repellent to insects.





Value added products

Cashew kernel peels (Testa): Cashew peels are rich in protein and dietary fibre that may be used for cattle feed.

Cashew fruit juice from Cashew Apple: it has multifarious uses viz. as a beverage for drinking purposes, for wine manufacture & cashew feni, and its consumption in hotels, restaurants, juice corner or various occasions etc. makes it a demandable product.

Cashew Butter: Cashew butter is nutritious as it is a rich source of vitamins, lipids and protein. It may be used as a food spread and has rich and creamy sensory profile. As it contains high amount of lipid, cashew butter is recommended to be stored at a cool and dark place to prevent rancidity defect.

Cashew nut paste: Cashewnut kernels are soaked in drinking water or milk till the kernels become soft. After that the kernels are ground to form a smooth paste. During grinding, if required a small amount of water may be added. The formed paste is to be stored in low temperature refrigeration for long time storage. This paste may be used while preparing various types of vegetable dishes or sweet dish preparations to experience enhanced flavour experience.

Other Cashew Kernel Products:

Kerala State Cashew Development Corporation Limited (KSCDC) under Government of Kerala, has worked extensively in the field of development of cashew kernel value-

added products. Value-added products developed and marketed are following: Cashew Vita – Nutritious health drink; Cashew soup mix; Milky kaju; Choco kaju; and Cashew powder.

Cashew wine: Cashew apple juice is extracted and fermented with wine yeast. Cashew wine contains 6-12% alcohol and is a light yellowish colour liquid, which is popular in parts of Asian and Latin American countries.

Dried cashew fruit: Cashew fruit is not readily consumed in the raw state because of its high content of astringent compounds. Boiling with salt for 5 min removed astringent compounds and it can be converted into a useful dried product. The fruit must therefore be extensively processed prior to drying.

Cashew fenny: In Goa (India), cashew juice is utilised for preparation of alcoholic beverage named as Fenny. Recently Cashew Fenny got its GI registration as a specialty alcoholic beverage from Goa. It has a long shelf life. In fenny, alcohol content ranges from 40-45%.

Cashew apple jam: Cashew apple is thoroughly cleaned by washing with water. The apple is immersed in 3% salt solution for three days to reduce the tannin content, after which the fruits are steamed for 15 to 20 minutes at 0.7 to 1.05 kg steam pressure. Then the apples are crushed and mixed with sugar and boiled. A pinch of citric acid is added towards the end of the cooling process to improve the taste. Finally it is stored well in sterilized jam bottles.

Cashew syrup: For preparation of cashew syrup, first stage was to remove the astringency taste by following the same boiling method as done for dried cashew fruit preparation. Then sugar, citric acid and sodium benzoate needed to be added followed by mixing for 3-4 h. prepared syrup is to be cleaned and packaged.

5. COCOA

Chocolate milk is a popular dairy product that combines cocoa powder with milk, sugar, and thickeners. Dark chocolate, white chocolate, chocolate spread are popular cocoa-based product. Cocoa butter is the pure fat removed from cocoa beans during their processing.

5. 5. VALUE ADDED PRODUCTS FROM FRUIT PLANTS

1. JACKFRUIT

Dried Jackfruit Flakes: Dehydrated Jackfruit flakes with a shelf life of one year were standardized by KAU. The flour prepared from dehydrated Jackfruit flakes was found to be suitable for preparing chapattis and other snacks by replacing 25% wheat flour, maida or Bengal gram flour, respectively with Jackfruit flour

Preserved Jackfruit Bulbs: Fresh Jackfruit bulbs are a consumer-preferred commodity and relished well by all sections of population. Ready-to-eat fresh Jackfruit bulbs along with seeds were preserved under vacuum (760 mm lbs pressure) by treating with 1.5% KMS and 0.5% sodium benzoate. Preserved bulbs depicted negligible changes in the chemical constituents and were organoleptically stable for period of 15 days under refrigeration.

Ready-to-serve Jackfruit beverages: The ready-to-serve beverages can be prepared from fruits very easily with a composition of 10% of juice, 10% of TSS and 0.3% acidity. Also formulated ready-to-serve beverages from jackfruit pulp is prepared with 10% pulp content, 12% TSS and 0.3% acidity.

Jackfruit squash: Refreshing beverage with pleasant taste and aroma was developed from the bulbs of ripe Jackfruit. This was found to have a shelf life of 60 weeks when stored at room temperature (24-30°C).

Jackfruit Nectar: Fruit nectar is a concentrated form of fruit pulp having honey-like consistency. Jackfruit nectar was standardized successfully from the two popular varieties of Jackfruit available in Kerala individually and by blending with other fruit pulp.

Jackfruit Wine: There is immense scope for fruit-based fermented beverages in India, especially wine and vinegar. Two fermented products, which can be prepared from jackfruit pulp, are wine and vinegar. Jackfruit in general contains high amount of easily fermentable sugars, which makes it suitable for the growth of wine.

Jackfruit Vinegar: Vinegar is a fermented product which can be formulated from Jackfruit. Vinegar recovered from the ripe fruits yielded 7% alcohol and 6% acetic acid upon fermentation.

Canned Jackfruit Products: Jackfruit bulbs both raw and ripe could be successfully canned for subsequent use. Canned Jackfruit when stored at room temperature (24-30°C) was found to retain normal color and characteristic taste and aroma. However, the product, when stored at 37°C for 19 weeks depicted deteriorative changes.

Dehydrated Jackfruit Slice: Recently, at IIHR, Bangalore (India), a process has been developed for making osmotically dehydrated Jackfruit slices. Osmo-air dried fruits are the dehydrated fruit products based on the novel approach towards dehydration. Suitable fruits are selected at optimum stage of ripeness (hard ripe stage) made into slices and dipped in sugar syrup containing citric acid, preservatives and with and without maltodextrin.

Jackfruit bar and Ice-cream: Jackfruit ice-cream and Jackfruit mixed mango ice-cream are also becoming popular in India. It is observed that Jackfruit bars stored in modified polypropylene packets (MPP) recorded higher percent of nutrient retention to have distinct taste and flavor. Blending Papaya pulp with Jackfruit pulp imparted better appearance, color and textural qualities, while blending with mango pulp resulted in better flavor, taste and overall acceptability.

Jackfruit Pickles: The Central Food Technology Research Institute (CFTRI) had undertaken studies on the preservation of jackfruit and reported that tender jackfruit could be preserved in the form of pickles. The important pickle preservations include sweet oil pickle, spiced vinegar pickle, and plain vinegar pickles.

Jackfruit Chips: Jackfruit chips are prepared using raw bulbs.

Jackfruit papad Jackfruit bulbs which are neither fully mature nor completely raw, could be used for preparing jackfruit papads

Jackfruit Sweets Various sweet delicacies such as Jackfruit halwa (variety), pudding, jackfruit toffee, Jackfruit barfi, elayappam, adda, Muffin, Cakes and payasam, etc. could also be prepared from Jackfruit bulbs.

Jackfruit Jelly Jackfruit rind contains fair amount of sugar and pectin that could be used for pectin extraction.

Jackfruit Seed Flour: Jackfruit seeds may be converted into flour after inactivating the anti-nutritional factors by drying. The flour prepared from Jackfruit seeds can be used for making chapattis by blending with wheat flour (25:75). Further, Jackfruit flour produced may be used as thickening and binding agent in food systems.

Roasted Nuts The roasted jackfruits seeds are reported to resemble chestnuts in nutritive value and flavor and are palatable. However, the shelf life of fried seeds is low, as these cannot be stored for more than a few days at room temperature of 24-30°C.



Dried Jackfruit flakes



Dehydrated jackfruit bulbs



Jackfruit Squash, Nectar & Wine, Juice



Jackfruit vinegar



Jackfruit ice cream



Jackfruit Chips

Jack fruit Pappad



Jackfruit Sweets and cake Jackfruit Jelly Jackfruit Seed Flour



Roasted Nuts

2. PINEAPPLE

Pineapple fruit is processed into a range of refreshing food products including juice, squash, halva, jam, candy, pickles, chutney and vine. A fruit processing unit was established by Government of Kerala at Nadukkara, near Vazhakulam and various products are marketed under the brand name Jive.



Pineapple candy & Jive products

3. MANGO

Mango powder Aamchur or mango powder is a fruity spice powder made from dried unripe green mango which are sliced and sun-dried before grinding.

Mango pulp It is prepared from selected varieties of fresh mango fruit. Fully matured mangoes are harvested, quickly transported to the fruit processing plant. The refined pulp is also packed in cans, hermetically sealed and restored frozen pulp is pasteurized and deep frozen in plant freezers.

Mango beverages Three important beverages are prepared on a commercial scale- mango juice, nectar as well as squash. Mango juice is prepared by adding equal quantity of water and adjusting the total soluble solid and acid. Mango nectar contains 20% pulp with sugar and acidity. These beverages are packed in cans. Mango squash contain 25% juice, 45% TSS and 1.2 to 1.5% acidity and is preserved with preservative in a glass bottle.

Mango jam To prepare mango jam, pulp from dehydrated mango slices was heated with an equal quantity of sugar and citric acid was added at the end to get 0.6-0.7% acidity in the final product.

Mango By-Products After consumption or industrial processing of the fruits, considerable amounts of mango seeds and pulp are discarded as waste. Technologies

for different categories of mango by-products are- mango ready to eat breakfast cereal, mango dried chutney.

Mango kernel is a good source of starch and fat. Mango seed kernels have a low content of protein but they contain the most of the essential amino acids. A preliminary study showed that the seed represents from 20% to 60% of the whole fruit weight, depending on the mango variety and the kernel inside the seed, which represents from 45% to 75% of the whole seed.

Mango peel, generally termed as "total waste" is the second most important waste generated in the processing factories. During processing of mango, peel a major by-product, contributes about 15-20% of the fruit. Peel has been found to be a good source of phyto-chemicals, such as polyphenols, carotenoids, vitamin E, dietary fibre and vitamin C and it also exhibited good antioxidant properties.

4. BANANA

<p>Banana chips and Sarkkaravaratty Chips are the only processed banana product widely manufactured on a commercial scale in Kerala.</p>	
<p>Raw banana flour and flour based products Banana has high starch content, and also has a wide range of vitamins and minerals present in both pulp and peels. Flour, the main product of green banana, is one of the most common forms of preserving bananas. It is widely used in infant feeding as a source of energy and also has excellent medicinal properties.</p>	

Now a days raw banana powder is an ingredient for different functional and convenience foods like cookies, cakes, bread, sponge cake, soup mix, pudding mix, health mix and ice cream.



Banana jam

Jam is prepared by mixing equal quantity of banana pulp and sugar. Pectin present in the fruit gives it a good set. Appropriate combination of pectin, sugar and acid is essential to give a proper set to the jam.



Banana halwa:

Prepared by mixing banana pulp with sugar (1.25 times the weight of pulp), ghee and nuts and concentrating till the mass separate from the cooking dish.



Fruit Juice




Clear banana juice could be extracted using commercial pectinase enzyme @ 5ml/ kg pulp and incubating for 4 hours at room temperature. Squash, crush, nectar, Ready-To -Serve beverages can be prepared using this juice. Juice is also made from pseudostem of banana



Banana carbonated beverage (soda)

Soda is prepared with 30% sweetened banana juice (150 ml) and carbonated water (90 ml containing 130 volumes CO₂). Ready-to-serve (RTS) beverage RTS is a beverage prepared from clarified banana juice. Banana pulp based ready to serve beverage and milk shake can also be prepared.



<p>Banana wine: Banana wine is a delicious beverage with low alcohol content. It is obtained by fermentation of clarified juice or cut pieces of banana with sugar, yeast and water.</p>	
<p>Banana fibre Banana is a major source of fibre. The entire leaf sheath of banana yields good quality fibre, which is highly valued in the market for its durability and strength. By extracting banana fibre, the waste can be effectively put to use and provide additional income to the farmers. Banana fibre is classified under leaf fibre as it is extracted from leaf sheath otherwise called pseudostem. The middle seven to eight layers are utilized for commercial fibre extraction. The outer layers yield coarse fibre, while the fibre from inner layer is very soft. Nendran and Red banana shows highest fibre recovery percentage and Palayankodan and Kunnan shows longest fibre among different banana varieties.</p>	
<p>Products from banana fibre: Different types of hand bags, purses, coasters, table mats, mobile phone holders, banana fibre net bag, CD holders, foot wear, flower vase, flower basket, ornaments, makeup box, letter box, curtains, key chains, belt, hat etc can be prepared.</p>	

5. PAPAYA FRUIT

Papain is an active enzyme present in the latex or milky secretion of papaya plants and immature fruits. Half to three-fourth matured fruits (about 70 to 100 days from fruit set) are preferred for papain extraction.

Papaya candy A fruit impregnated with cane sugar and glucose, and subsequently drained and dried is called a candy. A higher percentage of sugar is used than in

preserves. The total sugar content of the impregnated fruit is kept at about 75% to prevent fermentation.

5.6. VALUE ADDED PRODUCTS FROM OIL CROPS

1. PALM TREE

Palm oil or Palmolein is the oil produced from the red oil palm tree (*E.Guineensis*). Palm Oil is extracted from the pulpy portion (mesocarp) of the fruit of Oil Palm. The Crude palm oil is deep orange red in colour and is semi solid at a temperature of 20°C. Palm oil contains an equal proportion of saturated and unsaturated fatty acid containing about 40% oleic acid, 10% linoleic acid, 44% palmitic acid and 5% stearic acid. **Palm kernel oil** is edible plant oil derived from the kernel of the oil palm

Oil palm broom

Oil Palm India Limited supplies high quality brooms from oil palm leaves collected from the plantations. It is made from the midrib of palm leaves collected from the oil palm trees. It is also more flexible and durable than others.

Palm fiber is a by-product at the time oil extraction The palm fiber can use for making briquette (compressed block of combustible material).

Palm cake is obtained after expelling and extraction of Kernel oil and used for production of cattle feed.



Palm seed and oil



Brooms from oil palm leaves



Palm fiber



Oil palm cake



Palm Kernel oil



2. PEANUT

Groundnut milk: It is obtained from peanut and can be used as a supplement to the diets of pre-school and school children or it can be used as substitute for ordinary milk, if allergic condition develops.

Peanut butter: It is a nutrient-rich food, containing protein, many vitamins, and dietary minerals in high content. It is typically served as a spread on bread, toast, or crackers, and used to make sandwiches (notably the peanut butter and jelly sandwich). It is also used in breakfast dishes and desserts, like peanut flavored granola, smoothies, crepes, cookies, brownies, or croissants.

Oil cake: or oil meal the byproducts of the oil extraction industry are a rich source of proteins, and calories and used as livestock feed. Oil cakes are produced in the form of tightly pressed plates or in the form of slabs.

Peanut butter cookie is a type of cookie that is distinguished for having peanut butter as a principal ingredient.

Peanut oil: Mild or neutral flavor but, if made with roasted peanuts, has a stronger peanut flavor and aroma. Unrefined peanut oil has a smoke point of 320°F/160°C and is used as a flavorant for dishes akin to sesame oil. The refined peanut oil has a smoke point of 450 °F/232 °C is commonly used for frying volume batches of foods like French fries. Like other vegetable oils, can be used to make soap by the process of saponification



Peanut butter, cookies, Groundnut oil

3. SEASAME

Sesame oil: Edible vegetable oil derived from sesame seeds. Besides being used as a cooking oil, it is used as a flavor enhancer in many cuisines, having a distinctive nutty aroma and taste. The oil is one of the earliest-known crop-based oils

Sesame milk: One glass of this recipe provides 40% of the daily value, almost double the amount that's in cow's milk and is also an excellent source of non-heme iron (33% DV), zinc (21% DV) and a good source of many other vital vitamins and minerals. Sesame seeds contain phytosterols, lignans, heart-healthy oleic fatty acids plus unique substances such as Sesamin & Sesamolins. They have been associated with heart, bone, skin and oral health as well as promoting sleep, mood and providing protection from liver oxidative damage and certain types of cancers

Sesame butter: One tablespoon of sesame butter contains 104 calories, 4 grams of protein, 10 grams of fat, 1.6 grams of carbs, and 1.5 grams of fiber and is cholesterol and sugar-free. These three nutrients work to keep blood sugar levels stable, sesame butter also contains lignans and phytosterols. Lignans are plant fibers which have been shown to help lower cholesterol and blood pressure. They also have antioxidant properties, helping to reduce free radicals in the body that can lead to cancer

Sesame Biscuits: Sesame seeds are used to bake biscuits or sesame balls

4. SOYABEANS

Soybean oil is a vegetable oil extracted from the seeds of the soybean. It is one of the most widely consumed cooking oils and the second most consumed vegetable oil. As a drying oil, processed soybean oil is also used as a base for printing inks (soy ink) and oil paints. Soybean oil is indicated for parenteral nutrition as a source of calories and essential fatty acids.

Soy Milk has 26% protein and 39% carbohydrates. It has exactly the same nutritional properties as dairy milk. The starting material is soy concentrate, and several nutrients and other ingredients are added to give it the nutritional properties of dairy milk. It provides higher benefits than dairy milk, because it is lactose free and cholesterol free. It is a different product than soy milk and has a different nutritional profile

Fermented soybean products such as *cheonggukjang* (Japanese *natto*), *doenjang* (soy paste), *ganjang* (soy sauce), and *douchi*, are widely consumed in East Asian countries and are major sources of bioactive compounds. The fermentation of cooked soybean with bacteria (*Bacillus* spp.) and fungi (*Aspergillus* spp. and *Rhizopus* spp.) produces a variety of novel compounds, most of which possess health benefits

Soy sauce is a liquid condiment of Chinese origin, traditionally made from a fermented paste of soybeans, roasted grain, brine, and *Aspergillus oryzae* or *Aspergillus sojae* molds. It is considered to contain a strong flavor and can be added to food, and is used as a dip or salt flavor in cooking.

5.7 SUGARCANE

Marayoor and Kanthalloor of Idukki district of Kerala known for its extensive sugarcane cultivation. The peculiar geographical location of Marayoor, which nestles amid the forests of the Western Ghats, gives the sugar cane a distinct geographical identity

Sucrose: sugar produced by sugarcane is sucrose. It is used as a sweetening agent for foods and in the manufacture of cakes, candies, preservatives, soft drinks, alcohol and numerous other foods.

Blackstrap Molasses: This thick, dark liquid remains when the sugar has been removed from the boiled cane juice. It is used primarily as animal feed but can also be sold as syrup, to flavor rum and other foods or as an additive for ethyl alcohol.

Bagasse (baa gas): After the juice has been extracted from the sugarcane stalk, this plant material remains. While generally burned as fuel for the mills, it could be used as a feedstock for ethanol production.

Ethanol: Sugarcane, which produces a large amount of biomass per acre in the form of bagasse and cane stalks and leaves, would be a viable feedstock for the cellulosic conversion of biomass into ethanol. Instead of having to first convert the sugarcane to sugar juice, ethanol could be produced by processing the entire plant.



PLANT BIO-RESOURCE BASED INDUSTRIES

Biological resources are used in food, fuel, cosmetics, pharmaceuticals, traditional medicines, nutraceutical industries. In addition, bio resources have wider applications such as in paper manufacturing, timber, spices, oleoresins, aromatic oils. This chapter provides a detailed analysis of the raw materials used in plant bioresource based industries. A checklist of Ayurvedic, herbal cosmetic companies, major bioresources based export companies etc are given in Annexure.6.1 and 6.2

6.1 AYURVEDA AND HERBAL COSMETICS INDUSTRY

6.1.1 MARKET SCENARIO IN AYURVEDA INDUSTRY

In this section an attempt has been made to assess the annual consumption of raw materials including raw and fresh drugs (Medicinal plants) and value added products (gum, resins, lichens, lac, honey, bee wax, extracts, byproducts, semi processed products etc.) and base materials used for the preparation of various classical ayurvedic products like different types of oils, clarified butter, milk etc. Nearly about 500 classical preparations of ayush products are manufactured in Kerala. Apart from these proprietary/ patented medicines and other health care products/ OTC products, new gen products, Nutraceuticals, Cosmeceuticals etc. are produced by the ayush manufacturing units in Kerala.

India is one of the major exporters of medicinal plants having exported USD 330.18 million worth of herbs during 2017-2018 with a growth rate of 14.22% over the previous year.

- India also exported value added extracts of medicinal herbs/herbal products during 2017-18 valued at USD 456.12 million recording a growth rate of 12.23 % over the previous year.
- Of the total number of medicinal plants used globally, 21% fall under the endangered category (IUCN)

- IUCN updated the redlist in 2015 and added 44 Indian medicinal plants in the list where 18 plants are categorized as vulnerable and 16 as endangered and 10 as critically endangered species.
- WHO listed out 30,000 plant species used in different traditional systems of medicine in India

Table 6.1.1 Medicinal plants used in Indian system of medicine

Sl. No.	Name of the system	Total number of plants mentioned
1	*Ayurveda	1200
2	*Siddha	800
3	*Unani	700
4	*Amchi	300
5	Folk medicine / Tribal medicine	10000
6	Modern medicine	90

* Roughly about 50% of medicinal plants mentioned in this system of medicine are common to all four systems.

The Ministry of Ayush was formed on the 9th of November 2014 with a vision of reviving the profound knowledge of the ancient systems of medicine and ensuring the optimal development and propagation of the Ayush systems of healthcare. Earlier, the Department of Indian System of Medicine and Homoeopathy (ISM&H) formed in 1995, was responsible for the development of these systems. It was then renamed as the Department of Ayurveda, Yoga, and Naturopathy, Unani, Siddha and Homoeopathy (Ayush) in November 2003 with focused attention towards education and research in Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homoeopathy.

The Traditional Knowledge Digital Library (TKDL) provides a list of around 82,900 Ayurveda medical formulations. Official estimates of Ayurveda classical drug formulations market size are unavailable.

More than 75 % of the business today is in private sector. Most of these companies are small and medium sized and only around 50 companies have revenue above Rs. 100 crore in 2016-17. These 50 companies account for over 85 per cent of the revenue generated by this sector. According to Ayurvedic Drug Manufacturers Association (ADMA), which has around 9,000 members, 99 per cent of their members are MSMEs (micro, small and medium enterprises). As 100 per cent Foreign Direct Investment (FDI) is permitted in the AYUSH sector, it is attracting many domestic and international investors. With the growing potential of the AYUSH sector, several start-ups are also working on innovative ideas to tap this market and serve customers not only in Tier-1 and Tier-2 cities but also in the rural parts of India.

According to Orbis Research - The global Ayurveda market size will reach US\$ 9210 million (INR 66,000 crores) by 2024, from US\$ 5170 million (INR 37,000 crores) in 2019.

- As per the CII survey of Ayurveda Industries the size of Indian market was US\$ 3000 million (INR 21,000 crores) in 2016 and INR 30,000 crores by end of 2018. Ayurveda product's share in the market was 75% and share of services was 25%.
- The size of Ayurveda market is expected to reach US\$ 8,000 million (INR 56,000 crores) by 2022.
- According to an assessment by Ministry of AYUSH the domestic demand of medicinal plants was 1,95,000 tons for 2014-15 and the export demand was 1,34,500 tons
- There are 8,000 registered pharmacies and 400,000 registered practitioners in India
- Over 30,000 branded and 1,500 traditional AYUSH products available in the market

- According to a study by CII and PwC, there are 1,400 Ayurveda associated industries in Kerala with a total turnover of \$37 million (INR 260 crores) and export of \$8.3 million (INR 58 crores) in 2016.
- Market size of India's beauty, cosmetic and grooming market is expected to reach US\$ 20,000 million (INR 140,000 crores) by 2025. This offers a huge scope for herbal cosmetics market, which is growing at the rate of 12% per annum.

Source: Compiled from CII, CII-PwC Report on Ayurveda, Annual Report of Ministry of AYUSH, ASSOCHAM Report, Media reports

As per a report out of 8610 manufacturing units in India, 642 units are in Kerala which consumes 23731.015 MT of raw herbs and 7118.510 MT of animal products for medicine manufacturing. 57.2 % of raw herbs are used in fresh form and the rest 42.80 % are used in dried form. The highest consumed plant parts are fruits 20.64% and root, root tubers & rhizomes 21.86%. Jaggery, Coconut, Gingely Oil, Puliya, Coconut Oil, Nellikka, Sathavari, Kurunthotty, Chittamruth, Brahmi, Manjal, Parpatkapullu, Ayyappala Leaf etc are examples of items consumed highly. Substitution and adulteration is another issue in the field. Cultivation of medicinal plants, sufficient subsidy for cultivation, training for the drug collectors are a few solutions for managing the scarcity. High land value, high wages, non-availability of cultivable land etc are certain stumbling blocks in Kerala for cultivation. (*Source: Compiled from CII, CII-PwC Report on Ayurveda, Annual Report of Ministry of AYUSH, ASSOCHAM Report, Media reports*)

6.1.2 MEDICINAL PLANTS IN AYUSH INDUSTRY OF KERALA

Methodology of study

To collect the primary and secondary data related to tradable bioresources, KSBB has conducted the following workshops, round table discussion, interaction and focus group discussions:

- Organised three regional consultative workshops in association with AMMOI at Thiruvananthapuram, Thrissur and Kozhikkode, which covered all 14 districts

with a view to collect primary and secondary data related to tradable bioresources used in Ayush Industry on 02.02.2021, 18.02.2021 and 17.02.2021

- A round table discussion was held at Oushadhi on 26.03.2021. Major participants include representatives of Oushadhi, State Medicinal Plant Board, the HOMCO, Thrippunnithura Ayurveda College, Bamboo Corporation, and Agriculture University etc.
- A four days conference on 'Bioresources and Commercial Utilisation-Trends, Supply chain and sustainability' was organised from 27th - 30th September 2021. In this session total 7 invited talks were presented on different topics.
- Department of Ayush was requested to give necessary directions to District Medical officers, and to other organizations as Oushadhi (The Pharmaceutical Corporation Kerala limited) and Kerala State Medicinal Plant Board to provide data on Medicinal plants commonly used in Ayurveda, Homeopathy, details of traders/ suppliers involved, Quantity of bioresources exported etc.
- Department of Industry, & Commerce and Drugs Controller Authority was requested to provide details of industries using bioresources etc, their annual turnover, quantity of bioresources used etc
- Interaction held with Shri.Prasanth, Secretary, Mattathur Labour Cooperative Society on 19.02.2021 and discussed about current activities related to the Medicinal plants cultivation and buy back arrangements.
- A Focus Group Discussion held on 25.03.2021 with experts of Thrippunnithura Ayurveda College including Dr.PY.Ansari, Dr. Taralakshmi.S, Dr. K.P.Sreekumar Principal, Ayurveda College.

Medicinal Plants used in Ayurveda Industry of Kerala

- The list of Medicinal Plants used in the Ayurvedic Industry is given in Annexure 6.1.1
- The list of endangered medicinal and aromatic plants of Western Ghats recommended for Ex-situ conservation is given in Annexure 6.1.2

- The list of Medicinal and aromatic plants used in lifestyle disease is given in Annexure 6.1.3
- The list of Medicinal trees having carbon sequestration potential is given in Annexure 6.1.4

6.1.3. RAW MATERIAL REQUIREMENT OF THE AYURVEDA INDUSTRY

The total licensed Ayurveda manufacturing units in Kerala is 766 including 4 Siddha and 4 units of Unani (Personal communication from Deputy Drug Controller, Ayurveda, Thiruvananthapuram). Apart from this 95 loan licensed companies are also manufacturing different proprietary/ other health care projects.

Raw material requirement of 121 Ayurveda industries in Kerala were collected and the data was projected to obtain the annual raw material requirement of the sector. The consolidated data on species wise utilisation of raw materials in Ayurveda Industry both Govt. and Private sector in Kerala from 2015-2020 is given as Annexure 6.1.5. Based on the parts used, 1695 entries has been made with respect to total of 578 medicinal plant

species used in the 121 Ayurvedic manufacturing units (major/ key manufacturing unit, medium and small scale units) and analysis was carried out based on the above data.

There are about 663 functioning units which has been categorised in to 85% small scale manufacturing units and 15% medium and large scale units. Of these 40 are major (Turn over ≥ 3 crores), 60 were medium scale (1 to 3 Crores) and 563 are small scale (< 1crore). About 578 medicinal plants are utilized and the total quantity of raw material requirement has been estimated as 25,516.6 MT.

Annual consumption of medicinal plants used in the Ayurveda Industry is projected and the table given below shows the abstract of unit size, name of units sampler and percentage of samples.

Ayurveda industries in Kerala

Unit Size	Number of units sampled	Total number of units	% of sample
Major/ Key	10	40	25
Medium	21	60	35
Small	90	563	16
Total	121	663	18.3

Year	Total quantity(kg)	Total Price(in lakhs)
2015-16	4224723.29	3916.26
2016-17	3864852.77	3986.67
2017-18	4615867.4	46795.84
2018-19	11968611.81	56510.28
2019-20	5440135.155	29437.38

There is a high variation in prices of the raw materials among the ayurveda manufacturing units and through the period 2015-16 to 2019-20. Thus the medium price is taken as an average price. The quantities obtained from the sampled industries

forecasted to the total respectively for each category (major/ key manufacturing units, medium and small) is given below.

Annual projected consumption of raw drugs by Ayurveda industries

Unit Size	Estimated Quantity (MT)
Major/ key/ Medium	22366.3
Small	3150.3
Total	25516.6

The quantity collected from the sample units are projected to the totality according to the size (Major/key, medium and small) of the industries. The total quantity estimated is 25,516.6 MT. Data analysed based on projected quantity of the raw drugs consumption (medicinal plants) of 578 species are given in below table.

Table 6.1.2 Projected quantity of the raw drugs consumption in Ayurveda sector

Sl. No.	BotanicalName *	Threatened status	Projected Quantity	Quantity(MT)
1	<i>Citrus limon</i>	LC	15,45,824.40	1545.8
2	<i>Cocos nucifera</i>	LC	12,07,948.80	1207.9
3	<i>Phyllanthus emblica</i>	LC	9,81,556.40	981.6
4	<i>Terminalia chebula</i>	LC	9,13,682.20	913.7
5	<i>Tamarindus indica</i>	LC	8,34,813.20	834.8
6	<i>Asparagus racemosus</i>	LC	7,77,795.40	777.8
7	<i>Zingiber officinale</i>		7,02,025.80	702
8	<i>Sida cordifolia</i>		6,42,061.00	642.1
9	<i>Tinospora cordifolia</i>		6,31,977.20	632
10	<i>Aloe vera</i>		5,61,265.10	561.3
11	<i>Momordica dioica</i>		5,33,580.40	533.6
12	<i>Aegle marmelos</i>	NT	5,13,258.70	513.3

13	<i>Curcuma longa</i>		4,23,538.60	423.5
14	<i>Withania somnifera</i>	DD	4,14,100.90	414.1
15	<i>Bacopa monnieri</i>	VU	4,10,341.30	410.3
16	<i>Eclipta prostrata</i>	LC	3,98,796.60	398.8
17	<i>Sida rhombifolia</i>		3,87,394.20	387.4
18	<i>Piper longum</i>	NT	3,31,777.00	331.8
19	<i>Phyllanthus emblica</i>		3,15,500.30	315.5
20	<i>Vitis vinifera</i>		3,03,176.40	303.2
21	<i>Cedrus deodara</i>		3,02,404.00	302.4
22	<i>Azadirachta indica</i>	LC	2,98,380.00	298.4
23	<i>Justicia beddomei</i>		2,88,111.20	288.1
24	<i>Solanum melongena</i>		2,85,658.40	285.7
25	<i>Boerhavia diffusa</i>		2,81,837.50	281.8
26	<i>Cyperus rotundus</i>	LC	2,72,182.20	272.2
27	<i>Tribulus terrestris</i>		2,63,089.90	263.1
28	<i>Moringa oleifera</i>		2,56,935.80	256.9
29	<i>Ricinus communis</i>		2,54,810.20	254.8
30	<i>Nilgirianthus ciliatus</i>	VU	2,36,859.40	236.9
31	<i>Cuminum cyminum</i>		2,29,248.30	229.2
32	<i>Terminalia bellericca</i>	LC	2,25,497.50	225.5
33	<i>Cynodon dactylon</i>		2,19,282.30	219.3
34	<i>Premna serratifolia</i>	LC	1,86,370.70	186.4
35	<i>Woodfordia fruticosa</i>	LC	1,86,196.50	186.2
36	<i>Pseudarthria viscida</i>	VU	1,83,589.60	183.6
37	<i>Crocus sativus</i>		1,74,251.90	174.3
38	<i>Pongamia pinnata</i>	EN	1,74,347.70	174.3
39	<i>Tragia involucrata</i>	LC	1,68,884.30	168.9
40	<i>Hordeum vulgare</i>	LC	1,64,474.70	164.5
41	<i>Gmelina arborea</i>	LC	1,63,228.40	163.2
42	<i>Desmodium gangeticum</i>		1,62,004.20	162
43	<i>Allium cepa</i>		1,53,700.90	153.7
44	<i>Oroxylum indicum</i>	EN	1,51,956.40	152
45	<i>Stereospermum chelonoides</i>	NT	1,52,011.00	152
46	<i>Aerva lanata</i>		1,51,335.90	151.3
47	<i>Wrightia tinctoria</i>	LC	1,50,969.40	151
48	<i>Piper betle</i>		1,48,675.50	148.7
49	<i>Spermacoce hispida</i>		1,45,525.00	145.5
50	<i>Alpinia officinarum</i>		1,42,675.90	142.7
51	<i>Oldenlandia corymbosa</i>		1,40,251.40	140.3
52	<i>Piper nigrum</i>		1,38,138.20	138.1
53	<i>Acorus calamus</i>	EN	1,37,854.00	137.9
54	<i>Operculina turpethum</i>	EN	1,33,712.20	133.7

55	<i>Glycyrrhiza glabra</i>	LC	1,33,445.00	133.4
56	<i>Coriandrum sativum</i>		1,31,211.50	131.2
57	<i>indigofera tinctoria</i>		1,24,150.40	124.2
58	<i>Hedyotis corymbosa</i>		1,11,016.20	111
59	<i>Trichosanthes lobata</i>		1,08,597.50	108.6
60	<i>Chrysopogon zizanioides</i>	LC	1,00,816.90	100.8
61	<i>Hemidesmus indicus</i>		96,291.20	96.3
62	<i>Acacia catechu</i>	LC	96,163.10	96.2
63	<i>Pterocarpus santalinus</i>	EN	95,601.80	95.6
64	<i>Holoptelea integrifolia</i>		93,458.10	93.5
65	<i>Solanum anguivi</i>	LC	92,435.00	92.4
66	<i>Trachyspermum roxburghianum</i>		92,088.00	92.1
67	<i>Justicia adhatoda</i>		91,253.60	91.3
68	<i>Vigna mungo</i>		90,438.20	90.4
69	<i>Caesalpinia sappan</i>	LC	90,265.40	90.3
70	<i>Cardiospermum halicacabum</i>	LC	84,644.30	84.6
71	<i>Rubia cordifolia</i>	LC	84,646.50	84.6
72	<i>Allium sativum</i>		82,261.70	82.3
73	<i>Kaempferia galanga</i>	DD	80,371.90	80.4
74	<i>Salacia oblonga</i>	VU	79,902.60	79.9
75	<i>Coscinium fenestratum</i>	CR	79,249.70	79.2
76	<i>Indigofera tinctoria</i>		77,919.60	77.9
77	<i>Curculigo orchoides</i>		77,091.60	77.1
78	<i>Strobilanthes ciliata</i>		76,268.80	76.3
79	<i>Benincasa hispida</i>		72,251.50	72.3
80	<i>Elettaria cardamomum</i>		70,823.30	70.8
81	<i>Oryza sativa</i>		70,473.30	70.5
82	<i>Erythrina variegata</i>		70,223.20	70.2
83	<i>Saussurea costus</i>	CR	67,525.50	67.5
84	<i>Anethum graveolens</i>		64,921.40	64.9
85	<i>Pterocarpus marsupium</i>	NT	64,873.20	64.9
86	<i>Dolichos biflorus</i>		64,296.00	64.3
87	<i>Ocimum tenuiflorum</i>		61,283.40	61.3
88	<i>Cyclea peltata</i>	LC	60,574.40	60.6
89	<i>Vitex negundo</i>		60,381.20	60.4
90	<i>Santalum album</i>	VU	58,768.00	58.8
91	<i>Cassia fistula</i>	LC	57,860.10	57.9
92	<i>Trigonella foenum-graecum</i>		57,877.50	57.9
93	<i>Andrographis paniculata</i>	VU	57,466.20	57.5
94	<i>Symplocos cochinchinensis</i>	VU	57,429.60	57.4
95	<i>Ixora coccinea</i>		56,048.50	56

96	<i>Acacia nilotica</i>	LC	53,489.70	53.5
97	<i>Trachyspermum roxburghianum</i>		50,051.20	50.1
98	<i>Nigella sativa</i>	LC	47,504.50	47.5
99	<i>Macrotyloma uniflorum</i>		47,139.90	47.1
100	<i>Piper attenuatum</i>		44,816.50	44.8
101	<i>Hygrophila auriculata</i>	LC	44,153.80	44.2
102	<i>Gossypium herbaceum</i>	LC	43,969.60	44
103	<i>Inula racemosa</i>		43,874.40	43.9
104	<i>Syzygium aromaticum</i>		43,444.40	43.4
105	<i>Embelia ribes</i>	VU	43,014.30	43
106	<i>Strychnos potatorum</i>		43,043.30	43
107	<i>Datura metel</i>	LC	40,106.90	40.1
108	<i>Plumbago zeylanica</i>	VU	38,554.80	38.6
109	<i>Plectranthus hadiensis</i>	LC	38,208.90	38.2
110	<i>Murraya koenigii</i>		36,237.70	36.2
111	<i>Punica granatum</i>	LC	35,852.60	35.9
112	<i>Alpinia calcarata</i>		35,114.20	35.1
113	<i>Merremia tridentata</i>		32,938.10	32.9
114	<i>Saraca asoca</i>	VU	32,703.50	32.7
115	<i>Ziziphus mauritiana</i>		32,520.30	32.5
116	<i>Phyllanthus amarus</i>		32,412.00	32.4
117	<i>Holarrhena pubescens</i>	LC	32,280.60	32.3
118	<i>Sesamum indicum</i>		31,765.30	31.8
119	<i>Brassica nigra</i>	LC	31,077.90	31.1
120	<i>Myristica fragrans</i>	DD	30,971.60	31
121	<i>Aquilaria agallocha</i>	EN	30,945.60	30.9
122	<i>Saccharum officinarum</i>		30,875.10	30.9
123	<i>Solanum virginianum</i>		30,865.90	30.9
124	<i>Picrorhiza kurroa</i>		30,513.50	30.5
125	<i>Terminalia bellirica</i>	LC	29,780.40	29.8
126	<i>Calotropis gigantea</i>		29,287.40	29.3
127	<i>Jasminum grandiflorum</i>		28,964.80	29
128	<i>Plumbago indica</i>		27,979.80	28
129	<i>Biophytum sensitivum</i>		27,747.20	27.7
130	<i>Mesua ferrea</i>	EN	27,469.30	27.5
131	<i>Pueraria tuberosa</i>	VU	27,531.20	27.5
132	<i>Cinnamomum malabatum</i>	LC	27,446.20	27.4
133	<i>Hibiscus rosa-sinensis</i>	LC	27,431.60	27.4
134	<i>Terminalia arjuna</i>	LC	26,270.50	26.3
135	<i>Imperata cylindrica</i>	LC	24,662.70	24.7
136	<i>Valeriana wallichii</i>	VU	23,890.70	23.9

137	<i>Pogostemon cablin</i>	LC	23,309.00	23.3
138	<i>Nardostachys jatamansi</i>	CR	22,463.20	22.5
139	<i>Vernonia cinerea</i>		22,368.30	22.4
140	<i>Sphaeranthus indicus</i>	LC	21,785.00	21.8
141	<i>Centratherum anthelminticum</i>		21,236.80	21.2
142	<i>Limonia acidissima</i>	VU	20,815.70	20.8
143	<i>Berberis aristata</i>		20,708.50	20.7
144	<i>Madhuca longifolia</i>	VU	19,461.70	19.5
145	<i>Salacia reticulata</i>		18,847.70	18.8
146	<i>Alpinia galanga</i>		18,501.20	18.5
147	<i>Mucuna pruriens</i>	LC	17,621.50	17.6
148	<i>Chonemorpha fragrans</i>	EN	17,257.90	17.3
149	<i>Hedyotis pruinosa</i>	R	17,094.00	17.1
150	<i>Pandanus odorifer</i>	LC	15,920.60	15.9
151	<i>Clerodendrum serratum</i>	EN	15,689.00	15.7
152	<i>Holostemma ada-kodien</i>	EN	15,351.10	15.4
153	<i>Amorphophallus paeoniifolius</i>	LC	15,243.90	15.2
154	<i>Nelumbo nucifera</i>	DD	15,168.40	15.2
155	<i>Crateva magna</i>		15,031.60	15
156	<i>Abies spectabilis</i>	NT	14,864.30	14.9
157	<i>Piper cubeba</i>		14,413.50	14.4
158	<i>Ipomoea marginata</i>	NT	14,168.70	14.2
159	<i>Prunus cerasoides</i>		14,087.00	14.1
160	<i>Solena amplexicaulis</i>		13,911.10	13.9
161	<i>Pinus roxburghii</i>		13,625.00	13.6
162	<i>Aconitum heterophyllum</i>	EN	13,151.80	13.2
163	<i>Callicarpa macrophylla</i>	LC	13,191.70	13.2
164	<i>Hugonia mystax</i>		12,641.30	12.6
165	<i>Calycopteris floribunda</i>		12,463.90	12.5
166	<i>Trachyspermum ammi</i>		12,390.40	12.4
167	<i>Syzygium cumini</i>	LC	12,133.10	12.1
168	<i>Citrullus colocynthis</i>	VU	11,997.00	12
169	<i>Musa paradisiaca</i>		11,639.40	11.6
170	<i>Ficus racemosa</i>	LC	10,863.30	10.9
171	<i>Piper mullesua</i>	NT	10,669.80	10.7
172	<i>Physalis minima</i>	LC	10,367.60	10.4
173	<i>Cyathula prostrata</i>		10,212.80	10.2
174	<i>Vigna trilobata</i>		9,953.70	10
175	<i>Cullen corylifolium</i>	LC	9,875.20	9.9
176	<i>Kaempferia rotunda</i>		9,866.20	9.9
177	<i>Cinnamomum zeylanicum</i>		9,848.80	9.8
178	<i>Lagenaria siceraria</i>		9,508.50	9.5

179	<i>Desmodium triflorum</i>	LC	9,393.50	9.4
180	<i>Illicium verum</i>		9,295.70	9.3
181	<i>Ficus religiosa</i>		8,820.50	8.8
182	<i>Clitoria ternatea</i>		8,722.60	8.7
183	<i>Pothos scandens</i>		8,640.00	8.6
184	<i>Raphanus sativus</i>		8,201.60	8.2
185	<i>Phoenix pusilla</i>		7,790.50	7.8
186	<i>Syzygium caryophyllatum</i>	EN	7,841.80	7.8
187	<i>Baliospermum montanum</i>	VU	7,737.80	7.7
188	<i>Ipomoea mauritiana</i>	NT	7,719.50	7.7
189	<i>Symplocos racemosa</i>		7,690.30	7.7
190	<i>Mangifera indica</i>	LC	7,148.90	7.1
191	<i>Cinnamomum tamala</i>		7,049.00	7
192	<i>Linum usitatissimum</i>		6,899.50	6.9
193	<i>Cinnamomum verum</i>		6,848.60	6.8
194	<i>Tectona grandis</i>	EN	6,797.60	6.8
195	<i>Aristolochia bracteolata</i>	VU	6,678.50	6.7
196	<i>Rhaphidophora pertusa</i>		6,668.00	6.7
197	<i>Senna alexandrina</i>		6,581.90	6.6
198	<i>Smilax china</i>		6,634.00	6.6
199	<i>Brassica alba</i>	LC	6,502.40	6.5
200	<i>Mimosa pudica</i>		6,374.50	6.4
201	<i>Trichosanthes tricuspidata</i>		6,356.30	6.4
202	<i>Achyranthes aspera</i>		6,085.00	6.1
203	<i>Coccinia grandis</i>		6,115.00	6.1
204	<i>Alstonia scholaris</i>	LC	5,897.60	5.9
205	<i>Semecarpus anacardium</i>	LC	5,939.80	5.9
206	<i>Ficus benghalensis</i>		5,796.00	5.8
207	<i>Prunus avium</i>	LC	5,793.50	5.8
208	<i>Spandlas pinnate</i>		5,661.90	5.7
209	<i>Curcuma zedoaria</i>		5,406.40	5.4
210	<i>Ichnocarpus frutescens</i>		5,353.80	5.4
211	<i>Curcuma aromatica</i>	VU	5,157.00	5.2
212	<i>Cyperus esculentus</i>		5,180.10	5.2
213	<i>Elaeocarpus serratus</i>		4,970.90	5
214	<i>Valeriana jatamansi</i>	EN	4,981.70	5
215	<i>Dysoxylum malabaricum</i>	VU	4,909.30	4.9
216	<i>Areca catechu</i>	LC	4,689.70	4.7
217	<i>Rauwolfia serpentina</i>	EN	4,726.80	4.7
218	<i>Senna tora</i>		4,749.30	4.7
219	<i>Vinca roseae</i>		4,567.20	4.6
220	<i>Abutilon indicum</i>		4,473.10	4.5

221	<i>Vigna sublobata</i>		4,459.20	4.5
222	<i>Vigna vexillata</i>		4,453.80	4.5
223	<i>Coleus aromaticus</i>		4,353.20	4.4
224	<i>Desmostachya bipinnata</i>	LC	4,303.90	4.3
225	<i>Ficus microcarpa</i>	LC	4,285.30	4.3
226	<i>Mukia maderaspatana</i>		4,300.50	4.3
227	<i>Vigna radiata</i>		4,262.80	4.3
228	<i>Caesalpinia mimosoides</i>		4,228.00	4.2
229	<i>Celastrus paniculatus</i>	EN	4,245.00	4.2
230	<i>Cymbopogon citratus</i>		4,180.10	4.2
231	<i>Erythrina indica</i>		4,151.20	4.2
232	<i>Euphorbia thymifolia</i>		4,089.60	4.1
233	<i>Garcinia gummi-gutta</i>	LC	4,141.90	4.1
234	<i>Rotula aquatica</i>	LC	3,980.70	4
235	<i>Foeniculum vulgare</i>		3,899.80	3.9
236	<i>Monochoria vaginalis</i>	LC	3,879.80	3.9
237	<i>Saccharum spontaneum</i>		3,947.40	3.9
238	<i>Caryota urens</i>	LC	3,840.00	3.8
239	<i>Holarrhena antidysenterica</i>		3,775.60	3.8
240	<i>Phaseolus radiatus</i>		3,813.90	3.8
241	<i>Citrus medica</i>		3,673.20	3.7
242	<i>Pistacia chinensis</i>	LC	3,564.90	3.6
243	<i>Scindapsus officinalis</i>		3,390.60	3.4
244	<i>Amomum subulatum</i>	DD	3,317.40	3.3
245	<i>Brassica juncea</i>		3,260.40	3.3
246	<i>Sterculia foetida</i>		3,332.80	3.3
247	<i>Stereospermum tetragonum</i>		3,299.90	3.3
248	<i>Abrus precatorious</i>	NT	3,176.70	3.2
249	<i>Bauhinia purpurea</i>		3,146.40	3.1
250	<i>Solanum nigrum</i>		2,998.50	3
251	<i>Catunaregam spinosa</i>		2,893.00	2.9
252	<i>Coptis teeta</i>	EN	2,771.10	2.8
253	<i>Portulaca oleracea</i>	LC	2,837.80	2.8
254	<i>Bauhinia variegata</i>	LC	2,687.90	2.7
255	<i>Heliotropium indicum</i>		2,723.60	2.7
256	<i>Heracleum rigens</i>	VU	2,650.30	2.7
257	<i>Lepidium sativum</i>		2,704.40	2.7
258	<i>Vitex altissima</i>		2,680.30	2.7
259	<i>Albizia lebbeck</i>	LC	2,621.20	2.6
260	<i>Butea monosperma</i>	LC	2,580.40	2.6
261	<i>Parmelia perlata</i>		2,620.80	2.6
262	<i>Cinnamomum malabatum</i>	LC	2,512.80	2.5

263	<i>Cleome gynandra</i>		2,473.10	2.5
264	<i>Ventilago maderaspatana</i>	VU	2,546.70	2.5
265	<i>Aconitum ferox</i>	EN	2,354.30	2.4
266	<i>Setaria italica</i>		2,370.30	2.4
267	<i>Trichosanthes dioica</i>		2,361.50	2.4
268	<i>Pandanus odoratissimus</i>		2,314.40	2.3
269	<i>Maranta arundinacea</i>		2,178.20	2.2
270	<i>Phoenix dactylifera</i>	LC	2,088.10	2.1
271	<i>Actiniopteris dichotoma</i>	R	1,950.00	2
272	<i>Allium sativum</i>	LC	2,001.80	2
273	<i>Ocimum gratissimum</i>	VU	2,021.60	2
274	<i>Solanum aculeatissimum</i>		2,016.30	2
275	<i>Holostemma ada-kodien</i>	EN	1,930.20	1.9
276	<i>Thespesia populnea</i>		1,875.20	1.9
277	<i>Gymnema sylvestre</i>	EN	1,802.80	1.8
278	<i>Sesbania grandiflora</i>		1,760.00	1.8
279	<i>Saccharum bengalense</i>		1,657.70	1.7
280	<i>Centella asiatica</i>	LC	1,608.70	1.6
281	<i>Trichosanthes cucumerina</i>		1,606.60	1.6
282	<i>Aristolochia indica</i>	VU	1,496.60	1.5
283	<i>Caesalpinia bonduc</i>	LC	1,531.30	1.5
284	<i>Homonoia riparia</i>	LC	1,520.70	1.5
285	<i>Oxalis corniculata</i>		1,500.40	1.5
286	<i>Pajanelia longifolia</i>		1,526.70	1.5
287	<i>Paspalum scrobiculatum</i>	LC	1,470.00	1.5
288	<i>Datura stramonium</i>		1,355.90	1.4
289	<i>Dysoxylum gotadhora</i>		1,379.40	1.4
290	<i>Phaseolus aureus</i>		1,435.20	1.4
291	<i>Prunus dulcis</i>	LC	1,420.40	1.4
292	<i>Crateva nurvala</i>		1,295.20	1.3
293	<i>Ipomoea pes-tigridis</i>		1,327.90	1.3
294	<i>Lens culinaris</i>	LC	1,309.00	1.3
295	<i>Senna occidentalis</i>		1,268.00	1.3
296	<i>Ageratum conyzoides</i>		1,212.80	1.2
297	<i>Calophyllum inophyllum</i>		1,172.90	1.2
298	<i>Eclipta alba</i>		1,169.60	1.2
299	<i>Inula racemosa</i>		1,161.00	1.2
300	<i>Vigna umbellata</i>		1,223.30	1.2
301	<i>Aconitum palmatum</i>		1,062.20	1.1
302	<i>Cissus quadrangularis</i>		1,145.20	1.1
303	<i>Lawsonia inermis</i>		1,096.80	1.1
304	<i>Pergularia daemia</i>		1,067.00	1.1

305	<i>Costus speciosus</i>	VU	1,016.40	1
306	<i>Cycas circinalis</i>	CR	1,027.10	1
307	<i>Myristica fragrans</i>	DD	953.70	1
308	<i>Plectranthus amboinicus</i>	EN	1,047.60	1
309	<i>Aquilaria malaccensis</i>		879.80	0.9
310	<i>Borassus flabellifer</i>	EN	929.60	0.9
311	<i>Evolvulus alsinodes</i>	EN	852.00	0.9
312	<i>Leucas aspera</i>		915.60	0.9
313	<i>Commiphora caudata</i>		812.00	0.8
314	<i>Dalbergia sissoo</i>		792.30	0.8
315	<i>Heracleum rigens</i>		788.20	0.8
316	<i>Ocimum kilimandscharicum</i>		784.00	0.8
317	<i>Plumbago auriculata</i>		773.20	0.8
318	<i>Pogostemon cablin</i>	LC	796.70	0.8
319	<i>Saccharum arundinaceum</i>		838.90	0.8
320	<i>Solanum ferox</i>		751.50	0.8
321	<i>Solanum violaceum</i>		784.50	0.8
322	<i>Stereospermum suaveolens</i>		824.50	0.8
323	<i>Bridelia stipularis</i>	LC	727.20	0.7
324	<i>Carum carvi</i>		662.70	0.7
325	<i>cassia fistula</i>	LC	724.80	0.7
326	<i>Datura Stramonium</i>		663.10	0.7
327	<i>Datura fastuosa</i>		651.20	0.7
328	<i>Lavandula stoechas</i>		704.40	0.7
329	<i>Ocimum sanctum</i>		698.80	0.7
330	<i>Panicum sumatrense</i>		650.00	0.7
331	<i>Piper nigrum</i>	NT	729.40	0.7
332	<i>Plantago ovata</i>		692.00	0.7
333	<i>Prunus domestica</i>		656.80	0.7
334	<i>Salacia reticulata</i>	VU	720.70	0.7
335	<i>Sida acuta</i>		719.20	0.7
336	<i>Allophylus serratus</i>		572.80	0.6
337	<i>Anisomeles malabarica</i>		573.20	0.6
338	<i>Azima tetraantha</i>	LC	637.30	0.6
339	<i>Cipadessa baccifera</i>		632.00	0.6
340	<i>Elephantopus scaber</i>		591.20	0.6
341	<i>Hibiscus furcatus</i>		582.40	0.6
342	<i>Nerium oleander</i>		586.80	0.6
343	<i>Nymphaea nouchali</i>	EN	575.20	0.6
344	<i>Sarcostemma brevistigma</i>	EN	573.20	0.6
345	<i>Solanum rudepannum</i>		559.20	0.6
346	<i>Soymida febrifuga</i>		586.70	0.6

347	<i>Spondias pinnata</i>		613.80	0.6
348	<i>Vigna Mungo</i>		644.20	0.6
349	<i>Xylia xylocarpa</i>	DD	611.40	0.6
350	<i>Anacyclus pyrethrum</i>		460.50	0.5
351	<i>Corchorus trilocularis</i>		474.50	0.5
352	<i>Curcuma aromatica</i>	VU	538.00	0.5
353	<i>Gossypium arboreum</i>		495.80	0.5
354	<i>Justicia gendarussa</i>		497.60	0.5
355	<i>Kaempferia galanga</i>	DD	462.90	0.5
356	<i>Musa sapientum</i>		471.70	0.5
357	<i>Musa paradisiaca</i>		504.00	0.5
358	<i>Myristica malabarica</i>	VU	520.40	0.5
359	<i>Ocimum tenuiflorum</i>		538.00	0.5
360	<i>Piper nigrum</i>		494.20	0.5
361	<i>Plectranthus vettiveroides</i>		539.20	0.5
362	<i>Polygonum alatum</i>		480.00	0.5
363	<i>Solanum indicum</i>		546.70	0.5
364	<i>Tephrosia purpurea</i>		517.60	0.5
365	<i>Apium graveolens</i>		392.10	0.4
366	<i>Cassia tora</i>		364.50	0.4
367	<i>Croton tiglium</i>		407.80	0.4
368	<i>Euphorbia ligularia</i>		402.80	0.4
369	<i>Euphorbia nerifolia</i>	LC	416.00	0.4
370	<i>Euphorbia trigona</i>		428.00	0.4
371	<i>Glycosmis pentaphylla</i>		416.00	0.4
372	<i>Lannea coromandelica</i>	LC	417.10	0.4
373	<i>Merremia emarginata</i>	LC	403.20	0.4
374	<i>Neolamarckia cadamba</i>		371.20	0.4
375	<i>Nervelia zeylanica</i>		418.40	0.4
376	<i>Pistia stratiotes</i>		372.00	0.4
377	<i>Sarcostemma acidum</i>		358.40	0.4
378	<i>Catunaregam spinosa</i>		319.00	0.3
379	<i>Chrysopogon zizanioides</i>	LC	333.50	0.3
380	<i>Cymbopogon coloratus</i>		312.00	0.3
381	<i>Cymbopogon martini</i>		304.50	0.3
382	<i>Fritillaria cirrhosa</i>		259.10	0.3
383	<i>Gynandropsis gynandra</i>		310.40	0.3
384	<i>Hyoscyamus niger</i>	EN	290.40	0.3
385	<i>Ipomoea nil</i>		304.80	0.3
386	<i>Malaxis muscifera</i>		290.10	0.3
387	<i>Nothapodytes nimmoniana</i>	VU	319.20	0.3
388	<i>Nyctanthes arbor-tristis</i>		291.40	0.3

389	<i>Pogostemon heyneanus</i>		288.20	0.3
390	<i>Schizachyrium exile</i>		325.10	0.3
391	<i>Scoparia dulcis</i>		252.50	0.3
392	<i>Strophanthus wightianus</i>		318.40	0.3
393	<i>Taxus wallichiana</i>		260.80	0.3
394	<i>Tridax procumbens</i>		324.80	0.3
395	<i>Acacia sinuata</i>		157.60	0.2
396	<i>Acalypha indica</i>		194.00	0.2
397	<i>Amaranthus spinosus</i>		179.20	0.2
398	<i>Argemone mexicana</i>		172.00	0.2
399	<i>Cassia angustifolia</i>		150.80	0.2
400	<i>Citrus aurantiifolia</i>		190.40	0.2
401	<i>Cleome viscosa</i>		190.40	0.2
402	<i>Cucumis sativus</i>		248.20	0.2
403	<i>Elaeocarpus sphaericus</i>		156.00	0.2
404	<i>Entada rheedii</i>	R	210.40	0.2
405	<i>Helicteres isora</i>		236.10	0.2
406	<i>Holostemma ada-kodien</i>	EN	222.30	0.2
407	<i>Hydnocarpus laurifolius</i>		240.00	0.2
408	<i>Ipomoea turbinata</i>		207.20	0.2
409	<i>Malaxis acuminata</i>		151.40	0.2
410	<i>Mucuna prurita</i>	LC	179.80	0.2
411	<i>Myxopyrum smilacifolium</i>		183.70	0.2
412	<i>Nymphaea alba</i>		178.40	0.2
413	<i>Orthosiphon glabratus</i>		239.20	0.2
414	<i>Phyllanthus niruri</i>		162.40	0.2
415	<i>Pogostemon heyneanus</i>	VU	174.00	0.2
416	<i>Sapindus trifoliatus</i>		155.00	0.2
417	<i>Strychnos nux-vomica</i>		246.40	0.2
418	<i>Triticum aestivum</i>	LC	192.50	0.2
419	<i>Vigna unguiculata</i>		181.20	0.2
420	<i>Wedelia chinensis</i>		162.40	0.2
421	<i>Zanthoxylum alatum</i>		176.00	0.2
422	<i>Actiniopteris radiata</i>		111.60	0.1
423	<i>Alternanthera sessilis</i>		78.90	0.1
424	<i>Anacardium occidentale</i>		123.90	0.1
425	<i>Argyreia nervosa</i>		60.10	0.1
426	<i>Bixa orellana</i>		132.00	0.1
427	<i>Brassica oleracea</i>		71.00	0.1
428	<i>Cajanus cajan</i>		67.10	0.1
429	<i>Capparis sepiaria</i>		85.00	0.1
430	<i>Cinnamomum cassia</i>		64.00	0.1

431	<i>Clerodendrum inerme</i>		62.40	0.1
432	<i>Cyanthillium cinereum</i>		64.00	0.1
433	<i>Dactylorhiza incarnata</i>		132.00	0.1
434	<i>Desmodium oojeinense</i>		70.40	0.1
435	<i>Eleusine coracana</i>		76.00	0.1
436	<i>Emilia sonchifolia</i>		136.10	0.1
437	<i>Euphorbia antiquorum</i>		147.20	0.1
438	<i>Evolvulus alsinoides</i>		118.50	0.1
439	<i>Feronia limonia</i>		138.90	0.1
440	<i>Ficus arnottiana</i>	LC	55.20	0.1
441	<i>Ficus microcarpa</i>	LC	85.90	0.1
442	<i>Fumaria indica</i>		123.20	0.1
443	<i>Hygroryza aristata</i>		62.40	0.1
444	<i>Jasminum multiflorum</i>		53.50	0.1
445	<i>Juglans regia</i>		61.80	0.1
446	<i>Lagerstroemia speciosa</i>		72.00	0.1
447	<i>Lilium polyphyllum</i>		120.50	0.1
448	<i>Magnolia champaca</i>	LC	52.60	0.1
449	<i>Mallotus philippensis</i>	LC	138.70	0.1
450	<i>Marsilea quadrifolia</i>		64.80	0.1
451	<i>Merremia turpethum</i>		50.00	0.1
452	<i>Mimusops elengi</i>		84.00	0.1
453	<i>Mussaenda frondosa</i>		82.40	0.1
454	<i>Nerium indicum</i>		68.00	0.1
455	<i>Nicotiana tabacum</i>		120.00	0.1
456	<i>Ocimum kilimandscharicum</i>		54.30	0.1
457	<i>Papaver somniferum</i>	LC	82.90	0.1
458	<i>Phlogacanthus thyriformis</i>		60.60	0.1
459	<i>Polygonatum cirrhifolium</i>		98.80	0.1
460	<i>Quercus infectoria</i>	LC	133.90	0.1
461	<i>Raphanus raphanistrum subsp sativus</i>		65.60	0.1
462	<i>Saraca indica</i>	EN	52.80	0.1
463	<i>Schleichera oleosa</i>		149.70	0.1
464	<i>Schrebera swietenoides</i>		144.00	0.1
465	<i>Solanum americanum</i>		55.20	0.1
466	<i>Solanum trilobatum</i>		60.00	0.1
467	<i>Solena heterophylla</i>		128.80	0.1
468	<i>Sphaeranthus indicus</i>	LC	63.20	0.1
469	<i>Strobilanthes heyneana</i>		116.00	0.1
470	<i>Strychnus nuxvomica</i>		55.20	0.1
471	<i>Tinospora crispa</i>		94.70	0.1

472	<i>Vateria indica</i>	VU	144.90	0.1
473	<i>Xylia xylocarpa</i>	DD	53.70	0.1
474	<i>Acalypha fruticosa</i>		8.00	0
475	<i>Adenantha pavonina</i>		17.70	0
476	<i>Adiantum lunatum</i>	NT	11.20	0
477	<i>Ailanthus excelsa</i>		2.40	0
478	<i>Alangium salviifolium</i>	LC	21.80	0
479	<i>Anogeissus latifolia</i>		1.30	0
480	<i>Aporosa cardiosperma</i>		42.40	0
481	<i>Arachis hypogaea</i>		1.20	0
482	<i>Artemisia maritima</i>		33.50	0
483	<i>Artemisia nilagirica</i>		4.80	0
484	<i>Artemisia vulgaris</i>	LC	43.20	0
485	<i>Artocarpus heterophyllus</i>		0.80	0
486	<i>Balanophora fungosa</i>		17.10	0
487	<i>Bambusa arundinacea</i>		12.60	0
488	<i>Bambusa bamboos</i>		15.30	0
489	<i>Barringtonia acutangula</i>		24.40	0
490	<i>Boerhaavia diffusa</i>		10.10	0
491	<i>Bombax ceiba</i>		6.30	0
492	<i>Boswellia serrata</i>		11.80	0
493	<i>Calamus rotang</i>		29.60	0
494	<i>Calotropis procera</i>		21.30	0
495	<i>Canthium coromandelicum</i>		7.20	0
496	<i>Capparis zeylanica</i>		15.10	0
497	<i>Capsicum annum</i>	LC	1.60	0
498	<i>Cassia occidentalis</i>		15.20	0
499	<i>Catharanthus roseus</i>	LC	32.00	0
500	<i>Celastrus paniculatus</i>	EN	36.30	0
501	<i>Celtis cinnamomea</i>		7.60	0
502	<i>Celtis philippensis</i>		45.20	0
503	<i>Celtis timorensis</i>		20.90	0
504	<i>Centrosema pubescens</i>		42.90	0
505	<i>Cicer arietinum</i>		2.00	0
506	<i>Cinnamomum camphora</i>		30.10	0
507	<i>Cissampelos pareira</i>	VU	13.60	0
508	<i>Clerodendrum infortunatum</i>		48.00	0
509	<i>Clerodendrum phlomidis</i>		25.60	0
510	<i>Coldenia procumbens</i>		12.00	0
511	<i>Crepidium acuminatum</i>		11.90	0
512	<i>Cucurbita maxima</i>		0.80	0
513	<i>Cuscuta reflexa</i>		16.00	0

514	<i>Cymbopogon flexuosus</i>		14.50	0
515	<i>Dendrophthoe falcata</i>		19.20	0
516	<i>Echinochloa esculenta</i>		1.60	0
517	<i>Encostemma axillare</i>		20.00	0
518	<i>Eucalyptus globulus</i>		10.20	0
519	<i>Ferula assa-foetida</i>		26.80	0
520	<i>Ferula narthex</i>		28.00	0
521	<i>Ficus hispida</i>	LC	8.00	0
522	<i>Flacourtia indica</i>		0.80	0
523	<i>Grewia asiatica</i>		41.80	0
524	<i>Habenaria intermedia</i>		44.70	0
525	<i>Helianthus annuus</i>		20.80	0
526	<i>Inula Racemosa</i>		12.50	0
527	<i>Ipomoea obscura</i>		3.60	0
528	<i>Ipomoea tridentata</i>		31.60	0
529	<i>Jasminum officinale</i>	LC	16.30	0
530	<i>Jasminum sambac</i>		2.40	0
531	<i>Juniperus communis</i>		1.30	0
532	<i>Kyllinga nemoralis</i>		3.80	0
533	<i>Leptadenia reticulata</i>		7.50	0
534	<i>Lodoicea maldivica</i>	EN	11.10	0
535	<i>Marsdenia tenacissima</i>		37.50	0
536	<i>Mastixia pentandra</i>		7.20	0
537	<i>Micrococca mercurialis</i>		32.80	0
538	<i>Microstachys chamaelea</i>		0.80	0
539	<i>Microstylis wallichii</i>		12.60	0
540	<i>Mimosa rubicaulis</i>		8.00	0
541	<i>Morinda coreia</i>		8.00	0
542	<i>Naravelia zeylanica</i>		19.20	0
543	<i>Nervilia concolor</i>		44.30	0
544	<i>Nervilia crociformis</i>	NT	9.80	0
545	<i>Ocimum basilicum</i>		44.80	0
546	<i>Panicum sumatrense</i>		6.40	0
547	<i>Panicum miliaceum</i>		0.80	0
548	<i>Pennisetum glaucum</i>		1.60	0
549	<i>Phyla nodiflora</i>		40.80	0
550	<i>Piper cubeba</i>		33.80	0
551	<i>Platanthera edgeworthii</i>		44.80	0
552	<i>Plumeria rubra</i>		36.00	0
553	<i>Polygonatum verticillatum</i>		49.10	0
554	<i>Psidium guajava</i>		2.50	0
555	<i>Randia dumetorum</i>		5.20	0

556	<i>Raphanus raphanistrum</i>		9.90	0
557	<i>Salmalia malabarica</i>		0.80	0
558	<i>Sansevieria roxburghiana</i>		14.40	0
559	<i>Scindapsus officinalis</i>		30.00	0
560	<i>Senna alata</i>		48.00	0
561	<i>Senna auriculata</i>		0.50	0
562	<i>Senna sophera</i>		30.20	0
563	<i>Shorea robusta</i>		37.50	0
564	<i>Sida spinosa</i>		19.20	0
565	<i>Solanum torvum</i>		1.60	0
566	<i>Sorghum bicolor</i>		2.00	0
567	<i>Tabernaemontana alternifolia</i>		8.00	0
568	<i>Terminalia catappa</i>		17.10	0
569	<i>Theobroma cacao</i>		3.40	0
570	<i>Toddalia asiatica</i>		8.00	0
571	<i>Trapa natans</i>	LC	33.00	0
572	<i>Typha elephantina</i>		28.00	0
573	<i>Vernonia anthelmintica</i>		8.00	0
574	<i>Vigna trilobata</i>		1.30	0
575	<i>Vitex agnus-castus</i>		0.00	0
576	<i>Vitex trifolia</i>		21.70	0
577	<i>Zanthoxylum armatum</i>		13.90	0
578	<i>Zea mays</i>		1.20	0
				25516.6

1. About 578 Medicinal plants consumed by the Ayurvedic manufacturing units of Kerala
2. Out of top 100 with regard to quantity 60 species are consumed above 100 MT annually. Consumed of the rest of 40 species is between 96.3 and 60.6 MT by the manufacturing units.
3. Out of the 189 species with codified threat status, 68 species are classified under threatened status (CR-4, EN-30, VU-31, R-3) and the other 111 species are classified under NT (12) and LC (99).
4. Some of the conservation concern species have a projected demand of greater than 50 MT. These include Critically endangered species as *Saussurea costus* (67.5 MT), *Coscinium fenestratum* (79.2 MT) vulnerable species as *Bacopa monnieri* (410 MT), *Niligirianthus ciliatus* (230 MT), *Woodfordia fruticosa* (186 MT). Endangered species as *Oroxylum indicus* (152 MT), *Acorus calamus* (137 MT),

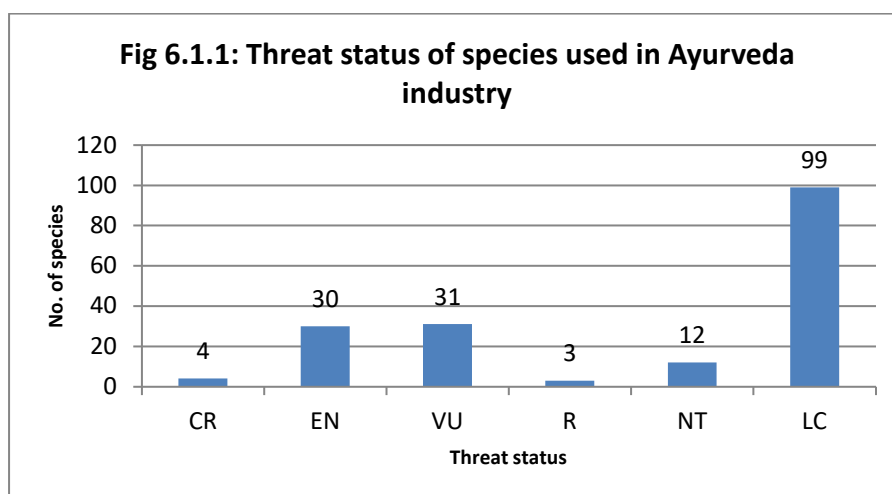


Table 6.1.3 Major bioresources utilized

Sl. No.	Botanical Name	Quantity(MT)
1	<i>Citrus limon</i>	1545.8
2	<i>Cocos nucifera</i>	1207.9
3	<i>Phyllanthus emblica</i>	981.6
4	<i>Terminalia chebula</i>	913.7
5	<i>Tamarindus indica</i>	834.8
6	<i>Asparagus racemosus</i>	777.8
7	<i>Zingiber officinale</i>	702
8	<i>Sida cordifolia</i>	642.1
9	<i>Tinospora cordifolia</i>	632
10	<i>Aloe vera</i>	561.3
11	<i>Momordica dioica</i>	533.6
12	<i>Aegle marmelos</i>	513.3
13	<i>Curcuma longa</i>	423.5
14	<i>Withania somnifera</i>	414.1
15	<i>Bacopa monnieri</i>	410.3
16	<i>Eclipta prostrata</i>	398.8
17	<i>Sida rhombifolia</i>	387.4
18	<i>Piper longum</i>	331.8
19	<i>Phyllanthus emblica</i>	315.5
20	<i>Vitis vinifera</i>	303.2
21	<i>Cedrus deodara</i>	302.4
22	<i>Azadirachta indica</i>	298.4
23	<i>Justicia beddomei</i>	288.1

24	<i>Solanum melongena</i>	285.7
25	<i>Boerhavia diffusa</i>	281.8
26	<i>Cyperus rotundus</i>	272.2
27	<i>Tribulus terrestris</i>	263.1
28	<i>Moringa oleifera</i>	256.9
29	<i>Ricinus communis</i>	254.8
30	<i>Nilgirianthus ciliatus</i>	236.9
31	<i>Cuminum cyminum</i>	229.2
32	<i>Terminalia bellericca</i>	225.5
33	<i>Cynodon dactylon</i>	219.3
34	<i>Premna serratifolia</i>	186.4
35	<i>Woodfordia fruticosa</i>	186.2
36	<i>Pseudarthria viscida</i>	183.6
37	<i>Crocus sativus</i>	174.3
38	<i>Pongamia pinnata</i>	174.3
39	<i>Tragia involucrata</i>	168.9
40	<i>Hordeum vulgare</i>	164.5
41	<i>Gmelina arborea</i>	163.2
42	<i>Desmodium gangeticum</i>	162
43	<i>Allium cepa</i>	153.7
44	<i>Oroxylum indicum</i>	152

45	<i>Stereospermum chelonoides</i>	152
46	<i>Aerva lanata</i>	151.3
47	<i>Wrightia tinctoria</i>	151
48	<i>Piper betle</i>	148.7
49	<i>Spermacoce hispida</i>	145.5
50	<i>Alpinia officinarum</i>	142.7
51	<i>Oldenlandia corymbosa</i>	140.3
52	<i>Piper nigrum</i>	138.1
53	<i>Acorus calamus</i>	137.9
54	<i>Operculina turpethum</i>	133.7
55	<i>Glycyrrhiza glabra</i>	133.4
56	<i>Coriandrum sativum</i>	131.2
57	<i>indigofera tinctoria</i>	124.2
58	<i>Hedyotis corymbosa</i>	111
59	<i>Trichosanthes lobata</i>	108.6
60	<i>Chrysopogon zizanioides</i>	100.8
61	<i>Hemidesmus indicus</i>	96.3
62	<i>Acacia catechu</i>	96.2
63	<i>Pterocarpus santalinus</i>	95.6
64	<i>Holoptelea integrifolia</i>	93.5
65	<i>Solanum anguivi</i>	92.4
66	<i>Trachyspermum roxburghianum</i>	92.1
67	<i>Justicia adhatoda</i>	91.3
68	<i>Vigna mungo</i>	90.4

69	<i>Caesalpinia sappan</i>	90.3
70	<i>Cardiospermum halicacabum</i>	84.6
71	<i>Rubia cordifolia</i>	84.6
72	<i>Allium sativum</i>	82.3
73	<i>Kaempferia galanga</i>	80.4
74	<i>Salacia oblonga</i>	79.9
75	<i>Coscinium fenestratum</i>	79.2
76	<i>Indigofera tinctoria</i>	77.9
77	<i>Curculigo orchioides</i>	77.1
78	<i>Strobilanthes ciliata</i>	76.3
79	<i>Benincasa hispida</i>	72.3
80	<i>Elettaria cardamomum</i>	70.8
81	<i>Oryza sativa</i>	70.5
82	<i>Erythrina variegata</i>	70.2
83	<i>Saussurea costus</i>	67.5
84	<i>Anethum graveolens</i>	64.9
85	<i>Pterocarpus marsupium</i>	64.9
86	<i>Dolichos biflorus</i>	64.3
87	<i>Ocimum tenuiflorum</i>	61.3
88	<i>Cyclea peltata</i>	60.6
89	<i>Vitex negundo</i>	60.4
90	<i>Santalum album</i>	58.8
91	<i>Cassia fistula</i>	57.9
92	<i>Trigonella foenum-graecum</i>	57.9

93	<i>Andrographis paniculata</i>	57.5
94	<i>Symplocos cochinchinensis</i>	57.4
95	<i>Ixora coccinea</i>	56
96	<i>Acacia nilotica</i>	53.5

97	<i>Trachyspermum roxburghianum</i>	50.1
98	<i>Nigella sativa</i>	47.5
99	<i>Macrotyloma uniflorum</i>	47.1
100	<i>Piper attenuatum</i>	44.8

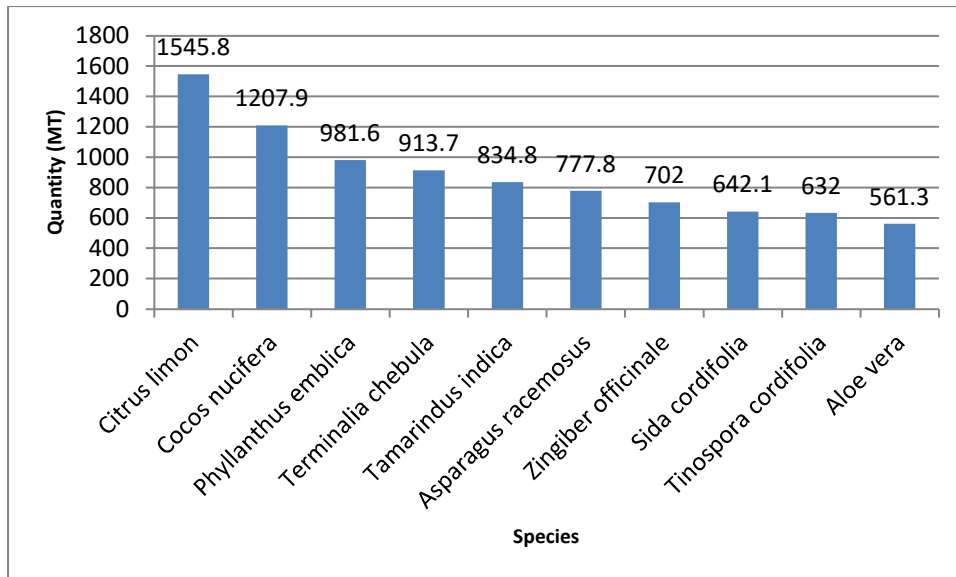


Fig 6.1.2: Top 10 high quantity bioresources utilised

Out of 578 medicinal plants consumed by the Ayurvedic manufacturing units of Kerala, 15 medicinal plants are with an average price/ per kilogram between Rs.24653 to Rs.1000 and rest of the medicinal plant species is between Rs.989.00 and Rs.185.00.

- The top 10 highest quantity bioresource species are shown in Fig 6.1.1.
- *Citrus limon* was the highest quantity bioresource species utilised with a total quantity of 1545.8 MT, followed by *Cocos nucifera* (1207.9 MT) and *Phyllanthus emblica* (981.6 MT).

Table 6.1.4 High value medicinal plants

Sl. No.	BotanicalName	Average price/kg	Minimum price/kg	Maximum price/kg
1	<i>Lodoicea maldivica</i>	24653	10500	38806
2	<i>Crocus sativus</i>	11031	713	39073
3	<i>Ficus hispida</i>	5776	5776	5776
4	<i>Trapa natans</i>	3494	3494	3494
5	<i>Homonoia riparia</i>	2870	2870	2870
6	<i>Aconitum heterophyllum</i>	2321	1377	6838
7	<i>Nervilia crociformis</i>	1910	1910	1910
8	<i>Jasminum multiflorum</i>	1822	1822	1822
9	<i>Bridelia stipularis</i>	1249	1249	1249
10	<i>Elettaria cardamomum</i>	1207	748	3336
11	<i>Soymida febrifuga</i>	1180	1180	1180
12	<i>Holostemma adakodien</i>	1130	254	2007
13	<i>Adiantum lunatum</i>	1062	1062	1062
14	<i>Chrysopogon zizanioides</i>	1028	115	1940
15	<i>Coptis teeta</i>	1009	500	1517
16	<i>Vateria indica</i>	988	988	988
17	<i>Holostemma adakodien</i>	846	740	953
18	<i>Cymbopogon martini</i>	845	845	845
19	<i>Picrorhiza kurroa</i>	843	524	2531
20	<i>Indigofera tinctoria</i>	773	477	1068
21	<i>Holostemma adakodien</i>	771	771	771
22	<i>Pogostemon heyneanus</i>	754	127	1381
23	<i>Aconitum palmatum</i>	730	730	730
24	<i>Piper nigrum</i>	709	283	1066
25	<i>Nerium oleander</i>	621	621	621
26	<i>Ipomoea turbinata</i>	559	559	559
27	<i>Juglans regia</i>	515	230	800

28	<i>Euphorbia trigona</i>	505	505	505
29	<i>Piper cubeba</i>	501	406	714
30	<i>Valeriana jatamansi</i>	468	455	480
31	<i>Nymphaea nouchali</i>	433	10	856
32	<i>Orthosiphon glabratus</i>	429	429	429
33	<i>Prunus dulcis</i>	427	427	427
34	<i>Prunus domestica</i>	402	402	402
35	<i>Nardostachys jatamansi</i>	398	316	1264
36	<i>Cassia tora</i>	386	373	400
37	<i>Amomum subulatum</i>	384	187	485
38	<i>Embelia ribes</i>	384	323	631
39	<i>Cinnamomum cassia</i>	380	380	380
40	<i>Callicarpa macrophylla</i>	378	169	1191
41	<i>Heracleum rigens</i>	367	367	367
42	<i>Psidium guajava</i>	360	360	360
43	<i>piper nigrum</i>	354	354	354
44	<i>Cassia fistula</i>	352	33	354
45	<i>Rauwolfia serpentina</i>	343	261	426
46	<i>Syzygium aromaticum</i>	335	295	432
47	<i>Kylinga nemoralis</i>	328	328	328
48	<i>Valeriana wallichii</i>	325	31	587
49	<i>Phyllanthus emblica</i>	319	58	580
50	<i>Anacyclus pyrethrum</i>	307	237	378
51	<i>Prunus avium</i>	306	212	401
52	<i>Trichosanthes tricuspidata</i>	306	27	314
53	<i>Neolamarckia cadamba</i>	299	299	299
54	<i>Leucas aspera</i>	294	294	294
55	<i>Calophyllum inophyllum</i>	294	294	294
56	<i>Heracleum rigens</i>	293	220	343
57	<i>Ficus benghalensis</i>	290	75	2993
58	<i>Lavandula stoechas</i>	289	289	289
59	<i>Hemidesmus indicus</i>	288	282	1269
60	<i>Bauhinia variegata</i>	286	286	286
61	<i>Schleichera oleosa</i>	277	277	277
62	<i>Hedyotis corymbosa</i>	276	64	488
63	<i>Magnolia champaca</i>	275	275	275
64	<i>Trichosanthes Dioica</i>	272	272	272

65	<i>Fumaria indica</i>	270	270	270
66	<i>Myristica malabarica</i>	270	197	343
67	<i>Terminalia catappa</i>	268	258	278
68	<i>Argyreia nervosa</i>	267	83	450
69	<i>Senna tora</i>	266	122	2280
70	<i>Oxalis corniculata</i>	262	262	262
71	<i>Cinnamomum verum</i>	256	113	335
72	<i>Papaver somniferum</i>	250	210	263
73	<i>Cinnamomum malabattrum</i>	247	77	361
74	<i>Cyclea peltata</i>	245	244	261
75	<i>Senna occidentalis</i>	244	12	475
76	<i>Boerhaavia diffusa</i>	238	238	238
77	<i>Inula racemosa</i>	237	204	270
78	<i>Merremia emarginata</i>	237	237	237
79	<i>Pogostemon heyneanus</i>	234	234	234
80	<i>Myristica fragrans</i>	230	185	311
81	<i>Illicium verum</i>	227	191	239
82	<i>Piper longum</i>	225	187	530
83	<i>Saussurea costus</i>	224	177	404
84	<i>Ferula assa-foetida</i>	217	217	217
85	<i>kaempferia galanga</i>	216	216	216
86	<i>Plumbago auriculata</i>	214	214	214
87	<i>Polygonatum verticillatum</i>	210	210	210
88	<i>Ocimum kilimandscharicum</i>	207	207	207
89	<i>Nelumbo nucifera</i>	205	66	301
90	<i>Trichosanthes lobata</i>	202	154	298
91	<i>Ficus microcarpa</i>	201	152	295
92	<i>Pogostemon cablin</i>	201	139	263
93	<i>Habenaria intermedia</i>	192	162	222
94	<i>Cinnamomum malabattrum</i>	191	191	191
95	<i>phyllanthus emblica</i>	190	190	190
96	<i>Curculigo orchioides</i>	188	131	199
97	<i>Syzygium caryophyllatum</i>	187	187	187
98	<i>Mimusops elengi</i>	185	51	320
99	<i>Withania somnifera</i>	185	168	271
100	<i>Inula racemosa</i>	185	185	185

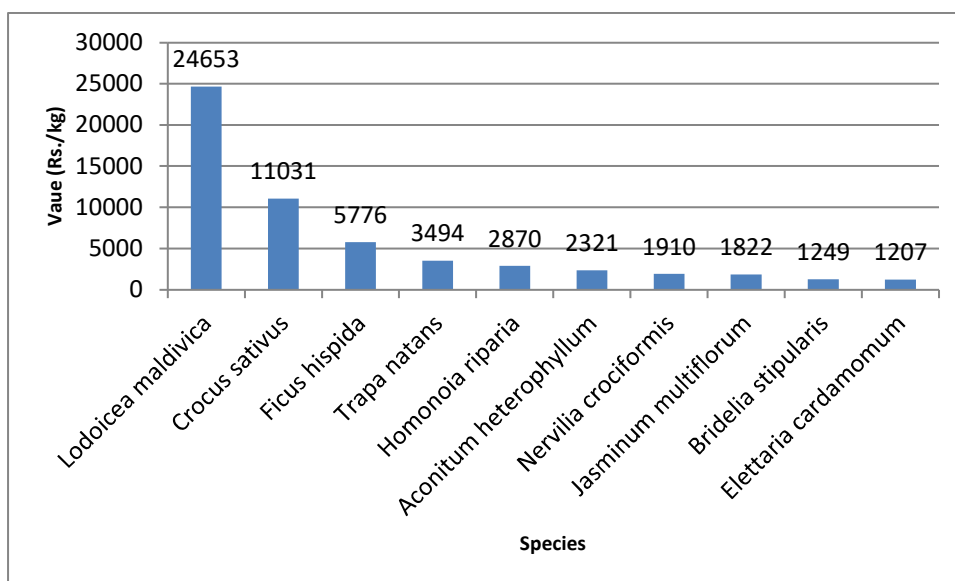


Fig 6.1.3: Top 10 High value medicinal plants

- The top 10 highest unit value bioresource species are shown in Fig 6.1.2
- Among these, *Lodoicea maldivica* was the highest unit value species with a unit value of Rs.24653/kg followed by *Crocus sativus* (Rs.11031/kg) and *Ficus hispida* (Rs.5776/kg).

Table 6.1.5 Price of the raw drugs (medicinal plants)

Sl.No.	BotanicalName	Average price/kg	Minimum price/kg	Maximum price/kg
1.	<i>Lodoicea maldivica</i>	24653	10500	38806
2.	<i>Crocus sativus</i>	11031	713	39073
3.	<i>Ficus hispida</i>	5776	5776	5776
4.	<i>Trapa natans</i>	3494	3494	3494
5.	<i>Homonoia riparia</i>	2870	2870	2870
6.	<i>Aconitum heterophyllum</i>	2321	1377	6838
7.	<i>Nervilia crociformis</i>	1910	1910	1910
8.	<i>Jasminum multiflorum</i>	1822	1822	1822
9.	<i>Bridelia stipularis</i>	1249	1249	1249
10.	<i>Elettaria cardamomum</i>	1207	748	3336
11.	<i>Soymida febrifuga</i>	1180	1180	1180
12.	<i>Holostemma ada-kodien</i>	1130	254	2007
13.	<i>Adiantum lunatum</i>	1062	1062	1062

14.	<i>Chrysopogon zizanioides</i>	1028	115	1940
15.	<i>Coptis teeta</i>	1009	500	1517
16.	<i>Vateria indica</i>	988	988	988
17.	<i>Holostemmaada-kodien</i>	846	740	953
18.	<i>Cymbopogon martini</i>	845	845	845
19.	<i>Picrorhiza kurroa</i>	843	524	2531
20.	<i>Indigofera tinctoria</i>	773	477	1068
21.	<i>Holostemma ada-kodien</i>	771	771	771
22.	<i>Pogostemon heyneanus</i>	754	127	1381
23.	<i>Aconitum palmatum</i>	730	730	730
24.	<i>Piper nigrum</i>	709	283	1066
25.	<i>Nerium oleander</i>	621	621	621
26.	<i>Ipomoea turbinata</i>	559	559	559
27.	<i>Juglans regia</i>	515	230	800
28.	<i>Euphorbia trigona</i>	505	505	505
29.	<i>Piper cubeba</i>	501	406	714
30.	<i>Valeriana jatamansi</i>	468	455	480
31.	<i>Nymphaea nouchali</i>	433	10	856
32.	<i>Orthosiphon glabratus</i>	429	429	429
33.	<i>Prunus dulcis</i>	427	427	427
34.	<i>Prunus domestica</i>	402	402	402
35.	<i>Nardostachys jatamansi</i>	398	316	1264
36.	<i>Cassia tora</i>	386	373	400
37.	<i>Amomum subulatum</i>	384	187	485
38.	<i>Embelia ribes</i>	384	323	631
39.	<i>Cinnamomum cassia</i>	380	380	380
40.	<i>Callicarpa macrophylla</i>	378	169	1191
41.	<i>Heracleum rigens</i>	367	367	367
42.	<i>Psidium guajava</i>	360	360	360
43.	<i>piper nigrum</i>	354	354	354
44.	<i>Cassia fistula</i>	352	33	354
45.	<i>Rauwolfia serpentina</i>	343	261	426
46.	<i>Syzygium aromaticum</i>	335	295	432
47.	<i>Kyllinga nemoralis</i>	328	328	328
48.	<i>Valeriana wallichii</i>	325	31	587
49.	<i>Phyllanthus emblica</i>	319	58	580
50.	<i>Anacyclus pyrethrum</i>	307	237	378
51.	<i>Prunus avium</i>	306	212	401
52.	<i>Trichosanthes tricuspidata</i>	306	27	314
53.	<i>Neolamarckia cadamba</i>	299	299	299
54.	<i>Leucas aspera</i>	294	294	294
55.	<i>Calophyllum inophyllum</i>	294	294	294

56.	<i>Heracleum rigens</i>	293	220	343
57.	<i>Ficus benghalensis</i>	290	75	2993
58.	<i>Lavandula stoechas</i>	289	289	289
59.	<i>Hemidesmus indicus</i>	288	282	1269
60.	<i>Bauhinia variegata</i>	286	286	286
61.	<i>Schleichera oleosa</i>	277	277	277
62.	<i>Hedyotis corymbosa</i>	276	64	488
63.	<i>Magnolia champaca</i>	275	275	275
64.	<i>Trichosanthes Dioica</i>	272	272	272
65.	<i>Fumaria indica</i>	270	270	270
66.	<i>Myristica malabarica</i>	270	197	343
67.	<i>Terminalia catappa</i>	268	258	278
68.	<i>Argyreia nervosa</i>	267	83	450
69.	<i>Senna tora</i>	266	122	2280
70.	<i>Oxalis corniculata</i>	262	262	262
71.	<i>Cinnamomum verum</i>	256	113	335
72.	<i>Papaver somniferum</i>	250	210	263
73.	<i>Cinnamomum malabattrum</i>	247	77	361
74.	<i>Cyclea peltata</i>	245	244	261
75.	<i>Senna occidentalis</i>	244	12	475
76.	<i>Boerhaavia diffusa</i>	238	238	238
77.	<i>Inula racemosa</i>	237	204	270
78.	<i>Merremia emarginata</i>	237	237	237
79.	<i>Pogostemon heyneanus</i>	234	234	234
80.	<i>Myristica fragrans</i>	230	185	311
81.	<i>Illicium verum</i>	227	191	239
82.	<i>Piper longum</i>	225	187	530
83.	<i>Saussurea costus</i>	224	177	404
84.	<i>Ferula assa-foetida</i>	217	217	217
85.	<i>kaempferia galanga</i>	216	216	216
86.	<i>Plumbago auriculata</i>	214	214	214
87.	<i>Polygonatum verticillatum</i>	210	210	210
88.	<i>Ocimum kilimandscharicum</i>	207	207	207
89.	<i>Nelumbo nucifera</i>	205	66	301
90.	<i>Trichosanthes lobata</i>	202	154	298
91.	<i>Ficus microcarpa</i>	201	152	295
92.	<i>Pogostemon cablin</i>	201	139	263
93.	<i>Habenaria intermedia</i>	192	162	222
94.	<i>Cinnamomum malabattrum</i>	191	191	191
95.	<i>phyllanthus emblica</i>	190	190	190
96.	<i>Curculigo orchoides</i>	188	131	199
97.	<i>Syzygium caryophyllatum</i>	187	187	187

98.	<i>Mimusops elengi</i>	185	51	320
99.	<i>Withania somnifera</i>	185	168	271
100.	<i>Inula racemosa</i>	185	185	185
101.	<i>Plectranthus hadiensis</i>	183	117	358
102.	<i>Ipomoea tridentata</i>	180	180	180
103.	<i>Mallotus philippensis</i>	175	20	330
104.	<i>Trachyspermum roxburghianum</i>	173	99	246
105.	<i>Vitis vinifera</i>	166	91	173
106.	<i>Smilax china</i>	163	155	382
107.	<i>Aconitum ferox</i>	162	60	240
108.	<i>Plumbago indica</i>	161	106	176
109.	<i>Coscinium fenestratum</i>	161	111	902
110.	<i>scindapsus officinalis</i>	160	160	160
111.	<i>Kaempferia galanga</i>	160	147	388
112.	<i>Andrographis paniculata</i>	159	123	511
113.	<i>Dysoxylum malabaricum</i>	159	58	259
114.	<i>Rubia cordifolia</i>	156	123	166
115.	<i>Celtis philippensis</i>	156	156	156
116.	<i>Jasminum grandiflorum</i>	155	36	275
117.	<i>Barringtonia acutangula</i>	155	155	155
118.	<i>Pterocarpus santalinus</i>	155	81	351
119.	<i>Ficus religiosa</i>	154	79	194
120.	<i>Catunaregam spinosa</i>	153	112	194
121.	<i>Mesua ferrea</i>	151	128	213
122.	<i>Solanum indicum</i>	151	151	151
123.	<i>Santalum album</i>	148	11	643
124.	<i>Plantago ovata</i>	148	148	148
125.	<i>Randia dumetorum</i>	148	148	148
126.	<i>Platanthera edgeworthii</i>	147	115	179
127.	<i>Plumbago zeylanica</i>	145	45	187
128.	<i>Costus speciosus</i>	143	143	143
129.	<i>Anacardium occidentale</i>	142	142	142
130.	<i>Hibiscus rosa-sinensis</i>	141	33	256
131.	<i>Sarcostemma brevistigma</i>	141	141	141
132.	<i>Quercus infectoria</i>	140	108	490
133.	<i>Lilium polyphyllum</i>	138	84	164
134.	<i>Trachyspermum roxburghianum</i>	138	138	138
135.	<i>indigofera tinctoria</i>	136	107	166
136.	<i>Asparagus racemosus</i>	135	43	995
137.	<i>Glycyrrhiza glabra</i>	133	76	431

138.	<i>Gmelina arborea</i>	131	108	220
139.	<i>Ventilago maderaspatana</i>	130	97	134
140.	<i>Cuminum cyminum</i>	129	90	342
141.	<i>Myristica fragrans</i>	128	128	128
142.	<i>Centratherum anthelminticum</i>	128	47	209
143.	<i>Cinnamomum camphora</i>	128	128	128
144.	<i>Malaxis acuminata</i>	126	126	126
145.	<i>Zingiber officinale</i>	125	125	274
146.	<i>Celastrus paniculatus</i>	125	125	125
147.	<i>Azadirachta indica</i>	123	58	138
148.	<i>Cymbopogon flexuosus</i>	123	123	123
149.	<i>Vitex altissima</i>	121	47	196
150.	<i>Ficus racemosa</i>	121	58	233
151.	<i>Nigella sativa</i>	121	102	430
152.	<i>Boerhavia diffusa</i>	119	49	959
153.	<i>Pogostemon cablin</i>	117	117	117
154.	<i>Euphorbia ligularia</i>	116	116	116
155.	<i>Eucalyptus globulus</i>	116	116	116
156.	<i>Catunaregam spinosa</i>	113	113	113
157.	<i>Malaxis muscifera</i>	111	8	213
158.	<i>Clerodendrum serratum</i>	110	83	198
159.	<i>Alpinia calcarata</i>	110	91	206
160.	<i>Cucurbita maxima</i>	110	110	110
161.	<i>curcuma aromatica</i>	110	110	110
162.	<i>Operculina turpethum</i>	109	101	118
163.	<i>Carum carvi</i>	109	53	164
164.	<i>Aristolochia indica</i>	108	39	111
165.	<i>Caesalpinia bonduc</i>	108	68	131
166.	<i>Alpinia officinarum</i>	108	84	125
167.	<i>Pandanus odorifer</i>	106	71	142
168.	<i>Foeniculum vulgare</i>	105	50	141
169.	<i>Elaeocarpus serratus</i>	104	57	151
170.	<i>Boswellia serrata</i>	102	102	102
171.	<i>Oroxylum indicum</i>	101	22	110
172.	<i>Bacopa monnieri</i>	101	52	367
173.	<i>Salacia oblonga</i>	100	89	146
174.	<i>Senna auriculata</i>	100	100	100
175.	<i>Crateva nurvala</i>	99	38	160
176.	<i>Celastrus paniculatus</i>	98	40	116
177.	<i>Holarrhena pubescens</i>	98	72	128
178.	<i>Maranta arundinacea</i>	98	36	509

179.	<i>Schizachyrium exile</i>	97	31	164
180.	<i>Salacia reticulata</i>	97	21	173
181.	<i>xylia xylocarpa</i>	95	95	95
182.	<i>Nilgirianthus ciliatus</i>	95	64	147
183.	<i>Pseudarthria viscida</i>	94	49	167
184.	<i>Solanum anguivi</i>	92	35	129
185.	<i>Sesamum indicum</i>	92	49	179
186.	<i>Sida rhombifolia</i>	92	48	205
187.	<i>Abrus precatorious</i>	89	44	117
188.	<i>Trichosanthes cucumerina</i>	88	79	97
189.	<i>Tribulus terrestris</i>	88	69	127
190.	<i>Cedrus deodara</i>	87	83	741
191.	<i>Caesalpinia mimosoides</i>	87	87	87
192.	<i>Cardiospermum halicacabum</i>	87	21	227
193.	<i>Pistacia chinensis</i>	87	45	143
194.	<i>Baliospermum montanum</i>	86	75	152
195.	<i>Eclipta prostrata</i>	86	39	403
196.	<i>Solanum nigrum</i>	85	82	87
197.	<i>Celtis timorensis</i>	84	30	138
198.	<i>Feronia limonia</i>	84	84	84
199.	<i>Hygrophila auriculata</i>	84	64	255
200.	<i>Piper nigrum</i>	84	84	84
201.	<i>Sphaeranthus indicus</i>	82	20	137
202.	<i>Theobroma cacao</i>	82	82	82
203.	<i>Trachyspermum ammi</i>	82	30	134
204.	<i>Shorea robusta</i>	81	81	81
205.	<i>Fritillaria cirrhosa</i>	81	70	182
206.	<i>Saraca asoca</i>	81	43	86
207.	<i>Garcinia gummi-gutta</i>	80	65	95
208.	<i>Polygonatum cirrhifolium</i>	80	57	103
209.	<i>Mucuna prurita</i>	79	63	96
210.	<i>Sarcostemma acidum</i>	79	79	79
211.	<i>Corchorus trilocularis</i>	79	64	81
212.	<i>Areca catechu</i>	78	20	93
213.	<i>Nothapodytes nimmoniana</i>	77	77	77
214.	<i>cassia fistula</i>	77	15	139
215.	<i>Punica granatum</i>	77	25	93
216.	<i>Euphorbia neriifolia</i>	76	76	76
217.	<i>Hyoscyamus niger</i>	76	21	97
218.	<i>Hedyotis pruinosa</i>	75	74	523
219.	<i>Chrysopogon zizanioides</i>	72	35	309

220.	<i>Solanum aculeatissimum</i>	72	29	115
221.	<i>Adenantha pavonina</i>	72	72	72
222.	<i>Scindapsus officinalis</i>	71	61	82
223.	<i>Myxopyrum smilacifolium</i>	71	45	97
224.	<i>Albizia lebeck</i>	70	9	105
225.	<i>Desmodium gangeticum</i>	70	44	80
226.	<i>Aquilaria malaccensis</i>	69	45	545
227.	<i>Tinospora cordifolia</i>	68	31	73
228.	<i>Tragia involucrata</i>	68	67	125
229.	<i>Holarrhena antidysenterica</i>	67	67	67
230.	<i>Kaempferia rotunda</i>	67	32	101
231.	<i>Alangium salviifolium</i>	65	64	66
232.	<i>Acorus calamus</i>	64	56	276
233.	<i>Plectranthus vettiveroides</i>	64	57	71
234.	<i>Hydnocarpus laurifolius</i>	64	64	64
235.	<i>Curcuma longa</i>	63	38	176
236.	<i>Terminalia bellericca</i>	63	63	63
237.	<i>Alpinia galanga</i>	62	60	227
238.	<i>Anethum graveolens</i>	62	47	120
239.	<i>Abies spectabilis</i>	61	50	193
240.	<i>Actiniopteris dichotoma</i>	61	31	122
241.	<i>Coriandrum sativum</i>	60	44	94
242.	<i>Brassica alba</i>	60	60	60
243.	<i>Rhaphidophora pertusa</i>	60	52	67
244.	<i>Erythrina indica</i>	59	21	97
245.	<i>Nyctanthes arbor-tristis</i>	59	59	59
246.	<i>Woodfordia fruticosa</i>	59	26	78
247.	<i>Aristolochia bracteolata</i>	59	55	135
248.	<i>Terminalia chebula</i>	58	18	82
249.	<i>Ocimum tenuiflorum</i>	58	28	104
250.	<i>Aloe vera</i>	58	6	159
251.	<i>Artemisia maritima</i>	57	57	57
252.	<i>Entada rheedii</i>	56	56	56
253.	<i>Phaseolus radiatus</i>	56	29	83
254.	<i>Oldenlandia corymbosa</i>	55	46	60
255.	<i>Zanthoxylum alatum</i>	55	55	55
256.	<i>Aegle marmelos</i>	55	36	138
257.	<i>Anisomeles malabarica</i>	55	5	104
258.	<i>Rotula aquatica</i>	54	48	100
259.	<i>Acacia sinuata</i>	54	54	54
260.	<i>Linum usitatissimum</i>	54	54	54
261.	<i>Stereospermum chelonoides</i>	53	20	67

262.	<i>Strychnos potatorum</i>	53	50	165
263.	<i>Ipomoea mauritiana</i>	52	39	66
264.	<i>Croton tiglium</i>	52	40	64
265.	<i>Salacia reticulata</i>	52	52	52
266.	<i>Aerva lanata</i>	51	30	392
267.	<i>Cyperus rotundus</i>	51	30	339
268.	<i>Actiniopteris radiata</i>	50	50	50
269.	<i>Zanthoxylum armatum</i>	50	50	50
270.	<i>Allium sativum</i>	49	39	122
271.	<i>Microstylis wallichii</i>	49	49	49
272.	<i>Citrullus colocynthis</i>	49	19	55
273.	<i>Lens culinaris</i>	49	49	49
274.	<i>Allium cepa</i>	48	17	389
275.	<i>Clitoria ternatea</i>	48	46	52
276.	<i>Piper mullesua</i>	48	32	50
277.	<i>Symplocos racemosa</i>	48	15	80
278.	<i>Gymnema sylvestre</i>	48	48	48
279.	<i>Ageratum conyzoides</i>	47	47	47
280.	<i>Sida cordifolia</i>	47	35	102
281.	<i>Ocimum tenuiflorum</i>	47	47	47
282.	<i>Lepidium sativum</i>	47	19	144
283.	<i>Prunus cerasoides</i>	47	25	165
284.	<i>Cocos nucifera</i>	46	46	58
285.	<i>Cymbopogon coloratus</i>	46	20	72
286.	<i>Mucuna pruriens</i>	46	23	55
287.	<i>Vigna mungo</i>	46	24	67
288.	<i>Citrus medica</i>	46	46	46
289.	<i>Datura stramonium</i>	45	9	81
290.	<i>Cullen corylifolium</i>	45	39	52
291.	<i>Bambusa bamboos</i>	44	44	44
292.	<i>Phoenix dactylifera</i>	44	30	58
293.	<i>Sida acuta</i>	43	43	43
294.	<i>Sterculia foetida</i>	43	40	46
295.	<i>Musa paradisiaca</i>	42	42	42
296.	<i>Premna serratifolia</i>	42	21	60
297.	<i>Centrosema pubescens</i>	42	42	42
298.	<i>Vigna trilobata</i>	42	42	42
299.	<i>Coleus aromaticus</i>	41	41	41
300.	<i>Symplocos cochinchinensis</i>	41	28	51
301.	<i>Macrotyloma uniflorum</i>	41	32	149
302.	<i>Bombax ceiba</i>	41	41	41
303.	<i>Desmodium triflorum</i>	41	10	55

304.	<i>Dysoxylum gotadhora</i>	41	17	65
305.	<i>Imperata cylindrica</i>	41	27	65
306.	<i>Phoenix pusilla</i>	41	16	45
307.	<i>Solanum melongena</i>	41	31	71
308.	<i>Caesalpinia sappan</i>	41	31	108
309.	<i>Piper attenuatum</i>	40	29	51
310.	<i>Sapindus trifoliatus</i>	40	40	40
311.	<i>Xylia xylocarpa</i>	40	40	40
312.	<i>Brassica juncea</i>	40	35	45
313.	<i>Argemone mexicana</i>	39	39	39
314.	<i>Acacia catechu</i>	39	27	344
315.	<i>Calycopteris floribunda</i>	39	39	39
316.	<i>Curcuma aromatica</i>	39	33	95
317.	<i>Ipomoea pes-tigridis</i>	38	32	44
318.	<i>Senna Alata</i>	38	38	38
319.	<i>Vernonia cinerea</i>	38	2	67
320.	<i>Spondias pinnata</i>	38	38	38
321.	<i>Vigna vexillata</i>	37	34	39
322.	<i>Cinnamomum zeylanicum</i>	36	36	36
323.	<i>Solanum virginianum</i>	36	35	40
324.	<i>Solanum torvum</i>	36	36	36
325.	<i>Sphaeranthus indicus</i>	36	36	36
326.	<i>Vigna umbellata</i>	36	31	49
327.	<i>Cajanus cajan</i>	35	35	35
328.	<i>Crepidium acuminatum</i>	35	19	51
329.	<i>Solena amplexicaulis</i>	35	32	39
330.	<i>Celtis cinnamomea</i>	35	35	35
331.	<i>Datura metel</i>	35	24	61
332.	<i>Centella asiatica</i>	34	13	56
333.	<i>Trigonella foenum-graecum</i>	34	32	88
334.	<i>Arachis hypogaea</i>	34	34	34
335.	<i>Cyathula prostrata</i>	34	34	34
336.	<i>Heliotropium indicum</i>	34	28	40
337.	<i>Ichnocarpus frutescens</i>	33	31	33
338.	<i>Capparis zeylanica</i>	33	33	33
339.	<i>Syzygium cumini</i>	33	33	48
340.	<i>Citrus limon</i>	33	7	58
341.	<i>Terminalia arjuna</i>	32	29	36
342.	<i>Oryza sativa</i>	32	18	60
343.	<i>Cyperus esculentus</i>	32	24	41
344.	<i>Ipomoea marginata</i>	32	23	42
345.	<i>Vernonia anthelmintica</i>	32	32	32

346.	<i>Merremia tridentata</i>	32	30	95
347.	<i>Butea monosperma</i>	31	28	35
348.	<i>Curcuma zedoaria</i>	31	15	1429
349.	<i>Ipomoea nil</i>	31	31	31
350.	<i>Nymphaea alba</i>	31	31	31
351.	<i>Limonia acidissima</i>	31	20	31
352.	<i>allium sativum</i>	31	31	31
353.	<i>Gossypium arboreum</i>	31	21	40
354.	<i>Holoptelea integrifolia</i>	31	11	34
355.	<i>Balanophora fungosa</i>	30	30	30
356.	<i>Stereospermum tetragonum</i>	30	28	45
357.	<i>Gossypium herbaceum</i>	30	16	44
358.	<i>Anogeissus latifolia</i>	30	30	30
359.	<i>Dactylorhiza incarnata</i>	30	30	30
360.	<i>Merremia turpethum</i>	30	30	30
361.	<i>Pinus roxburghii</i>	30	22	33
362.	<i>Vigna trilobata</i>	30	28	54
363.	<i>Hordeum vulgare</i>	30	10	159
364.	<i>Dolichos biflorus</i>	30	14	46
365.	<i>Pongamia pinnata</i>	29	19	30
366.	<i>Phlogacanthus thyrsoformis</i>	29	29	29
367.	<i>Aquilaria agallocha</i>	28	13	413
368.	<i>Ixora coccinea</i>	28	16	48
369.	<i>Phyllanthus amarus</i>	28	22	38
370.	<i>Senna alexandrina</i>	28	21	48
371.	<i>Caryota urens</i>	28	28	28
372.	<i>Datura Stramonium</i>	28	28	28
373.	<i>Parmelia perlata</i>	28	28	28
374.	<i>Vigna radiata</i>	27	21	34
375.	<i>Cymbopogon citratus</i>	27	11	44
376.	<i>Momordica dioica</i>	27	27	27
377.	<i>Terminalia bellirica</i>	27	16	38
378.	<i>Vitex negundo</i>	27	19	35
379.	<i>Semecarpus anacardium</i>	27	17	101
380.	<i>Stereospermum suaveolens</i>	27	27	27
381.	<i>Cynodon dactylon</i>	27	21	49
382.	<i>Evolvulus alsinodes</i>	27	27	27
383.	<i>Hugonia mystax</i>	27	12	29
384.	<i>Amorphophallus paeoniifolius</i>	26	8	45
385.	<i>Pothos scandens</i>	26	26	26
386.	<i>Solena heterophylla</i>	26	26	26

387.	<i>Ricinus communis</i>	26	19	47
388.	<i>Cinnamomum tamala</i>	26	15	266
389.	<i>Helicteres isora</i>	25	15	36
390.	<i>Gynandropsis gynandra</i>	25	25	25
391.	<i>Lagenaria siceraria</i>	25	25	25
392.	<i>Justicia adhatoda</i>	24	23	787
393.	<i>Achyranthes aspera</i>	24	18	50
394.	<i>Vigna sublobata</i>	24	24	24
395.	<i>Calotropis gigantea</i>	24	21	28
396.	<i>Cicer arietinum</i>	24	24	24
397.	<i>Cycas circinalis</i>	24	19	29
398.	<i>Madhuca longifolia</i>	23	16	27
399.	<i>Crateva magna</i>	23	22	128
400.	<i>Brassica nigra</i>	23	16	31
401.	<i>Desmostachya bipinnata</i>	23	16	27
402.	<i>Capparis sepriaria</i>	23	23	23
403.	<i>Azima tetraacantha</i>	23	16	30
404.	<i>Apium graveolens</i>	23	23	23
405.	<i>Spandlas pinnate</i>	23	23	23
406.	<i>Moringa oleifera</i>	23	18	69
407.	<i>Biophytum sensitivum</i>	22	7	38
408.	<i>Chonemorpha fragrans</i>	22	20	40
409.	<i>Paspalum scrobiculatum</i>	22	22	22
410.	<i>Alstonia scholaris</i>	22	16	29
411.	<i>Solanum rudepannum</i>	22	22	22
412.	<i>Saccharum officinarum</i>	22	14	32
413.	<i>Saccharum spontaneum</i>	21	16	52
414.	<i>Ficus macrocarpa</i>	21	21	21
415.	<i>Saccharum bengalense</i>	21	18	25
416.	<i>Saccharum arundinaceum</i>	21	15	27
417.	<i>Justicia beddomei</i>	21	21	21
418.	<i>Ocimum gratissimum</i>	21	10	31
419.	<i>Eclipta alba</i>	21	5	36
420.	<i>Echinochloa esculenta</i>	20	20	20
421.	<i>Raphanus sativus</i>	20	20	20
422.	<i>Benincasa hispida</i>	20	8	32
423.	<i>Micrococca mercurialis</i>	20	20	20
424.	<i>Tinospora crispa</i>	20	20	20
425.	<i>Ziziphus mauritiana</i>	20	20	30
426.	<i>Piper betle</i>	20	10	94
427.	<i>Cucumis sativus</i>	20	20	20
428.	<i>Artemisia nilagirica</i>	20	20	20

429.	<i>Nicotiana tabacum</i>	20	20	20
430.	<i>Acacia nilotica</i>	19	17	78
431.	<i>Emilia sonchifolia</i>	19	19	20
432.	<i>Pterocarpus marsupium</i>	19	14	419
433.	<i>Mangifera indica</i>	19	16	22
434.	<i>Erythrina variegata</i>	19	16	23
435.	<i>Panicum sumatrense</i>	19	19	19
436.	<i>Monochoria vaginalis</i>	18	10	47
437.	<i>Panicum miliaceum</i>	18	18	18
438.	<i>Plectranthus amboinicus</i>	18	18	18
439.	<i>Artemisia vulgaris</i>	16	16	16
440.	<i>Bauhinia purpurea</i>	16	16	16
441.	<i>Cassia angustifolia</i>	16	16	16
442.	<i>Enicostema axillare</i>	16	16	16
443.	<i>Inula Racemosa</i>	16	16	16
444.	<i>Strychnos nux-vomica</i>	16	16	16
445.	<i>Mukia maderaspatana</i>	16	10	22
446.	<i>Elaeocarpus sphaericus</i>	16	16	16
447.	<i>Cleome viscosa</i>	16	16	16
448.	<i>Solanum trilobatum</i>	15	15	15
449.	<i>Tectona grandis</i>	15	15	15
450.	<i>Musa sapientum</i>	15	15	15
451.	<i>Evolvulus alsinoides</i>	15	9	20
452.	<i>Vigna Mungo</i>	14	8	20
453.	<i>Borassus flabellifer</i>	14	14	14
454.	<i>Piper cubeba</i>	14	14	14
455.	<i>Nerium indicum</i>	14	14	14
456.	<i>Triticum aestivum</i>	14	10	17
457.	<i>Phaseolus aureus</i>	14	14	14
458.	<i>Setaria italica</i>	13	7	19
459.	<i>Musaparadisiaca</i>	13	13	13
460.	<i>Marsdenia tenacissima</i>	13	0	26
461.	<i>Cissus quadrangularis</i>	13	12	13
462.	<i>Lawsonia inermis</i>	13	13	13
463.	<i>Strychnus nuxvomica</i>	13	13	13
464.	<i>Spermacoce hispida</i>	12	8	48
465.	<i>Calotropis procera</i>	12	12	12
466.	<i>Portulaca oleracea</i>	12	4	20
467.	<i>Solanum violaceum</i>	12	6	18
468.	<i>Naravelia zeylanica</i>	11	11	11
469.	<i>Tamarindus indica</i>	11	10	54
470.	<i>Vinca roseae</i>	11	11	11

471.	<i>Physalis minima</i>	11	10	19
472.	<i>Aporosa cardiosperma</i>	11	11	11
473.	<i>Strobilanthes ciliata</i>	11	11	11
474.	<i>Calamus rotang</i>	10	10	10
475.	<i>Murraya koenigii</i>	10	10	34
476.	<i>Raphanus raphanistrum</i>	10	9	11
477.	<i>Hygroryza aristata</i>	10	10	10
478.	<i>Senna sophora</i>	10	10	10
479.	<i>Coccinia grandis</i>	10	8	12
480.	<i>Alternanthera sessilis</i>	10	8	12
481.	<i>Ocimum basilicum</i>	10	10	10
482.	<i>Panicum sumatrense</i>	9	8	11
483.	<i>Cissampelos pareira</i>	9	9	9
484.	<i>Pajanelia longifolia</i>	9	2	17
485.	<i>Phyllanthus nodiflora</i>	9	6	12
486.	<i>Phyllanthus niruri</i>	9	9	9
487.	<i>Thespesia populnea</i>	9	9	9
488.	<i>Tephrosia purpurea</i>	9	9	9
489.	<i>Elephantopus scaber</i>	9	9	9
490.	<i>Wedelia chinensis</i>	8	8	8
491.	<i>Brassica oleracea</i>	8	1	16
492.	<i>Plumeria rubra</i>	8	8	8
493.	<i>Pueraria tuberosa</i>	8	8	8
494.	<i>Salmalia malabarica</i>	8	8	8
495.	<i>Sorghum bicolor</i>	8	8	8
496.	<i>Citrus aurantiifolia</i>	8	8	8
497.	<i>Raphanus raphanistrum</i> <i>subsp sativus</i>	8	8	8
498.	<i>Clerodendrum phlomidis</i>	7	7	7
499.	<i>Eleusine coracana</i>	7	7	7
500.	<i>Ficus arnottiana</i>	7	7	7
501.	<i>Pergularia daemia</i>	7	6	44
502.	<i>Vigna unguiculata</i>	7	7	7
503.	<i>Zea mays</i>	7	7	7
504.	<i>Euphorbia thymifolia</i>	7	7	7
505.	<i>Cleome gynandra</i>	7	3	11
506.	<i>Bixa orellana</i>	6	6	6
507.	<i>Canthium coromandelicum</i>	6	6	6
508.	<i>Nervelia zeylanica</i>	6	6	6
509.	<i>Schrebera swietenoides</i>	6	6	6
510.	<i>Justicia gendarussa</i>	6	6	6
511.	<i>Sida spinosa</i>	6	6	6

512.	<i>Acalypha fruticosa</i>	6	6	6
513.	<i>Allophylus serratus</i>	6	6	6
514.	<i>Catharanthus roseus</i>	6	6	6
515.	<i>Clerodendrum infortunatum</i>	6	6	6
516.	<i>Cuscuta reflexa</i>	6	6	6
517.	<i>Helianthus annuus</i>	6	6	6
518.	<i>Microstachys chamaelea</i>	6	6	6
519.	<i>Morinda coreia</i>	6	6	6
520.	<i>Mussaenda frondosa</i>	6	6	6
521.	<i>Sansevieria roxburghiana</i>	6	6	6
522.	<i>Strobilanthes heyneana</i>	6	6	6
523.	<i>Tabernaemontana alternifolia</i>	6	6	6
524.	<i>Wrightia tinctoria</i>	6	4	9
525.	<i>Solanum ferox</i>	6	6	6
526.	<i>Mimosa pudica</i>	6	4	42
527.	<i>Capsicum annuum</i>	6	6	6
528.	<i>Desmodium oojeinense</i>	6	6	6
529.	<i>Amaranthus spinosus</i>	6	6	6
530.	<i>Commiphora caudata</i>	5	5	5
531.	<i>Ocimum kilimandscharicum</i>	5	5	5
532.	<i>Pennisetum glaucum</i>	5	5	5
533.	<i>Strophanthus wightianus</i>	5	5	5
534.	<i>Typha elephantina</i>	5	5	5
535.	<i>Abutilon indicum</i>	5	5	5
536.	<i>Ailanthus excelsa</i>	5	5	5
537.	<i>Solanum americanum</i>	5	5	5
538.	<i>Berberis aristata</i>	5	5	5
539.	<i>Dendrophthoe falcata</i>	5	5	5
540.	<i>Ferula narthex</i>	5	5	5
541.	<i>Grewia asiatica</i>	5	5	5
542.	<i>Clerodendrum inerme</i>	5	5	5
543.	<i>Glycosmis pentaphylla</i>	5	5	5
544.	<i>Cassia occidentalis</i>	5	5	5
545.	<i>Flacourtia indica</i>	5	5	5
546.	<i>Toddalia asiatica</i>	5	5	5
547.	<i>Pistia stratiotes</i>	5	5	5
548.	<i>Coldenia procumbens</i>	4	4	4
549.	<i>Hibiscus furcatus</i>	4	4	4
550.	<i>Pandanus odoratissimus</i>	4	4	4
551.	<i>Polygonum alatum</i>	4	4	4
552.	<i>Tridax procumbens</i>	4	4	4

553.	<i>Datura fastuosa</i>	4	4	4
554.	<i>Cipadessa baccifera</i>	4	4	4
555.	<i>Marsilea quadrifolia</i>	4	4	4
556.	<i>Mastixia pentandra</i>	4	4	4
557.	<i>Taxus wallichiana</i>	4	4	4
558.	<i>Euphorbia antiquorum</i>	4	4	4
559.	<i>Ocimum sanctum</i>	4	4	4
560.	<i>Bambusa arundinacea</i>	4	4	4
561.	<i>Cyanthillium cinereum</i>	4	4	4
562.	<i>Lagerstroemia speciosa</i>	4	4	4
563.	<i>Mimosa rubicaulis</i>	4	4	4
564.	<i>Sesbania grandiflora</i>	4	4	4
565.	<i>Ipomoea obscura</i>	4	4	4
566.	<i>Jasminum sambac</i>	4	4	4
567.	<i>Artocarpus heterophyllus</i>	3	3	3
568.	<i>Vitex trifolia</i>	3	3	3
569.	<i>Dalbergia sissoo</i>	2	1	4
570.	<i>Acalypha indica</i>	2	2	2
571.	<i>Jasminum officinale</i>	2	2	2
572.	<i>Lannea coromandelica</i>	2	0	3
573.	<i>Juniperus communis</i>	0	0	0
574.	<i>Leptadenia reticulata</i>	0	0	0
575.	<i>Nervilia concolor</i>	0	0	0
576.	<i>Saraca indica</i>	0	0	0
577.	<i>Scoparia dulcis</i>	0	0	0
578.	<i>Vitex agnus-castus</i>	0	0	0

Table 6.1.6 Parts of medicinal plants used in Ayush Industries

1. Roots (100%)

Sl. No.	Scientific name	Threat status	Sl. No.	Scientific name	Threat status
1	<i>Abutilon indicum</i>		39	<i>Merremia turpethum</i>	EN
2	<i>Aconitum palmatum</i>	EN	40	<i>Microstylis wallichii</i>	
3	<i>Aerva lanata</i>		41	<i>Monochoria hastata</i>	
4	<i>Alangium salviifolium</i>	LC	42	<i>Neolamarckia cadamba</i>	
5	<i>Alpinia officinarum</i>		43	<i>Ocimum kilimandscharicum</i>	
6	<i>Anogeissus latifolia</i>		44	<i>Pandanus odoratissimus</i>	
7	<i>Bauhinia purpurea</i>	LC	45	<i>Piper mullesua</i>	

8	<i>Bergenia pacumbis</i>		46	<i>Plectranthus hadiensis</i>	
9	<i>Bridelia stipularis</i>	LC	47	<i>Plumbago auriculata</i>	
10	<i>Caesalpinia mimosoides</i>		48	<i>Plumbago indica</i>	
11	<i>Calotropis procera</i>		49	<i>Plumeria rubra</i>	
12	<i>Capparis decidua</i>		50	<i>Polygonatum verticillatum</i>	
13	<i>Capparis sepiaria</i>		51	<i>Pueraria tuberosa</i>	
14	<i>Capparis spinosa</i>		52	<i>Raphanus raphanistrum</i>	
15	<i>Capparis zeylanica</i>		53	<i>Raphanus raphanistrum subsp sativus</i>	
16	<i>Centrosema pubescens</i>		54	<i>Raphanus sativus</i>	
17	<i>Clerodendrum phlomidis</i>		55	<i>Roscoea purpurea</i>	
18	<i>Commiphora caudata</i>		56	<i>Saccharum bengalens</i>	
19	<i>Coptis teeta</i>	EN	57	<i>Saccharum arundinaceum</i>	
20	<i>Curcuma zedoaria</i>		58	<i>Salacia oblonga</i>	VU
21	<i>Daucus carota</i>		59	<i>Salacia reticulata</i>	
22	<i>Desmodium oojeinense</i>		60	<i>Saraca asoca</i>	EN
23	<i>Dichrostachys cinerea</i>		61	<i>Schleichera oleosa</i>	
24	<i>Elephantopus scaber</i>		62	<i>Senna occidentalis</i>	
25	<i>Euphorbia ligularia</i>		63	<i>Shorea robusta</i>	
26	<i>Ficus hispida</i>	LC	64	<i>Sida spinosa</i>	
27	<i>Flacourtia indica</i>		65	<i>Smilax zeylanica</i>	
28	<i>Grewia asiatica</i>		66	<i>Solanum ferox</i>	
29	<i>Gynandropsis gynandra</i>		67	<i>Solanum indicum</i>	
30	<i>Habenaria intermedia</i>		68	<i>Solanum rudepannum</i>	
31	<i>Hygroryza aristata</i>		69	<i>Solena heterophylla</i>	
32	<i>Ipomoea obscura</i>		70	<i>Soymida febrifuga</i>	
33	<i>Jasminum multiflorum</i>	LC	71	<i>Stereospermum suaveolens</i>	
34	<i>Juniperus communis</i>		72	<i>Strobilanthes ciliata</i>	
35	<i>Leptadenia reticulata</i>		73	<i>Tinospora crispa</i>	
36	<i>Litsea cubeba</i>		74	<i>Uraria picta</i>	
37	<i>Marsdenia tenacissima</i>		75	<i>Valeriana jatamansi</i>	VU
38	<i>Mastixia pentandra</i>		76	<i>Vigna trilobata</i>	
			77	<i>Vigna sublobata</i>	

2. Seeds/fruits (100%)

Sl. No.	Scientific name	Sl. No.	Scientific name
1	<i>Apium graveolens</i>	40	<i>Ipomoea</i>
2	<i>Arachis hypogaea</i>	41	<i>Ipomoea turbinata</i>
3	<i>Artemisia maritima</i>	42	<i>Juglans regia</i>
4	<i>Balanophora fungosa</i>	43	<i>Linum usitatissimum</i>
5	<i>Bambusa bamboos</i>	44	<i>Macrotyloma uniflorum</i>
6	<i>Barringtonia acutangula</i>	45	<i>Malaxis acuminata</i>
7	<i>Benincasa hispida</i>	46	<i>Momordica dioica</i>
8	<i>Brassica alba</i>	47	<i>Nigella sativa</i>
9	<i>Brassica juncea</i>	48	<i>Panicum sumatrense</i>
10	<i>Brassica nigra</i>	49	<i>Panicum miliaceum</i>
11	<i>Brassica oleracea</i>	50	<i>Papaver somniferum</i>
12	<i>Capsicum annum</i>	51	<i>Pennisetum glaucum</i>
13	<i>Carum carvi</i>	52	<i>Phaseolus aureus</i>
14	<i>Cassia occidentalis</i>	53	<i>Phaseolus radiatus</i>
15	<i>Catunaregam spinosa</i>	54	<i>Phoenix dactylifera</i>
16	<i>Cicer arietinum</i>	55	<i>Piper nigrum</i>
17	<i>Citrus aurantiifolia</i>	56	<i>piper nigrum</i>
18	<i>Citrus limon</i>	57	<i>Plantago ovata</i>
19	<i>Citrus medica</i>	58	<i>Prunus domestica</i>
20	<i>Coffea arabica</i>	59	<i>Psidium guajava</i>
21	<i>Coriandrum sativum</i>	60	<i>Randia dumetorum</i>
22	<i>Cucumis sativus</i>	61	<i>Rhaphidophora pertusa</i>
23	<i>Cuminum cyminum</i>	62	<i>Sapindus trifoliatus</i>
24	<i>Dactylorhiza incarnata</i>	63	<i>Senna sophera</i>
25	<i>Dolichos biflorus</i>	64	<i>Solanum torvum</i>
26	<i>Echinochloa esculenta</i>	65	<i>Sorghum bicolor</i>
27	<i>Elaeocarpus serratus</i>	66	<i>Terminalia bellericca</i>
28	<i>Elaeocarpus sphaericus</i>	67	<i>Terminalia catappa</i>
29	<i>Eleusine coracana</i>		<i>Trachyspermum roxburghianum</i>
30	<i>Embelia ribes</i>	68	<i>Trachyspermum ammi</i>
31	<i>Entada rheedii</i>	69	<i>Trapa natans</i>
32	<i>Feronia limonia</i>	70	<i>Trigonella foenum-graecum</i>
33	<i>Foeniculum vulgare</i>	71	<i>Vernonia anthelmintica</i>
34	<i>Fumaria indica</i>	72	<i>Vigna mungo</i>
35	<i>Gossypium arboreum</i>	73	<i>Vigna unguiculata</i>
36	<i>Gossypium herbaceum</i>	74	<i>Vitis vinifera</i>
37	<i>Helianthus annuus</i>	75	<i>Zanthoxylum alatum</i>
38	<i>Hydnocarpus laurifolius</i>	76	<i>Zea mays</i>
39	<i>Hyoscyamus niger</i>	77	<i>Ziziphus mauritiana</i>

3. Stem/Wood/Bark (100%)

Sl. No.	Scientific name	Sl. No.	Scientific name
1	<i>Acacia catechu</i>	17	<i>Dalbergia sissoo</i>
2	<i>Adenanthera pavonina</i>	18	<i>Dysoxylum gotadhora</i>
3	<i>Ailanthus excelsa</i>	19	<i>Dysoxylum malabaricum</i>
4	<i>Aporosa cardiosperma</i>	20	<i>Ficus arnottiana</i>
5	<i>Aquilaria agallocha</i>	21	<i>Lagerstroemia speciosa</i>
6	<i>Berberis aristata</i>	22	<i>Lanea coromandelica</i>
7	<i>Bombax ceiba</i>	23	<i>Prunus cerasoides</i>
8	<i>Caesalpinia sappan</i>	24	<i>Pterocarpus santalinus</i>
9	<i>Canthium coromandelicum</i>	25	<i>Salmalia malabarica</i>
10	<i>Cedrus deodara</i>	26	<i>Saraca indica</i>
11	<i>Celtis cinnamomea</i>	27	<i>Schrebera swietenoides</i>
12	<i>Celtis philippensis</i>	28	<i>Streblus asper</i>
13	<i>Celtis timorensis</i>	29	<i>Symplocos racemosa</i>
14	<i>Cinnamomum malabatrum</i>	30	<i>Terminalia arjuna</i>
15	<i>Cinnamomum verum</i>	31	<i>Ventilago maderaspatana</i>
16	<i>Cinnamomum zeylanicum</i>	32	<i>xylia xylocarpa</i>

4. Flowers (100%)

Sl.No.	Scientific name
1	<i>Fumaria parviflora</i>
2	<i>Artemisia vulgaris</i>
3	<i>Bacopa monnieri</i>
4	<i>Callicarpa macrophylla</i>
5	<i>Calophyllum inophyllum</i>
6	<i>Cinnamomum cassia</i>
7	<i>Lavandula stoechas</i>
8	<i>Tabernaemontana divaricata</i>
9	<i>Woodfordia fruticosa</i>

5. Leaf (100%)

Sl.No.	Scientific name	Sl.No.	Scientific name
1	<i>Acalypha fruticosa</i>	19	<i>Morinda coreia</i>
2	<i>Allophylus serratus</i>	20	<i>Murraya koenigii</i>
3	<i>Aloe vera</i>	21	<i>Mussaenda frondosa</i>

4	<i>Artocarpus heterophyllus</i>	22	<i>Nervilia concolor</i>
5	<i>Bambusa arundinacea</i>	23	<i>Nicotiana tabacum</i>
6	<i>Bixa orellana</i>	24	<i>Ocimum sanctum</i>
7	<i>Calamus rotang</i>	25	<i>Pogostemon heyneanus</i>
8	<i>Cassia angustifolia</i>	26	<i>Sansevieria roxburghiana</i>
9	<i>Clerodendrum inerme</i>	27	<i>Senna Alata</i>
10	<i>Clerodendrum infortunatum</i>	28	<i>Sesbania grandiflora</i>
11	<i>Coleus aromaticus</i>	29	<i>Spandlas pinnate</i>
12	<i>Datura fastuosa</i>	30	<i>Strobilanthes heyneana</i>
13	<i>Datura stramonium</i>	31	<i>Strychnos axillaris</i>
14	<i>Euphorbia neriifolia</i>	32	<i>Tabernaemontana alternifolia</i>
15	<i>Euphorbia trigona</i>	33	<i>Taxus wallichiana</i>
16	<i>Justicia gendarussa</i>	34	<i>Vitex trifolia</i>
17	<i>Lawsonia inermis</i>	35	<i>Wrightia tinctoria</i>
18	<i>Mimosa rubicaulis</i>		

6. Whole part (100%)

Sl. No.	Scientific name	RET status	Sl. No.	Scientific name	RET status
1	<i>Acalypha indica</i>		32	<i>Merremia emarginata</i>	LC
2	<i>Actiniopteris radiata</i>		33	<i>Micrococca mercurialis</i>	
3	<i>Alternanthera sessilis</i>		34	<i>Naravelia zeylanica</i>	
4	<i>Amaranthus spinosus</i>		35	<i>Nervelia zeylanica</i>	
5	<i>Biophytum sensitivum</i>		36	<i>Nothapodytes nimmoniana</i>	
6	<i>Brassica rapa</i>		37	<i>Ocimum tenuiflorum</i>	
7	<i>Catharanthus roseus</i>		38	<i>Ocimum kilimandscharicum</i>	
8	<i>Centella asiatica</i>	LC	39	<i>Oldenlandia corymbosa</i>	
9	<i>Chenopodium album</i>		40	<i>Orthosiphon glabratus</i>	
10	<i>Cipadessa baccifera</i>		41	<i>Osmanthus fragrans</i>	
11	<i>Cleome viscosa</i>		42	<i>Paederia foetida</i>	
12	<i>Coldenia procumbens</i>		43	<i>Phlogacanthus thyriformis</i>	
13	<i>Cuscuta reflexa</i>		44	<i>Phyla nodiflora</i>	
14	<i>Datura stramonium</i>		45	<i>Phyllanthus niruri</i>	
15	<i>Dendrophthoe falcata</i>		46	<i>Physalis minima</i>	LC

16	<i>Eclipta alba</i>		47	<i>Pistia stratiotes</i>	
17	<i>Enicostema axillare</i>		48	<i>Polygonum alatum</i>	
18	<i>Euphorbia thymifolia</i>		49	<i>Schizachyrium exile</i>	
19	<i>Fagonia cretica</i>		50	<i>Scoparia dulcis</i>	
20	<i>Ferula narthex</i>		51	<i>Solanum aculeatissimum</i>	
21	<i>Ficus lacor</i>		52	<i>Solanum americanum</i>	
22	<i>Grewia tenax</i>		53	<i>Solanum trilobatum</i>	
23	<i>Hedyotis corymbosa</i>		54	<i>Swertia chirata</i>	
24	<i>Hedyotis pruinosa</i>		55	<i>Toddalia asiatica</i>	
25	<i>Hibiscus furcatus</i>		56	<i>Tridax procumbens</i>	
26	<i>Ipomoea pes-caprae</i>		57	<i>Typha elephantina</i>	
27	<i>Ipomoea pes-tigridis</i>		58	<i>Urena procumbens</i>	
28	<i>Ipomoea tridentata</i>		59	<i>Vernonia cinerea</i>	
29	<i>Jasminum sambac</i>		60	<i>Vinca roseae</i>	
30	<i>Kyllinga nemoralis</i>		61	<i>Wedelia chinensis</i>	
31	<i>Marsilea quadrifolia</i>		62	<i>Zanthoxylum armatum</i>	

7. Rhizomes (100%)

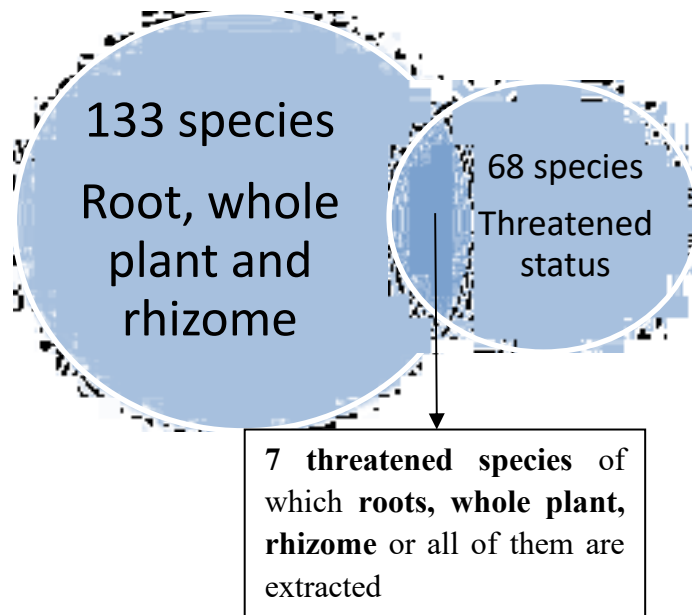
Sl. No.	Scientific name	RET status
1	<i>Cheilocostus speciosus</i>	
2	<i>Chlorophytum tuberosum</i>	
3	<i>Curcuma zedoaria</i>	
4	<i>Nervilia crocifformis</i>	NT
5	<i>Nymphaea nouchali</i>	EN
6	<i>Strophanthus wightianus</i>	
7	<i>Zingiber officinale</i>	

Threatened species of which roots, whole plant, rhizome or all of them are extracted

Sl No.	Botanical Name	Part used	Threat status

1.	<i>Aconitum palmatum</i>	Root	EN
2.	<i>Coptis teeta</i>	Root	EN
3.	<i>Merremia turpethum</i>	Root	EN
4.	<i>Salacia oblonga</i>	Root	VU
5.	<i>Saraca asoca</i>	Root	EN
6.	<i>Valeriana jatamansi</i>	Root	VU
7.	<i>Nymphaea nouchali</i>	Rhizome	EN

Figure 6.1.4: Convergence of threatened medicinal plant species with root, whole plant and rhizome usage



- It can be observed from the analysis of RET (Rare, Endangered and Threatened) status that 7 species (Fig. 6.1.4) are in higher threat of extinction or extirpation due to their inclusion under threatened status as well as usage of their roots, rhizomes or whole plants which lead to their complete destruction during extraction.



6.1.3 VALUE ADDED PRODUCTS USED IN AYUSH INDUSTRY

Consolidated of value added products is prepared based on the data collected from the 121 Ayurvedic manufacturing units. Scientific/ common name, parts used, quantity in Kg with minimum, maximum and average price of each items was worked out and

Items used above 1000 kg are Aloe vera (1,990.00), Asphalt shilajit (1,210.00), Bhasmam (1,600.00), Cinnabar (5,410.90), Cinnamomum camphora (1,189.33), Citrus lemon(1,538.46), Commiphora wightii (1,120.00), Coral (4,000.00), Elettaria cardamomum (4,750.00), Eucalyptus citriodora (1,500.00), Gorochanam (4,010.00), Loha (2,102.00), Mentha piperita (2,425.00), Mucuna pruriens (2,654.00), Panchavampazhukka (1,800.00), Racinus communis (5,634.25), Saccharum officinarum (30,163.16), Sea sponge (1,202.60), Sesamum indicum (64,289.25), Shorea robusta (5,622.67), Sida cordifolia (1,113.60), Sugar candy (1,500.37), Syzygium aromaticum (3,500.00), Withania somnifera (2,614.40)

projected.

Table 6.1.7 Plant products used in Ayush idustry

Sl. No.	Scientific name	Parts used	Quantity (kg)	Minimum price	Maximum price	Average price
1	<i>Acacia nilotica</i>	Resin/Gum	14.20	80	100	88.00
2	<i>Aloe vera</i>		502.75	78	3,900	1,990.00
3	<i>Aloe vera</i>	Dried juice	5.67	250	280	266.67
4	<i>Aloe vera</i>	Semi processed product	2,147.73	0	2,210	538.76
5	<i>Anjanakkallu</i>	As such	8.73	200	245	211.25
6	<i>Asphalt shilajit</i>	Rock Exudate	223.80	1,200	1,225	1,210.00
7	<i>Asphaltum</i>		136.00	55	55	55.00
8	<i>Asphaltum punjabianum</i>		33.60	1,200	1,200	1,200.00

9	<i>Azadirachta indica</i>	Oil	15,301.40	75	180	108.72
10	<i>Bambusa bambos</i>	Resin/Gum	350.00	200	200	200.00
11	<i>Bee wax</i>	Wax	7,839.01	210	243	227.35
12	<i>Bhasmam</i>		0.00	1,600	1,600	1,600.00
13	<i>Bombax ceiba</i>	Latex,Resins	37.38	190	235	218.75
14	<i>Bombax ceiba</i>	Resin /Gum	53.07	120	285	166.34
15	<i>Borax</i>		72.00	56	80	68.00
16	<i>Bos taurus</i>		3,086.00	433	433	432.54
17	<i>Boswelia serrata</i>	Resin /Gum	3,017.07	170	1,845	309.95
18	<i>Boswelia serrata</i>	synthetic products	124.00	78	78	78.00
19	<i>Brassica juncea</i>	Oil	12,778.20	116	252	165.70
20	<i>Brassica nigra</i>	Oil	992.95	210	1,390	495.29
21	<i>Buffallo bone</i>		45.00	75	75	75.00
22	<i>Butter</i>		45.00	370	420	395.00
23	<i>Canarium strictum</i>	Resin/Gum	504.90	140	380	295.25
24	<i>Choodan karpooram</i>	Synthetic products	15.00	400	960	684.00
25	<i>Cinnabar</i>	Powder	1,071.70	2,230	8,000	5,410.90
26	<i>Cinnaber</i>	Powder	596.00	5,200	8,000	6,140.00
27	<i>Cinnamomum ca mphora</i>	Exudate	14.33	550	750	633.33
28	<i>Cinnamomum camphora</i>	Synthetic product	1,697.66	400	2,000	1,189.33
29	<i>Citrus lemon</i>	Oil	58.50	1,538	1,538	1,538.46
30	<i>Coccus lacca</i>	Lac	50.00	367	367	367.00
31	<i>Cocos nucifera</i>	Coconut Milk	21,921.23	55	80	72.00
32	<i>Cocos nucifera</i>	Oil	345,640.10	193	219	211.00
33	<i>Cod liver oil</i>	Oil	200.00	206	206	205.88
34	<i>Commiphora wightii</i>	Resin/Gum	2,190.23	710	1,350	1,120.00
35	<i>Commiphora myrrha</i>	Resin/Gum	683.00	20	1,600	207.49
36	<i>Coral</i>	Coral	100.00	4,000	4,000	4,000.00
37	<i>Cow Milk</i>	Milk	63,224.20	35	45	39.82
38	<i>Cow's urine</i>		130.51	9	35	15.83
39	<i>Crocus sativus</i>	Style & Stigma	0.15	180	200	192.00
40	<i>Curd</i>		3,600.07	26	65	38.22
41	<i>Cypraea Moneta</i>		4.00	60	60	60.00

42	<i>Elettaria cardamomum</i>	Oil	10.00	4,750	4,750	4,750.00
43	<i>Eucalyptus citriodora</i>	Oil	45.60	1,500	1,500	1,500.00
44	<i>Ferrous sulphate</i>		10.72	60	250	153.33
45	<i>Ferula asafoetida</i>	As such	3.17	30	40	33.33
46	<i>Ferula asafoetida</i>	Magnetite	4.00	30	40	33.33
47	<i>Ferula asafoetida</i>	Resin/Gum	7,251.04	350	3,000	487.97
48	<i>Ficus religiosa, Ficus racemose, Ficus benghalensis, Ficus microcarpa</i>	Bark	94.40	15	90	57.81
49	<i>Galana Aratha</i>		1.20	400	400	400.00
50	<i>Ghee</i>	Clarified butter	8,782.77	320	600	380.73
51	<i>Gingely oil</i>	Oil	30,000.00	129	129	129.00
52	<i>Goat flesh</i>		324.00	440	550	463.33
53	<i>Goat Milk</i>	Milk	609.47	150	300	196.78
54	<i>Goat urine</i>		0.00	35	50	42.50
55	<i>Gorochanam</i>		0.18	550	6,000	4,010.00
56	<i>Govudhanti bhasmam</i>		149.00	240	250	245.00
57	<i>Gum of Aloe vera</i>	semiprocessed products	200.00	170	170	170.00
58	<i>Hardwickia pinnata</i>	Resin/Gum	2.00	350	350	350.00
59	<i>Honey(Big)</i>		274,967.68	155	1,200	273.45
60	<i>Hydnocarpus pentandrus</i>	Oil	697.66	500	1,300	953.72
61	<i>Iron powder</i>		25.67	30	1,063	374.89
62	<i>Kadal nura</i>		98.00	50	120	77.78
63	<i>Kanmadham</i>		13.67	700	800	750.00
64	<i>Kannaram</i>		3.67	25	25	25.00
65	<i>Kannaram</i>	Powder	180.80	148	155	152.00
66	<i>Kaolinum</i>		150.00	25	50	37.50
67	<i>Karuthuppu</i>		22.00	60	60	60.00
68	<i>Laccifer laca</i>	Lac	9,598.42	200	699	286.18
69	<i>Laccifer laca</i>	Resin/Gum	56.33	200	480	363.33
70	<i>Lobatus gigas</i>	Conch shell	1,455.00	24	24	24.00
71	<i>Loha</i>	Powder	16.20	255	2,580	2,102.00

72	<i>Maranta arundinacea</i>	Root	363.53	75	5,130	398.25
73	<i>Mentha piperita</i>	Synthetic products	1,013.71	2	11	5.71
74	<i>Mentha piperita</i>	Synthetic products	1,314.60	2,450	2,450	2,425.00
75	<i>Minerala pitch</i>	As such	200.00	196	196	196.00
76	<i>Mucuna pruriens</i>	Seed extarct	1.00	1,470	3,700	2,654.00
77	<i>Mulamkarpooram</i>	As it is	5.50	110	130	122.67
78	<i>Muthuchippy</i>		0.00	150	150	150.00
79	<i>Neem oil</i>	As such	350.00	147	147	147.00
80	<i>Nelumbium speciosum</i>		36.00	180	180	180.00
81	<i>Oryza sativa</i>	Puffed rice	55.00	40	100	56.72
82	<i>Palm Leaf</i>		12.80	170	275	231.00
83	<i>Panchavampazhu kka</i>		32.00	1,800	1,800	1,800.00
84	<i>Picroorhiza scrophulariflora</i>		9.00	240	530	383.33
85	<i>Picroorhiza scrophulariflora</i>	Exudate	2.67	700	800	750.00
86	<i>Pinus roxburghii</i>	Resin /Gum	143.93	45	80	64.05
87	<i>Plumbi sulphuratum</i>	As such	20.00	280	280	280.00
88	<i>Pongamiapinnata</i>	Oil	45.00	220	220	220.00
89	<i>ponkaram</i>		33.40	65	80	74.00
90	<i>Potassium carbonate</i>		327.26	0	800	240.29
91	<i>Pravala Bhasmam</i>		11,507.57	34	86	50.42
92	<i>Pulthailam</i>		1,523.67	60	142	87.50
93	<i>Puranakittam</i>		10.00	50	50	50.00
94	<i>Racinus communis</i>	Oil	64,463.76	0	47,542	5,634.25
95	<i>Red Ochre</i>	Powder	61.00	20	40	29.30
96	<i>Red Orche</i>	Powder	111.33	30	34	32.67
97	<i>Rock Salt</i>		1,236.00	11	76	47.20
98	<i>Rosa damascena</i>	Essential Oil	1,260.00	80	80	79.97
99	<i>Saccharomyces cerevisiae</i>		85.00	268	268	267.86
100	<i>Saccharum officinarum</i>	As such	945,657.32	0	978,008	30,163.16

101	<i>Saccharum officinarum</i>	Stem extract	49,283.20	25	370	51.34
102	<i>Sanku</i>		12.50	45	50	47.50
103	<i>Sea piae</i>		2.83	80	90	83.33
104	<i>Sea Salt</i>	Powder	4.40	10	19	12.80
105	<i>Sea sponge</i>	Nura	19.20	1,175	1,228	1,202.60
106	<i>Seasamum indica</i>	Oil	1,086.00	89	96	92.40
107	<i>Sesamum indicum</i>	Oil	104,565.36	0	618,630	64,289.25
108	<i>Shorea robusta</i>	Powder	1,691.50	580	8,000	5,622.67
109	<i>Shorea robusta</i>	Resin /Gum	3,780.89	210	600	254.32
110	<i>Sida cordifolia</i>	Extract	1.00	918	1,920	1,113.60
111	<i>Smilax china</i>		3.00	100	110	103.33
112	<i>Sodium chloride</i>	As such	8.00	10	10	10.00
113	<i>Spadika bhasmam</i>		47.20	510	550	536.00
114	<i>Styrax benzoin</i>	Resin/Gum	32.00	280	280	280.00
115	<i>Sugar candy</i>		4,027.83	28	70	1,500.37
116	<i>Sulphur</i>	Purified form	55.40	0	130	45.00
117	<i>Syzygium aromaticum</i>	Oil	10.00	3,500	3,500	3,500.00
118	<i>Theobroma cacao</i>	powder	4.00	411	411	410.59
119	<i>Thuvarchilakkaram</i>	As such	28.00	58	80	68.25
120	<i>Thymus vulgaris</i>	Synthetic products	217.60	900	1,010	955.00
121	<i>Trachys permum coxburghia</i>		4.00	320	320	320.00
122	<i>Vanilla planifolia</i>		434.31	3	12	6.50
123	<i>Vaslin</i>		18.40	240	270	258.00
124	<i>Vateria indica</i>	Resin / Gum	1,309.61	50	1,200	309.27
125	<i>Vateria indicum</i>	Resin / Gum	1,927.00	285	285	285.00
126	<i>Vateria indica</i>	Resin / Gum	1,388.83	0	1,400	199.79
127	<i>Vateria indicum</i>	Resin / Gum	1,392.00	300	400	320.00
128	<i>Vilayuppu</i>		9.00	100	100	100.00
129	<i>Withania somnifera</i>	Extract	1.00	1,200	4,300	2,614.40
130	<i>Yellow bee wax</i>	As such	45.00	300	300	300.00
131	<i>Zea mays</i>	Seed powder	39,700.00	34	34	34.00

6.1.4. MAJOR PLAYERS IN AYURVEDIC SECTOR IN KERALA

1. Ousadhi, Kerala

- A GMP and ISO 9001:2015 certified company and largest producer of Ayurveda medicines in public sector in India
- Produces 498 Ayurveda formulations –both classical and proprietary
- Revenue from operations during 2017-18 was Rs. 142 crores and net profit was Rs. 17.85 crores
- Sole supplier of medicines to Government Ayurveda Hospital and Dispensaries in Kerala
- Supplier of Ayurveda Medicines to Government Hospitals and Dispensaries of 19 other states
- Market outreach - a vast network over 650 dealers spread all over the nation
- Infrastructure and facilities available - R&D center, manufacturing units at Kuttanellur and
- Muttathara, medicinal plants extraction centers at Kuttanellur and Paryaram, regional distribution centers at Pathanapuram and Kannur, Hospital at Thrissur
- Annual requirement of forest produces (raw materials) is approximately 2,400 tons (potential area for linkages with primary collectors/ producers for raw material supply)

2. Care Keralam Ltd.

CARE-KERALAM Ltd (Confederation for Ayurvedic Renaissance-Keralam Limited) is a public limited company established as a cluster of Ayurveda industries with the support of AYUSH department of Government of India and equity partnership from Government of Kerala through the Kerala State Industrial Infrastructure Development Corporation (KINFRA). The infrastructure facilities are available for the use of Ayurvedic product manufacturers and service providers for standardization of Ayurvedic medicines. The ultimate objective is to promote Kerala as a global destination for sourcing Ayurvedic products and services of international standards.

3. Kottakkal Arya Vaidyasala (AVS)

- A leader among the Ayurvedic companies in Kerala. AVS was established at Kottakkal in 1902 by the late Vaidyaratnam P.S. Varier. It offers classical Ayurvedic medicines and authentic Ayurvedic treatments and therapies to patients.
- AVS has Ayurvedic Hospitals at Kottakkal, Delhi and Kochi, and clinics in major cities in the country.
- AVS manufactures about 500 Ayurvedic medicines and has a sales network over 900 authorized dealers.
- It has been playing an important role in propagation of medicinal plants and in order to ensure the supply of raw materials, AVS has set up medicinal plants estates in about 220 acres of land.
- The Vaidyaratnam P.S. Varier Ayurveda College was established by AVS in 1917. It is a pioneer in Ayurveda education in the State. AVS has a full-fledged research wing for modernization of production and quality control of ayurvedic drugs.

4. Vaidyaratnam Oushadhasala

- Vaidyaratnam Oushadhasala Pvt. Ltd, with its rich heritage of Ayurvedic Medicine Manufacturing since 1941, is one amongst the leading manufacturers of Ayurvedic Medicine.
- The policy of traditional principles with judicious combination of modern technology in manufacturing and quality control has helped Vaidyaratnam products win favour of physicians and patients alike, globally.
- Vaidyaratnam Oushadhasala manufactures around 500 classical and over 150 proprietary products. The classical products which are taken from the ancient Ayurvedic literature, are approved by the Govt. of India and included under Schedule 1 of Drugs & Cosmetic Act.
- Vaidyaratnam has introduced successful medicines like Mehanil, Cardocalm, Thyrocalm, Rheumacalm, Digestol, Gasnull, Pilonil, Rejotone, Panchajeeraka

Gudam, Vajitone tablets etc. These medicines are the outcome of dedicated literary research of the ancient Ayurveda scriptures and passionate work spanning decades, corroborated by scientific validation through clinical research by the Research & Development department.

- The growing Research & Development department of Vaidyaratnam is adopting various efficacy studies that help the community to achieve the benefit of medicines in a more palatable mode. These new generation medicines are effective in the management of Diabetes, Thyroid ailments and other Lifestyle disorders.

(<https://vaidyaratnammooss.com>)

5. Sitaram Ayurveda

- Sitaram Ayurveda was established in 1921.
- Being the pioneer in GMP certified Ayurvedic Medicine Manufacturing Plants, ISO 9001:2015 and DSIR recognized research and development laboratory, Sitaram give utmost priority to the quality to achieve in each step - right from raw material sourcing to dispatch of finished goods.
- Well equipped manufacturing plant with tailor-made machineries.
- Ergonomically Set Packing and Storing Areas
- Research and Development Laboratory
- Effluent Treatment Plant
- Herbal Garden

(<https://www.sitaramayurveda.com>)

6. Pankajakasthuri Herbals

- Pankajakasthuri Herbals India Private Limited is an Ayurvedic medicine manufacturing company established in 1988 based at Tiruvananthapuram.
- Pankajakasthuri is Kerala's first ISO 9000 certified Ayurvedic medicine manufacturing company.

- Pankajakasthuri has over 450 Ayurvedic products spread over four categories - Ethical, Classical, FMCG and OTC.

(<https://en.wikipedia.org>)

7. SNA Oushadhasala Pvt. Ltd.

- SNA Oushadhasala is one of the earliest institutions in Kerala established in 1920.
- At beginning, it was a small manufacturing unit of classical Ayurvedic formulations, which satisfy the need of the family physician but later broadened the services to other Ashtavaidyas too.
- At present SNA institution has global acceptance with more than 400 classical formulations, 50 traditional preparations and 25 proprietary medicines.
- Patent products include creams, linaments, etc, which fulfill the need of minor ailments for counter sale. It also represents the new generation pharmaceutical form with all ancient known ingredients.

(<http://thaikatmooss.com>)

8. Ambuja Institute of Ayurvedic Research and Documentation

Ambuja Institute of Ayurvedic Research and Documentation was established in April 2011 at Udayamperoor, Ernakulum District, Kerala state, South India. The primary activity at the clinic is treating patients with original raw drugs obtained from genuine sources. The raw drugs are pulverised and packed in food grade plastic covers and dispensed at the clinic dispensary. Coarse herbal powders, fine herbal powders, tablets, medicated oils etc. (classical pharmaceutical modes) are prepared only for the medical practice at the clinic. It is not intended for commercial sale.

This institute promote Classical Ayurveda, Sanskrit, Medicinal plant cultivation, Revalidation practices of Vriksha Ayurveda, Training of school children, Continuous education programmes for doctors (CME), Surveys on raw drugs markets of india and also quality standards of Ayurvedic academy and research.

- Assigning farmers who are professionally engaged in organic methods in virgin lands all over India for medicinal plants cultivation.
- The species are selected on the basis of natural flora and also with suggestions from experts regarding scope of introducing new varieties after soil testing.
- After the selection, minimum number of saplings or seedlings will be freely distributed to farmers for assessing the growth rate.
- Periodical inspection once in a month is conducted to all the farms by AIARD representatives for assuring safe and quality farming.
- Regular follow up to finalise harvesting time and methods of harvesting. Post harvest management systems including packing as a commodity for transporting
- Sustainable harvesting techniques will be demonstrated for endangered species. The following are the commodities with examples;
 - Roots (Dasamoolam)
 - Rhizomes (Rasna)
 - Stem cuts instead of barks (Parijatham)
 - Root tubers (Chithraka)
 - Whole plant (Bhoomyamalaki)
 - Leaves (Sthree kutaja)
 - Seeds (Jambu)
 - Fruits (Gambhari)
- They collect raw materials for the clinical practice from the following genuine resources;
 - Forest dwellers (from permitted areas as sustainable method)
 - Cultivated resources (among professional farmers using organic methods in virgin lands)
 - Traders (from all over India)

- NGO (specialised in medicinal herbal cultivations)
- Tribes (recognised by forest department through VSS)
- Legal procurement (for restricted produces)
- Schools and organizations (saplings – seedlings and cultivated produces by team of teachers and students, cultivated produces by self help groups etc.

Cultivation projects: 82 plant species across the following states of India- Kerala, Tamilnadu, Karnataka, Himachal Pradesh, Madhya Pradesh, Sikkim, Meghalaya, Uttarakhand, Odisha, Jammu & Kashmir, and Maharashtra

6.1. 5 CASE STUDIES OF MAJOR PLAYERS IN MARKET

1. Pharmaceutical Corporation (IM) Kerala Ltd. (OUSHADHI)

One of the top Ayurveda manufacturing unit under Kerala Govt. It is the largest producer of Ayurvedic Medicines belonging to Public Sector in the country. Oushadhi manufactures and market high quality Ayurvedic medicines at a reasonable price, adhering to classical Ayurvedic text under the direct supervision of Ayurvedic physicians.

- Total asset value: Rs. 4798.64 Lakhs
- Providing employment to: 1000
- Progressively increasing Turnover: 2019-20: 151 Cr

Formulations

(450 Classic and 24 Proprietary/ Patent)

Important Classical Products

Sivagulika, Haridrakhanda, Gandhathylam, Aswagandhadi Thylam, Saraswatharishtam, Dasamoolarishtam, Ayaskrithi, Kottamchukkadi Thylam, Laghusoothasekhararasam Tablet(L.S.R), Agasthyarasayanam, Brahmighritham, Thaleesapathradi Choornam, Rasnadi Choornam, Rasnerandadi Kashayam, Brahma Rasayanam, Murivenna



Important Patent/ proprietary Products

Pramehoushadhi Choornam Diabet Drinks , Pramehoushadhi Tablet, Ashtachoornam Syrup, Burncure Ointment, Oushdhi Cough Syrup, Rheumajith Ointment Shaddharanam Tablet, Psorset Ointment, Hair Tone, Lipo Care Tablet, Thenginpookkulamrutham, Psorset Oil, Oushadhi Baby Oil, Oushadhi Chavanaprasam, Cardocare Tablet, Oushadhi Dhahasamani, Vigor Plus, Oushadhi Tooth Powder, Oushadhi Facepack, K K Lepam,

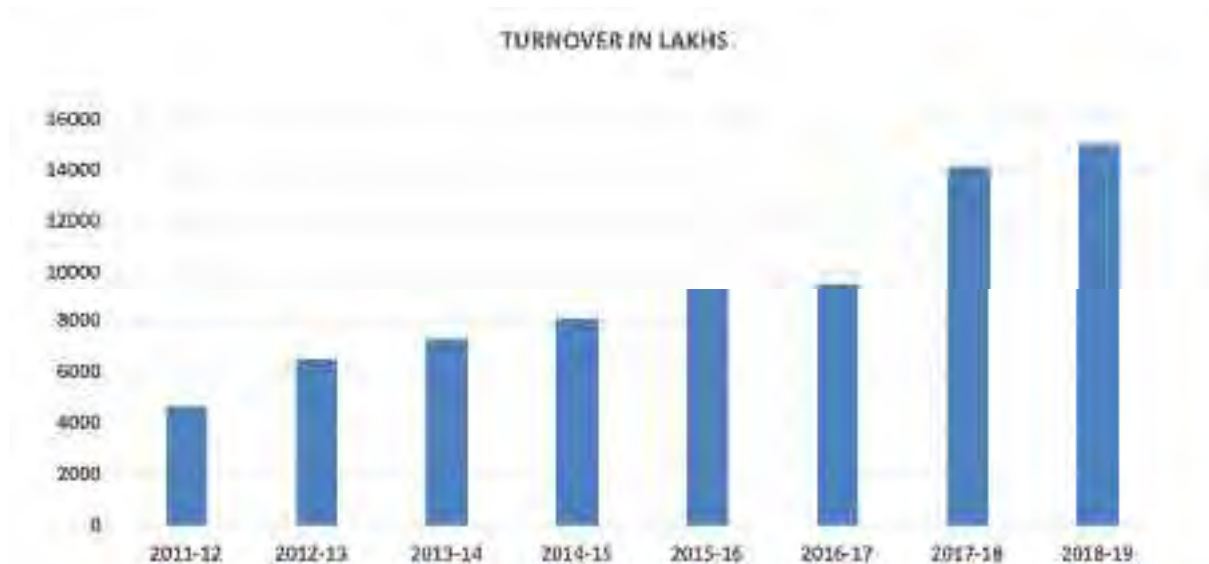


Figure 6.1.5 Turnover 2011-19

Table 6.1.8 Profit Profile of the Company (Lakh)

Year	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Total Sales	4710.38	6549.67	7315.42	8140.66	9385.89	9575.96	14159	15129
Turnover	4710.38	6549.67	7315.42	8140.66	9385.89	9575.96	14159	15129

Profit	733.71	889.09	849.66	872.3	1347.89	955.86	1785	2416
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Figure 6.1.6 Profit of the company



Figure 6.1.7 Sales and Profit

Raw material requirements of the company

- Purchases more than 500 varieties of raw materials through open tender.
- Standardized procedure to verify raw materials.
- Buy back agreement with farmers
- Direct procurement from farmers (upto 25%).
- Other sources include SC/ST Federation, V.S.S (Vana Samrakshana Samithi), EDC, Co-Operative Societies
- Sandalwood is procured from the Forest Department.

Annual Purchase

2016-17	Rs. 44.83 crore
2017-18	Rs. 66.29 crore
2018-19	Rs. 82.08 crore
2019-20	Rs 75.00 crore

The quantity and price of twenty major raw materials and value added/ byproducts used in manufacturing medicines are given in Table 6.1. 8 and 6.1.9. In total about

398 medicinal plants are utilized and the details are given in Annexure 6.1.6. Roots are most commonly used part.

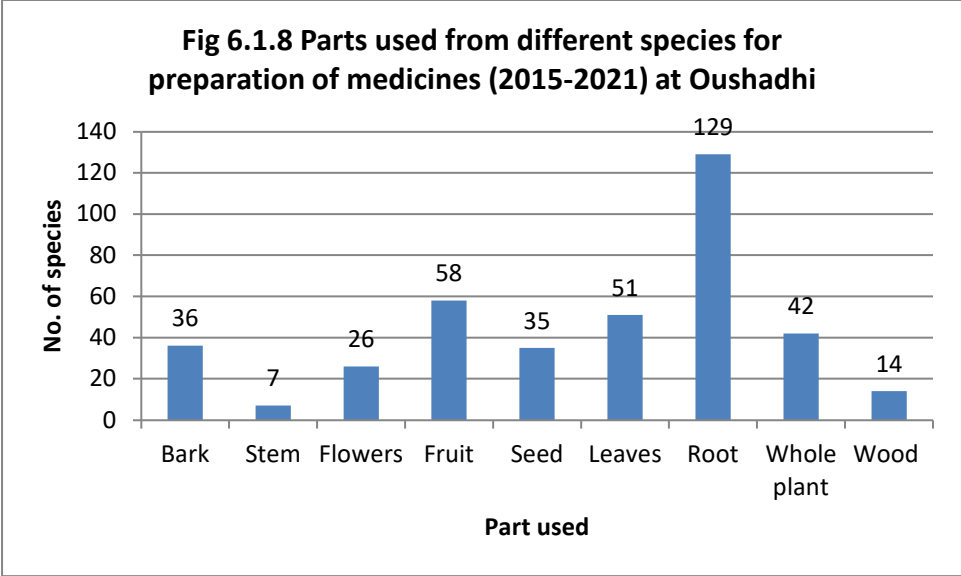


Table 6.1.9 Quantity and Price of twenty major raw materials for 2017-2021

Sl. No	Local Name	Botanical Name	2020-21			2019-2020			2018-2019			2017-2018			Cumulative Average		
			Quantity (Kg)	Price (Rs./kg)	Value (Rs.)	Quantity (Kg)	Price (Rs./kg)	Value(Rs.)	Quantity (Kg)	Price (Rs./kg)	Value(Rs.)	Quantity (Kg)	Price (Rs./kg)	Value(Rs.)	Quantity (Kg)	Price (Rs./kg)	Value(Rs.)
1	Kurumthotti Veru (Dry)	<i>Sida rhombifolia</i>	158499.86	85.01	13474072.93	168380.39	88.80	14952178.45	151265.78	79.93	12090673.80	153384.13	84.58	12973229.55	157882.5	84.58	13372539
2	Kadukkathodu	<i>Terminalia chebula</i>	134537.97	53.70	7224688.94	128731.84	56.60	7286222.20	162559.53	52.08	8466100.22	14105561.61	53.70	7574686.31	3632848	54.02	7637924
3	Puliyila (Fresh)	<i>Tamarindus indica</i>	119488.51	26.90	3214240.97	145220.89	28.81	4183813.78	99434.56	22.22	2209435.92	130958.99	26.90	3522796.88	123775.7	26.21	3282572
4	Chukku	<i>Zingiber officinale</i>	116369.01	152.00	17688088.91	96976.75	164.04	15908065.74	114127.24	124.75	14237373.31	110297.13	152.00	16765163.61	109442.5	148.20	16149673
5	Nellikathodu	<i>Phyllanthus emblica</i>	97291.51	128.80	12531145.84	91708.96	118.06	10827159.70	110193.51	138.08	15215519.72	82415.41	128.80	10615104.16	95402.35	128.44	12297232
6	Kattarvazhathandu (Fresh)	<i>Aloe vera</i>	93868.28	11.34	1064466.34	112143.49	17.80	1996154.19	140328.71	5.20	729709.28	92711.68	11.34	1051350.45	109763	11.42	1210420
7	Sathavarikizhangu (Fresh)	<i>Asparagus racemosus</i>	76632.88	37.24	2853808.45	98257.76	31.61	3105927.79	121355.74	39.00	4732873.86	85254.84	37.24	3174890.24	95375.31	36.27	3466875
8	Koovalaveru (Dry)	<i>Aegle marmelos</i>	73197.64	36.80	2693672.97	71721.53	31.32	2246318.38	88073.02	29.50	2598154.15	89868.85	36.80	3307173.68	80715.26	33.61	2711330
9	Devadharam	<i>Cedrus deodara</i>	72931.54	53.40	3894544.13	57802.21	48.20	2786066.52	63641.74	62.30	3964880.65	58098.55	53.40	3102462.68	63118.51	54.33	3436988
10	Amukooram	<i>Withania somnifera</i>	61157.08	311.00	19019853.12	69250.63	208.00	14404130.00	69259.72	171.10	11850338.43	64147.62	311.00	19949909.82	65953.76	250.28	16306058
11	Aryaveppinholi (Dry)	<i>Azadirachta indica</i>	57831.43	17.68	1022459.63	49422.60	20.38	1007232.49	54454.42	15.67	853300.73	64246.42	17.68	1135876.71	56488.72	17.85	1004717
12	Muthangakizhangu (Dry)	<i>Cyperus rotundus</i>	54553.71	36.40	1985755.08	37141.13	28.40	1054808.12	47443.58	27.41	1300428.50	38357.67	52.89	2028737.27	44374.02	36.28	1592432
13	Njerinjil	<i>Tribulus terrestris</i>	51450.81	194.00	9981457.72	40863.70	118.56	4844800.27	51935.19	88.04	4572374.30	50700.75	103.00	5222177.66	48737.61	125.90	6155202
14	CheruvazhuthinaVeru (Dry)	<i>Solanum melongena</i>	46767.95	67.00	3133452.92	36824.92	84.66	3117597.39	41839.20	19.50	815864.44	43437.54	67.00	2910314.91	42217.4	59.54	2494307
15	Aavanakkinveru (Dry)	<i>Ricinus communis</i>	46430.25	48.44	2249081.26	57844.47	62.00	35863557.26	56497.42	16.74	945766.78	51114.71	48.44	2475996.75	52971.71	43.91	10383601
16	Chandhanam	<i>Santalum album</i>	6526.60	2190.23	14294761.69	3466.17	3449.25	11955673.08	5092.45	4201.81	21397503.13	4873.89	2190.23	10674946.67	4989.778	3007.88	14580721
17	Rakthachandhanam	<i>Pterocarpus santalinus</i>	23492.17	217.50	5109547.41	23168.60	205.00	4749562.18	20034.98	228.00	4567976.12	37828.15	217.50	8227621.54	26130.98	217.00	5663677
18	Chinithippali	<i>Piper longum</i>	39149.26	451.50	17675802.40	37096.40	367.82	13644799.32	47791.97	379.82	18152233.62	43739.52	451.50	19748395.09	41944.29	412.66	17305308
19	Seemakottam	<i>Saussurea costus</i>	11476.26	500.79	5747197.75	15715.43	491.00	7716274.17	14160.73	540.00	7646791.50	15114.23	500.79	7569053.24	14116.66	508.15	7169829
20	Chittamruth (Dry)	<i>Tinospora cordifolia</i>	40849.84	30.80	1258175.13	33141.65	29.83	988615.48	41713.59	31.22	1302298.22	43922.00	30.71	1318134.56	39906.77	30.64	1216806

-
1. *The raw materials quantity extracted from the species such as Kurumthotti (Sida rhombifolia), Kadukkathodu (Terminalia chebula), Puliyila (Tamarindus indica), Chukku (Zingiber officinale) and Kattarvazhathandu (Aloe vera) accounted for more than 100 tonnes annually (cumulative average).*
 2. *The cumulative average of quantity of Kurumthotti root extracted was around 158 tonnes sold for total value of around Rs. 133 lakh (Unit price of Rs.84.58/kg).*
 3. *The cumulative average of quantity of Kadukkathodu extracted was around 3632 tonnes sold for total value of around Rs. 76 lakh (Unit price of Rs.54.02/kg).*
 4. *The cumulative average of quantity of Puliyila (Fresh) extracted was around 123.7 tonnes sold for total value of around Rs. 32 lakh (Unit price of Rs. 26.21/kg).*
 5. *The cumulative average of quantity of Chukku extracted was around 109.4 tonnes sold for total value of around Rs. 161.4 lakh (Unit price of Rs. 148.20/kg).*
 6. *The cumulative average of quantity of Kattarvazhathandu extracted was around 109.7 tonnes sold for total value of around Rs. 12.1lakh (Unit price of Rs. 11.42/kg).*
 7. *Highest unit price of raw materials was for Chandanam (Santalum album) which was sold for around Rs. 3007.88/kg.*
 8. *Lowest unit price of raw materials was obtained from Kattarvazhathandu which was sold for around Rs. 11.42/kg.*
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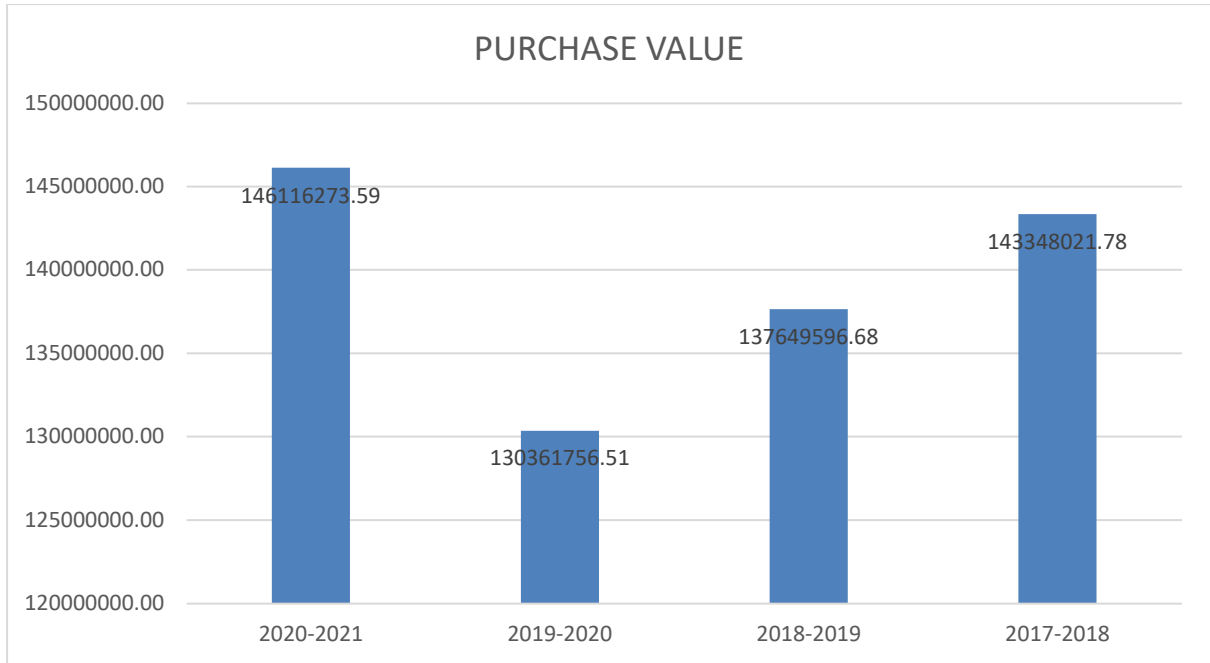


Fig 6.1.9 Purchase Value of the 20 major raw materials for the last 4 Years

Table 6.1.10 Value added Products / by products utilized by Oushadhi

SL. No	Botanical Name	Local Name	2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021	
			Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
1	<i>Mentha piperita</i>	Peppermint flour	6	990	11	1132	2	990	8	990	8	990	6	990
2		Pravala Bhasmam	41	11250	34	11250	50	11772	86	11409	75	11214	58	12150
3	<i>Vanilla planifolia</i>	Vanila flour	11	500	3	6	9	531	11	564	12	504	5	500
4	<i>Racinus communis</i>	Aavanakenna	37639	105	39774	89	42657	107	44077	112	47542	128	47445	115
5	<i>Racinus communis</i>	Aavanakenna	4418	110	4105	95	8502	119	10250	116	12775	132	8505	120
6	<i>Cocos nucifera</i>	Velichenna	305585	112	279985	101	413180	171	485410	160	482260	140	435115	163
7	<i>Sesamum indicum</i>	Ellenna	377595	90	35797	85	554335	87	533731	94	618630	95	567070	94
8	<i>Brassica nigra</i>	Kadukenna	522	137	653	143	1148	155	1390	139	884	142	609	154
9	<i>Hydnocarpus petandra</i>	Marotti	100	551	520	616	793	526	1225	427	500	369	0	0
10	<i>Cocos nucifera</i>	Urukku velichenna	375	336	75	701	150	1760	325	368	150	343	385	350
11	<i>Pearl</i>	Pavizham	0	0	0	0	0	0	0	0	0	0	0	0
12		Pulthailam	64	1268	60	1400	60	1400	142	1513	126	1728	137	1834
13	<i>Saccharum officinarum</i>	Sarkara	0	0	0	0	0	0	241146	30	829258	33	841480	43

14	<i>Saccharum officinarum</i>	Sarkara	811267	39	680510	44	978008	58	868682	44	149286	43	159048	46
15	<i>Saccharum officinarum</i>	Panchasara	121500	29	140000	39	155000	37	201000	33	169020	34	140250	34
16	<i>Sugar candy</i>	Kalkandam	30294	50	28610	54	47146	63	51466	51	47474	45	70217	46

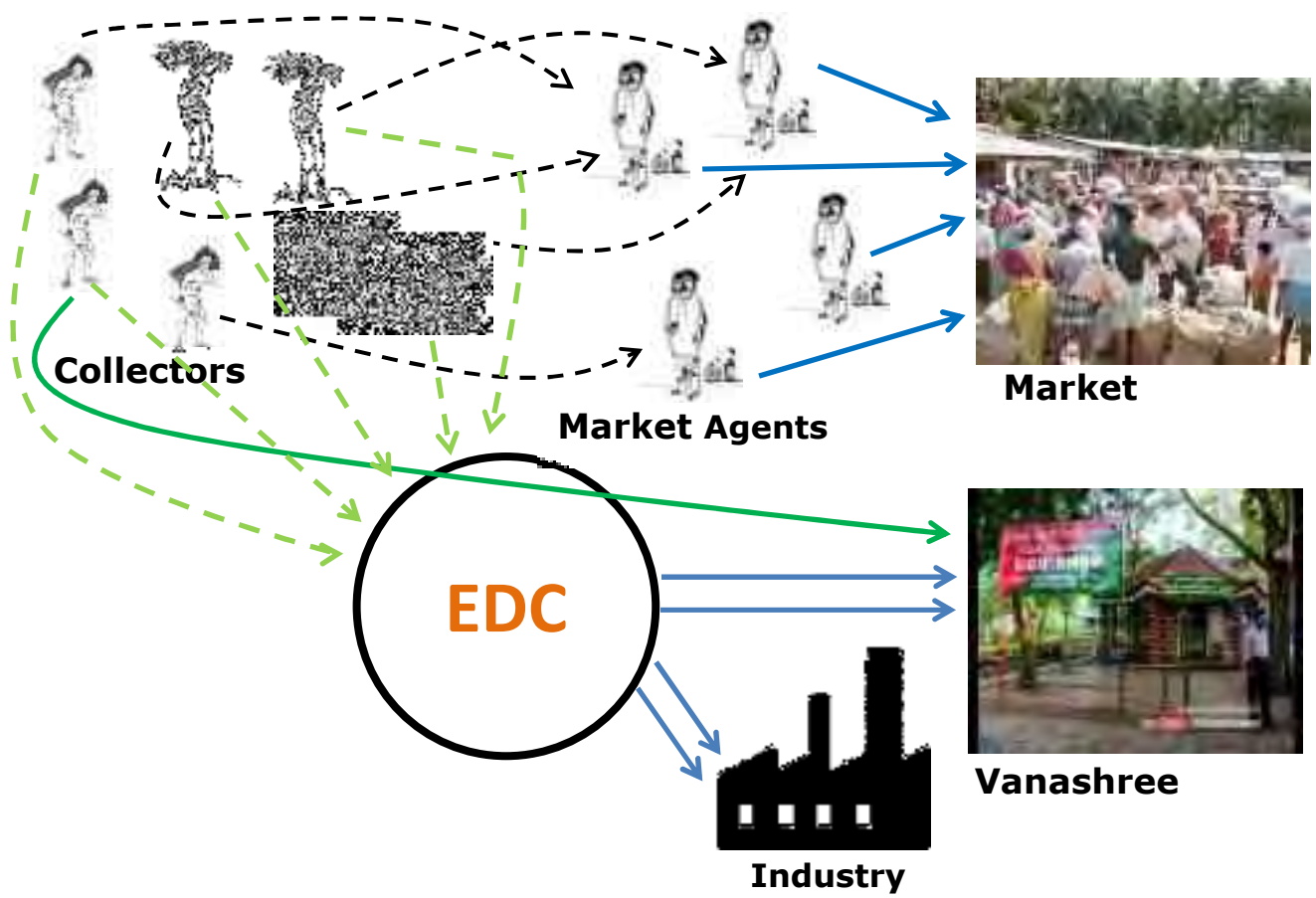


Fig 6.1.10 Marketing of medicinal plants

2. Govt. Ayurveda College, Thrippunnithura and Thiruvananthapuram

(Department of Rasasastra and Bhaishaiya Kalpana)

Government Ayurveda College, Thiruvananthapuram, is a pioneer educational institution for providing quality Ayurveda education and treatment in Kerala, established in the year 1889 by the erstwhile Maharaja of Travancore, located in the heart of Thiruvananthapuram city. This is one of the oldest institutions promoting various R& D programmes. The college is recognised by the Central Council of Indian Medicine (CCIM) and affiliated to Kerala University of Health Sciences (KUHS). The standard price list issued by the Additional Director, Price of the Economic & Statistics Department is provided in Annexure 6.1.7

Table 6.1.11 Raw drugs used for preparation of medicines during the year 2016-2017 at Govt. Ayurveda College, Thiruvananthapuram

SL. No	Botanical Name	Local Name	Parts Used	Type	Quantity	Price (Per Kg)
1	<i>Abies spectabilis</i>	Thaleesapathram	Leaf	Dry	32	120
2	<i>Abrus precatorious</i>	Velutha Kunni	Root	Dry	17	80
3	<i>Acacia catechu</i>	Karingali	Heart wood	Dry	131	60
4	<i>Achyranthes aspera</i>	Valiya kadaladi	Root	Dry	2	50
5	<i>Aconitum ferox</i>	Valsanabhi	Tuberous root	Dry	0.7	600
6	<i>Aconitum heterophyllum</i>	Athividayam	Tuberous root	Dry	1.5	5500
7	<i>Acorus calamus</i>	Vayambu	Rhizome	Dry	205	100
8	<i>Aegle marmelos</i>	Koovalam	Root	Dry	311	80
9	<i>Aegle marmelos</i>	Koovalam	Leaf	Dry	785	60
10	<i>Aerva lanata</i>	Cheroola	Whole plant	Dry	283	60
11	<i>Allium cepa</i>	Chuvannulli	Bulb	Fresh	1476	40
12	<i>Allium sativum</i>	Veluthulli	Bulb	Fresh	145	80
13	<i>Aloe vera</i>	Kattarvazha	Stem	Fresh	1476	20
14	<i>Alpinia calcarata</i>	Chittaratha	Rhizome	Dry	612	80

15	<i>Anethum graveolens</i>	Shathakuppa	Seed	Dry	300	120
16	<i>Aquilaria agallocha</i>	Akil	Heart wood	Dry	104	80
17	<i>Areca catechu</i>	Adakka	Fruit	Dry	0.784	100
18	<i>Asparagus racemosus</i>	Shathavari	Tuberous root	Fresh	583	60
19	<i>Azadirachta indica</i>	Veppu	Seed	Dry	3	200
20	<i>Azadirachta indica</i>	Veppu	Bark	Dry	1100	60
21	<i>Azima tetracantha</i>	Yeshank	Root	Dry	167	80
22	<i>Bacopa monnieri</i>	Brahmi	Whole plant	Fresh	1.3	40
23	<i>Boerhavia diffusa</i>	Thazhuthama	Whole plant	Fresh	1097	80
24	<i>Brassica oleracea</i>	Kaduk	Seed	Dry	29	80
25	<i>Callicarpa macrophylla</i>	Njazhalpoovu	Flower	Dry	1	100
26	<i>Calotropis gigantea</i>	Erikkila	Leaf	Fresh	210	30
27	<i>Calotropis procera</i>	Velutha Erukk	Root	Dry	17	60
28	<i>Cardiospermum halicacabum</i>	Uzhinja	Whole	Dry	16	40
29	<i>Carum carvi</i>	Karimjeerakam	Seed	Dry	16	200
30	<i>Cassia fistula</i>	Kanikonna	Bark	Dry	24	30
31	<i>Cedrus deodara</i>	Devatharam	Heart wood	Dry	1014	80
32	<i>Celastrus paniculatus</i>	Cherupunnayari	Seed	Dry	18	200
33	<i>Centella asiatica</i>	Veluthakudangal	Whole	Fresh	16	60
34	<i>Chrysopogon zizanioides</i>	Ramacham	Root	Dry	538	200
35	<i>Cinnamomum tamala</i>	Elavargapatta	Bark	Dry	28	700
36	<i>Citrullus colocynthis</i>	Kattuvellari	Root	Dry	4	150
37	<i>Citrus medica</i>	Cherunaranga	Fruit	Fresh	1150	4/one
38	<i>Clerodendrum serratum</i>	Cheruthekk	Root	Dry	3	150
39	<i>Clitoria ternatea</i>	Velutha Shanmkupushpam	Root	Dry	2	80
40	<i>Coccinia grandis</i>	Koval	Whole	Dry	785	40

41	<i>Cocos nucifera</i>	Nalikeram	Kernel	Fresh	1500	17/one
42	<i>Coriandrum sativum</i>	Kothamalli	Seed	Dry	358	140
43	<i>Coscinium fenestratum</i>	Maramnjai	Bark	Dry	381	100
44	<i>Cuminum cyminum</i>	Jeerakam	Seed	Dry	242	220
45	<i>Curculigo orchioides</i>	Nilappana	Tuberous root	Dry	324	220
46	<i>Curcuma longa</i>	Pachamanjal	Rhizome	Fresh	4	50
47	<i>Curcuma longa</i>	Varattumnjai	Rhizome	Dry	693	120
48	<i>Cyclea peltata</i>	Padakizhang	Tuberous root	Dry	351	500
49	<i>Cymbopogon coloratus</i>	Nanmukhapullu	Whole	Dry	17	100
50	<i>Cynodon dactylon</i>	Karuka	Whole	Fresh	1104	40
51	<i>Cyperus rotundus</i>	Muthanga	Tuberous root	Dry	739	60
52	<i>Desmodium gangeticum</i>	Orila	Root	Dry	372	120
53	<i>Desmodium triflorum</i>	Cherupulladi	Whole	Dry	27	50
54	<i>Desmostachya bipinnata</i>	Attudarbha	Root	Dry	1	80
55	<i>Elettaria cardamomum</i>	Elam	Fruit	Dry	85	1000
56	<i>Embelia ribes</i>	Vizhalari	Seed	Dry	40	1400
57	<i>Enicostema axillare</i>	Vellarugu	Whole	Dry	16	80
58	<i>Erythrina variegata</i>	Murikk	Leaf	Fresh	1476	80
59	<i>Evolvulus alsinoides</i>	Vishnukranthi	Whole	Dry	16	100
60	<i>Ficus benghalensis</i>	Peralpatta	Bark	Dry	8	300
61	<i>Ficus microcarpa</i>	Ithi	Bark	Dry	8	50
62	<i>Ficus racemosa</i>	Athi	Bark	Dry	8	50
63	<i>Ficus religiosa</i>	Arayal	Bark	Dry	8	50
64	<i>Glycyrrhiza glabra</i>	Erattimadhuram	Root	Dry	593	220
65	<i>Gmelina arborea</i>	Kumbil	Root	Dry	400	60
66	<i>Hedyotis pruinosa</i>	Parppadakapullu	Whole	Dry	10	150
67	<i>Hemidesmus indicus</i>	Naruneendi	Tuberous root	Dry	419	340

68	<i>Holarrhena pubescens</i>	Kudukappala	Seed	Dry	46	250
69	<i>Holoptelea integrifolia</i>	Avil	Bark	Dry	553	60
70	<i>Holostemma adakodien</i>	Adapathiyam	Tuberous root	Dry	1	200
71	<i>Hordeum vulgare</i>	Yavam	Seed	Dry	128	40
72	<i>Hugonia mystax</i>	Karthotti	Root	Dry	6	60
73	<i>Hygrophila auriculata</i>	Vayalchulli	Root	Dry	251	60
74	<i>Hyoscyamus niger</i>	Khurashani	Seed	Dry	22	100
75	<i>Illicium verum</i>	Thakkolam	Flower	Dry	0.7	250
76	<i>Inula Racemosa</i>	Pushakaram	Root	Dry	10	80
77	<i>Ipomoea mauritiana</i>	Palmuthakk	Tuberous root	Dry	50	50
78	<i>Ixora coccinea</i>	Thechi	Root	Dry	255	80
79	<i>Justicia adhatoda</i>	Adalodakam	Root	Dry	900	80
80	<i>Kaempferia galanga</i>	Kacholam	Rhizome	Dry	293	200
81	<i>Limonia acidissima</i>	Vlankay	Fruit	Dry	0.672	100
82	<i>Macrotyloma uniflorum</i>	Pazhamuthira	Seed	Dry	307	60
83	<i>Madhuca longifolia</i>	Elippa	Heart wood	Dry	90	60
84	<i>Mallotus philippensis</i>	Chenkolli	Bark	Dry	0.212	100
85	<i>Merremia turpethum</i>	Thrikolpakonna	Root	Dry	40	150
86	<i>Mesua ferrea</i>	Nagapoov	Flower	Dry	3	800
87	<i>Monochoria vaginalis</i>	Karimkoovalam	Rhizome	Dry	90	50
88	<i>Moringa oleifera</i>	Muringa	Leaf	Fresh	1476	40
89	<i>Moringa oleifera</i>	Muringa	Bark	Dry	267	80
90	<i>Mucuna pruriens</i>	Nayakkaraunam	Seed	Dry	2	150
91	<i>Mukia maderaspatana</i>	Mushumushukk	Whole	Dry	785	50
93	<i>Murraya koenigii</i>	Kariveppila	Leaf	Fresh	72	50
94	<i>Myristica fragrans</i>	Jathi	Fruit	Dry	36	350
95	<i>Nardostachys jatamansi</i>	Jadamanji	Root	Dry	35	600
96	<i>Nelumbo nucifera</i>	Thamaravalayam	Twiner	Dry	90	60
97	<i>Nilgirianthus ciliatus</i>	Karimkuringi	Root	Dry	1015	60

98	<i>Ocimum gratissimum</i>	Kattuthulsi	Root	Dry	21	50
99	<i>Pajanelia longifolia</i>	Vayyazhantha	Root	Dry	228	70
100	<i>Pergularia daemia</i>	Veliparuthi	Whole	Dry	16	30
101	<i>Phoenix pusilla</i>	Chitteenthal	Root	Dry	107	80
102	<i>Phyla nodiflora</i>	Poduthala	Whole	Dry	16	60
103	<i>Phyllanthus emblica</i>	PachaNellikka	Fruit	Fresh	30	40
104	<i>Phyllanthus emblica</i>	Nellikathodu	Fruit rind	Dry	1792	80
105	<i>Phyllanthus emblica</i>	Nellippatta	Bark	Dry	110	40
106	<i>Physalis minima</i>	Njottanjodiyam	Whole	Dry	16	50
107	<i>Picrorhiza kurroa</i>	Kadukurohini	Tuberous root	Dry	591	1350
108	<i>Pinus roxburghii</i>	Charalam	Wood	Dry	28	150
109	<i>Piper betle</i>	Vettila	Whole		1476	50
110	<i>Piper longum</i>	Kattuthippali	Root	Dry	66	150
111	<i>Piper longum</i>	Athithippali	Fruit	Dry	4	400
112	<i>Piper longum</i>	Cheruthippali	Fruit	Dry	525	700
113	<i>Piper attenuatum</i>	Kattumulaku	Root	Dry	257	100
114	<i>Piper nigrum</i>	Kurumulak	Fruit	Dry	250	600
115	<i>Piper cubeba</i>	Valmulak	Fruit	Dry	0.672	900
116	<i>Pistacia chinensis</i>	Karkkidakashringi	Gall	Fresh	0.672	400
117	<i>Plectranthus hadiensis</i>	Eruveli	Whole	Dry	140	40
118	<i>Plumbago indica</i>	Koduveli	Tuberous root	Dry	485	180
119	<i>Pogostemon cablin</i>	Pachila	Leaf	Fresh	5	200
120	<i>Pongamia pinnata</i>	Unginkuru	Seed	Dry	4	60
121	<i>Pongamia pinnata</i>	Punkinpatta	Bark	Dry	1476	60
122	<i>Portulaca oleracea</i>	Kozhuppa	Whole plant	Fresh	16	20
123	<i>Premna serratifolia</i>	Moonja	Root	Dry	275	80
124	<i>Prunus cerasoides</i>	Pathimugam	Heart wood	Dry	421	100
125	<i>Cinnamomum malabattrum</i>	Elavalukam	Bark	Dry	0.6	100
126	<i>Pseudarthria viscida</i>	Moovila	Root	Dry	336	80
127	<i>Cullen corylifolium</i>	Karkokilari	Seed	Dry	14	80
128	<i>Pterocarpus marsupium</i>	Venga	Heart wood	Dry	86	60

129	<i>Pterocarpus santalinus</i>	Rakthachandanam	Heart wood	Dry	616	200
130	<i>Quercus infectoria</i>	Mayakk	Fruit	Dry	22	700
131	<i>Ricinus communis</i>	Velutha Avanakk	Root	Dry	778	60
132	<i>Ricinus communis</i>	VeluthaAvanakk	Leaf	Fresh	210	30
133	<i>Ricinus communis</i>	Avanakk	Seed	Dry	3	80
134	<i>Rubia cordifolia</i>	Manjatti	Root	Dry	66	300
135	<i>Saccharum officinarum</i>	Karimbu	Stem	Fresh	127	80
136	<i>Saccharum spontaneum</i>	Kusha	Root	Dry	1	80
137	<i>Salacia oblonga</i>	Ponkurandi	Root	Dry	337	200
138	<i>Santalum album</i>	Chandanam	Heart wood	Dry	30	150
139	<i>Saussurea costus</i>	Kottam	Tuberous root	Dry	113	350
140	<i>scindapsus officinalis</i>	Anathippali	Fruit	Dry	24	800
141	<i>Semecarpus anacardium</i>	Cherkkuru	Seed	Dry	25	80
142	<i>Sesamum indicum</i>	Ellu	Seed	Dry	148	220
144	<i>Sida cordifolia</i>	Kurunthotti	Root	Dry	1886	80
145	<i>Solanum melongena</i>	Cheruvazhuthina	Root	Dry	445	60
146	<i>Solanum anguivi</i>	Putharichunda	Root	Dry	245	60
147	<i>Solanum rudepannum</i>	Velutha chunda	Root	Dry	442	60
148	<i>Solanum melongena</i>	Karuthachunda	Root	Dry	260	60
149	<i>Solanum virginianum</i>	Kandakarichunda	Root	Dry	13	60
150	<i>Spermacoce hispida</i>	Velutha tharthaval	Whole	Dry	1492	40
151	<i>Stereospermum suaveolens</i>	Pathiri	Root	Dry	317	60
152	<i>Strychnos potatorum</i>	Thettambaral	Fruit	Dry	374	150
153	<i>Symplocos cochinchinensis</i>	Pachottipatta	Bark	Dry	473	140
154	<i>Syzygium aromaticum</i>	Grambu	Flowerbud	Dry	36	900
155	<i>Tamarindus indica</i>	Puliyila	Leaf	Fresh	3259	30
156	<i>Tamarindus indica</i>	Pulinjarambu	Fruit	Dry	18	80
158	<i>Terminalia bellirica</i>	Thannikka	Fruit rind	Dry	1402	50
159	<i>Terminalia chebula</i>	Kadukka	Fruit rnd	Dry	2900	50

160	<i>Tinospora cordifolia</i>	Amruth	Whole plant	Fresh	2810	20
161	<i>Trachyspermum roxburghianum</i>	Ayamodakam	Seed	Dry	452	200
162	<i>Tragia involucrata</i>	Kodithoova	Whole plant	Dry	689	180
163	<i>Tribulus terrestris</i>	Njerinjil	Fruit	Dry	594	100
164	<i>Trichosanthes tricuspidata</i>	Kaipan Padavalam	Whole plant	Dry	1171	300
165	<i>Trigonella foenum-graecum</i>	Uluva	Seed	Dry	208	80
166	<i>Valeriana wallichii</i>	Thakaram	Root	Dry	25	160
167	<i>Ventilago maderaspatana</i>	Thakittuvembadapatta	Bark	Dry	8	300
168	<i>Vigna Mungo</i>	Uzhunnu	Seed	Dry	3	100
169	<i>Vigna trilobata</i>	Kattupayar	Whole plant	Dry	13	100
170	<i>Vigna umbellata</i>	Kattuzhunnu	Whole plant	Dry	9	100
171	<i>Vitex negundo</i>	Karinochi	Root	Dry	140	80
172	<i>Vitex negundo</i>	Karinochi	Leaf	Fresh	210	40
173	<i>Vitis vinifera</i>	Karuthamunthiri	Fruit	Dry	187	320
174	<i>Withania somnifera</i>	Amukkuram	Root	Dry	224	280
175	<i>Woodfordia fruticosa</i>	Thathiri	flower	Dry	21	80
176	<i>Zingiber officinale</i>	Chukk	Rhizome	Dry	2052	280
177	<i>Zizyphus mauritiana</i>	Lanthakkuru	Seed	Dry	120	40
178	<i>Piper nigrum</i>	Naruk kurumolaku	Root	Dry	28	200
179	<i>Anogeissus latifolia</i>	Njama	Root	Dry	1	150
180	<i>Senna alexandrina</i>	Nilavaka	Fruit	Dry	15	200
181	<i>Celtis timorensis</i>	Poothavriksham	Bark	Dry	4	150

Some of the recommendations by the stakeholders include:

- All the medicinal plants required for the preparation of medicines are not available. Some of them are purchased from outside the state/ country.
- Availability of the raw drugs is considerably reduced as per the demand. At present demand is more but supply is insufficient according to the needs.

The following plants are included in the high volume category

Kurumthotti (Sida alnifolia, Sida cordata, Sida cordifolia, Sida rhombifolia), Chittamruth (Tinospora cordifolia), Nellikka (Phyllanthus emblica), Amukkuram (Withania somnifera), Karimkurinji (Nilgirianthus ciliatus), Chukku (Zingiber officinale)

- It is recommended to introduce good collection, processing, storage, selling and manufacturing practices.
- Capacity building programmes in this sector shall be introduced for a systematic and scientific collection practice with a view to ensure the sustainability of the tradable bioresources based on the demand and supply.
- Encourage conservation and cultivation of high volume and high value medicinal plants to keep the momentum and sustainability of demand and supply.
- Start up mission programme in this sector shall be worked out and introduced with a view to provide genuine, standard raw materials
- Establishment of drug testing laboratory is highly essential to ensure the standards of raw materials as well as finished products.
- A state level integrated network shall be set up, so that the end users will be benefited with getting genuine raw materials for the preparation of various drugs.
- At present majority of the Ayurvedic manufactures are establishing their own infrastructure facilities in their pharmacy to produce standard classical, Ayurvedic drugs/ proprietary drugs and other OTC products.
- Govt. shall set up a central instrumentation centre so that this can be appropriately and effectively used by the small scale manufacturers.

- Establishment of District level Drug Testing Laboratory is recommended to ensure the quality, safety and efficacy of the product.
- Adding number of preservatives some times affected the safety, efficacy of the product and therefore the issue raised by the experts to be discussed and debated and adequate / alternate solution is to be worked out and implemented accordingly.
- Undertake post graduate level research programmes for the scientific validation of drugs.

(Input from Dr.Taralekshmi. S, Dr. P. Y. Ansari, Dr.Sandhya, Dr. V. Rajmohan)

3. Ayurdhara Pharmaceuticals

Ayurdhara is a project of the Kerala State Federation of Scheduled Castes and Scheduled Tribes Development Cooperatives Limited, a Government of Kerala co-operative enterprise. Arishtam, Asavam, ghrithas, lehyas, choornam, thailam, and keragal etc and patent medicines are being produced here. Ayurdhara barm , ayurdharalin, ayurdharahyppotten, ayurdhara expower and ayurdharadayab are the patent medicines.

Table 6.1.12 Raw Material Quantity (2019-202)

Sl.No	RawMaterials	Total Qty Required in Kg/Lit	Rate	Amount
1	Adakkamaniyan	59	41	2,419.00
2	Adalodaka Veru dry	6,686	30	2,00,580.00
3	Adapathiyam Kizhangu dry	187	950	1,77,650.00
4	Athithippali	27	128	3,456.00

5	Avanakkinn Veru dry	1,448	44	63,712.00
6	Brahmi Pacha	475	28	13,300.00
7	Brahmi dry	18	88	1,584.00
8	Changalaparanda	11	70	770.00
9	Cherupunnayari	24	281	6,744.00
10	Cheruthekkinn Veru dry	379	111	42,069.00
11	Cheruthippalli	2,614	370	9,67,180.00
12	Chittamruthu dry	2,048	56	1,14,688.00
13	Chittamruthu Pacha	7,397	20	1,47,940.00
14	Chittaratha dry	182	219	39,858.00
15	Chittelam	66	313	20,658.00
16	Darbha dry	144	49	7,056.00
17	Elakkay	355	4,200	14,91,000.00
18	Erukkin veru dry	426	38	16,188.00
19	Garudakodi veru	3	112	336.00
20	Honey	2,486	500	12,43,000.00
21	Ilavinpasa	13	250	3,250.00
22	Jaathipathrika	2	1,250	2,500.00
23	Kaattukodi Veru dry	563	65	36,595.00
24	Kaattupadavalam dry	2,270	380	8,62,600.00
25	Kaattupayar veru dry	106	93	9,858.00

26	Kaattuthippali Veru dry	160	37	5,920.00
27	Kaattuthulasi Dry	19	56	1,064.00
28	Kaattuvellari	970	94	91,180.00
29	Kaattuzhunnin Veru dry	106	62	6,572.00
30	Kadukkathodu	6,590	65	4,28,350.00
31	Kandakaari Dry	2,602	68	1,76,936.00
32	Karimjeerakam	98	150	14,700.00
33	Karimkuringi Veru	5,830	25	1,45,750.00
34	Karutha Kanmadam	64	200	12,800.00
35	Kattaarvaazhappola pacha	3,600	8	28,800.00
36	Keezharnelli Pacha	181	37	6,697.00
37	Kiriyaath dry	794	75	59,550.00
38	Kodithoova Veru dry	4,090	93	3,80,370.00
39	Koduveli Dry	370	250	92,500.00
40	Koduveli pacha (Sudhi)	1,944	150	2,91,600.00
41	Kolarakku	6	287	1,722.00
42	Koovappodi	43	60	2,580.00
43	Kudakappaalatholi dry	2,614	72	1,88,208.00
44	Kumizhu veru dry	1,963	30	58,890.00
45	Kunniveru dry	5	125	625.00
46	Kunthirikkam	1,128	275	3,10,200.00

47	Kurunthotti Samoolam dry	9,714	85	8,25,690.00
48	Kusha Veru	30	20	600.00
49	Lanthakkuru	146	28	4,088.00
50	Maanchi	75	55	4,125.00
51	Manjatti dry	688	200	1,37,600.00
52	Moovila veru	2,059	87	1,79,133.00
53	Munjaveru dry	1,675	27	45,225.00
54	Muthanga dry	1,586	60	95,160.00
55	Naanmukhappullu dry	387	120	46,440.00
56	Nagappoovu	254	200	50,800.00
57	Naruneendi Kizhangu	520	550	2,86,000.00
58	Naykurana Paripu dry	14	125	1,750.00
59	Naykurana Veru dry	18	30	540.00
60	Neelayamari veru dry	2	150	300.00
61	Nellikka Pacha	1,848	80	1,47,840.00
62	Nellikka thodu dry	4,446	150	6,66,900.00
63	Nilappanakkizhangu dry	1,171	325	3,80,575.00
64	Njaavalkuru dry	10	45	450.00
65	Njaavaltholi dry	443	40	17,720.00
66	Njerinjaampuli Kizhangu	26	100	2,600.00
67	Njerinjil	2,867	140	4,01,380.00

68	Orila Samoolam dry	2,026	85	1,72,210.00
69	Paachottitholi dry	608	90	54,720.00
70	Paada kizhangu dry	1,379	550	7,58,450.00
71	Paalmuthukkin kizhangu dry	216	85	18,360.00
72	Pachila dry	208	140	29,120.00
73	Peenari	5	70	350.00
74	Pulichuvadi veru dry	11	140	1,540.00
75	Punnappoovu dry	11	525	5,775.00
76	Putharichunda veru dry	1,094	55	60,170.00
77	Raamacham dry	538	125	67,250.00
78	Sathavari Dry	514	290	1,49,060.00
79	Thaamara Kizhangu	10	325	3,250.00
80	Thaannikka Thodu	2,677	40	1,07,080.00
81	Thakaram	331	860	2,84,660.00
82	Thazhuthaama	1,747	140	2,44,580.00
83	Thekkida Veru dry	45	90	4,050.00
84	Mezhuku (Thean Mezhuku)	240	400	96,000.00
85	Thettaamparal	154	135	20,790.00
86	Ungin Tholi dry	248	100	24,800.00
87	Uzhinja Pacha	187	27	5,049.00
88	Vayalchulli veru dry	261	15	3,915.00

89	Vayampu	1,437	115	1,65,255.00
90	Vizhaalari	365	850	3,10,250.00
	TOTAL			1,36,61,605.00

LIST OF RAWMATERIALS FROM OUTSIDE STATE

Sl.No	RawMaterials	Total Qty Required in Kg/Lit	Rate	Amount
1	Aambal Kizhangu dry	218	200	43,600.00
2	Adakka dry	6	165	990.00
3	Akathikuru dry	37	250	9,250.00
4	Akkikaruva	3	65	195.00
5	Amruthin Nooru	3	235	705.00
6	Amukkuram dry	2,611	180	4,69,980.00
7	Anjanakkallu	21	244	5,124.00
8	Aratha	1,389	94	1,30,566.00
9	Arayalin Tholi dry	45	40	1,800.00
10	Arenukam	22	45	990.00
11	Ashali	11	70	770.00
12	Athitholi	45	22	990.00
13	Attin mamsam	274	450	1,23,300.00
14	Attinmoothram	200	30	6,000.00
15	Attukottappala	186	70	13,020.00

16	Avanakkenna	1,379	140	1,93,060.00
17	Avitholi	1,760	33	58,080.00
18	Ayamodakam	1,731	135	2,33,685.00
19	Ayaskantham	2	35	70.00
20	Chaanakam	182	60	10,920.00
21	Channa kizhangu	11	200	2,200.00
22	Charalam	64	44	2,816.00
23	Chavarkaram	58	48	2,784.00
24	Chayilya Bhasmam	14	7,288	1,02,032.00
25	Chemparuthiyila Pacha	181	35	6,335.00
26	Chenchellyam (Thelly)	502	140	70,280.00
27	Chengezhuneer Kizhangu Pacha	29	90	2,610.00
28	Chenninayakam	62	85	5,270.00
29	Cherkuru dry	11	33	363.00
30	Cheroola dry	155	40	6,200.00
31	Cheroola Pacha	146	30	4,380.00
32	Cherunaranga Pacha	1,066	60	63,960.00
33	Cherupulladi	14	150	2,100.00
34	Cheruvazhuthana veru dry	2,558	90	2,30,220.00
35	Chiteenth veru dry	128	55	7,040.00
36	Chonakappullu	56	35	1,960.00

37	Chooda Karpooram	347	900	3,12,300.00
38	Chukku	5,434	258	14,01,972.00
39	Chuvannulli Pacha	2,880	20	57,600.00
40	Devatharam	2,675	104	2,78,200.00
41	Distilled Water	160	130	20,800.00
42	Ekanayakam dry	150	124	18,600.00
43	Eucaliptes	106	1,380	1,46,280.00
44	Ezhilampaala Tholi dry	102	90	9,180.00
45	Gandhakam Sudhi	5	125	625.00
46	Gomoothram	450	20	9,000.00
47	Grampu	106	560	59,360.00
48	Gulgulu	11	700	7,700.00
49	Gulgulu sudhi	1,418	300	4,25,400.00
50	Ilavarngatholi	218	188	40,984.00
51	Inchi Pacha	34	90	3,060.00
52	Inthuppu	93	30	2,790.00
53	Iratimadhuram	464	170	78,880.00
54	Irippakkathal	141	35	4,935.00
55	Irippapoovu	245	70	17,150.00
56	Iruveli dry	475	154	73,150.00
57	Ithitholi dry	45	30	1,350.00

58	Jaathikka dry	78	500	39,000.00
59	Jaathipathrika	3	1,250	3,750.00
60	Jadaamanchi	102	980	99,960.00
61	Jeerakam	5,254	195	10,24,530.00
62	Kaarkokilari	91	72	6,552.00
63	Kaarthotti dry	59	35	2,065.00
64	Kaavimannu	16	24	384.00
65	Kaavimannu Sudhi	3	34	102.00
66	Kacholam dry	539	214	1,15,346.00
67	Kadal Nura	16	35	560.00
68	Kaduku	275	58	15,950.00
69	Kadukenna	24	1,750	42,000.00
70	Kadukurohini dry	1,320	1,325	17,49,000.00
71	Kalkandam	1,200	60	72,000.00
72	Kalluppu	19	12	228.00
73	Kannaram	22	55	1,210.00
74	Karakil	96	55	5,280.00
75	Karimkoovala Kizhangu	154	115	17,710.00
76	Karingaalli kaathal dry	622	30	18,660.00
77	Karinochi Veru dry	75	29	2,175.00
78	Karinochiyila pacha	187	60	11,220.00

79	Karkidaka Shringi	21	160	3,360.00
80	Karuka pacha	1,566	35	54,810.00
81	Karuthuppu	19	30	570.00
82	Kayyunyam Pacha	981	25	24,525.00
83	Kazhanji Veru dry	176	20	3,520.00
84	Konnatholi dry	243	60	14,580.00
85	Koovalam veru dry	1,680	26	43,680.00
86	Koovalathila pacha	181	90	16,290.00
87	Kothampalayari dry	742	70	51,940.00
88	Kottam veru	1,398	597	8,34,606.00
89	Kudakappaalayari dry	192	299	57,408.00
90	Kumplanga Pacha	1,200	30	36,000.00
91	Kurassaani	43	95	4,085.00
92	Kurumulaku	714	370	2,64,180.00
93	Lemon Grass Oli	106	940	99,640.00
94	Maanchi	120	55	6,600.00
95	Maathalathodu dry	283	38	10,754.00
96	Maavintholi dry	13	15	195.00
97	Malayakathi tholi dry	13	10	130.00
98	Manayola	3	250	750.00
99	Manjal pody	3	195	585.00

100	Mangayandiparippu	32	80	2,560.00
101	Maramanjai	392	65	25,480.00
102	Menthole	173	3,150	5,44,950.00
103	Methyle Salicilate	106	588	62,328.00
104	Mulla mottu pacha	24	650	15,600.00
105	Munthiri dry	4,970	244	12,12,680.00
106	Murikkila Pacha	3,026	60	1,81,560.00
107	Murikkintholi dry	91	45	4,095.00
108	Mukkutty	32	160	5,120.00
109	Muringatholi dry	413	38	15,694.00
110	Muringayila Pacha	2,880	35	1,00,800.00
111	Muthira	165	42	6,930.00
112	Muthuchippi	11	35	385.00
113	Naagadanthi veru dry	453	150	67,950.00
114	Naagunam	22	32	704.00
115	Naalikeram	3,867	22	85,074.00
116	Narumpasa	27	90	2,430.00
117	Neelayamariyila Pacha	304	95	28,880.00
118	Neermaathalam Tholi dry	424	90	38,160.00
119	Neermaruthin Tholi dry	13	87	1,131.00
120	Neyyu	7,411	473	35,05,403.00

121	Njaazhalppoovu dry	466	650	3,02,900.00
122	Njottanjodiyam Pacha	146	40	5,840.00
123	Paadathali Kizhangu	3	520	1,560.00
124	Paal High Fat	30,573	39	11,92,347.00
125	Paalkkaayam sudhi	56	380	21,280.00
126	Paalmuthukkin kizhangu pacha	69	60	4,140.00
127	Paalvallikizhangu dry	93	32	2,976.00
128	Paathiri veru dry	1,528	24	36,672.00
129	Pacha Karpooram	67	1,150	77,050.00
130	Pacha Manjal	1,315	35	46,025.00
131	Panchasaara	23,382	40	9,35,280.00
132	Panchamanpazhukka	3	1,600	4,800.00
133	Parpadakappullu dry	459	160	73,440.00
134	Parpadakappullu Pacha	1,230	60	73,800.00
135	Pathimukham	755	44	33,220.00
136	Payyani veru	1,528	40	61,120.00
137	Peraalin Tholi dry	112	30	3,360.00
138	Perelam	64	700	44,800.00
139	Perumkurumpaveru dry	997	58	57,826.00
140	Perunjeerakam	72	110	7,920.00
141	White petroleum Jelly	72	188	13,536.00

142	Pichakamottu pacha	38	190	7,220.00
143	Pichakathila pacha	325	80	26,000.00
144	Pookkaitha Veru pacha	291	80	23,280.00
145	Poovath dry	110	380	41,800.00
146	Porikaaram Sudhi	8	60	480.00
147	Prasaarani dry	4,331	50	2,16,550.00
148	Prasaarani pacha	24	30	720.00
149	Puliyila Njarampu	43	300	12,900.00
150	Puliyila Pacha	5,400	25	1,35,000.00
151	Raktha Chandanam	534	300	1,60,200.00
152	Rasam Sudhi	6	8,000	48,000.00
153	Rudraaksham	5	85	425.00
154	Sahasravedhi	24	30	720.00
155	Sathakuppa	398	85	33,830.00
156	Sathavari Pacha	4,152	53	2,20,056.00
157	Thaaleesapathram	77	90	6,930.00
158	Thaamara Alli	130	630	81,900.00
159	Thaamara Valayam	141	175	24,675.00
160	Thaarthaval Pacha	2,880	12	34,560.00
161	Thaathirippoovu	4,619	55	2,54,045.00
162	Thavidu	7,894	22	1,73,668.00

163	Thairu	2,923	39	1,13,997.00
164	Thakittu Vempaada	38	255	9,690.00
165	Thakkolam	104	300	31,200.00
166	Thechi Veru dry	150	80	12,000.00
167	Thenginpookkula Pacha	216	100	21,600.00
168	Thiruvattappasa	11	60	660.00
169	Thooniyankam	11	50	550.00
170	Thrikolpakkonna	483	147	71,001.00
171	Thulasi Veru dry	8	38	304.00
172	Thulasiyila Pacha	2,154	40	86,160.00
173	Thurissu	10	180	1,800.00
174	Thuvarchilakkaaaram	45	48	2,160.00
175	Uluva	186	50	9,300.00
176	Ummam samoolam	83	425	35,275.00
177	Ummathila Pacha	270	30	8,100.00
178	Ummathin kuru	16	60	960.00
179	Ungin Kuru	16	50	800.00
180	Ungin Tholi Pacha	2,880	68	1,95,840.00
181	Urukkupody sudhi	51	18	918.00
182	Uzhunnu	722	58	41,876.00
183	Vaalmulaku	56	1,950	1,09,200.00

184	Valsanaabhi (sudhi)	29	966	28,014.00
185	Varattu Manjal	1,272	94	1,19,568.00
186	Vasa	432	70	30,240.00
187	Vattappoonthaliyari	13	155	2,015.00
188	Vediyuppu	19	160	3,040.00
189	Vellakil	1,584	50	79,200.00
190	Veluthulli dry	243	800	1,94,400.00
191	Veluthulli pacha	832	100	83,200.00
192	Velutha Samkupushpam Samoolam	48	90	4,320.00
193	Vengakaathal dry	219	34	7,446.00
194	Veppila Pacha	8	30	240.00
195	Veppin Tholi dry	2,982	21	62,622.00
196	Veppenna	24	1,750	42,000.00
197	Vettila Pacha	3,061	120	3,67,320.00
198	Vilayuppu	45	70	3,150.00
199	Vlaankaay	266	110	29,260.00
200	Vaikkathaverin tholi	45	520	23,400.00
201	Yavam	165	40	6,600.00
202	Yeast	200	250	50,000.00
	TOTAL			2,18,39,042.00
LIST OF Non MFP ITEMS				

Sl.No	RawMaterials	Total Qty Required in Kg/Lit	Rate	Amount
1	Nallenna	19,083	123	23,47,209.00
2	Sarkara	67,429	31	20,90,299.00
3	Velichenna	16,459	177	29,13,243.00
	TOTAL			73,50,751
	GRAND TOTAL			4,28,51,398.00

4. The Kerala State Homoeopathic Co Operative Pharmacy (HOMCO)

HOMCO is registered under co-operative societies Act 1969. The major shareholder of the pharmacy is Govt. of Kerala and other shareholders are eminent Homoeopaths of Kerala. The objective is to manufacture and sale quality Homoeopathic medicines and there by contribute to the growth of Homoeopathy. The manufacturing unit and head office of HOMCO is located by the side of NH 47 of Alappuzha. Details of Annual Herbs Consumption 2019-2020 and 2020 – 2021 is given in Annexure 6.1.8 and 6.1.9.

5. One of the top Ayurvedic manufacturing company in private sector in Kerala

It is one of the premier Ayurvedic manufacturing institutions in the private sector, engaged in the propagation of Ayurveda, the ancient health care science of India since 1902. The institution offers classical Ayurvedic medicines and authentic Ayurvedic treatments and therapies to patients from all over India and abroad. Started essentially as a village clinic, it has now grown into a multi-unit, multi-disciplinary, multi-functional and multi-crore organisations. It has operations in different areas of Ayurvedic practice.

Table 6.1.13 Raw materials used for production of Ayurvedic medicines and suppliers

Sl No	Local Names	Botanical Name	Parts Used	Form used- Fresh/Dried	Supplier names	Consumption	
						Quantity (Kg)	Rate (Rs/Kg)
1	Agasthikkuru	<i>Linum usitattissivum</i>	Seed	Dried	VHN	55	80-130
2	Aghoriver	<i>Flacourtia indica</i>	Root	Fresh	ASSAINAR K	1	23.48
3	Alariver	<i>Plumaria rudra</i>	Root	Fresh	V Alavikkutty	45	40
4	Amari	<i>Indigofera tinctoria</i>	Whole Plant	Fresh	V Alavikutty, abdu k, Ali k, C P Beerankutty	87200	34-49
5	Amariver	<i>Indigofera tinctoria</i>	Root	Fresh	V Alavikutty, abdu k, Ali k, C P Beerankutty	118	33.92
6	Amariyila	<i>Indigofera tinctoria</i>	Leaf	Fresh	V Alavikutty	12	34
7	Amaveru	<i>Saccharum bengalensis</i>	Root	Dried	ARAFA, JASMINE	1007	128-146
8	Ambalkizhang u	<i>Nymphaea alba</i>	Rhizome	Dried	ARAFA, JASMINE	223	138-155
9	Ambazham	<i>Spondias pinnata</i>	Leaf Bud	Fresh	HASSAN V	1	10
10	Ambazham	<i>Spondias pinnata</i>	Leaf	Fresh	HASSAN V	140	19.5
11	Ambazham	<i>Spondias pinnata</i>	Bark	Fresh	ASSAINAR V	260	26.93

12	Anakkurunthotty	<i>Sida spinosa</i>	Root	Dried	V K Mohammed kutty	10	42
13	Anakurunthotty	<i>Sida spinosa</i>	Root	Fresh	ARAFA	14	19
14	Andiparippu	<i>Anacardium occidentale</i>	Endosperm	Dried	VHN	144	780-800
15	Araliver	<i>Nerium oleander</i>	Root	Fresh	Abdu K	34	28
16	Arayal	<i>Ficus religiosa</i>	Leaf	Fresh	ASSAINAR K	58	18.47
17	Arayalmottu	<i>Ficus religiosa</i>	leaf Bud	Fresh	HASSAN V ASSAINAR K,	307	49.19
18	Arayaltholi	<i>Ficus religiosa</i>	Bark	Dried	ARAFA, JASMINE	4538	50-58
19	Asali	<i>Lepidium sativum</i>	Seed	Dried	ACC,HAL	111.5	65
20	Ashoka	<i>Saraca asoca</i>	Root	Dried	ALI K, ASSAINAR , HASSAN V	8	11.57
21	Atakka	<i>Areca catechu</i>	Endosperm	Fresh	AVS HERB GARDEN	1676	240
22	Atakkamaniyan	<i>Sphaeranthus indicus</i>	Whole Plant	Dried	AVS HERB GARDEN, JASMINE, ARAFA	4829	39-51
23	Atalotakam	<i>Justicia beddomei</i>	Leaf	Dried	AVS Herb garden, Assainar K	2293	20
24	Atalotakam	<i>Justicia beddomei</i>	Root	Dried	ARAFA,JASMINE, K P TRADERS	39834	45-59.75
25	Atalotakam	<i>Justicia beddomei</i>	Whole Plant	Fresh	AVS Herb Garden, HASSAN V, ASSAINAR K	33773	36-49
26	Atalotakam	<i>Justicia beddomei</i>	Whole Plant	Fresh	AVS Herb garden	44294	20

27	Atapathiyam	<i>Holostemma ada-kodien</i>	Root Tuber	Dried	Agasthya herbals	1789	930-940
28	Athimottu	<i>Ficus racemosa</i>	Leaf Bud	Fresh	HASSAN V	272	30-49.16
29	Athithipali	<i>Scindapsus officinalis Schott.</i>	Fruit	Dried	Kurumba society(SC/ST Federation)	3134	140
30	Athitholi	<i>Ficus racemosa</i>	Bark	Dried	ARAFA, JASMINE, K P TRADERS	5535	45-61
31	Attudarbha	<i>Imperata cylindrica.</i>	Root	Dried	K P TRADERS, JASMINE , HASSAN V	3854	42
32	Attukottappal a	<i>Aristolochia bracteolata</i>	Whole plant	Fresh	ALI K, ASSAINAR , HASSAN V	1166	35-36.5
33	Attuvanji	<i>Homonoia riparia</i>	Whole Plant	Dried	ARAFA, JASMINE	1895	54-57
34	Aval	<i>Oryza sativa</i>	Endospe rm	Dried	Unneen & Co	2081	45
35	Avanakkila	<i>Ricinus communis</i>	Leaf	Fresh	ASSAINAR K	18	19
36	Avanakinver	<i>Ricinus communis</i>	Root	Dried	KMH, Arumai Prakash,Agasthya	41761	18-41
37	Avanakku	<i>Ricinus communis</i>	Seeds	Dried	ACC,	23	65
38	Avanakku	<i>Ricinus communis</i>	Root	Dried	ARAFA, M MARAKKAR, K P TRADERS	10404	46-47.75
39	Aveerakkuru	<i>Cassia occidentalis</i>	Seed	Dried	ACC	19	24

40	Avil	<i>Oryza sativa</i>	Perched Seed	Dried	Unneen & Co	672	43
41	Ayyappala	<i>Wrightia tinctoria</i>	Leaf	Fresh	AVS Herb Garden, HASSAN V, ASSAINAR K, RAZAK K	155000	22.23
42	Badam	<i>Prunus dulcis</i>	Endosperm	Dried	VHN,, C V AZEEZ	311	650-800
43	Brahmi	<i>Bacopa monnieri</i>	Whole Plant	Fresh	AVS HERB GARDEN, HASSAN V ,ALI K, ASSAINAR	184016	18.50-27
44	Chakkarakolli	<i>Gymnema sylvestre</i>	Whole Plant	Fresh	Alavikutty, Mohammed Ali A	1000	25.5-32
45	Chandanam	<i>Santalum album</i>	Heart Wood	Dried	Marayur sandal division	11000	190-1010
46	Changalamparanda	<i>Cissus quadrangularis</i>	Whole Plant	Fresh	Moideenkutty, Ummer M	667	21.75
47	Changanampullu	<i>Cymbopogon martinii</i>	Whole Plant	Fresh	Alavikutty v	314	34
48	Channakizhan gu	<i>Costus speciosus</i>	Rhizome	Fresh	Hamza haji, Ali k, Assainar k	419	29-30
49	Chappangam	<i>Caesalpinia sappan</i>	Bark	Dried	AVS HERB GARDEN	96	23.61
50	Charngeri	<i>Oxalis corniculata</i>	Whole Plant	Fresh	V Alavikutty	1800	49
51	Chathurakkalli	<i>Euphorbia antiquorum</i>	Leaf	Fresh	AVS HERB Garden	155	11.5
52	Cheenamulak	<i>Capsicum annum</i>	Fruit	Fresh	AVS HERB Garden	2	28

53	Chempakamottu	<i>Jasminum grandiflorum</i>	Flower Bud	Dried	AVS Herb Garden	343.3	932
54	Chemparuthiyilka	<i>Hibiscusrosa sinensis</i>	Leaf	Fresh	Kunhammu, Razak, Assainar	14950	34-35
55	Chemparuythimottu	<i>Hibiscus rosa-sinensis</i>	Flower Bud	Fresh	Kunhammu, Razak, Assainar	4	45
56	Chengazhuneerarkizhangu	<i>Kaempferia rotunda</i>	Rhizome	Fresh	Mohammed kuttu v k, Ali k, C P Nazer	3868	29
57	Cherukadaladi	<i>Cyathula prostrata</i>	Root	Dried	Abdu K	20	29
58	Cherula	<i>Aerva lanata</i>	Whole Plant	Fresh	Ali K,AVS HERB GARDEN	3795	24-49
59	Cherunaranga	<i>Citrus limon</i>	Fruit	Fresh	ABDU K, ASSAINAR K	11295.5	24-120
60	Cheruparava	<i>Sida acuta</i>	Bark	Dried	Assainar K	864	24-27
61	Cherupayar	<i>Phaseolus aureus</i>	Seed	Dried	Unneen & Co	1794	65-68
62	Cheruthekk	<i>Clerodendrum serratum</i>	Root	Dried	Arafa, M Marakkar, Agasthya	4297	100-151
63	Cheruvazhuthina	<i>Solanum melongena</i>	Root	Dried	Kurumba society(SC/ST Fedn),Brothers, Jasmine, AVS Herb Garden	125541	53.5-92
64	Chethikoduveli	<i>Plumbago zeylanica</i>	Rhizome	Dried	Agasthya herbals	1755	122-130
65	Chettenthal	<i>Phoenix pusilla</i>	Root	Dried	BROTHERS, JASMINE	3975	180-197
66	Chitrakmul	<i>Plumbago zeylanica</i>	Rhizome	Dried	Agasthya herbals	1755	122-130

67	Chittamruth	<i>Tinospora cordifolia</i>	Stem	Fresh	A ,ASSAINAR K, HASSAN V, ARAFA	185885	24, 25, 32
68	Chittaratha	<i>Alpinia galanga</i>	Rhizome	Dried	AVS HERB GARDEN	50	80
69	Chukku	<i>Zingiber officinale</i>	Rhizome	Dried	NAFED, STC	110473	101-144
70	Chullivith	<i>Hygrorhiza aristata</i>	Seed	Dried	ACC,	5	185
71	Chuvanulli	<i>Allium cepa</i>	Bulb	Fresh	ABDU K, ASSAINAR, C P NAZER	53216	32-80
72	Darbha	<i>Desmostachya bipinnata</i>	Root	Dried	K P TRADERS, JASMINE , HASSAN V	11740	147-177
73	Eanthinkaya	<i>Cycas circinalis</i>	Endosperm	Dried	Agasthya herbals	1247	201
74	Eathapazham	<i>Phoenix dactylifera</i>	Fruit	Fresh	VHN	12	80
75	Elakkaya	<i>Elettaria cardamomum</i>	Dried Fruit	Dried	Kingfisher, Header Commodities, Agasthya	11125	865-890
76	Elaneer	<i>Cocos nucifera</i>	Fruit	Fresh	Vijayan T	87975	22
77	Elavalukam	<i>Prunus avium</i>	Dried Fruit	Dried	ACC, SADSC	1093	935-1268
78	Ellenna	<i>Sesamum indicum</i>	Seed Oil	Fresh	Vyttila, VMC, RG OILs	745225	106-163
79	Ellinthandu	<i>Sesamum indicum</i>	Stem	Dried	K Ali	84	23
80	Ellu	<i>Sesamum indicum</i>	Seed	Dried	Unneen & Co, Patwa mahendrakumar	17396	92-145

81	Erukkila	<i>Calotropis gigantea</i>	Leaf	Fresh	ASSAINAR, HASSAN V, ABDU K	287	17.5-18.68
82	Erukkinver	<i>Calotropis gigantea</i>	Root	Dried	KUNHAMMU K, KUNDIL BEERAYU	3317	31.49
83	Ethapazham	<i>Phoenix dactylifera</i>	Fruit	Fresh	Abdu k, Marakkar, Assainar	9.75	171-354
84	Ganapathinara nga	<i>Citrus medica</i>	Fruit	Fresh	M Musthafa, Moideen K,	2326	36-38
85	Ghee	<i>Cow ghee</i>	Ghee	Fresh	Milma, Nilgiris Dt.Co.Op.Milk Producers Union Ltd	191684	45-427.68
86	Gothamb	<i>Triticum aestivum</i>	Fruit	Dried	Unneen & Co	2	23
87	Honey	<i>Apis mellifera</i>	Honey	Fresh	HPP, Hexa, KSS, V Raman Nair	104420	135-148
88	Ilanhippoov	<i>Mimusops elengi</i>	Flower	Dried	RNRT, VHN	47	320
89	Illippa	<i>Madhuca longifolia</i>	Bark	Dried	HASSAN V	9	45.92
90	Illippakkathal	<i>Madhuca longifolia</i>	Heart Wood	Dried	Arafa traders	2465	36.75
91	Inchi	<i>Zingiber officinale</i>	Rhizome	Fresh	V K Mohammedkutty	2186	23-100
92	Irulinkathal	<i>Dalbergia sissoo DC.</i>	Heartwood	Dried	AVS Herb Garden	984	4
93	Iruveli	<i>Plectranthus vettiveroides</i>	Root	Dried	ARAFA	5065	183
94	Ithi	<i>Ficus microcarpa</i>	Leaf Bud	Fresh	HassaN V	107	45

95	Ithi	<i>Ficus microcarpa</i>	Bark	Dried	AVS Herb Garden	247	42
96	Ithi	<i>Ficus microcarpa</i>	BARK	Fresh	K FERUZ, HASSAN V	164	30-49
97	Ithikanni	<i>Dendrophthoe falcata</i>	Whole Plant	Fresh	Assainar K	24	25
98	Ithimottu	<i>Ficus microcarpa</i>	Flower Bud	Fresh	AVS HERB GARDEN	328	19
99	Itinhil ver	<i>Commiphora caudata</i>	Root	Fresh	ALI K	1015	27-Oct
100	Jaggery	<i>Sacharum officianrum</i>	Stem extract		Unneen & Co	12000	37-55
101	Jathikka	<i>Myristica fragrans</i>	Fruit-endosp erm	Dried	ACC, STC, AVS Herb garden	5082	360-575
102	Jathikka Thailam	<i>Myristica fragrans</i>	Oil	Fresh	Geekey Drug house	60.98	1257-1538
103	Jathipathri	<i>Myristica fragrans</i>	Arill	Dried	ACC, STC,AVS Herb garden	1936	360-858
104	Jeerakam	<i>Cuminum cuminum</i>	Oil	Dried	AVS Factory	4.5	1450-2000
105	Kacholam	<i>Kaempferia rotunda</i>	Root	Dried	Suresh Trading Co	581	325
106	Kadali	<i>Musa sapientum</i>	Stem tuber	Fresh	ASSAINAR K , ABDU K	218.6	50
107	Kadalipazham	<i>Musa sapientum</i>	Fruit	Fresh	AVS HERB GARDEN, K ABDU	217	60-154

108	Kadalivazhakutam	<i>Musa sapientum</i>	Rhizome	Fresh	Mohammed Ali A, Hassan v	154	15.39
109	Kadambu	<i>Neolamarckia cadamba</i>	Root	Fresh	Mohammed Ali	74	19
110	Kadaram	<i>Acacia sinuata</i>	Root	Frsh	Mohammed Ali	20	28
111	Kaipananarachi	<i>Cipadessa baccifera</i>	Whole Plant	Fresh	Assainar K	790	20.5
112	Kaipanpatolam	<i>Trichosanthes lobata</i>	Whole Plant	Fresh	Local collectors	3439	39-40
113	Kaipanpatolam	<i>Trichosanthes lobata</i>	Whole Plant	Dried	VSS MARAYUR	12531	177
114	Kakkathondi	<i>Trichosanthes tricuspidata</i>	Root	Dried	Hassan V, Arafa Traders	2155	43
115	Kalkandam	<i>Sacharum officinarum</i>	Purified Extract	Dried	Unneen & Co, Pooja Kalakandam	14091	43-48
116	Kallal	<i>Ficus arnottiana</i>	Bark	Dried	AVS HERB GARDEN	69	35
117	Kallippalaveru	<i>Euphorbia antiquorum</i>	Root	Fresh	AVS HERB GARDEN	1	30
118	Kalliyila	<i>Euphorbia neriifolia</i>	Leaf	Fresh	ASSAINAR K	409	16.48
119	Kallurvanhi	<i>Rotula aquatica</i>	Root	Dried	JASMINE	226	128
120	Kampipalaver	<i>Mallotus philippensis</i>	Root	Fresh	Mayin k	12	18.28
121	Kanaveeram	<i>Nerium oleander</i>	Root	Fresh	Abbas Moopedan	452.5	20.5
122	Kanheeram	<i>Strychnos nux-vomica</i>	Bark	Fresh	Assainar K	17	23

123	Kanheeram	<i>Strychnos nuxvomica</i>	Leaf	Fresh	Assainar K	64	25
124	Kanhikkoorka/ Panikkorkka	<i>Plectranthus amboinicus</i>	Whole Plant	Fresh	Hassan V ,Mohammed Ali A	198	26.5-49
125	Kanhirakkuru	<i>Strychnos nuxvomica</i>	Seed	Dried	VHN	5	100
126	Kanhunni	<i>Eclipta alba</i>	Whole Plant	Fresh	Marakkar M, Ali K	95674	24
127	Karalayam	<i>Aristolochia indica</i>	Root	Fresh	ALI K, MARAKKAR M	61	28.5-30
128	Karamullu	<i>Canthium coromandelicum</i>	Bark	Fresh	Hamza Haji	9	32
129	Karimbana	<i>Borassus flabellifer</i>	Leaf Base	Fresh	Alavikutty V	1	50
130	Karimbana	<i>Borassus flabellifer</i>	Endosperm	Fresh	AVS Herb Garden	15	80
131	Karimbu	<i>Saccharum officinarum</i>	Stem	Fresh	HYDRU K , ASSAINAR K	223	20.53
132	Karimbuver	<i>Saccharum officinarum</i>	Root	Dried	ARAFA, BROTHERS, JASMINE	5132	46-55.75
133	Karimkuvalam	<i>Monochoria hastaeifolia</i>	Whole Plant	Dried	Arafa	1416	138.75
134	KariMkuvalum	<i>Monochoria hastaeifolia</i>	Whole Plant	Fresh	Hassan V, Assainar K	2342	23.39
135	Karimthakara	<i>Senna occidentalis</i>	Whole Plant	Fresh	Hassan V	1	45

136	Karimthumba	<i>Anisomeles malabarica</i>	Flower	Fresh	Hassan V	36	37
137	Karimuthil	<i>Centella asiatica</i>	Whole Plant	Fresh	K Ali	555	22.98-50.80
138	Karingali	<i>Acacia catechu</i>	Heart Wood	Dried	Arafa traders, Jasmine herbals	18597	60-78.75
139	Karinkurinhil	<i>Strobilanthes ciliata</i>	Root	Dried	Kurumba Society, JASIMNE, ARAFA AVS HERB GARDEN, JASIMNE, ARAFA	95336	45-53
140	Karinochi	<i>Vitex negundo</i>	Leaf	Fresh	Marakkal M	6270	19
141	Kariveppila	<i>Murraya koenigii</i>	Leaf	Fresh	Mohammed Ali A	10759	33.75
142	Karpoora tulasi	<i>Ocimum kilimandscharicum</i>	Whole Plant	Fresh	Yousuf k , Assainar k	980	26.69
143	Karthotti	<i>Hugonia mystax</i>	Root	Fresh	Marakkal m, Shafeeque	734	25
144	Karthotti	<i>Hugonia mystax</i>	Root	Dried	ARAFA, KP TRADERS	2781	80-95
145	Karuka	<i>Cynodon dactylon</i>	Whole Plant	Fresh	Hassan, Abdu k	56006	23.5-49
146	Karunochi	<i>Vitex negundo</i>	Root	Dried	Arafa, Jasmine, M Marakkal	2836	32-46
147	Kattappa	<i>Ageratum conyzoides</i>	Leaf	Fresh	Abdu k	1449	41
148	Kattarvazha	<i>Aloe vera</i>	Leaf	Fresh	ABDU K, ALI K, ASSAINAR K	66456	5.25-13.5
149	Kattuchena	<i>Amorphophallus paeoniifolius</i>	Rhizome	Fresh	Hassan V , Mohammed Ali A	8276	29-30.5

150	Kattumulaku	<i>Piper chaba</i>	Root	Dried	Kurumba society, Brothers, Avs Herb Garden	13984	62-80
151	Kattupayar	<i>Vigna trilobata</i>	Root	Dried	Arafa, Jasmine,	5573	84-121
152	Kattuthipaliver	<i>Piper mullesua</i>	Root	Dried	AVS HERB GARDEN, Brothers	11776	62-197
153	Kattuzhunnu	<i>Vigna sublobata</i>	Root	Dried	AVS HERB GARDEN, BROTHERS	5574	59-121
154	Katuku	<i>Brassica juncea</i>	Seed	Dried	Dathri impex, Unneen & co	2020	47-55
155	Kazhimuthang a	<i>Cyperus esculentus</i>	Root Tuber	Fresh	K Usman	494	28.75
156	Kazhimuthang a	<i>Cyperus esculentus</i>	Root Tuber	Dried	Hiya India Ltd	2359	47
157	Kazhimuthang a	<i>Cyperus esculentus L</i>	Root Tuber	Fresh	K Usman	494	28.75
158	Keezharnelli	<i>Phyllanthus amarus</i>	Whole Plant	Fresh / Dried	V Hassan, PSS	11000	35.81
159	Kiriyatha	<i>Andrographis paniculata</i>	Whole Plant	Dried	Rameshchandra	5965	25-35.70
160	Kiriyatha	<i>Andrographis paniculata</i>	Whole Plant	Fresh	Local collectors	8323	36-38
161	Kodampuli	<i>Garcinia gummi-gutta</i>	Fruit Rind	Dried	Mathew Thamarasseri	467	130
162	Konna	<i>Cassia fistula</i>	Bark	Fresh	Arafa, Abdu K	7244	32
163	Konna	<i>Cassia fistula</i>	Root	Dried	Arafa, Abdu K	3	38
164	Konna	<i>Cassia fistula</i>	Leaf	Fresh	Abdu k, Marakkar, Hamza Haji	3500	20.15
165	Konnatholi	<i>Cassia fistula L</i>	Bark	Dried	Brothers, jasmine	1880	40-60

166	Koovalam	<i>Aegle marmelos</i>	Leaf	Fresh	AVS Herb garden, Assainar K, Brothers	54779	36.11
167	Koovalam	<i>Aegle marmelos</i>	Root	Dried	Arafa, Sebastian Traders, KMH	90729	28.56-60.75
168	Kova	<i>Coccinia grandis</i>	Leaf	Fresh	Assainar K	33	7
169	Kova	<i>Coccinia grandis</i>	Rhizome	Fresh	Brothers	2330	25-26.75
170	Kozhinhil	<i>Tephrosia purpurea</i>	Root	Fresh	Mohammed Ali A	161	27.5
171	Kozhuppa	<i>Portulaca oleracea</i>	Whole Plant	Fresh	Hassan V , Moideen Karuthedan	1083	29-50.69
172	Krimisathru	<i>Vernonia cinerea</i>	Fruit	Seeds	BTC	547	387
173	Kumbalam	<i>Benincasa hispida</i>	Fruit	Fresh	Mohammed Ali A	10424	15-25
174	Kumizh	<i>Gmelina arborea</i>	Root	Dried	Brothers , AVS Herb Garden	39840	34.66-53.75
175	Kunnankkaya	<i>Musa paradisiaca L.</i>	Fruit	Dried	AVS HERB GARDEN	405	225
176	Kunniver	<i>Abrus precatorius L.</i>	Root	Dried	Ummer M, Hassan V	567	30.67
177	Kunniyila	<i>Abrus precatorius L.</i>	Leaf	Fresh	Mohammed ali	1.5	34
178	Kuppameni	<i>Bixa orellana L.</i>	Leaf	Fresh	Hamza Haji, Hassan V	165	32
179	Kurumulak	<i>Piper nigrum L.</i>	Fruit	Dried	NAFED,STC	23653	344-406

180	Kurunthotty	<i>Sida rhombifolia L.</i>	Root	Dried	Arafa, K P Traders, Kurumba Society	189969	95-133
181	Kusha	<i>Saccharum spontaneum L.</i>	Root	Dried	Arafa, BrOTHERS, JASMINE	3747	84-85.75
182	Kutakapala	<i>Holarrhena antidysentrica</i>	Bark	Fresh	C P Kunhimohammed, K Ali	4131	27-36.89
183	Maize Starch	<i>Zea mays</i>	Seed powder	Dried	Indras Agencies Pvt Ltd, Sree Meenakshe Enterprises	39700	28.5-34
184	Malar	<i>Oryza sativa L.</i>	Seed	Dried	C.V Azeez	2098	90
185	Malli	<i>Coriandrum sativum L.</i>	Dried Fruit	Dried	Unneen & Co	13367	68-71
186	Manathakkali	<i>Solanum americanum Mill.(S.nigrum. L)</i>	Whole Plant	Fresh	Hassan V	69	25.5
187	Mandaram	<i>Bauhinia variegata L.</i>	Fresh	Dried	Brothers	1480	41
188	Manhamantharam	<i>Bauhinia purpurea L.</i>	Root	Dried	Brothers, K P Traders	3933	75-82
189	Manjal	<i>Curcuma longa L.</i>	Rhizome	Fresh	Abdu K, Ali K, C P Beerankuty	172944	24
190	Mathrukathini	<i>Other</i>	Whole Plant	Fresh	Assainar K	8	23
191	Mavin tholi	<i>Mangifer indica</i>	Bark	Fresh	Kunhammu K Assainar,	74.75	20
192	Milk-Cow	<i>Cow milk</i>	Milk	Fresh	Milma, Nilgiris Dt.Co.Op.Milk Producers Union Ltd	2163883	35-48
193	Milk-Goat	<i>Goat Milk</i>	Milk	Fresh	A V S Goat Farm	4636	37.5

194	Moovila	<i>Pseudarthria viscida (L.) Wight & Arn.</i>	Root	Dried	Kurumba Society Brothers, Jasmine, Avs Herb Garden	42771	50.5-133.75
195	Mukkannaper ukila	<i>Allophyllus serratus</i>	Leaf	Fresh	Hassan V	716	30
196	Mukkappeeram	<i>Mukia maderaspatana (L.) M.Roem.</i>	Whole Plant	Fresh	V K Muhammed Kutty	5	40.17
197	Mukkutti	<i>Biophytum sensitivum (L.) DC.</i>	Whole Plant	Fresh	Shamsudheen K P	16779	34.13
198	Mulakuthanniver	<i>Toddalia asiatica (L.) Lam.</i>	Whole Plant	Fresh	Hassan V	10	23.48
199	Mulamplash	<i>Schrebera swietenoides Roxb.</i>	Bark	Fresh	Arafa	180	31
200	Mulla	<i>Jasminum sambac (L.) Aiton</i>	Whole Plant	Fresh	Hamza haji, Hassan V	3	18
201	Mullancheera	<i>Amaranthus spinosus L.</i>	Whole Plant	Fresh	Hassan V	208	18.5-20
202	Mullanki	<i>Raphanus raphanistrum subsp. sativa (L.) Domino</i>	Root Tuber	Fresh	Abdu K	4	38

203	Mullilav	<i>Salmaaliamalabarica</i>	Bark	Fresh	Abdu K	1	40
204	Munha	<i>Premnacorymbosa Rottler & Willd.</i>	Leaf	Fresh	Kunhammu	2	30
205	Munha	<i>Premnacorymbosa Rottler & Willd.</i>	Root	Dried	K P Traders, Brothers	49149	59-60.75
206	Murikkila	<i>Erythrina variegata L.</i>	Leaf	Fresh	V K Mohammed Kutty	53000	24
207	Murikkintholi	<i>Erythrina variegata L.</i>	Bark	Fresh	Abdu k	53	28-49
208	Muringatholi	<i>Moringa oleifera Lam.</i>	Bark	Fresh	Ali K, Alavikutty V	4817	29.73
209	Muringaver	<i>Moringa oleifera Lam.</i>	Root	Fresh	Kundil Saidalavi	4055	29.73
210	Muringayila	<i>Moringa oleifera Lam.</i>	Leaf	Fresh	Assainar K	108000	32.16
211	Muthari	<i>Eleucine coracana Linn</i>	Seed	Dried	Unneen & Co	95	35
212	Muthil	<i>Centella asiatica (L.) Urb.</i>	Whole Plant	Fresh	Moideen Karuthedan	119	34
213	Muthira	<i>Dolichos biflorus L.</i>	Dry Seeds	Dried	UNNEEN, DATHRI	17311	43-47.67
214	Mylanchi	<i>Lawsonia inermis L.</i>	Leaf	Fresh	Assainar K	4	14.05

215	Nagadanthi	<i>Baliospermum montanum</i> (Willd.) Mull.Arg.	Rhizome	Dried	AVS HERB GARDEN	4758	195-200
216	Naikkurana	<i>Mucuna pruriens</i> (L.) DC. var. <i>utilis</i> (Wall. ex Wight) Baker ex Burck	Stem	Dried	Brothers, Jasmine	7116	42-67.75
217	Naikkurana	<i>Mucuna pruriens</i> (L.) DC. var. <i>utilis</i> (Wall. ex Wight) Baker ex Burck	Glands & hair on fruit	Dried	Local suppliers	41	5500-5800
218	Naithal Kizhangu	<i>Strophanthus wightianus</i> Wall.ex.wight	Rhizome	Fresh	Mayin K	398	27
219	Nalikeram	<i>Cocos nucifera</i> L	Endosperm	Fresh	V Abdurahiman, AVS Herb Garden	793883	16-18
220	Nalikeram	<i>Cocos nucifera</i> L.	Root	Fresh	V Abdurahiman, AVS Herb Garden	6	32.50-48.50
221	Nandyarvattom	<i>Tabernaemontana divaricata</i> (L.) R.Br. ex M.Roem. & Schult.	Flower Bud	Fresh	Agasthya, Ali K	7	

222	Nanmughapullu	<i>Actinopteris dichotoma Bedd</i>	Whole Plant	Dried	VHN, Agasthya, Rajkumar	216	75-90
223	Nannari	<i>Hemidesmus indicus (L.) R.Br. ex Schult.</i>	Rhizome	Fresh	PSS, AGASTHYA	36476	444-570 (F-95)
224	Navara	<i>Oryza sativa L.</i>	Seed	Dried	Jewel trading Co, Chandragiri Mill	28988	40
225	Neerattienna	<i>Hydnocarpus kurzii (King) Warb.</i>	Oil		Keerthi oil mills	1417	805-1350
226	Neerattikkuru	<i>Hydnocarpus laurifolia</i>	Seed	Dried	Satheesh Nilambur	300	320
227	Neermaruth	<i>Terminalia arjuna (Roxb. Ex DC.) Wight & Arn.</i>	Bark	Fresh	Mohammed Ali A	371	31
228	Neermaruthintholi	<i>Terminalia arjuna</i>	Bark	Dried	Jasmine, Brothers, AVS Herb Garden	4988	44-50
229	Neermathalam	<i>Crataeva magna</i>	Leaf	Fresh	Ali K , Hassan V	175	18-49
230	Neermathalam	<i>Crataeva magna (Lour) DC.</i>	Root	Dried	Brothers, Jasmine	7865	40-53.75
231	Neervalam	<i>Croton tiglium L.</i>	Endosperm	Dried	ACC	85	335

232	Nellikka	<i>Phyllanthus emblica L.</i>	Fruit	Fresh /Dried	Rameshchandra, Adinath, AVS Herb Garden	243671	30-70/135-162
233	Nellikka	<i>Phyllanthus emblica L.</i>	Fruit	Fresh	AVS Herb Garden, Hassan V, Assainar K, Abdu K, Mayin , Marrakkar M	163671	28-42
234	Nenmenivaga	<i>Albizia lebbbeck (L.) Benth.</i>	Bark	Fresh	VHN, Assainar K, Mohammed Ali A	550	32.5-40
235	Nhaval	<i>Syzygium cumini (L.) Skeels</i>	Seed	Dried	ACC	60	80
236	Nhaval	<i>Syzygium cumini (L.) Skeels</i>	Bark	Dried	Mohammed Ali A	4354	28.5-30
237	Nherinjampuli	<i>Solena amplexicaulis (Lam.) Gandhi</i>	Leaf	Fresh	Hassan V	238	28.89
238	Nherinjampuli	<i>Solena amplexicaulis (Lam.) Gandhi</i>	Rhizome	Fresh	Shamsudheen K P	3954	43
239	Nhettaval	<i>Holoptelea integrifolia (Roxb.) Planch.</i>	Leaf	Fresh	M Marakkar, AVS HERB GARDEN	14214	18.46
240	Nhettaval	<i>Holoptelea integrifolia (Roxb.) Planch.</i>	Bark	Dried	M Abu, Brothers, K P traders	4967	27.50-47.75

241	Nhottanhodiy an	<i>Physalis minima L.</i>	Whole Plant	Fresh	ASSAINR V	1077	30-49
242	Nilamparanda	<i>Desmodium triflorum (L.) DC.</i>	Whole Plant	Fresh	Abdul Gafoor V K, Abdu K	1450	35-49
243	Nilappala	<i>Euphorbia thymifolia Linn</i>	Whole Plant	Fresh	Albert, Alavikutty, Assainar, Albert shelvaraj	5112	32.67
244	Niraral	<i>Marsilea quadrifolia L.</i>	Whole Plant	Fresh	Hassan V	81	20.5
245	Nithyakalyani	<i>Vinca roseae</i>	Whole Plant	Fresh	Assainar V	5709	53-55
246	Orila	<i>Desmodium gangeticum (L.) DC.</i>	Root	Dried	Brothers, K P traders	42245	92- 128.75
247	Orilathamara	<i>Narvelia zeylanica (L.) DC.</i>	Whole Plant	Fresh	Hamza Haji, Hassan V	24	56
248	Otto-D-Rose	<i>Rosa floribunda L</i>	Rose oil		D.V.Deo Industries,	11	1136.36
249	Pala ver	<i>Alstonia scholaris (L.) R.Br.</i>	Root	Dried	V Mayin	64.5	28
250	Palakapayyana	<i>Oroxylum indicum (L.) Benth. ex Kurz</i>	Root	Dried	Arafa, Jasmine	43593	58-67.75

251	Palatholi	<i>Alstonia scholaris</i> (L.) R.Br.	Bark	Fresh	C P Nazer, Mohammed Ali A	3938	23 - 33.26
252	Palmuthukku	<i>Pueraria tuberosa</i> (Roxb. ex Willd.) DC.	Tuber		Brothers	34414	40
253	Panal	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Leaf	Fresh	Assainar K	19.5	19.69
254	Panal	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Root	Fresh	Assainar K	10.5	21-23
255	Panchasara	<i>Saccharum officinarum</i>	Stem Extract	Dried	Unneen &Co, SNGovindarajalu Naidu & Sons	57064	34
256	Panchasara	<i>Sacharum officianarum</i>	Purified Extract	Dried	Unneen & Co	56000	31.60-35.40
257	Panichakam	<i>Hibiscus furcatus</i> Roxb.	Whole Plant	Fresh	Hydru K	728	20.5-22
258	Parapatakapullu	<i>Oldenlandia corymbosa</i> L.	Whole Plant	Fresh	Hamza Haji, Hassan V	172772	36
259	Parvalli	<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton	Root	Dried	Arafa	4660	69
260	Pasupasi	<i>Myristica malabarica</i> Lam.	Aril	Fresh	ACC	83	45-550

261	Patakizhangu	<i>Cyclea peltata (Lam.) Hook.f. & Thomson</i>	Rhizome	Dried	KERA SPICES, ARAFA, AGSTHYA	32500	440-583
262	Payar	<i>Vigna unguiculata Linn</i>	seed	Dried	Unneen & Co	226	64-68
263	Peenari	<i>Sterculia foetida L.</i>	Root	Dried	STC	502.84	160
264	Peral	<i>Ficus benghalensis L.</i>	Leaf	Fresh	Hassan V	497	23
265	Peral vedu	<i>Ficus benghalensis L.</i>	Stile Root	Fresh	Assainar K	221	22
266	Peralmottu	<i>Ficus benghalensis L.</i>	Leaf Bud	Fresh	Hassan V , Hamza Haji	418	20-49
267	Peraltholi	<i>Ficus benghalensis L.</i>	Bark	Dried	Jasmine, K P Traders	2382	50-56.75
268	Perumaratholi	<i>Ailanthus excelsa Roxb.</i>	Bark	Fresh	Moideen Karuthedan	3	26
269	Perumjeerakam	<i>Foeniculum vulgare Mill.</i>	Fruit	Dried	UNNEEN & CO	164	114
270	Perumkurumba	<i>Chonemorpha fragrans (Moon) Alston</i>	Root	Dried	Arafa. KPT raders	6573	42-55.75
271	Pichakam	<i>Jasminum grandiflorum L.</i>	Root	Fresh	AVS HERB GARDEN, Assainar K P	70	20.5-45
272	Pichakam	<i>Jasminum grandiflorum L.</i>	Leaf	Fresh	Hassan V , AVS HERB GARDEN	1311	35.43

273	Plashinkuru	<i>Butea monosperma (Lam.) Taub.</i>	Seed	Dried	VHN,	48.9	65
274	Plasintholi	<i>Butea monosperma (Lam.) Taub.</i>	Bark	Fresh	M MARAKKAR	973.5	29-31
275	Plavila	<i>Artocarpus heterophyllus Lam.</i>	Leaf	Fresh	M Marakkar	1	15
276	Poithalachiyila	<i>Nervelia zeylanica</i>	Whole Plant	Fresh	Mohammed Ali A	523	30.67
277	Ponnamthakar am	<i>Senna sophera (L.) Roxb.</i>	Seed	Fresh	VHN	37.8	49
278	Ponngani	<i>Alternanthera sessilis (L.) R.Br. ex DC.</i>	Whole Plant	Fresh	V Hassan	92	29-45
279	Ponnumath	<i>Argemone mexicana L.</i>	Root	Fresh	Hamza Haji	20	35
280	Pookkaitha	<i>Pandanus odorattissimus L.f</i>	Stile Root	Fresh	Shamsudheen k p , CP Kunhahammed	2893	21.99
281	Poopathiri	<i>Stereospermum suaveolens</i>	Root	Dried	Brothers, Jasmine	41000	28-58.75
282	Poovamkurun nila	<i>Vernonia cinerea (L.) Less.</i>	Whole Plant	Fresh	Hydru K	25000	26-27

283	Poovarash	<i>Thespesia populnea</i> (L.) <i>Sol. ex Correa</i>	Bark	Fresh	K Kunhammu	22	24
284	Pottappullu	<i>Typha elephantina</i> <i>Grah. non Roxb.</i>	Whole Plant	Fresh	Assainar K	35	27
285	Prasarani	<i>Merremia tridentata</i> (L.) <i>Hallier f.</i>	Whole Plant	Fresh	Hassan V, Assaianar K, PSS	7305	32.97
286	Prasarani	<i>Merremia tridentata</i> (L.) <i>Hallier f.</i>	Whole Plant	Dried	PSS	3559	45-47
287	Pukayila	<i>Nicotiana tabacum</i> L.	Leaf	Dried	Local Purchase	150	98
288	Pulichuvadi	<i>Ipomoea pes-tigridis</i> L.	Whole Plant	Fresh	Assainar K	4	43
289	Pulimori	<i>Tamarindus indica</i> L.	Bark outer ridges	Fresh	Abdu K	15	44
290	Pulinharambu	<i>Tamarindus indica</i> L.	Leaf Rachis	Fresh	K Usman, Hydru K	1720	34.75
291	Pulinkuru	<i>Tamarindus indica</i> L.	Seed	Dried	K Kunhammu	646.75	33.5
292	Pulitholi	<i>Tamarindus indica</i> L.	Bark	Fresh	M Abhu, Assainar K	3853	27-31
293	Puliyila	<i>Tamarindus indica</i> L.	Leaf	Fresh	Assainar K ,Hydru K	325971	21.25

294	Pullani	<i>Calycopteris floribunda</i> (Roxb.) Poir.	Fruit	Fresh	Marakkar M	3	41,37
295	Pullaniver	<i>Calycopteris floribunda</i> (Roxb.) Poir.	Root	Fresh	Marakkar M	148	41.37
296	Pullaniyila	<i>Calycopteris floribunda</i> Lam	Whole Plant	Fresh	Marakkar M	3721	21
297	Putharichunta	<i>Solanum anguivi.v anguivi</i>	Root	Dried	Arafa	9586	85-142
298	Ragi Powder	<i>Eleusine coracana</i> (Linn) Gaertn	Seed	Dried	Unneen & Co	25	60
299	Raktachandana	<i>Pterocarpus santalinus</i> L.f.	Heart Wood	Dried	Kunnummal enterprises	2743	290-331
300	Ramacham	<i>Vetiveria zizanioides</i>	Root	Dried	AJAYAN K, KVS BABU,SREEJITH T	22074	156
301	Ramathulasi	<i>Ocimum basilicum</i> L.	Leaf	Fresh	Hassan V	50	47
302	Ramatulasi	<i>Ocimum basilicum</i> L.	Whole Plant	Fresh	Hassan V	6	49
303	Sankhpushpam	<i>Clitoria ternatea</i> L.	Whole Plant	Fresh	V Hassan	725	34
304	Sathavari	<i>Asparagus racemosus</i> Willd.	Rhizome	Fresh	Arafa	196000	34

305	Sathavari	<i>Asparagus racemosus Willd.</i>	Rhizome	Dried	Arafa	9800	175-180
306	Sharkara	<i>Sacharum officianrum L</i>	Stem extract	Dried	Unneen & Co	12000	37-55
307	Somalatha	<i>Sarcostemma acidum (Roxb.) Voigt</i>	Stem	Fresh	Hamza Haji	268	490
308	Tender Coconut	<i>Cocos nucifera</i>	Coconut water	Fresh	P Vijayan	72323	22
309	Thakara	<i>Cassia tora</i>	Seed	Dried	VHN	25	39
310	Thaliyari	<i>Ipomoea nil (L.) Roth</i>	Seed	Dried	ACC	381	155
311	Thamara	<i>Nelumbo nucifera Gaertn.</i>	Flower	Fresh	ALI K ,	40	80
312	Tharthaval	<i>Spermacoce hispida L.</i>	Whole Plant	Fresh	Hassan V Alavikutty V	53564	18-30.67
313	Thavidu	<i>Oryza sativa L.</i>	Bran of seed	Dried	Chandragiri Mill,	9540	21
314	Thavizhama	<i>Boerhavia diffusa L.</i>	Whole Plant	Fresh	Assainar K	8512	18
315	Thechi	<i>Ixora coccinea L.</i>	Root	Fresh	Hassan V, AVS HerbGarden	3854	29
316	Thechipoov	<i>Ixora coccinea L.</i>	Flower	Fresh	K Razak	4950	35.63
317	Thekkinver	<i>Tectona grandis L.f.</i>	Heart Wood	Fresh	AVS Herb garden	15	18

318	Thenginpookil a	<i>Cocos nucifera</i> L.	Flower Bud	Fresh	AVS Herb Garden	192	40
319	Therkkada	<i>Heliotropium</i> <i>indicum</i> L.	Whole Plant	Dried	Brothers, Jasmine	2185	46-50
320	Thina	<i>Setaria italica</i> (L.) P. Beauv	Seed	Dried	VHN, UNNEEN &CO	496	25-30
321	Thiruthaali	<i>Ipomoea</i> <i>marginata</i> (Desr.) Verdc.	Whole Plant	Fresh	K Razak, K Beerayu	384	27
322	Thodukara	<i>Desmodium</i> <i>oojeinense</i> (Roxb.) H. Ohashi	Root	Fresh	C P NAZER, ASSAINAR K	88	28
323	Thooniyankam	<i>Taxus</i> <i>wallichiana</i> Zucc.	Leaf	Fresh	C P NAZER, ASSAINAR K	326	19-21
324	Thottavati	<i>Mimosa pudica</i> L.	Root	Dried/ Fresh	Jasmine KP Traders	3695	24-58
325	Thulasi	<i>Ocimum</i> <i>sanctum</i>	Whole Plant	Fresh	C P Nazer, ASSAINAR K	6804	41
326	Thulasippov	<i>Ocimum</i> <i>sanctum</i>	Flower	Fresh	C P Nazer, ASSAINAR K	304	53
327	Thulasiyila	<i>Ocimum</i> <i>sanctum</i>	Leaf	Fresh	C P Nazer, ASSAINAR K	564	28.37
328	Thumbappov	<i>Leucas aspera</i> (Willd.) Link	Flower bud	Fresh	C P Nazer, ASSAINAR K	115	37

329	Thumbayila	<i>Leucas aspera</i> (Willd.) Link	Leaf	Fresh	C P Nazer, ASSAINAR K	8	37
330	Thuvaraver	<i>Cajanus cajan</i> (L.) Millsp.	Root	Fresh	Assainar K	17	32.75
331	Tulasi (Krishna Thulasi)	<i>Ocimum sanctum</i>	Whole Plant	Fresh	K Razak, Kunhammu, Abdu K	22000	29-39.63
332	Uluva	<i>Trigonella foenum-graecum</i> L.	Fruit	Dried	Dathri impex, Unneen &co	10683	43-51
333	Ummath	<i>Datura metel</i> L.	Leaf	Fresh	Assainar K	20058	42
334	Ummath samulam	<i>Datura metel</i> L.	Whole Plant	Fresh	Assainar K	512	23.17
335	Ummathinkaya	<i>Datura metel</i> L.	Dried Fruit	Dried	ACC	512	27.95
336	Ummthikuru	<i>Datura metel</i> L.	Seed	Dried	VHN	15	50-150
337	Unginkuru	<i>Pongamia pinnata</i> (L.) Pierre	Seed	Dried	ACC	209	40-55
338	Unginnila	<i>Pongamia pinnata</i> (L.) Pierre	Leaf	Fresh	Assainar K, AVS Herb Garden	65008	11.5
339	Ungintholi	<i>Pongamia pinnata</i> (L.) Pierre	Dried	Fresh	Brothers, Jasmine	479	37.95
340	Urakaver	<i>Abutilon indicum</i> (L.) Sweet	Root	Dried	K P Traders	5591	42-53

341	Uzhinha	<i>Cardiospermum halicacabum L.</i>	Whole Plant	Fresh	K Razak, Moideen K, Mohammed Ali A	87717	22.90-50.80
342	Uzhunnu	<i>Vigna mungo (L.) Hepper</i>	Seed	Dried	UNNEEN, DHAATHRI, A PALANISAMI	35465	46-51
343	Vankatalati (Apamarga)	<i>Achyranthes aspera</i>	Whole Plant	Fresh	Brothers	2902	28.25-63
344	Varaku	<i>Paspalum scrobiculatum L.</i>	Fruit	Fresh	ACC	504	35-37
345	Varinellu	<i>Hygroryza aristata (Retz.) Nees ex Wight & Arn.</i>	Root	Fresh	Hassan V	78	49.19
346	Vatukapulinar akam	<i>Citrus aurantiifolia (Christm.) Swingle</i>	Fruit	Fresh	Razak K	238	38
347	Vayalchulli	<i>Astercantha longifolia</i>	Seeds	Dried	ACC	4	84
348	Vayalchulli	<i>Hygrophylla schulli</i>	Root	Dried	Brothers, Jasmine	1892	58-78.75
349	Velaver	<i>Cleome viscosa L.</i>	Whole Plant	Dried	ARAF, BROTHERS	238	62-78
350	Velichenna	<i>Cocous nucifera L</i>	Seed oil		K.P Oil Mills, Krishna OilMills	325000	137-194.5

351	Velipparuthi	<i>Pergularia daemia</i> (Forssk.) Chiov.	Whole Plant	Fresh	Ali K , Hassan V	1040	30.67
352	Velladambu	<i>Mastixia pentandra</i>	Root	Fresh	Assainar K	9	21
353	Vellakotuveli	<i>Plumbago indica</i> L.	Root	Dried	Agasthya herbals	10201	122-140
354	Vellari	<i>Cucumis sativus</i> L.	Seed	Dried	V K maohammedkutty	3	45
355	Vellulli	<i>Allium sativum</i>	Bulb	Fresh	Unneen, Ubdu k	22053	18-73
356	Venga	<i>Pterocarpus marsupium</i> Roxb.	Heart Wood	Dried	Brothers, Jasmine	13824	42-52
357	Veppila	<i>Azadirachta indica</i> A.Juss.	Leaf	Fresh	ABDU K, ALI K , FIROZ	87821	24
358	Vettila (Kannivettila)	<i>Piper betle</i> L.	Leaf	Fresh	MAYIN K , KUNHAMMU K	4950	34-35.63
359	Vettitholi	<i>Aporosa cardiosperma</i>	Bark	Fresh	Mohammed Ali A	53	36.53
360	Vishnukranthi	<i>Evolvulus alsinoides</i>	Whole Plant	Dried	RNRT	481	80

SI Nos	Details of Suppliers	
1	KKT	- KK Traders, Amrithsar
2	BTC	- Bharat Trading Company, Mumbai
3	PSS	- P.S Sarparaj
4	DDH	- Darshan Drug House, Delhi
5	RKT	- RKT Overseas, Delhi
6	PP Enterprises	- PP Enterprises, Amrithsar
7	SREEPACHE CO	- Sri Pacche Commercials, Tumkur
8	VHN	- Haridasan Nair V
9	HAL	- Haridass Aggarwal and Sons, Mumbai
10	Rameshchandra	- Ramesh Chandra Ramkuwar, Neemuch
11	Patwa mahendrakumar	- Patwa Mahendrakumar Ratilal, Gujrat
12	RNRT	- RNR Trading Corporation, Chennai
13	ACC	- Ayurvedic Centre
14	Brothers	- Brothers Herbal Traders, Kottakkal
15	Arafa	- Arafa Traders Kottakkal
16	Jasmine	- Jasmine Herbels, Kottakkal
17	SHV	- Sohanlall Harshvardhan, Kolkatta
18	LME	- L.M. Enterprises, Kolkatta
19	STC	- Suresh Trading Company
20	Sarda Bros	- Sharda Brothers, Uttarakhand
21	SDH	- Santosh Ayurvedic Drug Supply Co.
22	Jairamdas	- Jairamdass khushiram, Mumbai
23	KMH	- KMH Traders
24	SVT	- S.V.Traders
25	FT	- Favourite Traders
26	HT	- Herbal Traders
27	PT	- P.T.Traders
28	Vyttila	- Vyttila Oil Mills
29	VMC	- V. Mariappan Chettiar Sons
30	Agasthya	- Agasthyaherbals
31	Avees	- Avees Corporation
32	DAATHRI	- Dhaatri Impex
33	Rameshchandra	- Ramesh Chandra Ramkuwar
34	Satyom	- Satyom Enterprises Private Limited
35	Adinath	- Adinath Trading Company
36	ETC	Excelsior Trading Company
37	HPP	Honey Procurement Processing and Packing Unit
38	Hexa	Hexa Apiarium Pvt. Limited
39	KSS	Kozhikode Sarvodaya Sangh

40	LTC	Swastik Traders
41	SVT	Sri Venkateshwara Traders

Table 6.1.14 Raw materials used for production of Ayurvedic Medicines (from other states)

Sl. Nos	Local Names	Botanical Name	Parts Used	Form used- Fresh/D ried	Supplier - State	Supplier names	Consumption	
							Quantity (Kg)	Rate (Rs/Kg)
1	Amukkram	<i>Withania somnifera</i>	Root	Dried	Madhyapradesh	Rameshchandra Ramkuwar	60257	203
2	Asali	<i>Lepidium sativum</i>	Seed	Dried	Kerala, Maharashtra	ACC, HAL	27.5	65
3	Ashokam	<i>Saraca asoca</i>	Bark	Dried	West Bengal	SHV, LM ENTERPRISES	6108	19-20
4	Athivitayam	<i>Aconitum heterophyllum</i>	Root	Dried	Punjab	BTC, RKT	1601	5350-7390
6	Ayamodakam	<i>Trachyspermum ammi</i>	Dried Fruit	Dried	Gujarat	Patwa Mahendrakumar Ratilal	11328	142-150
8	Borneol	<i>Cinnamomum camphora</i>	Exudate	Fresh	Maharashtra	BTC	1160	740-1135
7	Camphor	<i>Cinnamomum camphora</i>	Exudate	Dried	Maharashtra	Camphor & allied	28315	584-900
9	Charalam	<i>Pinus roxburghii</i>	Heart Wood	Dried	Uttarakhand	Sarda Bros	1570	100
10	Cheleyam	<i>Parmelia perlata</i>	Fruit	Dried	Maharashtra	SDH,BTC, AC	3276	110-140
12	Cherkkuru	<i>Semecarpus anacardium</i>	Seed	Dried	Tamil Nadu	Rajkumar	6601	31
13	Cherupunnayari	<i>Celastrus panniculatus</i>	Seed	Dried	Maharashtra	DDH,BTC, RNR,AVEES	890	207.25-260
14	Chittelam	<i>Heracleum candolleianum</i>	Fruit	Dried	Kerala	PSS	153	32
15	Chonakappulu	<i>Polygonum alatum</i>	Whole Plant	Dried	Tamil Nadu	Rajkumar & co	600	22
16	Devatharam	<i>Cedrus deodara</i>	Heart Wood	Dried	Uttarakhand	SARDA Bros	71126	80-100

17	Ekanayakam	<i>Salacia reticulate</i>	Root	Dried	West Bengal	SD & Grandsons, SLNT	21458	112-150
18	Elanhikkuru	<i>Mimusops enangi</i>	Seed	Dried	Tamil Nadu	RNRT	9	185
19	Elavalukam	<i>Prunus avium</i>	Dried Fruit	Dried	Kerala	ACC, SADSC	1093	935-1268
20	Elavangapatta	<i>Cinnamomum zeylanicum</i>	Bark	Dried	Delhi, Maharashtra	RS INTERNATIONAL,SADC	12311	178-182
22	Guugulu	<i>Commiphora wightii</i>	Olio-Gum-Resin	Dried	New Delhi, Maharashtra, Gujarat	PMRL, Ameya, KKT, RKT	39929	698-716
24	Illippapoo	<i>Madhuca longifolia</i>	Flower	Dried	Tamil Nadu	Rajkumar &co	4470	55
25	Irattimadhuram	<i>Glycyrrhiza glabra</i>	Root	Dried	Punjab, Maharashtra	Raja trading co, SDH,BTC	30390	106-148
26	Jatamanji	<i>Nardostachys jatamansi</i>	Root	Dried	Uttarakhand	SARDA BROS	3157	878
27	Jeerakam	<i>Cuminum cyminum</i>	Dried Fruit	Dried	Gujarat	Patwa Mahendrakumar Ratilal	81332	159-198
28	Kacholam	<i>Kaempferia galanga</i>	Rhizome	Dried	West Bengal, Kerala	STC, SHV, LME	16055	180-287
30	Karayampoo	<i>Syzigium caryophyllatum</i>	Flower bud	Dried	Maharashtra	SDH,DDH, Avees	5352	505- 590
31	Karivelam	<i>Acacia nilotica subsp. Indica</i>	Stem Bark	Dried	Tamil Nadu	PSS	3931	19-20
32	Karkitasringi	<i>Pistacia integerrima</i>	Glands & hair on fruit	Dried	Tamil Nadu	V B KULLAPPAN	2381	162
33	Karkokilari	<i>Psoralea corylifolia</i>	Seed	Dried	Tamil Nadu, Maharashtra	Jairamdas, T S Vijaya & Co	3155	68-70
34	Kath (Karingali)	<i>Acacia catechu</i>	Exudate	Dried	Delhi	Arafa, Jasmine, Agsthya	945	38-78.75

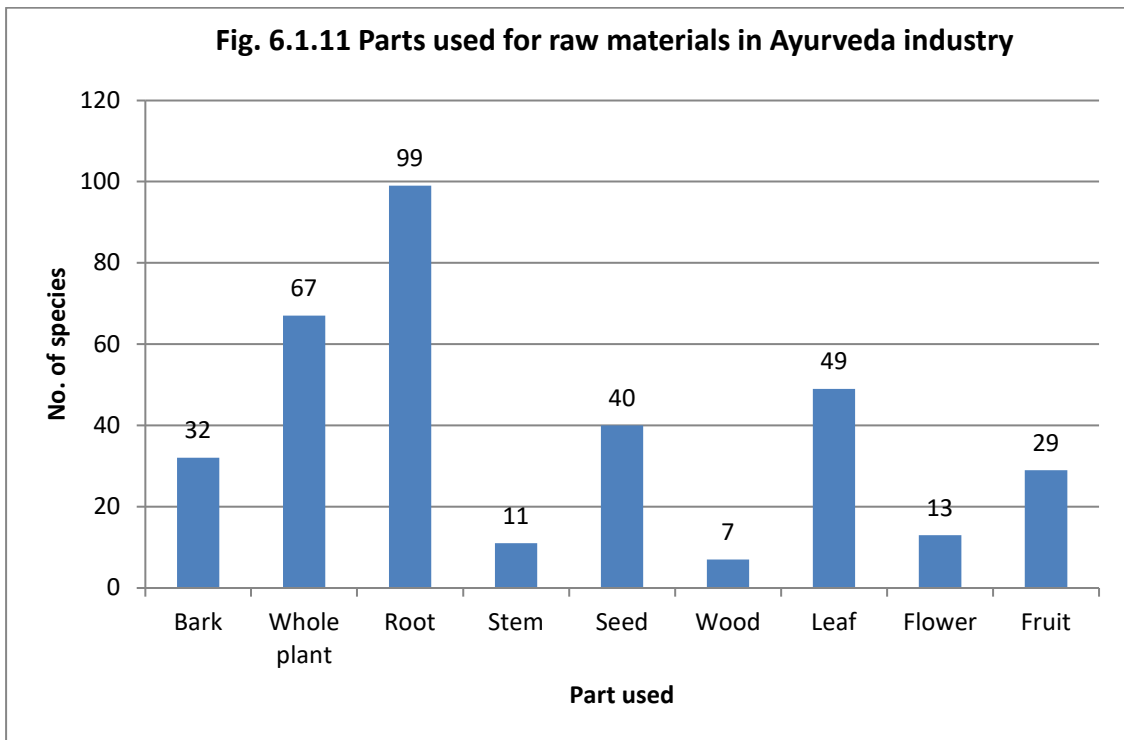
35	Katukka	<i>Terminalia chebula</i>	Fruit Rind	Dried	M P , Chathisgarh	Rameshchandra, Styanarayan Rathi, Satyom enterprises	85705	40-60
36	Katukurohini	<i>Picrorhiza kurroa</i>	Root	Dried	Uttarakhand	Sarda Bros	5815	1250
39	Kazhanji	<i>Caesalpinia bonduc</i>	Seed	Dried	Tamilnadu,Ker ala	RNRT, VHN	135	140-160
40	Kazhimuthanga	<i>Cyperus esculentus</i>	Root Tuber	Dried	Jharkhand	Hiya India Ltd	2359	47
41	Keezharnelli	<i>Phyllanthus amarus</i>	Whole Plant	Dried	Tamilnadu, Kerala	V Hassan, PSS	3000	90
42	Kiriyatha	<i>Andrographis paniculata</i>	Whole Plant	Dried	M P	Rameshchandra, Adinath Trading	5965	25-35.70
44	Kotithuva	<i>Tragia involucrata</i>	Whole Plant	Dried	Tamil Nadu	V B kullappan	30768	70
45	Krimisathru	<i>Vernonia cinerea</i>	Whole Plant	Dried	Maharashtra	BTC	547	387
46	Kumkumam	<i>Crocus sativus</i>	Stamen	Dried	Jammu & Kashmir	New Fancy Brand Kesar Co, Azad traders	381	57850- 76850
47	Kunnikkuru	<i>Abrus precatorius</i>	Seed	Dried	Amrithsar	Mugrai Bros, AVS Herb garden	988	135-825
49	Kutakappalayari	<i>Holarrhena antidysentrica</i>	Seed	Dried	West Bengal, Tamilnadu, Delhi	SHV,DDH, RNRT	7277	264-340
50	Lanthakkuru	<i>Ziziphus mauritiana</i>	Seed	Dried	Tamil Nadu	PSS, TS Vijaya & co	7953	17-19
53	Makkippoo	<i>Artemisia nilagirica.</i>	Flower	Dried	Tamil Nadu	RNRT	6	98
54	Malamkarakka	<i>Catunaregum spinosa</i>	Fruit	Dried	Tamil Nadu	ACC, RNRT	69	90
55	Mangayandi	<i>Mangifera indica</i>	Endosperm	Dried	Maharashtra	BTC, SDH	5340	45-63
56	Manjal	<i>Curcuma longa</i>	Rhizome	Dried	Tamil Nadu	A Palanisami	36345	69-90

57	Manjatty	<i>Rubia cordifolia</i>	Root	Dried	Maharashtra	HAL, JAIRAMDASS	17956	165-190
58	Maramanjai	<i>Berberis asiatica</i>	Stem	Dried	Uttarakhand	Sarda Bros	25747	50
60	Munthiri	<i>Vitis vinifera</i>	Dry Fruit	Dried	Maharashtra	Tekhchand Hemraj, Bhai pradhan Singh	81177	186
61	Muthanga	<i>Cyperus rotundus</i>	Root Tuber	Dried	Tamil Nadu	PSS, RAJKUMAR, Siva traders	49688	34-45
62	Nagappov	<i>Mesua ferrea</i>	Stamen	Dried	Delhi	L M ENTERPRISES	6453	166
63	Nagunam	<i>Hellix aspera</i>	Shell	Dried	Tamilnadu	RNRT, Vasavi India	448	1275-1488
64	Naikkuranavith	<i>Mucuna pruriens</i>	Seed	Dried	Delhi	KKT	5357	80-86
65	Nanmughapullu	<i>Actinopteris dichotoma</i>	Whole Plant	Dried	Kerala, Tamilnadu	VHN, Agasthya, Rajkumar	216	75-90
66	Neermaruthin tholi	<i>Terminalia arjuna</i>	Bark	Dried	Madyapradesh, Chatisgarh	Adinath Trading, Satyom Enterprises	2000	44-50
67	Neervalam	<i>Croton tiglium</i>	Seeds	Dried	Madras	RNRT	26	60
68	Nellikka	<i>Phyllanthus emblica</i>	Fruit	Dried	M P , Chathisgarh	Rameshchandra, Adinath	81000	135-162
69	Nhazhalpoov	<i>Callicarpa macrophylla</i>	Flower	Dried	Maharashtra, Kerala	SADSC, ACC, AJ Traders	5636	465-500
70	Nherinhil	<i>Tribulus terrestris</i>	Dried Fruit	Dried	Tamil Nadu	PSS, AGASTHYA, RAJKUMAR	41226	92-112
71	Nilappana	<i>Curculigo orchoides</i>	Rhizome	DRIED	Tamil Nadu	RAJKUMAR,AGASTHYA, TS VIJAYA	14500	230-320
72	Otto-D-Rose	<i>Rosa floribunda</i>	Rose oil		U P	D.V.Deo Industries,	11	1136.36
73	Pachotti	<i>Symplocos racemosa</i>	Bark	Dried	Chatisgarh, W -Bengal	SATYOM Enterprises,SOHANLAL	8903	60-71

75	Palnirveshi	<i>Kyllinga nemoralis</i>	Whole Plant	Dried	Uttarakhand	Sarda Bros	4.76	1640
76	Paruthikkuru	<i>Gossypium herbaceum</i>	Seed	Dried	Tamil Nadu	A PALANISAMI	6639	39
77	Pathimugham	<i>Prunus cerasoides</i>	Stem	Dried	Uttarakhand	Sarda Bros	12317	63
79	Peetha Rohini	<i>Coptis teeta Wall.</i>	Root	Dried	Delhi	KKT	15.9	2300
80	Perelam	<i>Amomum subulatum</i>	Dried Fruit	Dried	Maharashtra	HAL	643	538-560
81	Prasarani	<i>Merremia tridentata</i>	Whole Plant	Dried	Tamilnadu	PSS	3559	45-47
82	Pushkaramoolam	<i>Inula racemosa</i>	Rhizome	Dried	Himachal Pradesh	Everest Trading Corpn, Ajay Enterprises	17907	161
84	Rudraksham	<i>Elaeocarpus sphaericus.</i>	Dried Fruit	Dried	Odisha	Star marketting	190	65
85	Sahasravethi	<i>Ferula narthex</i>	Whole Plant	Dried	Tamil Nadu	VBK	35	25
86	Samudraphalam	<i>Barringtonia accutangula</i>	Fruit	Dried	Maharashtra	BTC	30	1500
87	Sankhpushpam	<i>Clitoria ternatea.</i>	Root	Dried	Tamil Nadu	PSS	659.9	70-81
89	Sathakuppa	<i>Anethum graveolens L</i>	Fruit	Dried	Gujarath	Patwa mahendrakumar	15587	120-132
91	Sunnamukki	<i>Senna alexandrina</i>	Leaf	Dried	Tamil Nadu	RAJKUMAR	198	40
92	Takaram	<i>Valeriana jatamansi</i>	Root	Dried	Delhi	KKT, DDH	6117	380-400
93	Tejpath	<i>Cinnamomum tamala</i>	Leaf	Dried	Maharashtra	HAL,SADSC	8042	64
94	Thakara	<i>Senna tora</i>	Seed	Dried	Maharashtra	ACC	13	42
95	Thakkola	<i>Illicium verum Hook.</i>	Flower	Dried	Tamil Nadu	SADS,DDH	2427	188-196
96	Thaleesapathram	<i>Abies spectabilis</i>	Leaf	Dried	New Delhi	BTC,SADS	3584	120-198
97	Thamaravalayam	<i>Nelumbo nucifera</i>	Substitute Root	Dried	Kerala	PSS	475	60-90

98	Thamaravalayam	<i>Nelumbo nucifera</i>	Substitute Root	Dried		475		
99	Thamarayalli	<i>Nelumbo nucifera</i>	Stamen	Dried	Uttar Pradesh	ESS KEY HERBS, MAHAVIR TRADING CORPN	2962	555- 720
100	Thannikka parippu	<i>Terminalia bellericca</i>	Endosperm	Dried	Madhyapradesh	Rameshchandra, Satyom enterprises	13.5	95
101	Thannikkathodu	<i>Terminalia bellericca</i>	Fruit rind	Dried	Madhyapradesh	Rameshchandra, Satyom, Adinath	31684	21-32
102	Thathiripoov	<i>Woodfordia fruticosa</i>	Flower	Dried	Chhattisgarh	Babaulal Sarabhai	51558	54
103	Thavizhama	<i>Boerhavia diffusa</i>	Root	Dried	Tamil Nadu	PSS, RAJKUMAR, TS VIJAYA	43630	90-120
104	Thettmparal	<i>Strychnos potatorum</i>	Seed	Dried	Tamil Nadu	RAJKUMAR, MALABAR, PSS	8856	108-150
105	Thippali	<i>Piper longum</i>	Dried Fruit	Dried	Meghalaya	Sagarmall, MECOFED, RAMDASS TIWARI	52469	631-655
106	Thrikolpakkonna	<i>Operculina turpethum</i>	Rhizome	Dried	Maharashtra	BTC, SADSC	24011	184
107	Urumampazham	<i>Punica granatum</i>	Fruit Rind	Dried	Maharashtra	BTC	2345	23-29
108	Valmulaku	<i>Piper cubeba</i>	Dried Fruit	Dried	Maharashtra	BTC, HAL, SDH	2683	1450-2000
109	Vatsanabhi	<i>Aconitum ferox</i>	Rhizome	Dried	Maharashtra	DDH	223	405
110	Vayambu	<i>Acorus calamus</i>	Rhizome	Dried	Karnataka	SINDGI BROS, SREEPACHE CO	16483	81-90
111	Vellakotuveli	<i>Plumbago indica</i>	Root	Dried	Kerala	Agasthya herbals	17989	
112	Vembada	<i>Ventilago maderaspatana</i>	Bark	Dried	Delhi	KKT	342	330
115	Veppinkkuru	<i>Azadirachta indica</i>	Dry Seeds	Dried	Tamil Nadu	RNRT	4	60
116	Vijayabeejam	<i>Papaver somniferum</i>	Seed	Dried	Maharashtra	BTC,	30	325

117	Vilamkaya	<i>Limonia acidissima</i>	Dried Fruit	Dried	Tamil Nadu	V B kullappan	4431	88-120
118	Vishnukranthi	<i>Evolvulus alsinoides</i>	Whole Plant	Dried	Kerala	RNRT	481	80
119	Vitayam	<i>Aconitum palmatum</i>	Root	Dried	Punjab	PP enterprises, RKT overseas	1327.7	2606-3650
120	Vizhalari	<i>Embelia ribes</i>	Dried Fruit	Dried	Maharashtra	BTC, SADSC	9784	560-700
121	Yavam	<i>Zea mays</i>	Grain	Dried	Tamil Nadu	Rameshchandra ramkuwar	33534	23-28



- From the above figure, it can be observed that roots are the most used parts (99 species) among all parts used of bioresources in Ayurveda industry.
- It can also be observed that wood is the least used part (7 species) among all parts used.

Table 6.1.15 Extracts / Byproducts of Plants and animals (Extracts, Bee wax, Value added Products etc)

Sl.n os	Local Names	Botanical Name	Parts Used	Form used- Fresh / Dried	Supplier-State	Supplier - names	Consumption	
							Quantity (Kg)	Rate (Rs/Kg)
1	Amber	Ambergris			Punjab	Arjun Herbal Products	7000	18
2	Avanakenna	<i>Ricinus communis</i>	Seed Oil	Fresh	Tamilnadu	Swastik Traders, LTC, SVT	51315	135- 142
3	Borneol	<i>Cinnamomu m camphora</i>	Exudate	Fresh	Maharashtra	BTC	1160	740- 1135
4	Butter	Butter	Butter		Tamilnadu	Nilgiris Dt.Co.Op.Milk Producers Union Ltd	12000	361
5	Camphor	<i>Cinnamomu m camphora</i>	Exudate	Dried	Maharashtra	Camphor & allieids	28315	584- 900
6	Ellenna	<i>Sesamum indicum</i>	Seed Oil		Kerala	Vyttila, VMC, RG OILs	745225	106- 163
7	Eucalyptus oil	<i>Eucalyptus citriodora</i>	Oil	Fresh	Tamil Nadu	Neelagiri essential Oils, Bell Essential Oils, Ganesh Eucalyptes Oils <K R G International	45.6	1090- 1500
8	Ghee	Cow ghee	Ghee		Kerala & Tamilnadu	Milma, Nilgiris Dt.Co.Op.Milk Producers Union Ltd	191684	427.68
9	Guggulu	Commiphora wightii	Olio- Gum- Resin	Dried	New Delhi, Maharashtra, Gujarath	Patwa, Ameya, KKT, RKT	39929	698- 716

10	Honey	Honey	Honey		Kerala, Utharakhand, Tamilnadu, Karnataka	HPP, Hexa, KSS, Shamee,	344420	135-148
11	Jathikkathailam	<i>Myristica fragrance</i>	Seed oil		Kerala	Geekay Drug House	60.98	1257-1538
12	Kath (Karingali)	<i>Acacia catechu</i>	Exudate	Fresh	Panjab	Mugrai	945	38-78.75
13	Kayam	<i>Ferula assafoetida.</i>	Exudate	Dried	Gujarath, Tamilnadu	Patwa Mahendra Kumar	3128	340
14	Kolarakku	<i>Laccifer laca</i>	Stick lac	Dried	Maharashtra	Maheshkumar, Anandlac	7930	155-273
15	Lemon Oil	<i>Citrus lemon</i>	Fruit rind oil	Fresh	Maharashtra	Sagar Aromatics	58.5	1538.46
16	Maize Starch	<i>Zea mays</i>	Seed powder	Dried	Maharashtra	Indras Agencies Pvt Ltd, Sree Meenakshe Enterprises	39700	28.5-34
17	Malar	<i>Oryza sativa L</i>	Seed	Dried	Kerala	C.V Azeez	1319.5	90
18	Meenenna	Cod fish	Liver oil		Karnataka	Blueline Foods (India) Pvt.Ltd	200	205.88
19	Menthol	<i>Mentha piperita</i>	Oil		Delhi	RKT	51	2140
20	Mezhu	Honey Wax	Wax	Dried	Tamilnadu	Shamee Bee Farm	1999.6	328-330
21	Milk-Cow	Cow milk	Milk		Kerala & Tamilnadu	Milma, Nilgiris Dt.Co.Op.Milk Producers Union Ltd	2163883	35-48
22	Milk-Goat	Goat Milk	Milk		Kerala	Goat Farm	4636	37.5
23	Nagunam	<i>Hellix aspera</i>	Shell	Dried	Tamilnadu	RNRT, Vasavi India	448	1275-1488

24	Neeratti enna	<i>Hydnocarpus laurifolia</i>	Seed oil	Fresh	Kerala	Showkath & Sons	510	805-1350
25	Otto-D-Rose	<i>Rosa floribunda</i>	Rose oil		UP	D.V.Deo Industries,	11	1136.36
26	Palkayam	<i>Ferula assa-foetida</i>	Resinous exudate	Dried	Tamilnadu	Sree subramaniya traders	113	660-700
27	Panchasara	<i>Saccharum officinarum</i>	Stem Extract	Dried	Kerala	Unneen & Co, SNGovindarajalu Naidu & Sons	57064	34
28	Pavizham	Coral	Coral	Dried	Maharashtra	ETC, BTC	100	4000
29	Rose Water	<i>Rosa floribunda</i>	Rose oil		U P	D.S.Fragrances	1260	79.97
30	Sankhu	<i>Lobatus gigas</i>	Conch shell	Dried	Tamilnadu	PSS	1455	24
31	Sharkkara	<i>Saccharum officinarum</i>	Stem Extract	Fresh	Kerala	Unneen & Co & Co, Srivenketeswara, J K Traders, Sahadevan, S A Kanakaraj	902000	34
32	Kalkandam	<i>Sacharum officianarum</i>	Purified Extract	Dried	Kerala	Unneen & Co, Pooja Kalakandam	14091	43-48
33	Velichenna	<i>Cocous nucifera</i>	Seed oil	Fresh	Tamilnadu & Kerala	Sri Malaiappa and Company, K.P Oil Mills	545050	137-194.5
34	Veppenna	<i>Azadirecta indica</i>	Seed Oil	Fresh	Tamilnadu	Swastik Industries, Sri Shanmuga Traders	13500	189-194

6. Santhigiri Siddha Medical College (SSMC)

Santhigiri Siddha Medical College (SSMC) was established in 2002 by Santhigiri Ashram, imbibing the vision of its Founder Guru, Navajyothisree Karunakara Guru. This college is the first ever Siddha Medical College in Kerala as well as the first outside the state of Tamil Nadu, the cradle of the Siddha system. This college is located close to Thiruvananthapuram in serene surroundings. It has an eminent faculty and a good hospital with all specialized departments, good laboratories, an exhaustive library and extensive gardens for medicinal plants. It also has a GMP certified pharmacy for Siddha and Ayurveda drugs, comfortable hostels, a canteen serving vegetarian food and ample extra-curricular facilities.

Table 6.1.16 Raw materials used in Ayurvedic system of medicine by one of the premier Siddha Medical College in Kerala

SL. No	Botanical Name	Local Name	Parts Used	Type	2018-2019	
					Quantity	Price (Per Kg)
1	<i>Aristolochia bracteolata</i>	Aadutheendappala	Whole Parts	Fresh	10	200
2	<i>Holoptelea integrifolia</i>	Aavi Tholi	Stem Bark	Dry	312.5	58
3	<i>Sphaeranthus indicus</i>	Adakkamaniyan	Root	Fresh	10	30
4	<i>Justicia adhatoda</i>	Adalodaka Veru	Root	Dry	100	38
5	<i>Sesbania grandiflora</i>	Agasthi Cheera	Leaf	Fresh	2200	20
6	<i>Withania somnifera</i>	Amukkuram	Root	Dry	345.1	519
7	<i>Elephantopus scaber</i>	Anachuvadi	Root	Fresh	739	43.08

8	<i>Catharanthus roseus</i>	Anchilathetti Samoolam	Whole Parts	Fresh	40	30
9	<i>Ficus religiosa</i>	Arayaal Mottu	Flower Bud	Fresh	7.5	50
10	<i>Saraca asoca</i>	Asokappovu	Flower	Dry	4.3	150
11	<i>Ficus racemosa</i>	Athi Patta	Stem Bark	Dry	97.5	30
12	<i>Ricinus communis</i>	Avanakku Ila	Leaf	Fresh	212	30
13	<i>Prunus dulcis</i>	Badam	Seed		30	533.4
14	<i>Bacopa monnieri</i>	Brahmi	Whole Parts	Fresh	487	27.84
15	<i>Panicum sumatrense</i>	Chaama Ari	seed		8	93.75
16	<i>Gymnema sylvestre</i>	Chakkarakolli	Leaf	Dry	120	150
17	<i>Senna tora</i>	Chakrathakara Ila	Leaf	Fresh	13	30
18	<i>Oryza sativa</i>	Champa Pachari	Seed		2.5	52
19	<i>Cissus Quadrangularis</i>	Chaangalam Piranda	Whole Parts	Fresh	121	20.91
20	<i>Euphorbia antiquorum</i>	Chathurakkalli	Stem	Fresh	28	20
21	<i>Myxopyrum smilacifolium</i>	Chathuramulla	Whole Parts	Fresh	37	30
22	<i>Thespesia populnea</i>	Cheelanthi Patta	Stem Bark	Fresh	2158	16.83
23	<i>Smilax china</i>	Cheenappavu	Rhizome	Dry	24	385
24	<i>Hibiscus rosa-sinensis</i>	Chemparathi Samoolam	Whole Parts	Fresh	150	30
25	<i>Aerva lanata</i>	Cheroola	W hole Parts	Fresh	54	20.74
26	<i>Amaranthus spinosus</i>	Cheru Cheera	Whole Parts	Fresh	14	22.86
27	<i>Cyathula prostrata</i>	Cheru Kadaladi	Whole Parts	Fresh	8	30
28	<i>Citrus limon</i>	Cheru Naranga	Fruit	Fresh	669	52.22
29	<i>Vigna radiata</i>	Cheru Payar	Seed		4520	101.67
30	<i>Cinnamomum cassia</i>	Cherunakapoo	Flower Bud	Dry	80	1900
31	<i>Desmodium triflorum</i>	Cherupulladi	Whole Parts	Fresh	56	30
32	<i>Celastrus paniculatus</i>	Cherupunnayari	Seed	Dry	121.4	250.05

33	<i>Clerodendrum serratum</i>	Cheruthekku	Root	Dry	275	328.69
34	<i>Acalypha fruticosa</i>	Chinni Ila	Leaf	Fresh	10	30
35	<i>Cocos nucifera</i>	Thenga	Shell	Dry	2992	13.24
36	<i>Tinospora cordifolia</i>	Chittamrithu	Stem	Fresh	970	24
37	<i>Alpinia calcarata</i>	Chittaratha	Rhizome	Dry	680.7	455
38	<i>Grewia asiatica</i>	Chitteenthal Veru	Root	Dry	51.3	50
39	<i>Zingiber officinale</i>	Chukku	Rhizome	Dry	1134.7	185.03
40	<i>Solanum torvum</i>	Chunda	Fruit	Dry	2	180
41	<i>Lagenaria siceraria</i>	Chura	Stem	Fresh	100	21
42	<i>Cinnamomum verum</i>	Churul Karuva Patta	Stem Bark		100	1400
43	<i>Physalis minima</i>	Chutti Thakkali	Whale Parts	Fresh	28	20
44	<i>Allium cepa</i>	Chuvannulli	Bulb	Fresh	758.5	52.16
45	<i>Theobroma cacao</i>	Cocoa Powder	Kernel		4.25	410.59
46	<i>Imperata cylindrica</i>	Darbha Veru	Rhizome	Dry	50	66.85
47	<i>Phoenix dactylifera</i>	Eenthappazham	Fruit		900	110.88
48	<i>Elettaria cardamomum</i>	Elakka	Fruit		342.75	974.17
49	<i>Sesamum indicum</i>	Ellu	Seed		30	195.1
50	<i>Calotropis gigantea</i>	Erukkin Poo	Flower	Fresh	45	40
51	<i>Musa paradisiaca</i>	Ethakka	Fruit	Fresh	19	50
52	<i>Aristolochia indica</i>	Garudakkodi	Stem	Fresh	85	21.06
53	<i>Syzygium aromaticum</i>	Grampoovu	Flower Bud		218.6	692.71
54	<i>Helicteres isora</i>	Idampiri Valampiri	Fruit	Dry	7	74.86
55	<i>Zingiber officinale</i>	Inchi	Rhizome	Fresh	80	56.13
56	<i>Cymbopogon flexuosus</i>	Inchipul kizhangu	Rhizome	Fresh	10	30
57	<i>Mimosa rubicaulis</i>	Intu Ila	Leaf	Dry	10	20

58	<i>Glycyrrhiza glabra</i>	Irattimadhuram	Root	Dry	317	190
59	<i>Plectranthus vettiveroides</i>	Iruveli	Root	Dry	228.5	296.29
60	<i>Azima tetracantha</i>	Isanku Ila	Leaf	Fresh	30	20
61	<i>Ficus microcarpa</i>	Ithi Patta	Stem Bark	Dry	97.5	30
62	<i>Myristica fragrans</i>	Jathikka	Fruit		193.33	500
63	<i>Cuminum cyminum</i>	Jeerakam	Seed		550	190
64	<i>Oryza sativa</i>	Kaattu Yaanam	Seed		3	78
65	<i>Kaempferia galanga</i>	Kachola Kizhangu	Rhizome	Dry	215.9	223.9
66	<i>Musaparadisiaca</i>	Kadali Pazham	Fruit	Fresh	595	100
67	<i>Terminalia chebula</i>	Kadukka Thodu	Pericarp	Dry	5248.8	60
68	<i>Brassica nigra</i>	Kaduku	Seed	Dry	25	81.9
69	<i>Pennisetum glaucum</i>	Kampu	Seed		2	27
70	<i>Solanum virginianum</i>	Kandankathiri	Whole Parts	Fresh	7	20
71	<i>Strychnos nux-vomica</i>	Kanjira Patta	Stem Bark	Dry	79.3	99.27
72	<i>Cocos nucifera</i>	Karikku	Fruit	Fresh	1010	28.12
73	<i>Nigella sativa</i>	Karimjeerakam "	Seed	Dry	293	295
74	<i>Monochoria vaginalis</i>	Karimkoovalam	Root Tuber	Fresh	174	20
75	<i>Strobilanthes heyneana</i>	Karimkuringi Ila	leaf	Fresh	145	30
76	<i>Saccharum officinarum</i>	Karimpu	Stem	Fresh	120	20
77	<i>Nilgirianthus ciliatus</i>	Karinkuringi Veru	Root	Dry	1429.5	31.92
78	<i>Vitex negundo</i>	Karinochi Ila	Leaf	Fresh	311.5	25.18
79	<i>Acacia nilotica</i>	Karivelam Patta	Stem Bark	Dry	220	30
80	<i>Murraya koenigii</i>	Kariveppila	Leaf	Fresh	1297	34.61
81	<i>Cullen corylifolium</i>	Karkolari	Seed	Dry	111	126.59
82	<i>Cynodon dactylon</i>	Karuka Pullu	Whole Parts	Fresh	589	20.17

83	<i>Oryza sativa</i>	Karum Kuruvai Ari	Seed		50	130
84	<i>Cinnamomum verum</i>	Karuvappatta	Stem Bark	Dry	99.5	297.44
85	<i>Curcuma aromatica</i>	Kasthoori Manjal	Rhizome	Dry	294.9	113.17
86	<i>Anacardium occidentale</i>	Kasuvandi	Kernel		1.8	616.67
87	<i>Achyranthes aspera</i>	Kadaladi	root	Fresh	45	30
88	<i>Aloe vera</i>	Kattarvazha	stem	Fresh	1657	12
89	<i>Amorphophallus paeoniifolius</i>	Kattu Chena	Root Tuber	Fresh	1140	25
90	<i>Vernonia anthelmintica</i>	Kattu Jeerakam	Seed	Dry	10	160
91	<i>Piper attenuatum</i>	Kattu Mulaku	Root	Dry	143.4	30
92	<i>Piper longum</i>	Kattu Thippili	Leaf	Fresh	22	30
93	<i>Citrullus colocynthis</i>	Kattu Vellari	Whole Parts	Dry	92	110
94	<i>Tridax procumbens</i>	Kayyan, Muriyampachila	Whole Parts	Fresh	406	21.55
95	<i>Eclipta prostrata</i>	Kayyonni	Whole Parts	Fresh	115	20
96	<i>Caesalpinia bonduc</i>	Kazhanji Kuru	Seed	Dry	50	240
97	<i>Phyllanthus niruri</i>	Keezharnelli	Whole Parts	Dry	178	70
98	<i>Microstachys chamaelea</i>	Kodi Avanakku	Whole Parts	Fresh	1	30
99	<i>Tragia involucrata</i>	Kodithoova Veru	Root	Dry	1554.5	126.14
100	<i>Alpinia galanga</i>	Kolinchi	Rhizome	Fresh	208	36.54
101	<i>Cassia fistula</i>	Kani Konna Tholi	Stem Bark	Dry	4.5	65
102	<i>Aegle marmelos</i>	Koovala Veru	Root	Fresh	800	25
103	<i>Coccinia grandis</i>	Koval Ila	Leaf	Fresh	25	24
104	<i>Tephrosia purpurea</i>	Kozhinjil Veru	Root	Dry	5	20
105	<i>Artemisia vulgaris</i>	Kozhunnu	Whole Parts	Dry	54	82.22

106	<i>Portulaca oleracea</i>	Kozhuppa	Whole Parts	Fresh	72	30
107	<i>Ocimum sanctum</i>	Krishna Thulasi Ila	Leaf	Fresh	873.5	20.19
108	<i>Holarrhena antidysenterica</i>	Kudakappalayari	Seed	Dry	176.5	386.51
109	<i>Centella asiatica</i>	Kudangal	Whole Parts	Fresh	298	49.93
110	<i>Tabernaemontana alternifolia</i>	Kundalappala Ila	Leaf	Fresh	10	30
111	<i>Micrococca mercurialis</i>	Kunukkittatti	Whole Parts	Fresh	41	100
112	<i>Acalypha indica</i>	Kuppameni	Whole Parts	Fresh	241	21.66
113	<i>Piper nigrum</i>	Kurumulaku	Fruit		911.7	419.08
114	<i>Sida cordifolia</i>	Kurunthotti	Root	Dry	3365	69.2
115	<i>Echinochloa esculenta</i>	Kuthiravali Ari	Seed		2	102
116	<i>Lawsonia inermis</i>	Mailanchi Ila	Leaf	Fresh	1076	20.05
117	<i>Zea mays</i>	Makka Cholam	Seed		1.5	33.33
118	<i>Cissampelos pareira</i>	Malathangi	Leaf	Fresh	7	64.29
119	<i>Coriandrum sativum</i>	Malli	Seed		276	80.74
120	<i>Rubia cordifolia</i>	Manchitti Kol	Root	Dry	200	190
121	<i>Mangifera indica</i>	Mangayandi Parippu	Kernel	Dry	21.2	90
122	<i>Solanum nigrum</i>	Manithakkali	Fruit	Dry	50	221.76
123	<i>Wedelia chinensis</i>	Manja Kayyonni	Whole Parts	Fresh	203	41.97
124	<i>Curcuma longa</i>	Manjal	Rhizome	Fresh	709	34.61
125	<i>Morinda coreia</i>	Manjanathi Ila	Leaf	Fresh	10	30
126	<i>Sansevieria roxburghiana</i>	Maral Ila	Leaf	Fresh	18	30
127	<i>Punica granatum</i>	Mathalam	Fruit	Fresh	2161	95.06
128	<i>Cucurbita maxima</i>	Mathan Kuru	Kernel	Dry	1	550
129	<i>Cuscuta reflexa</i>	Mootilla thali	Whole Parts	Fresh	20	30
130	<i>Pseudarthria viscida</i>	Moovila Veru	Root	Dry	155	90

131	<i>Biophytum sensitivum</i>	Mukkutti	Whole Parts	Fresh	29	29.66
132	<i>Bambusa bamboos</i>	Mulamkoombu	Stem	Dry	7	50
133	<i>Raphanus raphanistrum subsp sativus</i>	Mullanki	Root Tuber	Fresh	82	38
134	<i>Premna serratifolia</i>	Munja	Root	Dry	728	55.58
135	<i>Erythrina variegata</i>	Murikkin Tholi	Stem Bark	Fresh	10	20
136	<i>Moringa oleifera</i>	Muringa Ila	Leaf	Fresh	900.5	20.63
137	<i>Mukia maderaspatana</i>	Musukusukku	Leaf	Dry	8	20
138	<i>Cyperus rotundus</i>	Muthanga Kizhangu	Root Tuber	Dry	1727.1	70.8
139	<i>Macrotyloma uniflorum</i>	Muthira	Seed		100	42
140	<i>Pistia stratiotes</i>	Muttappayal	Whole Parts	Fresh	465	22.85
141	<i>Emilia sonchifolia</i>	Muyalcheviyan	Whole Parts	Fresh	1.8	50
142	<i>Cajanus cajan</i>	Muzhu Thuvara Chuvappu	Seed	Dry	1	90
143	<i>Actiniopteris radiata</i>	Nanmukhapullu	Whole Plant	Dry	139.5	250
144	<i>Citrus limon</i>	Narakathin Ila	Leaf	Fresh	12	30
145	<i>Hemidesmus indicus</i>	Naruneendi	root	Dry	369.7	730
146	<i>Indigofera tinctoria</i>	Neela Amari Ila	Leaf	Fresh	732	55
147	<i>Terminalia arjuna</i>	Neermaruthi n Patta	Stem Bark	Dry	325	95
148	<i>Crateva magna</i>	Neermathalathin Tholi	Stem Bark	Dry	100	138.1
149	<i>Phyllanthus emblica</i>	Nellikka	Fruit	Fresh	1140	35.44
150	<i>Albizia lebeck</i>	Nenmenivaka Ila	Leaf	Fresh	63.5	27.09
151	<i>Benincasa hispida</i>	Ney Kumbalam	Fruit	Fresh	80	18
152	<i>Curculigo orchoides</i>	Nilappana Kizhangu	Root Tuber	Dry	496.5	325
153	<i>Cassia angustifolia</i>	Nilavaaka	leaf	Dry	188.5	80.31

154	<i>Syzygium cumini</i>	Njaval Kuru	Seed	Dry	78.8	73.91
155	<i>Oryza sativa</i>	Njavara Ari	Seed		11000	43.54
156	<i>Plectranthus amboinicus</i>	Navara, Panikoorka	Leaf	Fresh	814.5	22.51
157	<i>Callicarpa macrophylla</i>	Njazhal Poovu	Flower	Dry	100	210
158	<i>Solena amplexicaulis</i>	Njerinjampuli	flower	Dry	110.8	180
159	<i>Tribulus terrestris</i>	Njerinjil	Whole Parts	Fresh	40	20
160	<i>Physalis minima</i>	Njottanjotiyam	Whole Parts	Fresh	116	30
161	<i>Apium graveolens</i>	Omam	Seed	Dry	447.7	227.36
162	<i>Clerodendrum infortunatum</i>	Oruveran Ila	Leaf	Fresh	60	30
163	<i>Ipomoea mauritiana</i>	Paalmuthakkin Kizhangu	Root Tuber	Fresh	1610	26.58
164	<i>Glycosmis pentaphylla</i>	Paanchi Ila	Leaf	Fresh	490	30
165	<i>Arachis hypogaea</i>	Pacha Nilakkadala	Seed		1.5	170
166	<i>Pogostemon cablin</i>	Pachila	Leat	Dry	131.9	492.52
167	<i>Symplocos racemosa</i>	Pachotti Tholi	Stem Bark	Dry	279.5	160
168	<i>Cyclea peltata</i>	Pada Kizhangu	Root Tuber	Dry	132.3	700
169	<i>Panicum miliaceum</i>	Pani Varaku	Seed		1	90
170	<i>Hedyotis corymbosa</i>	Parppadaka Pullu	Whole Parts	Dry	171	350
171	<i>Prunus cerasoides</i>	Pathimukham	Hear Wood	Dry	328	59.5
172	<i>Ficus benghalensis</i>	Peraal Patta	Stem Bark	Dry	97.5	30
173	<i>Coldenia procumbens</i>	Perum Cheruppadi	Whole Parts	Fresh	15	22
174	<i>Foeniculum vulgare</i>	Perum Jeerakam	Seed		50	110
175	<i>Anisomeles malabarica</i>	Perum Thumpa	Whole Parts	Fresh	10	20

176	<i>Chonemorpha fragrans</i>	Perunkurumpa Veru	Root	Dry	25	50
177	<i>Jasminum officinale</i>	Pichi Ila	Stem	Fresh	16	20
178	<i>Butea monosperma</i>	Plasinkuru	Seed	Dry	5	90
179	<i>Phyla nodiflora</i>	Poduthala	Whole Parts	Fresh	26	30
180	<i>Salacia reticulata</i>	Pankoranti	Root	Dry	193.8	200
181	<i>Alternanthera sessilis</i>	Ponnankanni Cheera	Whole Parts	Fresh	5	30
182	<i>Cissampelos pareira</i>	Ponvisitta	Root	Fresh	10	30
183	<i>Lagerstroemia speciosa</i>	Poomaruthin Tholi	Stem Bark	Fresh	90	20
184	<i>Cyanthillium cinereum</i>	Poovamkurunthal	Whole Parts	Fresh	80	20
185	<i>Thespesia populnea</i>	Poovarasu Ila Poovu	Leaf	Dry	1	75.43
186	<i>Cicer arietinum</i>	Pottu Kadala	Seed		2.5	120
187	<i>Merremia tridentata</i>	Prasarani	Whole Parts	Dry	314.5	59.81
188	<i>Tamarindus indica</i>	Puli Ila	Leaf	Fresh	1047	25
189	<i>Capparis sepiaria</i>	Pulichuvati	Root	Fresh	54	30
190	<i>Oxaliscorniculata</i>	Puliyarila	Whole Parts	Fresh	49.5	12
191	<i>Calycopteris floribunda</i>	Pullanji Ila	Stem	Fresh	135	30
192	<i>Pongamia pinnata</i>	Punkin Vithu	Kernel	Dry	10	90
193	<i>Solanum violaceum</i>	Putharichunda	Root	Dry	428	87.64
194	<i>Clerodendrum inerme</i>	Sanghumkuppi	Leaf	Fresh	78	24.87
195	<i>Anethum graveolens</i>	Sathakuppa	Seed	Dry	413.2	87.47
196	<i>Asparagus racemosus</i>	Sathavari Kizhangu	Tuberous root	Fresh	5.5	30
197	<i>Operculina turpethum</i>	Sivatha Veru	Root	Dry	16	20
198	<i>Triticum aestivum</i>	Soochi Gothambu	Seed		5	90
199	<i>Helianthus annuus</i>	Sooryakanthi Vithu	Seed		26	30

200	<i>Sapindus trifoliatus</i>	Soppin Kay	Fruit	Dry	193.8	200
201	<i>Benincasa hispida</i>	Thadiyankay	Fruit	Fresh	5	30
202	<i>Cleome gynandra</i>	Thaivela	Whole Parts	Fresh	10	30
203	<i>Valeriana wallichii</i>	Thakaram	Root	Dry	90	20
204	<i>Illicium verum</i>	Thakkolarn	Fruit		80	20
205	<i>Abies spectabilis</i>	Thaleesapathri	Leaf	Dry	1	75.43
206	<i>Nelumbo nucifera</i>	Thamara Alli	Stamen	Dry	163	62.76
207	<i>Spermacoce hispida</i>	Tharthaval	Whole Parts	Fresh	2.5	120
208	<i>Woodfordia fruticosa</i>	Thathiri Poovu	Flower	Dry	314.5	59.81
209	<i>Oryza sativa</i>	Thavitu	Husk	Dry	8	18.75
210	<i>Pandanus odorifer</i>	Thazha Vizhu	Aerial Root	Fresh	1047	25
211	<i>Boerhavia diffusa</i>	Thazhuthama Samoolam	Whole Parts	Fresh	54	30
212	<i>Heliotropium indicum</i>	Thekkida Veru	Root	Dry	49.5	12
213	<i>Cocos nucifera</i>	Thenga	Fruit	Fresh	135	30
214	<i>Strychnos potatorum</i>	Thettamparal	Seed	Dry	213	20
215	<i>Ixora coccinea</i>	Thetti Poovu	flower	Fresh	428	87.64
216	<i>Setaria italica</i>	Thina	Seed		413.2	87.47
217	<i>Piper longum</i>	Thippili	Fruit	Dry	5.5	30
218	<i>Ipomoea obscura</i>	Thiruthaali	Root	Fresh	4.5	18
219	<i>Solanum trilobatum</i>	Thoothulam	Whole Parts	Fresh	10	20
220	<i>Mimosa pudica</i>	Thottaavadi	Whole Parts	Fresh	9.5	30
221	<i>Leucas aspera</i>	Thumpa	Whole Parts	Dry	8	40
222	<i>Cajanus cajan</i>	Thuvara Parippu	Kernel		50	79.5
223	<i>Trigonella foenum-graecum</i>	Uluva	Seed		2500	77
224	<i>Datura fastuosa</i>	Ummathin Ila	Leaf	Fresh	814	21.52
225	<i>Curcuma longa</i>	Unakka Manjal	Rhizome		647	103.34

226	<i>Vitis vinifera</i>	Unakka Munthiri	Fruit		2788.9	269.3
227	<i>Lannea coromandelica</i>	Uthi Patta	Stem Bark	Dry	244	18.87
228	<i>Cardiospermum halicacabum</i>	Uzhinja	Whole Parts	Fresh	298	22.45
229	<i>Vigna mungo</i>	Uzhunnu	Seed		120	115
230	<i>Piper cubeba</i>	Valmulaku	Fruit	Dry	50	1600
231	<i>Justicia gendarussa</i>	Vathamparathi	Leaf	Fresh	622	30.84
232	<i>Acorus calamus</i>	Vayampu	Rhizome	Dry	321.6	128.02
233	<i>Pergularia daemia</i>	Veliparuthi	Whole Parts	Fresh	145	20
234	<i>Sorghum bicolor</i>	Vella Cholam	Seed		2.5	38.4
235	<i>Papaver somniferum</i>	Vella Kasakasa	Seed		20	1625
236	<i>Vitex trifolia</i>	Vella Nochi Ila	Leaf	Fresh	10	20
237	<i>Abrus precatorious</i>	Vellakkunni Veru	Root	Fresh	20	20
238	<i>Cucumis sativus</i>	Vellari Vithu	Seed	Dry	51	347.06
239	<i>Mussaenda frondosa</i>	Vellila	Leaf	Fresh	103	30
240	<i>Allium sativum</i>	Veluthulli	Bulb		274.2	102.4
241	<i>Ventilago maderaspatana</i>	Vempadam Patta	Stem Bark	Dry	103.7	490
242	<i>Azadirachta indica</i>	Veppila	Leaf	Fresh	203	25.07
243	<i>Wrightia tinctoria</i>	Vetpala Ila	Leaf	Fresh	100	50
244	<i>Piper betle</i>	Vettila Valli	Leaf	Fresh	877	15
245	<i>Evolvulus alsinodes</i>	Vishnu kranthi	Whole Parts	Dry	10	20
246	<i>Embelia ribes</i>	Vizhalari	Seed	Dry	370.9	746.48
247	<i>Limonia acidissima</i>	Vlaar mara Kaay	Fruit	Dry	10	150
248	<i>Hordeum vulgare</i>	Yavam	Seed	Dry	1	50
249	<i>Aristolochia bracteolata</i>	Aadutheendappala	Whole Parts	Dry	8	40
250	<i>Ficus religiosa</i>	Arayaal Patta	Stem Bark	Dry	97.5	30

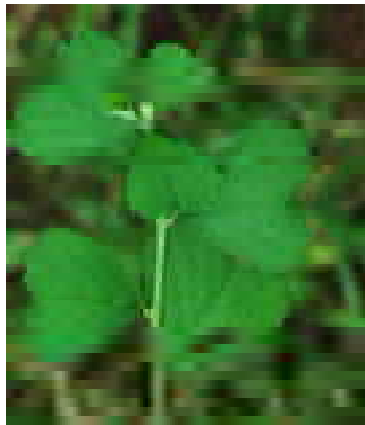
251	<i>Ricinus communis</i>	Avanakku Veru	Root	Dry	1055	21.63
252	<i>Bacopa monnieri</i>	Brahmi	Whole Parts	Dry	18.7	412.67
253	<i>Hibiscus rosa-sinensis</i>	Chemparathi Veru	Root	Dry	14	28
254	<i>Tinospora cordifolia</i>	Chittamrithu	Stem	Dry	103.4	70.16
255	<i>Calotropis gigantea</i>	Erukku Veru	Root	Dry	50	40
256	<i>Vitex negundo</i>	Karinochi Ila	Leaf	Dry	32	85.9
257	<i>Vitex negundo</i>	Karinochi Veru	root	Dry	7	40
258	<i>Murraya koenigii</i>	Kariveppila	Leaf	Dry	69	52
259	<i>Piper longum</i>	Kattu Thippili	Root	Dry	124.4	105
260	<i>Centella asiatica</i>	Kudangal	Whole Parts	Dry	42	255.18
261	<i>Lawsonia inermis</i>	Mailanchi Ila	Leaf	Dry	291	156.28
262	<i>Bambusa bamboos</i>	Mulayari	Seed	Dry	12	393.33
263	<i>Moringa oleifera</i>	Muringa Ila	Leaf	Dry	2.5	103
264	<i>Moringa oleifera</i>	Muringa Patta	Stem Bark	Dry	24	25.81
265	<i>Indigofera tinctoria</i>	Neela Amari Ila	lear	Dry	335	305.27
266	<i>Phyllanthus emblica</i>	Nellikka thodu	Fruit rind	Dry	2209.1	167.5
267	<i>Thespesia populnea</i>	Poovarasu Patta	Stem Bark	Dry	163	62.76
268	<i>Capparis sepiaria</i>	Pulichuvati	Root	Dry	21	70
269	<i>Boerhavia diffusa</i>	Thazhuthama Veru	Root	Dry	21	70
270	<i>Solanum trilobatum</i>	Thoothulam	Whole Parts	Dry	26	240
	<i>Cardiospermum</i>					
271	<i>halicacabum</i>	Uzhinja	Whole Parts	Dry	1	60
272	<i>Azadirachta indica</i>	Veppila	Leaf	Dry	150	60.71
273	<i>Azadirachta indica</i>	Veppin Patta	Stem Bark	Dry	2443	22
274	<i>Justicia adhatoda</i>	Adalodakathin Ila	Leaf	Fresh	536	27.46
275	<i>Ricinus communis</i>	Avanakku Veru	Root	Fresh	927	19
276	<i>Tinospora cordifolia</i>	Chittamrithu	Leaf	Fresh	182	22.47
277	<i>Imperata cylindrica</i>	Darbha Veru	Root	Fresh	37	55

	<i>Elettaria</i>					
278	<i>cardamomum</i>	Elathari	Seed		103.5	1132.07
279	<i>Calotropis gigantea</i>	Erukku Ila	Leaf	Fresh	578	21.56
280	<i>Zingiber officinale</i>	Inchi Ila	Leaf	Fresh	47	30
		Kadali Vazha				
281	<i>Musaparadisiaca</i>	Maanam	Rhizome	Fresh	35	30
282	<i>Strychnos nux-vomica</i>	Kanjirathila	Leaf	Fresh	95	25.79
283	<i>Curcuma aromatica</i>	Kasthoori Manjal	Rhizome	Fresh	8	20
284	<i>Phyllanthus niruri</i>	Keezharnelli	Whole Parts	Fresh	25	20
285	<i>Tragia involucrata</i>	Kodithoova Veru	Root	Fresh	44	50
286	<i>Aegle marmelos</i>	Koovalathin Ila	Leaf	Fresh	98	21.53
287	<i>Sida cordifolia</i>	Kurunthottl	Root	Fresh	157	35.61
288	<i>Punica granatum</i>	Mathalathin Ila	Leaf	Fresh	10	20
289	<i>Erythrina variegata</i>	Murikken Ila	Leaf	Fresh	1468	20
290	<i>Moringa oleifera</i>	Muringa Patta	Stem Bark	Fresh	73	30
291	<i>Cyperus rotundus</i>	Muthanga Pullu	Whole Parts	Fresh	10	30
292	<i>Hedyotis corymbosa</i>	Parppataka Pullu	Whole Parts	Fresh	10	50
	<i>Chonemorpha</i>					
293	<i>fragrans</i>	Perunkurumpa Veru	Root	Fresh	20	25
294	<i>Merremia tridentata</i>	Prasarani	Whole Parts	Fresh	8	18.75
295	<i>Pongamia pinnata</i>	Punku Ila	Leaf	Fresh	213	20
296	<i>Cocos nucifera</i>	Thengin Pookkula	Inflorescence	Fresh	10	90
297	<i>Ixora coccinea</i>	Thetti Samoolam	Whole Parts	Fresh	78	24.87
298	<i>Leucas aspera</i>	Thumpa	Whole Parts	Fresh	70	20
299	<i>Papaver somniferum</i>	Vella Kasakasa	Seed		4	80

6.1.5. AYURVEDA AND ADULTERATION

A large percentage of plants used in herbal industries are subject of controversy. Gap between demand and supply of raw drugs, habitat loss of herbs due to industrialization, confusion in distinguishing plants from allied species, poor understanding and parallel evolved knowledge systems, collection by untrained peoples from forest areas and lack of proper policies from government to control adulteration are some of the reasons attributed to it. Adulterants and substitutes of some important commercial herbal drugs Annexure 6.1.10 and 6.1.11.

***Sida alnifolia* L.-**



Sida cordata



Sida cordifolia



Sida rhombifolia



Sida scabrida



Sida rhombifolia- (Wayand Girijan Co-operative Society, Kallloor, Wayanad)



Kaempferia galanga

Chengazhaneerkizhangu- (Wayand Girijan Co-operative Society, Kallloor, Wayanad)



***Solanum torvum* –Chunda** (Wayand Girijan Co-operative Society, Kalloor, Wayanad)



6.1.6 NUTRACEUTICALS

Nutraceutical is defined as, —A food or a part of food that delivers medical/health benefits, as well as prevention/treatment of a disease. Nutraceutical industries have three main sections which comprise functional food, dietary supplement and herbal and natural products. In India, the FSSAI regulates the nutraceuticals through FSS Act and the regulations framed thereunder. As per the press note on Nutraceutical Regulations issued by the FSSAI, India has notified the Food Safety and Standards (health supplements, nutraceuticals, food for special dietary use, food for special

medical purpose, functional food and novel food) Regulations, 2016 in the Gazette of India on 23 December 2016.

Rising healthcare costs coupled with the increasing geriatric population across the world are anticipated to drive the global functional food industry. List of Botanical ingredients used in Nutraceutical industry and approved by Food Safety and Standards Authority of India is given in Annexure 6.1.12. India, having an abundance of useful herbs and spices, as well as owning a rich history in Ayurveda is a major player in the natural nutraceutical ingredients segment.

The global nutraceuticals market size was valued at USD 417.66 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 8.9% from 2020 to 2028. The growing demand for dietary supplements and functional foods is expected to be a key driving factor for the global market over the period. Rising healthcare costs coupled with the increasing geriatric population across the world are anticipated to drive the global functional foods industry.

The Indian nutraceuticals market is expected to grow from \$4 billion in 2017 to \$18 billion in 2025. The herbal segment is likely to contribute 30 per cent of the dietary supplements market in India, expected to grow CAGR of ~20 per cent from 2015 to 2023.

Production in Dietray Supplements Market (2018 - 2019) - India

Sr. No.	Product	Value (INR Mn)
1	Herbal / Traditional	422.4
2	Protein	369.6
3	Vitamins & Minerals	488.4
4	Others	39.6

Production in Functional Food and Beverages Market (2018 - 2019)- India

Sr. No.	Product	Value (INR Mn)
1	Nutrition	405
2	Muscle Enhancement	202.5
3	Weight Management	170.1
4	Others	32.4

Garcinia-based health supplement for slimming, green tea extracts capable of fighting cancer and turmeric-based capsules for combating ulcers have already hit the market. Arjuna Natural Extracts and Akay group are major nutraceutical ingredients manufacturers in Kerala and their key products include turmeric extract, Omega 3, boswellia, amla, coriander, fenugreek extracts etc.

In India the state has the monopoly over the production of ginger oil, cardamom oil, nutmeg oil and cinnamon leaf and bark oil. The state also has a share in the production of citronella oil (Java), palmarosa oil (Cymbopogon martini), patchouli (Pogostemon cablin), Eucalyptus citradora oil and tulsi oil (Ocimum sanctum). From the available plant genetic resources of the western ghats new/alternative sources of aromatic and medicinal oils are being developed. This include geranyl acetate rich lemongrass oil (Cymbopogon gidarba), geraniol rich lemongrass oil (Cymbopogon parkeri), Kacholam oil (Kaempferia galanga), galangal oil (Alpinia galanga & A. calcarata), Calamus oil (Acorus calamus) Cyprus oil (Cyprus rotanda) etc.

The state has rich ayurvedic plants resources from which, total extractables and value added medicinal principles and nutraceuticals are also being prepared. This include *Garcinia gambogia, Gymnema sylvestre, Mucuna puriens, Piper longum, Adhatoda vesica, Aloe vera, Adrographis, Asparagus, Bacopa monnieri, Boswellia sereta, Centella asiatica, Coleus forskholli, Withania somnifera*. A list of major bioresources used in nutraceutical industry is given in Table 6.1.17.

Table 6.1.17 : Major bioresources used in Nutraceuticals industry

Sl. No.	Common Name	Botanical Name
1.	Green algae	<i>Haematococcus pluvialis</i>
2.	Turmeric	<i>Curcuma longa L.</i>
3.	Parangi	<i>Boswellia serrata</i>
4.	Amaranth	<i>Amaranthus hypochondriacus</i>

5.	Brahmi	<i>Bacopa monnieri</i>
6.	Black Pepper	<i>Piper nigrum</i>
7.	Makandi	<i>Coleus Forskohlii</i>
8.	Mustard	<i>Brassica nigra</i>
9.	Fenugreek	<i>Trigonella foenum-graecum</i>
10.	Kudampuli	<i>Garcinia cambogia</i>
11.	Mangosteen	<i>Garcinia mangostana</i>
12.	Ginger	<i>Zingiber officinale</i>
13.	Guggul	<i>Commiphora mukul</i>
14.	Cakkarakkolli	<i>Gymnema sylvestre</i>
15.	Pomegranate	<i>Punica granatum</i>
16.	Njerinjal/Gokshura	<i>Tribulus terrestris</i>
17.	Nelli	<i>Emblica officinalis</i>
18.	Thaanni	<i>Terminalia bellerica</i>
19.	Neermaruthu	<i>Terminalia chebula</i>
20.	Thulasi	<i>Ocimum sanctum</i>
21.	Cumin	<i>Cuminum cyminum</i>
22.	Ashwagandha	<i>Withania somnifera</i>
23.	Arjuna	<i>Terminalia arjuna</i>
24.	Cinnamon	<i>Cinnamomum verum</i>
25.	Cardamom	<i>Elettaria cardamomum</i>
26.	Cloves	<i>Syzygium aromaticum</i>
27.	Yeast	<i>Saccharomyces cerevisiae</i>
28.	Tomato	<i>Solanum lycopersicum</i>
29.	Chendumalli/Marigold	<i>Tagetes erecta</i>
30.	Vattal Mulaku	<i>Capsicum annuum</i>
31.	African mango	<i>Irvingia gabonensis</i>
32.	Butterbur	<i>Tussilago hybrida</i>
33.	Lemon balm	<i>Melissa officinalis</i>
34.	Mulberry	<i>Morus alba</i>
35.	Nilampala	<i>Artemisia vulgaris</i>
36.	Aloe vera	<i>Aloe vera</i>
37.	Ummam	<i>Datura stramonium</i>
38.	Danthapala	<i>Wrightia tinctoria</i>
39.	Kariveppu	<i>Murraya koenigii</i>
40.	Kayyonni	<i>Eclipta prostrata</i>
41.	Chembarathi	<i>Hibiscus rosasinensis</i>
42.	Manjatii	<i>Rubia cordifolia</i>
43.	Ramacham	<i>Vetiveria zizanioides</i>
44.	Green alga	<i>Dunaliella salina</i>
45.	Guar	<i>Cyamopsis tetragonoloba</i>
46.	Arabic Gum	<i>Acacia senegal</i>

47.	Konjac yam	<i>Amorphophallus konjac</i>
48.	Papaya	<i>Carica papaya</i>
49.	Lemon	<i>Citrus limon</i>
50.	Barbados cherry	<i>Malpighia emarginata</i>
51.	Sour orange	<i>Citrus aurantium</i>
52.	Dandelion	<i>Taraxacum officinale</i>
53.	Cherupachotti	<i>Desmodium pulchellum</i>
54.	Eucalyptus	<i>Eucalyptus globulus</i>
55.	Nerinjil	<i>Tinospora cordifolia</i>
56.	Noni	<i>Morinda citrifolia</i>
57.	Drumstick tree	<i>Moringa oleifera</i>
58.	Neem tree	<i>Azadirachta indica</i>
59.	Shatavari	<i>Asparagus racemosus</i>
60.	Kurannumannal	<i>Bixa orellana</i>
61.	Amukkuram	<i>Withania somnifera</i>
62.	Karinochi	<i>Vitex negundo</i>
63.	Pudina	<i>Mentha arvensis</i>
64.	Erattimadhuram	<i>Glycyrrhiza glabra</i>
65.	Changalamparanda	<i>Cissus quadrangularis</i>
66.	Muttil	<i>Centella asiatica</i>
67.	Sunnamukhi	<i>Cassia angustifolia</i>
68.	Chitta-ratta	<i>Alpinia galanga</i>
69.	Parangi	<i>Boswellia serrata</i>
70.	Theyil	<i>Camellia sinensis</i>
71.	Maavu	<i>Mangifera indica</i>
72.	Flax	<i>Linum usitatissimum</i>
73.	Kanikonna	<i>Cassia fistula</i>
74.	Thazhuthama	<i>Boerrhaavia diffusa</i>
75.	Venga	<i>Pterocarpus marsupium</i>
76.	Njaval	<i>Syzygium cuminii</i>
77.	Kattupadavalam	<i>Trichosanthes dioica</i>
78.	Kurunthotti	<i>Sida cordifolia</i>
79.	Naruneendi	<i>Hemidesmus indicus</i>
80.	Karimuttan	<i>Cyperus rotundus</i>
81.	Jatamansi	<i>Nardostachys jatamansi</i>
82.	Shanghupushpam	<i>Clitoria ternatea</i>
83.	Naikkurana	<i>Mucuna pruriens</i>
84.	Kadaladi	<i>Achyranthes aspera</i>
85.	Mandaram	<i>Bauhinia variegata</i>
86.	Thrikoolpakkonna	<i>Operculina turpethum</i>
87.	Kadalpayal	<i>Spirulina plantesis</i>
88.	Vendakka	<i>Abelmoschus esculentus</i>

89.	Karingali	<i>Acacia catechu</i>
90.	Karivelam	<i>Acacia Nilotica</i>
91.	Vayambu	<i>Acorus calamus</i>
92.	Adalodakam	<i>Justicia adhatoda</i>
93.	Koovalam	<i>Aegle marmelos</i>
94.	Bavanga	<i>Allium cepa</i>
95.	Vellulli	<i>Allium sativum</i>
96.	Maramanjil	<i>Berberis aristata</i>
97.	Kattujirakam	<i>Centratherum anthelminticum</i>
98.	Veluttanilappana	<i>Chlorophytum borivilianum</i>
99.	Pikkumutti	<i>Citrullus colocynthis</i>
100.	Kovakka	<i>Coccinia indica</i>
101.	Pathalagarudakkodi	<i>Cocculus hirsutus</i>
102.	Panikoorka	<i>Coleus forskohlii</i>
103.	Vishnukranthi	<i>Convolvulus pluricaulis</i>
104.	Kotta-malli	<i>Coriandrum sativum</i>
105.	Niravila	<i>Crateva nurvala</i>
106.	Jeerakam	<i>Cuminum cymminum</i>
107.	Nilappana	<i>Curculigo orchioides</i>
108.	Karuka	<i>Cynodon dactylon</i>
109.	Kattu kachil	<i>Dioscorea bulbifera</i>
110.	Kayyonni	<i>Eclipta alba</i>
111.	Vayivalannam	<i>Embelia ribes</i>
112.	Kokam	<i>Garcinia indica</i>
113.	Kumbil	<i>Gmelina arborea</i>
114.	Katcholam	<i>Hedychium spicatum</i>
115.	Vayalchulli	<i>Hygrophila auriculata</i>
116.	Thakkolam	<i>Illicium verum</i>
117.	Muthalakizhangu	<i>Ipomoea mauritiana</i>
118.	Kachhuram	<i>Kaempferia galanga</i>
119.	Asali	<i>Lepidium sativum</i>
120.	Atakodiyam	<i>Leptademia reticulata</i>
121.	Tumba	<i>Leucas aspera</i>
122.	Kuva	<i>Maranta aurundinacea</i>
123.	Peppermint	<i>Mentha piperata</i>
124.	Guava	<i>Psidium guajava</i>
125.	Red sanders	<i>Pterocarpus Santalinus</i>
126.	Ekanayakam	<i>Salacia reticulata</i>
127.	Ukamaram	<i>Salvadora persica</i>
128.	Ashokam	<i>Saraca indica</i>
129.	Kottam	<i>Saussurea lappa</i>
130.	Adakkyamaniyan	<i>Sphaeranthus indicus</i>

131.	Thettamaram	<i>Strychnos potatorum</i>
132.	Nilavipaa	<i>Swertia chirayta</i>
133.	Pachotti	<i>Symplocas racemose</i>
134.	Kozhinjil	<i>Tephrosia purpurea</i>
135.	Aymodakam	<i>Trachyspermum ammi</i>
136.	Thakaram	<i>Valeriana wallichii</i>
137.	Kizharnelli	<i>Phyllanthus niruri</i>
138.	Jivanti	<i>Leptadenia eticulata</i>

Source : Compiled from <https://foscos.fssai.gov.in/>

6.1.7 HERBAL COSMETIC INDUSTRY

Cosmetic is defined under section 3(aaa) of the Drugs and Cosmetics Act, 1940 as, any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness or altering the appearance, and includes any article intended for use as a component of cosmetic.

The cosmetics and personal care industry is one of the fastest growing consumer products sectors in India. It is primarily categorized into five major categories - body care, face care, hair care, hand care and color cosmetics. The top three players in the Indian market are international players, namely Hindustan Unilever, Colgate-Palmolive India and L'Oréal India. Commonly used bioresources in the herbal cosmetic industry in Kerala is given in Table 6.1.18

Table 6.1.18 Major bioresources used in Cosmetics industry

Sl. No.	Common Name	Botanical Name
1.	Ummam	<i>Datura stramonium</i>
2.	Dhanthappala	<i>Wrightia tinctoria</i>
3.	Kattaarvaazha	<i>Aloe vera</i>
4.	Kariveppu	<i>Murraya koenigii</i>
5.	Kayyunni	<i>Eclipta prostrata</i>
6.	Chembarathi	<i>Hibiscus rosasinensis</i>
7.	Man-chetti	<i>Rubia cordifolia</i>
8.	Kashmiram	<i>Crocus sativus</i>

9.	Ramacham	<i>Vetiveria zizanioides</i>
10.	Veppu	<i>Azadirachta Indica</i>
11.	Manjal	<i>Curcuma longa</i>
12.	Pudina	<i>Mentha arvensis</i>
13.	Thakkali	<i>Solanum lycopersicum</i>
14.	Pichakam	<i>Jasminum officinale</i>
15.	Theyila	<i>Camellia sinensis</i>
16.	Nellikka	<i>Emblica officinalis</i>
17.	Kolinji	<i>Zingiber zerumbet</i>
18.	Marotti	<i>Hydnocarpus pentandra</i>
19.	Athi	<i>Ficus racemosa</i>
20.	Peral	<i>Ficus bengalensis</i>
21.	Chela	<i>Ficus Lacor</i>
22.	Tulsi	<i>Ocimum sanctum</i>
23.	Pomegranate	<i>Punica granatum</i>
24.	Patchouli	<i>Pogostemon cablin</i>
25.	YlangYlang	<i>Cananga odorata</i>
26.	Cinnamon	<i>Cinnamomum verum</i>
27.	Eucalyptus	<i>Eucalyptus globulus</i>
28.	Brahmi	<i>Bacopa monnieri</i>
29.	Mutti	<i>Centella asiatica</i>
30.	Nilam	<i>Indigofera tinctoria</i>
31.	Poovamkurunthal	<i>Vernonia cinerea</i>
32.	Henna	<i>Lawsonia inermis</i>
33.	Black Cumin	<i>Nigella Sativa</i>
34.	Jaathi	<i>Myristica fragrans</i>
35.	Sandal	<i>Santalum album</i>
36.	Gum arabic	<i>Acacia senegal</i>
37.	Kasthurimanjal	<i>Curcuma aromatica</i>
38.	Cardamom	<i>Elettaria cardamomum</i>
39.	Kokum	<i>Garcinia indica</i>
40.	Soap nut tree	<i>Sapindus mukorossi</i>
41.	Shikkakai	<i>Acacia concinna</i>
42.	Chittamrith	<i>Tinospora cordifolia</i>
43.	Maramanjal	<i>Berberis aristata</i>
44.	Cherupayar	<i>Vigna radiata</i>
45.	Rakthachandanam	<i>Pterocarpus santalinus</i>
46.	Kachhura	<i>Kaempferia Galanga</i>
47.	Indian Costus Root	<i>Sausures lappa</i>
48.	Chimpompil	<i>Callicarpa macrophylla</i>
49.	Takaram	<i>Nardostachys jatamansi</i>
50.	Iruveli	<i>Coleus vettiveroides</i>

51.	Karimthumba	<i>Anisomeles malabarica</i>
52.	Gingergrass	<i>Cymbopogon martinii</i>
53.	Katcholam	<i>Hedychium spicatum</i>
54.	Tagara	<i>Valeriana wallichii</i>
55.	Guggul	<i>Commiphora wightii</i>
56.	Parangi	<i>Boswellia serrata</i>
57.	Ceruppuna	<i>Calophyllum inophyllum</i>
58.	Nagachempakam	<i>Mesua ferrea</i>
59.	Peepal	<i>Ficus religiosa</i>
60.	Neermaruthu	<i>Terminalia chebula</i>
61.	Thanni	<i>Terminalia bellirica</i>
62.	Kakkapola	<i>Monochoria vaginalis</i>
63.	Erattimadhuram	<i>Glycyrrhiza glabra</i>
64.	Indian Lotus	<i>Nelumbo nucifera</i>
65.	Chappannam	<i>Ceasalpinia sappan</i>
66.	Kayyonni	<i>Eclipta alba</i>
67.	Paluruvam	<i>Cardiospermum halicacabum</i>
68.	Kunni kuru	<i>Abrus precatorius</i>
69.	Ungu	<i>Millettia pinnata</i>
70.	Korakizhanna	<i>Cyperus scariosus</i>
71.	Chukku	<i>Zingiber officinale</i>
72.	Changalapperanda	<i>Cissus quadrangularis</i>
73.	Vettila	<i>Piper betle</i>
74.	Ayamodhakam	<i>Trachyspermum ammi</i>
75.	Sathakuppa	<i>Anethum graveolens</i>
76.	Vembada	<i>Ventilago maderaspatana</i>
77.	Kurunthotty	<i>Sida cordifolia</i>
78.	Kurumulaku	<i>Piper nigrum</i>
79.	Grambu	<i>Syzygium aromaticum</i>
80.	Mango	<i>Mangifera indica</i>
81.	Yavam	<i>Hordeum vulgare</i>
82.	Lanthakuru	<i>Ziziphus jujuba</i>
83.	Muthira	<i>Dolichos biflorus</i>
84.	Kuvalam	<i>Aegle marmelos</i>
85.	Tarkkari	<i>Premna mucronata</i>
86.	Vellapathiri	<i>Oroxylum indicum</i>
87.	Pathiri	<i>Stereospermum suaveolens</i>
88.	Kumbil	<i>Gmelina arborea</i>
89.	Puthiri chunda	<i>Solanum indicum</i>
90.	Kandakarichundda	<i>Solanum xanthocarpum</i>
91.	Njerinjil	<i>Tribulus terrestris</i>
92.	Orila	<i>Desmodium gangeticum</i>

93.	Muvila	<i>Uraria picta</i>
94.	Meda	<i>Polygonatum cirrhifolium</i>
95.	Kakoli	<i>Fritillaria roylei</i>
96.	Ksheerakakoli	<i>Lilium polyphyllum</i>
97.	Jeevakam	<i>Malaxis acuminata</i>
98.	Pazhamunpala	<i>Manilkara hexandra</i>
99.	Sangupushpam	<i>Convolvulus pluricaulis</i>
100.	Vayambu	<i>Acorus calamus</i>
101.	Uluva	<i>Trigonella foenum-graecum</i>
102.	Amukkaram	<i>Withania somnifera</i>
103.	Thazuthama	<i>Boerhaavia diffusa</i>
104.	Shatavari	<i>Asparagus racemosus</i>
105.	Muringa	<i>Moringa oleifera</i>
106.	Valampuli	<i>Tamarindus indica</i>
107.	Grapefruit	<i>Citrus grandis</i>
108.	Sugar Cane	<i>Saccharum officinarum</i>
109.	Cashew	<i>Anacardium occidentale</i>
110.	Cocoa	<i>Theobroma cacao</i>
111.	Shea	<i>Butyrospermum parkii</i>
112.	Litchi	<i>Litchi chinensis</i>
113.	Illu Mulam	<i>Bambusa arundinacea</i>
114.	Coconut	<i>Cocos nucifera</i>
115.	Uruvanchi	<i>Sapindus mukurossi</i>
116.	Mulberry	<i>Morus nigra</i>
117.	Karuva	<i>Laurus nobilis</i>
118.	Ukamaram	<i>Salvadora persica</i>
119.	Karkokil	<i>Psoralea corylifolia</i>
120.	Nilappana	<i>Curculigo orchioides</i>
121.	Vellila	<i>Mussaenda frondosa</i>
122.	Passion flower	<i>Passiflora sp.</i>
123.	Kodi	<i>Hydnocarpus wightianus</i>
124.	Mottavaka	<i>Albizia marginata</i>

Source : Compiled from data provided by Drugs control, Govt of Kerala

6.1.8 Cultivation of Medicinal Plants in Kerala

List of Medicinal Plants of Kerala is given in Annexure 6.1.13.

CHITTARATHA (*Alpinia galanga*)



VAYAMBU-(*Acorus calamus*)- *Sapplings*



Andrographis paniculata- *Kiriyathu*



***Argyreia nervosa*- Vridhadharu**



***Asparagus racemosus*- Sathavari**



***Bacopa monnieri*- Brahmi**



***Baliospermum montanum*- Nagadanthi**



***Cinnamomum verum*- Karuvapatta**



***Coscinium fenestratum*- Maramanjai**



***Holostemma ada-kodien*- Adapathiyan**



***Pterocarpus santalinus*- Raktha chandanam**



***Santalum album*- Chandanam**



***Saraca asoca*- Asokam**



***Abrus precatorius*Linn -Kunni**



1. Mattathur Labour Co-operative Society, Mattathur, Thrissur – Medicinal Plant Cultivation

An example of success story of Medicinal plant cultivation in Kerala with buy back arrangements. At present the Society have 800 active farmers in medicinal plant cultivation and the society is issuing assured market price, production bonus and crop insurance.



Buy back with farmers - The success story Of “BITTER GOURD (*Momordica charantia*).”

Parties Involved

- OUSHADHI, Labour Co-Operative Society, Mattathur, Kudumbhasree Mission, Thrissur District Principal Agriculture Officer.

Tenure of Agreement - 5 years.

Quantity - 1,00,000 Kg/Annum.



Activities at Mattathur Gramapanchayath at a glance

Sl.No	Species	Cultivation Area (Acre)
1	<i>Momordica charantia</i>	40
2	<i>Plumbago indica</i>	35
3	<i>Pseudarthria viscida</i>	01
4	<i>Kaemferia galanga</i>	06
5	<i>Holostemma ada-kodien</i>	01
6	<i>Asparagus racemosus</i>	5
7	<i>Justicia adhatoda</i>	01
8	<i>Sida alnifolia</i>	50

- During the year 2017-18, society had harvested and sold around 30 tons of raw materials worth Rs. 26 lakhs.
- In the year 2018-19 they have sold 60 tonnes of raw materials worth Rs. 53 lakhs.
- Revenue during 2019-20 is 1 crore
- Initiated raw material collection and constructed a temporary warehouse for the storage of raw material
- Provided more than 8000 man days employment opportunities especially for women through cultivation , harvesting and collection.
- Ensure sustainable supply of quality raw drugs to industries a nominal quantity in a perpetual manner

2. Oushadhi

- Two medicinal plant nursery at Kuttanellur and Pariyaram for promoting medicinal plants cultivation.
- Annual distribution of 3 lakh seedlings of 50 leading species, free of cost/ subsidized rate.

- Cultivated 15 acres of land at Kuttanellur with 20 species of medicinal tree species.
- Raised medicinal trees on 35 acres of land at Pariyaram, Kannur District.
- Encourage public in cultivation of medicinal plants by free distribution of planting materials.
- Setting up of medicinal plants demonstration garden at Pariyaram and Kuttanellur was a significant footstep for promoting medicinal plants.
- New projects:
 - Institutional Medicinal Garden 5 Ha at Payaram NMPB
 - Medicinal plant Model Nursery at Pariyaram, SMPB
 - Medicinal plant Demonstration garden at Pariyaram SMPB

Table 6.1.19 Cultivation of Medicinal and Aromatic Plants in Tribal Settlements of Kerala MoU with KFD of Oushadhi

SI No	FDA	Range	Name of the settlement	Area of settlement (ha)	Total number of families
1	Kannur	Kannavam	Chikkery bit – 5	101.82	134
2	Trivandrum				
3	Neyyar-Peppara	Kottoor	Molamuda	20.00	12
4	Thenmala	Thenmala	Peramkovil	70.24	95
5	Peechi	Peechi	Thamaravellachal	120.00	33
6	Malayattoor	Kuttampuzha	Adichilthootti	70.00	54
7	Munnar	Marayoor	Theerthamalakudy	1	86
		Adimaly	Plamala	58.70	70
8	Palakkad	Walayar	Chavadippara	18.62	6

9	North Wayanad	Periya	Churuli	25.23	41
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3. Kottakkal Arya Vaidyasala

Table 6.1.20 Herbal gardens

Sl. No.	Name of Gardens	District	Area Acre	Major Crops
1	Kanhirapuzha	Palakkad	115.62	Adalodakam, Karimkuringi, Nagadanthi, Brahmi, Karinochi, Kariveppu, Jathi, Coconut, Arecanut, Kumizhu, Koovalam, Poopathiri, Venga, Ashokam, Njettaval, Ayyappala and herbs like sankhupushpam, Thulsi, Chengazhineerkizhangu, Kanjikkoorkka, Kurumulaku etc
2	Kottappuram	Palakkad	16.18	Adalotakam, Nagadanthi, Kariveppu, Jathi, Coconut, Arecanut, Kumizhu, Koovalam, Venga, Njettaval, Ayyappala and herbs like Sankhupushpam, Nithyakallyani, Kanjikkoorkka, Kunnanvazha, Thulsi, Chengazhineerkizhangu, Kurumulaku etc
3	Kanjikkode	Palakkad	26.5	Coconut, Palakappayyani, Adalotakam, Nagadanthi, Brahmi, Ayyappala, Njettaval and herbs like Thulsi, Sankhupushpam, Kanjikkoorkka, Nithyakallyani, Kattarvazha
4	Anoli	Malappuram	16.7	Coconut, Kumizhu, Koovalam Palakappayyani, Ayyappala, Njettaval, Venga, Adalotakam, Karimkuringi, Nagadanthi, Kacholam, Kurumulaku etc
5	Avanangad	Malappuram	9.07	Coconut
6	Peruvangad	Malappuram	6.95	Coconut, Kumizhu, Koovalam, Palakappayyani, Njettaval, Ayyappala, Ashokam, Adalotakam and herbs like sankhupushpam, Kanjikkoorkka, Nithyakallyani, Iruveli etc

7	Nallattu parambu	Malappuram	3.5	Coconut, Kumizhu, Koovalam, Ayyappala, Njettaval, Kunnanvazha, Kadali vazha and herbs like Sankhupushpasm, Vellakkuni etc
8	Kudalikundu	Malappuram	1.9	Coconut
9	Oushadhodyanam	Malappuram	7.2	Conserving more than 1000nos of Medicinal Plant species for Research and study purpose
10	Goat Farm	Malappuram	Avanangad	70 goat farm
11	Manalodipadam	Malappuram	2.25	Rice cultivation
12	Nanjagud	Mysore, Karnataka	8.5	1480 medicinal trees planted Area

4. Nagarjuna Herbal Nursery

Nagarjuna Ayurveda carries out the promotional activities related to medicinal plants, by preserving a big herbal garden as well as herbal nursery. Nagarjuna Herbal Nursery is producing huge numbers of medicinal plant saplings in order to distribute to the common public at nominal price. The herbal garden includes 200 rare species for demonstration. Around 200 Medicinal Herbs, 250 Medicinal trees, 100 Ornamental plants, 150 varieties of fruit plants and 20 varieties of Plantation crops are available in the nursery. Also available are some groups of plants such as Star trees (NAKSHATRA VANA), Thriphala, Thrikatu, Dasamoolas, Dasapushpas, Navagraha vrukshas, Raashi vrukshas etc. Nagarjuna Herbal Nursery is located at Vazhakulam, opposite to Vishwajyothi Engineering College, Thodupuzha – Muvattupuzha Road in Kerala. They also have an Herbal Wagon travelling all over Kerala for the distribution, awareness creation and promotion of medicinal plants to the public. For the last 30 years, Nagarjuna Ayurveda is committed to popularize and promote cultivation of medicinal plants through various programs such as planting and distribution of 50 lakhs saplings, providing technical advice to farmers, conducting more than 2000 awareness classes

in schools, colleges, religious institutions, public institutions etc. Nagarjuna organizes an endowment entitled ‘P.K Narayanan Oushadhamithram Award’ annually for the best farmer who cultivates medicinal plants scientifically. (<https://www.nagarjunaayurveda.com/>)

5. Other agencies currently engaged in cultivation of Medicinal Plants

Exclusive cultivation of Ramacham at Veliyamcode, Punnayoorkulam Gramapanchayath, Chavakkad Municipality, Perumpadappu Gramapanchayath in Thrissur district and Ponnani municipality in Malappuram district covered total 300 acres of land and 100 farmers are engaged in the cultivation. They are producing 4000 kg to 5000 kg annually. The selling price @ Rs.80 per kilo. They are marketing the root of Ramacham to Ayurvedic manufacturing companies and Cosmoseutical industries and also supplying different agencies located in other states of India. Due to the pandemic situation the farmers engaged in the cultivation are facing problem for marketing their produce. *(Source of information: Shalji Karumthedathu)*

Kudumbashree, which is a community organisation of Neighbourhood Group of women, launched medicinal plant cultivation in 2018. It is managed by Joint Liability Groups (JLGs) or groups of women farmers with four to 10 members. During 2018-19 176 JLG's started cultivating medicinal plants 530 acres covering 6 districts as of March 31, 2021.

THE MICRO, SMALL AND MEDIUM ENTERPRISES (MSME) SECTOR

Agribusiness is an emerging field in Kerala ensuring substantial income and employment opportunity. The dominance of commercial and horticultural crops in Kerala offers a great possibility for a variety of agribusiness opportunities. Kerala offers tremendous prospects for the growth of food- and agro-based sectors, particularly those that have close ties to Kerala's agricultural and natural resources, as noted in the Approach Paper to the Thirteenth Five-Year Plan. Both supply and demand considerations contribute to Kerala's potential for the growth of agro-based enterprises. Kerala produces a wide range of agricultural goods, including rice, coconut, rubber, pepper, cardamom, bananas, and pineapple, on the supply side. The State offers abundant marine and forest resources. Kerala has a sizable market for food and agricultural products on the demand side. Rural Kerala's average per capita consumption spending is about twice as much as rural India's average per capita consumption expenditure in 2011–12, according to National Sample Survey data. However, there are also important challenges for the growth of agro and food-based industries in Kerala.

In reality, any strategy to resurrect agricultural production in Kerala must include the construction of processing enterprises, which would help to provide higher returns to farmers for their agricultural products. developing new methods for buying agricultural goods The role performed by small farmers who cultivate in homesteads or other small parcels of land is particular to Kerala's agricultural economy. However, the small size presents a problem for farmers as well as the processing companies when it comes to the collection and acquisition of agricultural products. Farmers of a variety of agricultural products frequently complain that they do not acquire enough of their products because there is not a strong enough network for the acquisition of agricultural products. Agro-processing businesses, particularly small and medium-sized ones, struggle to work with the enormous number of small farmers dispersed around the State when they need to

buy agricultural products as raw materials for their operations. Despite Kerala's reputation as a significant producer of a wide range of agricultural goods, virtually little of their processing is done there. A shortage of raw materials or the need to import raw materials hurts Kerala's current agro-processing companies at the same time. Despite Kerala being a major producer of jackfruit and spices, several of the processing and extraction facilities have noted the challenges associated with obtaining the raw materials. Kerala is a major producer of pineapple (especially Ernakulam, Kottayam and Idukki districts). Vazhakkulam in Ernakulam district has emerged as a leading centre in the country in the trading of pineapple. Despite the easy availability of pineapple within the State, pineapple processing and value addition is limited.

Food processing sector in Kerala has always made significant contribution to exports. Kerala has been a major exporter of spices, marine products, cashew, coffee and tea. Kerala accounts for nearly 20 % of the country's total food exports. Two thirds of Kerala's export income comes from processed food. About 65 % of the cashew exporting and processing units officially registered with the Cashew Export Promotion Council of India (CEPCI) are from Kerala. It is estimated that the sector employs about 3, 00,000 workers and 90 % of them are women. Cashew processing is concentrated mainly in the private sector. The State's long coast line, lakes, lagoons and backwaters provided natural condition required for retting, an important part in coir processing. With the expansion of coconut cultivation, coir industry has picked up in Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Maharashtra, Assam and Tripura.

The availability of coconut husks, the natural retting facilities present in the lakes, lagoons and backwaters and the traditional expertise of the people were the reasons for the concentration and the growth of the industry in the State, especially in the coastal areas. This agro-based rural industry provides subsistence to around 1.5 lakh families in the coastal belt of Kerala. Kerala accounts for about 85 % of the total production of coir in the country. In Textile sector Kerala does not produce the raw material needed for the

spinning sector – cotton. Further, the yarn produced by the spinning mills in Kerala is processed outside the State. The handloom and powerloom industry provide employment to a sizeable section of the workforce in Kerala. One of the important challenges faced by coir industry in Kerala is the shortage of raw material, namely coconut husk, which is processed into coir fibre and coir products

The Micro, Small and Medium Enterprises (MSME) sector is a major income generating and employment providing sector in Kerala and 5.62 per cent of MSM.E enterprises in India are in Kerala. The bioresources based industries coming under this sector are handicrafts, handloom, khadi, food processing industries, garment making and textile industries and industries related to coir/wood.

6.2 FOOD PROCESSING SECTOR

Food processing sector is an important industry in India in terms of output and employment. India's food processing sector covers fruit and vegetables, spices, meat and poultry, milk and milk products, alcoholic beverages, fisheries, plantation, grain processing and other products like confectionery, chocolates, cocoa products, soya-based products, functional foods etc.

Food processing sector in Kerala has always made significant contribution to exports. Kerala has been a major exporter of spices, marine products, cashew, coffee and tea. Kerala accounts for nearly 20 % of the country's total food exports. Two thirds of Kerala's export income comes from processed food.

KINFRA has set up exclusive Food Processing Parks to suit the specific needs of the food processing sector and they offer space for food processing units in their 22 Industrial parks. KINFRA Mega Food Park at Palakkad will cover a region of 6 districts viz. Palakkad, Malappuram, Thrissur, Ernakulam, Kozhikode and Wayanad as the raw material cluster for the Park. There were 52 units functioning under KINFRA Food parks at Malappuram, Mazhuvannur, Adoor, Aroor and Wayand. Out of these, Mazhuvannur (Ernakulam) food

processing park has 24 units with 631 workers and Kakkancherry (Malappuram) food processing park has 15 units with 510 workers. Under the Mega Food Parks Scheme of Ministry of Food Processing Industries, KSIDC initiated a proposal to establish a Mega Food Park with thrust on the processing and export of seafood items at Pallippuram, Alappuzha district. The main objective is to create an integrated modern infrastructure leading to an ideal ecosystem to facilitate diverse sea food processing operations and encourage entrepreneurship in food processing in the region.

KINFRA Food Processing Park, Kakkancherry, Malappuram

The KINFRA Food Processing Park at Kakkancherry, Malappuram district, set up in an area of 71.5 acres, has 45 working units. In 2020-21, the park attracted an investment of ₹15,053.00 lakh and created 1,494 jobs.

KINFRA Mega Food Park, Palakkad

Ministry of Food Processing Industries (MOFPI), Government of India has approved the proposal from KINFRA for setting up a Mega Food Park in 79 acres with 40 working units at Kanjikode, Palakkad in accordance. In 2020-21, the park attracted an investment of ₹22,989.54 lakh and created 1,211 jobs.

KINFRA Food Processing Park, Adoor, Pathanamthitta

The KINFRA Food Processing Park at Adoor, Pathanamthitta district, set up in an area of 40.54 acres, currently have 18 working units. In 2020-21, the park has attracted investment of ₹6,010.44 lakh and created 759 jobs

Food and Spices Park, Muttam, Idukki

Total project cost is ₹12.5 crore, out of which ₹6 crore will be the assistance from Gol.

KSIDC Mega Food Park, Alappuzha

KSIDC is developing a Mega Food Park at Industrial Growth Centre Pallippuram, Cherthala with focus on the sea food processing sector. The park will cater to marine food processing sector with common infrastructure facilities such as cold storage,

standard design factory and ice plant. The project is expected to bring an investment of ₹350 crore within 3 years. As of now, about 42 acres has been allotted to different seafood/ food processing and allied units at the park.

Table 6.2.1 Status of Food Processing Units in KINFRA Parks, Source: KINFRA

SI No.	Name of the Park	No. of Units	Total Area (in acres)	Investment (lakhs)	Employment (In numbers)
1	Mega Food Park, Palakkad	40	79.42	22989.545	1211
2	KINFRA Food Processing Park, Kakkancherry, Malappuram	45	71.5	15053	1494
3	KINFRA Food Processing Park, Adoor, Pathanamthitta	18	40.54	6010.44	759
Total		103	235.92	44052.985	3464

Farmer Producer Organization (FPOs) is a formal cluster of farmers promoted to tap the benefits of economies of scale, product aggregation, value addition, branding and marketing. The following major crops/products were entrusted with FPOs in various districts of Kerala.

In Kerala, the registered FPOs in various districts were Thiruvananthapuram 10, Kollam - 6, Pathanamthitta 5, Alappuzha 7, Kottayam 8, Idukki -18, Ernakulam- 7, Thrissur 5, Palakkad 14, Malappuram -5, Kozhikode -6, Wayanad – 12, Kannur 9, Kasargod 6 and Lakshadweep 2. Similarly, the total Coconut producer company in Kerala was 18.

SI.No	Districts	Product
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

In Alappuzha, the Farmer tree Producer Company Limited year wise annual turnover was 2016-17 (In lakhs) 0.44, 2017-18 (In lakhs) 19.64, 2018-19 (In lakhs) 19.06. In 2019-2020 (In lakhs) it was improved to 27.58. The products were paddy seed sales, Puttu podi, Paddy & wheat value added products, Chilly & Turmeric powder.

Onattukara Spices Farmer Producer Company Limited involved in seed production, cultivation and processing of spice crops like turmeric, ginger, pepper, garcenea etc. The FPO also showed a progressive improvement from 1.11 lakhs 2016-17 to 34.06 lakhs (2019-2020).

Kothamangalam Agriculture Producer Company Limited of **Ernakulum** was involved in Vegetables, Nursery, Nutmeg, Rubber sheet processing, Coconut oil extract unit, Flour mill, Dry Banana, Dry Meat, Pineapple, Banana, Tapioca, Coconut, Garcinia. The annual turnover of 2016-17, 2017-18, 2018-19 and 2019-2020 was 91.32, 119.49, 32.27 and 87.59 lakhs respectively.

High Range Organic Producer Company Limited of Idukki (Eco Products, Dried Cardamom, Black & White Pepper, Nutmeg, Clove, Cocoa, Gambooge, Coffee) showed a hike from 3.1 lakhs to 174.84 lakhs i.e., 56.4 fold increase in turnover from 2016 to 2020.

Similarly, Hill Range Tribal Farmers Producer Company Limited (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 displayed a hike of 15.65 folds in 2019-2020.

Thodupuzha Farmers Agro Producer Company Limited dealt with Dairy, Coconut oil extraction, cattle feed, arrowroot powder started from 70.94 lakhs (2016-17) to 191.42 lakhs in 2019-2020.

In Kannur, Thejaswini Coconut Farmers Producer Company Limited (Coconut products, Honey, Jackfruit products, Organic Manure, Bath Soap, Coconut oil, Turmeric powder) recorded a turnover of 77.46 lakhs in 2016-17 and 102.98 lakhs in 2019-2020.

Gramalakshmi Marketing Producer Company Limited of Kasaragod showed a progressive increase of turnover of 35.38, 56.78, 58.41 and 42.07 lakhs from 2016 to 2020.

In Kollam, Venad Poultry Farmers Producer Company Limited deals with poultry, meat products etc. The turnover started with 71.29 (2016-17) and increased to 291.07 lakhs in 2019-2020.

Kanjirappally Agricultural And Dairy Producer Company Limited, Kottayam deals with Dairy and Cattle feed. Their turnover was 101.82 lakhs during 2019-20.

In Kozhikode, Niravu Farmers Producer Company Limited concentrates in Vegetables (Beans, Lady finger, Pumkin), Fruits (Banana), Sugarcane, Jaggery, Rice. The turnover from 2016 to 2020 was 2.08 to 319.01 lakhs.

The Vadakara Coconut Farmers Producer Company Limited (Coconut products, Jaggery, Choclates, Neera) revealed a turnover of 193.32 lakhs (2016-17) to 528.14 lakhs (2019-2020).

In Malappuram, Maranchery Kerasuraksha Agricultural Producer Company Limited (Nursery, Fertilizer, Coconut Products) recorded a turnover of 26.15 lakhs (2016-17) which decreased to 8.21 lakhs in 2019-2020.

Mannarmala Milk & Agro Producer Company Limited (Dairy, Curd, Sambaram, Nature Fresh Milk, Ghee) had a turnover of 52.84 lakhs (2019-2020).

Edakkara Agro Producer Company Limited traded Mushroom, Spawn, Layer Poultry & Hi tech Cage, Feeds, Puttu podi, Goat farming, Poly house, Fish farming, Irrigation etc. The annual turnover in 2017-18 was 160 lakhs and in 2019-2020 it was maintained at 156.52 lakhs.

The turnover of FPO at Palakkad, Palakkad Paddy Farmers Producer Company Limited (Paddy seed sales, Vegetables, Spice powder, Coconut oil, Agri inputs and grocery items) ranged from 50.69 (2017-18) to 186 lakhs (2019-2020).

Attappady Farmers Producer Company Limited (Goatery, Spices, Millets, Honey, Bamboo Rice) raised Rs 14.5 lakhs (2019-2020).

Thachanattukara Farmers Producer Company Limited carried poultry, Vegetables, Organic manure trading and recorded maximum turnover of Rs 244.92 lakhs.

Karshakajyothe Agro Producer Company Limited, Pathanamthitta trading Branded Rice, Coconut Oil, Coirpith, Mushroom, Honey displayed an annual turnover of 1.69 lakhs in 2016-17 and 18.77 lakhs during 2019-2020.

Thiruvananthapuram based FPOs Sabarmathy Agri And Livestock Farmers Producer Company Limited (Poultry, Goat farming, Eggs, Layer chicks, Cattle rearing) showed a range from 30.36 lakhs (2016-17) to 279.27 lakhs (2019-2020).

Panasa Farmers Producer Company Limited traded Jackfruit Pulp, Jackfruit Squash, Jackfruit Jam, Jackfruit Halwa, Jackfruit Cake, Jack Seed Cake, Jack Seed –Millet, Biscuit, Jack Pickle, Health Mix. Their annual turnover was 1.48 in 2016-17 which declined during 2019-2020 i.e., 0.56 lakhs.

Thrissur Paddy Farmers Producer Company Limited (Organic Rice, Rice products, Jaivamamrutham, Super Market (Coconut Oil, Chocolate, Jam, Juice), Cut Vegetables, Hotel, Meat Processing, Buffalo farming, Fisheries, Poultry) recorded an initial turnover of Rs. 888.75 lakhs during 2016-17 but reduced to Rs. 512.71 lakhs only during 2019-20.

Wayanad, Wayfarm Producer Company Limited carried out trading of Tomato, Carrot, Cabbage, Cucumber, Beans, Chilly, Onion, Potato, Brinjal, Okra, Dairy, Jackfruit products. In 2016-17 the turnover was 38.95, while in 2019-2020 it was 35.78 lakhs only. Wynad Agr

Marketing Producer Company Limited (Spices (Pepper, Turmeric), Coffee, Traditional Paddy (Gandhakashala), Pulses, Seasonal vegetables & fruits, Honey, Jackfruit & products, Arrowroot powder, Millets, Nursery (Spices, Seedlings) displayed a turnover of 3.9 lakhs in 2017-18 and during 2019-20 it was only 12 lakhs.

Cashew Industry

In India more than 50 % of the cashew processing is carried out in the unorganised sector. There are nearly 1800 medium to large and 2200 on-farm level processing units, engaging mostly women workers. The major distribution of Cashew in India is in the States of Kerala, Karnataka, Goa and Maharashtra along the West Coast and Tamil Nadu, Andhra Pradesh and Orissa along the East Coast and in West Bengal, Chhattisgarh, Gujarat, Jharkhand, and North Eastern States.

The Cashew Industry in Kerala is mainly concentrated in Kollam District. The Central Government recognises Kollam as a "Centre of Cashew Industry". The industry is highly labour intensive and employs more than 2 lakh workers, a majority of them women (above 90 %). Thus the industry provides a source of income for a large number of low-income families. The production of raw cashew nuts in Kerala was only about 80,000 tonnes a year and the demand for raw cashew nuts in the State was about 800,000 tonnes a year. The production of cashew in Kerala has not increased to meet the demand. Thus there was a gap in demand and supply of raw cashew nuts in Kerala. The GoK has created Special Purpose Vehicle (SPVs) for cashew nut procurement in order to tackle the problem as well as to increase the area under cashew cultivation and improve productivity per hectare .

About 65 % of the cashew exporting and processing units officially registered with the Cashew Export Promotion Council of India (CEPCI) are from Kerala. It is estimated that the sector employs about 3, 00,000 workers and 90 % of them are women. Cashew processing is concentrated mainly in the private sector. The co-operative sector has limited presence in cashew processing. There are two public institutions engaged in the cashew processing industry in Kerala, namely Kerala State Cashew Workers Apex Industrial Co-operative Society Ltd (CAPEX) and Kerala State Cashew Development Corporation (KSCDC).

In 2020-21, cashew kernel export from Kerala was 24,929 MT valued at ₹1,461.27 crore which is 49.87 per cent in terms of quantity and 50.27 per cent in terms of value that of India. In Kerala the production of raw cashew nut was 73,105 MT in 2020-21 and area was 1,03,210 hectares in 2020-21.

Table 6.2.2 Production of raw cashew nut in Kerala, 2013-14 to 2019-20, in ha and MT				
Year	Area in 000 ha	Annual growth, %	Quantity (in MT)	Annual growth, %
2013-14	84.9		80,120	
2014-15	84.5	-0.4	80,000	-0.2
2015-16	87.0	2.9	72,000	-10
2016-17	90.8	4.4	83,980	16.6
2017-18	92.8	2.1	88,180	5
2018-19	95.7	3.1	82,889	-6.1
2019-20	98.8	3.2	69,624	-16.1
2020-21	103.21	4.4	73,105	5
A-area (in 1000 hectares), P-Production (in 1000 MT) Source: Directorate of cashewnut & cocoa development (DCCD), Government of India				

Agencies in Cashew Sector

Kerala State Cashew Development Corporation (KSCDC) and Kerala State Cashew Workers Apex Co-operative Society (CAPEX) are the two State Government agencies involved in the processing of cashew in the State. Kerala State Agency for the Expansion of Cashew Cultivation (KSACC) and Kerala Cashew Board (KCB) are the other two State Government agencies in the sector. Cashew Export Promotion Council of India (CEPCI) and the Directorate of Cashew and Cocoa Development (DCCD) are the agencies involved in cashew promotion.

The Kerala State Cashew Development Corporation (KSCDC)

The Kerala State Cashew Development Corporation (KSCDC) has 30 factories with about 11000 workers. The Corporation processes raw cashew nuts and produces value added products. KSCDC processed 7,200 MT of raw cashew nuts and produced approximately 1,700 MT of cashew kernels in 2020-21. Total turnover of KSCDC in 2020-21 was Rs.87.44 crore.

Kerala State Agency for the Expansion of Cashew Cultivation (KSACC)

Kerala State Agency for the Expansion of Cashew Cultivation (KSACC) was established with a view to overcome the crisis of declining domestic production of cashew nuts resulting from the large shortfall of area under cashew cultivation in the State.

Cashew Workers Apex Co-operative Society (CAPEX)

CAPEX with headquarters in Kollam is the apex body of cashew workers' primary societies engaged in the procurement of raw cashew nuts and marketing of the processed Kernels. The main objective of the society is to organize cashew industry in the state on commercial basis, rendering assistance to affiliated societies, in the matter of procurement and distribution of raw-nuts, making available funds for processing and marketing of kernels and other items produced in the factories of the affiliated societies. The Society owns 10 factories and one packing centre. Total sales turnover in 2020-21 was ₹46.88 crore.

Table 6.2.3 Sales turnover of CAPEX, in ₹ crore

Year	Domestic Sales	Export	Total Sales Turnover	Loss
2013-14	42.3	21.2	63.5	9.4
2014-15	59.4	14.4	73.8	14.4
2015-16	59.1	14.6	73.7	16.4
2016-17	26.2	19.6	45.8	9.9
2017-18	81.5	5.3	86.8	12.6
2018-19	76.5	0	76.5	19.8
2019-20*	85.1	0	85.1	16.95
2020-21	46.88	0	46.88	-
Source: CAPEX *Subject to audit				

Cashew Export Promotion Council of India (CEPCI)

The Cashew Export Promotion Council of India (CEPCI, Govt. of India), a not-for-profit company, was established at Kollam, with the objective of promoting exports of cashew kernels and cashew nut shell liquid from India. There were 238 registered cashew exporters in India as members of CEPCI. In that, more than 200 exporters are based in Kollam. The export of raw cashew nut from India in 2019-20 was 15,826 MT, which was

valued at Rs. 140.46 crore. In 2019-20, import of raw cashew nut in India was 9.39 lakh MT valued at Rs. 8, 861. 58 crore. Import of RCN to Kerala in 2019-20 was 13,202 MT, valued at Rs. 125.51 crore. In 2020-21, the export of cashew kernels from Kerala was 24,929 MT and the earnings were about ₹1,461.27 crore which is 45-50% of Indias export in terms of quantity and value. In 2020-21, import of raw cashew nut (RCN) in India was 8.31 lakhMT valued at ₹7,331.28 crore. Import of RCN to Kerala in 2020-21 was 18,424 MT, valuedat ₹166.28 crore. Export of cashew nut shell liquid from the country during 2020-21 was 3,736 MT (valued at ₹19.72 crore) and the export from Kerala was nil in 2020-21.

In Kerala the production of raw cashew nut increased marginally from 80,120 MT in 2013-14 to 82,889 MT in 2018-19. However, the production fell sharply to 69,624 MT in 2019-20. Increase in production during recent years was attributed to increased productivity. The area under cultivation of cashew increased from 84,920 hectares in 2013-14 to 98,821 hectares in 2019-20, with significant gains from 2015-16 onwards.

Kerala Cashew Board Limited (KCB)

In 2019-20, Kerala Cashew Board procured 3,589 MT of RCN for a value of Rs.55.5 crore, which was utilised by 40 processing units under Kerala State Cashew Development Corporation (KSCDC) and Kerala State Cashew Workers Apex Co-operative Society (CAPEX). A general trend of decline in the rates (Rs./kg) at which KCB has been procuring Raw Cashew Nuts, is witnessed since the high rate of Rs.132.50/kg in September-October 2018. The last lot from Ghana (Lot V) was imported at the rate of Rs.83.69/kg. Decline in the price of imported RCN will benefit the processing industry.

6.3 TEXTILE AND HANDLOOM INDUSTRY

Handloom, Powerloom and Mill Sectors

The textile sector in Kerala includes areas like spinning, weaving, garment manufacturing, dyeing and processing units. The sector involves the units in public sector (both State

and Central), co-operative sector, and private sector. The garment industry has the potential to generate employment in large numbers even with the adoption of latest technologies. It has a large presence of women employees. The State Government has plans to set up a Textile Processing Centre at Nadukani, which will be an important step towards localisation of textile processing in the State.

Kerala's textile industry comprises traditional handloom sector, weaving sector and the spinning sector. The handloom industry in the State is mainly concentrated in Thiruvananthapuram and Kannur District and in some parts of Kozhikode, Palakkad, Thrissur, Ernakulam, Kollam and Kasaragod Districts. The industry is dominated by the co-operative sector, covering 96 % of total looms. The co-operative sector consists of factory type and cottage type societies. The remaining 4 per cent of handloom units are owned by industrial entrepreneurs. The spinning sector includes 26 mills with total spindle capacity of 7.03 lakh, employing about 7,600 people. The weaving sector includes the khadi units, handloom units, and power loom units.

Kerala State Co-operative Textile Federation Limited (TEXFED)

It integrates all the segments of the textile industry including spinning, weaving, processing and garmenting. There are eight co-operative spinning mills as members of TEXFED.

Kerala State Textile Corporation Limited (KSTC) The mills under KSTC are Prabhuram mills, Kottayam Textiles, Edarikkode Textiles, Malabar Spinning and Weaving Mills, Hi Tech Weaving Mills, Komalapuram Spinning and Weaving Mills and Uduma Textile Mills. Compared to previous years, the corporation had increased its production of Cotton/polyster blended yarn in 2018-19. Subsequently its income from sales of products also increased to Rs. 43.95 crore.

Handloom Sector

Among traditional industries of Kerala, the handloom Sector stands second only to the coir sector in terms of providing employment. The Handloom Industry in the State is

mainly concentrated in Thiruvananthapuram and Kannur District and in some parts of Kozhikode, Palakkad, Thrissur, Ernakulam, Kollam and Kasaragod Districts. The Industry was dominated by the Co-operative sector, covering more than 93 % of total looms. The remaining 4 % of Handloom units were owned by Industrial entrepreneurs. The total number of handlooms in the State in 2020-21 was 16,657. They produced about 148.8 lakh metres of handloom cloth. The total value of production in 2020-21 was ₹45.27 crore while the turnover was ₹164.98 crore. The total number of weavers in handloom sector in 2020-21 was 13,656.

The Co-operative sector consists of factory type and cottage type societies. The major varieties of products produced in the handloom sector of the State were dhothis, furnishing material, bed sheets, shirting, sarees and lungi. Considering the traditional value and heritage, the following products of the state are registered under the Geo Indication Act of India.

1. Balaramapuram Sarees & Fine cotton Fabrics 2, Kasargode Sarees 3. Kuthampully Sarees 4. Chendamangalam Dhothi 5. Kannur Home Furnishings

Kerala State Handloom Weaver's Co-operative Society (HANTEX)

Hantex is the apex body of handloom co-operatives established for distribution of required inputs to primary co-operative societies viz procurement, processing, marketing of goods, process high quality yarn and raw materials for societies and explore new business opportunities by promoting Handloom products through exports, about 380 primary cooperative societies are registered with it engaging about 10,000 weavers. HANTEX achieved a sale of ₹1,432 lakh in 2020-21.

Kerala State Handloom Development Corporation (HANVEEV)

Hanveev, which started functioning in 1968, is another agency for the upliftment of traditional handloom weavers in the unorganized sector in handloom industry with its registered office at Kannur and engaged in the manufacturing and marketing of wide range of handloom products depending on the market trends and sold at various outlets

throughout Kerala. Around 75 % of the textile mills in Kerala are spinning mills, which produce cotton yarn. Sales turnover (provisional figures) of Hanveev in 2020-21 was ₹687.06 lakh. The value of cloth and other items produced has fallen from ₹1,668.40 lakh in 2019-20 to ₹1,133.61 in 2020-21.

Table 6.3.1 Details regarding production in Handloom Industry in Kerala 2017-18 to 2019-20

Sl.No.	Item	2020-21	2018-19	2019-20
1	Co-operative Sector			
a	Number of looms	15405	16052	15851
b	Production of Handloom cloth (Million Meter)	14.03	28.63	30.23
c	Value of Production (Rs.in crores)	40.66	94.05	89.9
d	Total Turn over (Rs.in crore)	156.94	79.96	208.35
e	Productivity (M/L/A)	911.12	1783.58	1907.14
f	Total no.of weavers	12458	12545	12666
g	Employment generated (persondays in lakhs)	10.66	37.01	30.14
h	No.of women weavers in total number of weavers	7916	9732	8048
2	Corporate/ unorganised/ private sector			
a	Number of looms	1252	1265	1262
b	Production of Handloom cloth (Million Meter)	0.85	1.64	1.52
c	Value of Production (Rs.in crores)	4.61	27.80	23.87
d	Total Turn over (Rs.in crore)	8.04	22.64	12.6
e	Productivity (M/L/A)	686.27	1296.44	1296.44
f	Total no.of weavers	1198	1244	1262
g	Employment generated (persondays in lakhs)	1.009	3.67	1.51
h	No.of women weavers in total number of weavers	1116	1083	1089
3	Total: Co-Operative, Corporate and unorganised sector			
a	Number of looms	16657	17317	17113
b	Production of Handloom cloth (Million Meter)	14.88	39.97	31.75
c	Value of Production (Rs.in crores)	45.27	121.85	113.77
d	Total Turn over (Rs.in crore)	164.98	102.60	220.95
e	Productivity (M/L/A)	894.21	3078.02	1855.31
f	Total no.of weavers	13656	13789	13928

g	Employment generated (persondays in lakhs)	11.67	31.58	31.66
h	No.of women weavers in total number of weavers	9032	10815	9137
Source: Directorate of handloom & textiles				

Co-operative Sector

The co-operative sector in Textiles sector is involved in spinning and weaving activity (both power loom and handloom) in the State. There are 8 spinning mills in the co-operative sector. They are the Quilon Co-operative Spinning Mills Ltd, Alleppey Co-operative Spinning Mills Ltd, The Priyadarshini Co-operative Spinning Mills Ltd, The Trichur Co-operative Spinning Mills Ltd, The Malabar Co-operative Textiles Ltd, The Malappuram Co-operative Spinning Mills Ltd, The Cannanore Co-operative Spinning Mills Ltd, and the Karunakaran Memorial Co-operative Spinning Mills Ltd. There are 562 conventional power looms in five co-operative societies under TEXFED in the State. The co-operative units form about 82 % of total number of power looms in the State. There are 46 powerloom co-operative societies in the State.

The co-operative sector in handloom sector consists of factory type and cottage type societies. In 2019-20, there were 630 registered Primary Handloom Weavers Co-Operative Societies (PHWCS) in the State of which 180 were factory type and 450 were cottage type societies. Out of 630 registered Primary Handloom Weavers Co-Operative Societies, 408 were working. The production of handloom cloth by co-operative sector in 2020-21 was 14.03 million metres valued at Rs. 40.66 crore. Total turnover was ₹156.94 lakh. Number of looms has fallen from 15,851 in 2019-20 to 15,405 in 2020-21.

Powerloom Sector

There are 958 power looms in the State of which more than 84 per cent (812) are in the cooperative sector. In the power loom sector, production of cloth in 2020-21 was 55.73 lakh meters valued at ₹384.62 lakh. Productivity was 5,817.94 meters per loom and the total turnover was ₹396.01 lakh.

Spinning Mills

The spinning sector in Kerala includes the public sector (State and Central), the co-operative sector and the private sector. The spinning sector includes 26 mills with total spindle capacity of 7.03 lakh, employing about 7,600 people. There were 9 spinning mills under the 3 State PSUs namely Kerala State Textile Corporation Limited (7 mills), Sitaram Textiles Limited and Trivandrum Spinning Mills Limited. There were 8 co-operative spinning mills in Kerala. They were part of Kerala State Co-operative Textile Federation Limited (TEXFED). Together under State PSUs and co-operative sector, there were 17 spinning mills having 2.87 lakh spindle capacity and employing about 3,500 people. The Central PSU National Textile Corporation Limited has 5 mills with a total spindle capacity of 1.99 lakh and about 1,900 people employed. In addition, there were two major private sector enterprises with a total of 4 mills. They have a spindle capacity of 2.16 lakh and employ about 2,200 people.

Khadi and Village Industries Sector in Kerala

Khadi sector in Kerala has a strong base with its historical significance and the social and political patronage it is enjoying. There were 29 Khadi institutions including Khadi and Village Industries Board, KKVIB aided institutions (14 numbers) and KVIC aided institutions (14 numbers) were engaged in khadi production and sales. In 2020-21, khadi sector in Kerala provided employment to 13,190 artisans and value of cloth and yarn production was ₹7,981.83 lakh.

Village Industries sector in Kerala

Goods worth Rs. 506.81 crore was produced through the aided units of the KVIB and goods worth Rs. 627.38 crore were sold. The sector provided employment to 1, 31,840 persons.

Table 6.3.2 Performance of Khadi and Village Industries Board for three years

Sl.No	Name of the institutions	Production (Cloth & Yarn)			Sales			Employment (2019-20)			
		2017-18	2018-19	2019-20	2017-18	2018-19	2019-20	Spinners	Weavers	Others Artisans	Total
KVIC Aided instituions											
1	Aleppey Sarvodaya sanghm	109.72	141.68	285.53	820.6	790.76	776.34	483	219	12	714
2	Kannur Sarvodaya sanghm	523.74	514.58	659.13	679.63	722.27	742.95	521	400	148	1069
3	Changanassery Social Service Society (CHASS)	12.63	32.78	48.24	475.74	422.01	405.89	80	39	10	129
4	Kerala Gandhi Smarak Nidhi	221.74	205.9	345.37	587.36	449.4	434.6	264	170	35	469
5	K.K.V.I Assocaition	1523.9	1600.25	1675.13	3652.59	3440.4	3726.9	904	1152	70	2126
6	Kozhikode Sarvodaya sanghm	607.89	326.08	743.51	1641.88	1408.84	1530.25	461	293	10	764
7	Palghat Sarvodaya sangh	144.96	123.76	162.29	216.09	229.35	225.74	278	200	16	494

8	Trivandrum Sarvodaya sangh	98.49	91.3	74.79	109.15	146.16	190.53	142	68	16	226
9	K.K.V.I Federation	353.51	322.01	292.92	574.95	292.24	805.28	232	135	50	417
10	Kerala Sarvodaya sanghm	120.81	144.04	225.08	482.49	499.82	251.18	160	117	12	289
11	Kasturba Mahila Samajam	4.52	13.06	16.99	3.75	10.53	15.91	21	15	7	43
12	Friends Forum	3.54	2.22	0	5.67	5.58	0	15	3		18
13	KEDES	0	0	0	0.00	32.00	0.00				0
14	CREED							10	10	2	22
	Sub total	3725.45	3517.66	4528.98	9249.9	8449.36	9105.57	3571	2821	388	6780
	KKVIB AIDED INSTITUTIONS	0									
15	G.S.G.S Kendram, Nanthiattukunnam	75.23	55.23	80.04	118	11.52	174.64	212	67	13	292
16	Kokkottela khadi Society	12.86	13.79	20.25	2.78	2.46	17.42	17	16	1	34
17	Maranalloor KGVSS	3.55	0.3	0.04	0	0.7	1.75	4	2	0	6
18	Payyanur FGKS	469.79	538.95	642.65	706.78	738.03	955.73	345	226	82	653
19	Arpookara Khadi	0	0	0	0	11	2.24	0	0	0	0

	& Village co-operative society										
20	Chavara block khadi, Kollam	19.84	17.51	21.64	6.43	12.67	25.14	16	20	6	42
21	Irinjalakuda khadi producers industrial Co-operative society	11	10.74	18.66	61.95	49.6	42.04	25	8	0	33
22	Manappuram spinners & weavers, Thrissur	3.92	4.29	5.66	8.56	6.83	7.52	23	6	0	29
23	Trichur District khadi Co-operative society	33.10	38.91	55.41	71.12	67.82	66.26	34	26	4	64
24	Vettikavala Block khadi, Kollam	0	0	0	0.00	8.00	0.00	0	0	0	0
25	Kerala Service Sangham	0	0	0.87	4.21	5.82	3.95	13	0	0	13
26	Akathethara khadi producers industrial Co-	20.81	24.74	24.812	6.41	10.47	19.513	33	20	4	57

	operative society										
27	Madavi Mandiram Loka Seva Trust	1.87	1.89	3.23	0.00	0.00	4.68	2	2	1	5
28	Kaduthuruthy khadi society	0	0	0	0.00	32.00	1.28	0	0	0	0
	Sub total	651.97	706.35	873.262	986.24	956.92	1322.16	724	393	111	1228
	Total	4377.42	4224.01	5402.24	10236.1	9406.28	10427.7	4295	3214	499	8008
29	K K V I B	4081.14	3286.36	3173.71	5445.93	5292.05	5212.46	3244	1805	563	5612
	Grand Total	8458.56	7510.37	8575.95	15682.1	14698.3	15640.2	7539	5019	1062	13620

Table 6.3.3 Production, Sales, Employment, and Wages paid during 2018-19 & 2019-20 by Departmental and aided Khadi & Village Industries Units

Sl. No.	Name of Industry	Value of production (Rs in lakh)		Value of sales (Rs in lakh)		Employment (In Nos)		Wages paid (Rs in lakh)	
		2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
1	2	3	4	5	6	7	8	9	10
I	Khadi (including institutions)	6287.26	8576	14636.66	15640	14500	13620	2331	1268.77
	Polyvastra (including institutions)	28.21		61.63					
	Total I	6315.47	8576	14698.29	15640.00	14500.00	13620	2331	1268.77
II	Village Industries								
1	Cottage Match	428	285	441	302	4328	3700	340	290
2	Agarbathy	202	185	216	216	705	584	155	128
3	Village Leather	549	328	593	345	754	409	236	128
4	Fibre &	320	306	347	334	23328	18705	299	239

	Screwpine								
5	Rubber based industry	1110	940	1130	1035	978	803	342	281
6	Handmade paper	310	310	325	325	380	380	122	122
7	Village pottery industry	905	905	925	925	14427	14427	790	790
8	Gurkhandasari	4	4	4.25	4.25	55	55	22	22
9	Service industry	335	336	355	357	615	615	260	260
10	Non-edible oil & Soap	303	256	318	273	510	389	216	165
11	Village Oil	812	580	842	603	556	324	339	197
12	Textile	770	640	815	675	5161	4204	623	508
13	Palmgur	132	89	180	143	4477	3209	189	135
14	Bee-keeping	700	670	721	695	12655	12423	627	616
15	Processing of Cereals & Pulses	446	402	469	434	7685	6824	377	335
16	Ayurvedic	368	368	372	372	1004	1004	251	251

	medicines								
17	Fruits & Vegetable Processing	390	390	405	405	1785	1785	268	268
18	Lime	1115	1079	1201	1198	7320	7280	1055	1050
19	Cane & Bamboo	400	400	415	415	1760	1760	380	380
20	Carpentry & Blacksmithy	1360	1360	1415	1415	3380	3380	1000	1000
21	Aluminium industry	317	324	320	331	385	385	216	216
22	Electronic	270	262	280	272	535	535	154	154
23	PVC	160	150	170	160	227	227	68	68
	Total II	11706.00	10569.0 0	12259.25	11234.25	93010.00	83407.00	8329.00	7603.00
	Grand Total	18021	19145.0 0	26958	26874	107510.00	97027.00	10660	8871.8
Source: Kerala Khadi & Village Industries Board									

Table 6.3.4 District wise details of Departmental Sales outlets and Sales under Kerala Khadi & Village Industries Board For the Year 2018-19 & 2019-20 (Rs. lakh)

Sl. No.	Name of District	No.of Sales outlets during 2018-19	Sales During 2018-19	No.of Sales outlets during 2019-20	Sales During 2019-20
1	Thiruvananthapuram	8	404.35	8	389.27
2	Kollam	14	393.71	14	256.5
3	Pathanamthitta	3	205.6	3	185.06
4	Alappuzha	8	277.86	8	262.64
5	Kottayam	16	275.66	16	228.95
6	Idukki	3	187.23	3	195.22
7	Ernakulam	9	921.17	9	621.38
8	Thrissur	20	290.45	20	227
9	Palakkad	13	353.75	13	337.12
10	Malappuram	14	120.97	14	127.78
11	Kozhikode	25	404.14	25	354.59
12	Wayanad	2	41.13	2	42.28
13	PKC (Kannur, Kasargod)	47	1586.51	47	1513.5
	Grand Total	182	5463	182	4741.29
Source: Kerala Khadi & Village Industries Board					

Marketing

The KKVIB has 182 sales outlets for Khadi and village goods. This includes 44 Khadi Grama Soubhagya (including 3 mobile sales vans) units, 50 Khadi Soubhagya units and

88 Grama Soubhagya (GS Depot). The item-wise details of sales of KKVIB for the last three years from 2018-19 to 2020-21 was given in the Table 6.2.8

Table 6.3.5 Sales details of KKVIB during 2018-19, 2019-20 and 2020-21								
Year	Target	Sales (Rs. in lakh)						Total
		Cotton and muslin	Silk	Spun silk	Poly	Woollen	Village Industries products	
2018-19	6,930	3,350.40	1,399.09	268.82	29.52	0.69	258.14	5,306.66
2019-20	7,970	3,256.07	957.74	298.34	12.38	2.52	214.23	4,741.29
2020-21 (up to Sept 2020)	19,412	773.73	175.33	38.34	1.30	0	28.42	1,017.12

Source: Kerala Khadi and Village Industries Board

6.4 COIR INDUSTRY IN KERALA

India is the largest producer of coir in the world, accounting for more than 80 % of the production of coir fiber globally. Coir and coir products have been exported to 115 countries including China, USA, Netherlands, South Korea, and Spain. Coir industry first emerged in Kerala in the 19th century. The State's long coast line, lakes, lagoons and

backwaters provided natural condition required for retting, an important part in coir processing. With the expansion of coconut cultivation, coir industry has picked up in Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Maharashtra, Assam and Tripura.

The availability of coconut husks, the natural retting facilities present in the lakes, lagoons and backwaters and the traditional expertise of the people were the reasons for the concentration and the growth of the industry in the State, especially in the coastal areas. This agro-based rural industry provides subsistence to around 1.5 lakh families in the coastal belt of Kerala. Estimates suggest that 3.75 lakh persons were employed in the coir sector, both in the co-operative and private sectors, of which 80 % were women. This highlights the importance of this industry for Kerala's economy.

Kerala accounts for about 85 % of the total production of coir in the country. The entire processes in coir industry can be segregated into three major segments, namely fibre extraction, spinning, and products sectors. The fibre extraction and spinning segments are mostly concentrated in the cooperative sector while the manufacturing segment mostly runs in factory mode with large presence of exporters. Coir industry is also significant to Kerala for its role in generating export earnings. State Public Sector Undertakings and private entrepreneurs are engaged in export of coir and coir products in Kerala. Directorate of Coir Development acts as a facilitator for the promotion of coir industry in the State. Kerala State Coir Corporation, Foam Mattings (India) Ltd., Kerala State Co-operative Coir Marketing Federation Ltd (Coirfed), National Coir Research and Management Institute (NCRMI), Kerala State Coir Machinery Manufacturing Company, Kerala State Coir Workers Welfare Fund Board are the important agencies functioning for the promotion of coir industry. The co-operative sector plays a substantial role in activities like collecting husk, defibering, and production of yarn and other products in the Coir sector.

In Kerala, the Coir PSUs namely Kerala State Coir Corporation and Foam Mattings (India) Limited along with Coirfed are engaged in export of coir products. Export from these agencies has been increasing continuously since 2015-16: from Rs. 1,072.55 lakh in 2016-17, exports have increased to ₹1,413.78 lakh in 2020-21

Coir Co-operative societies

The total number of coir cooperative societies in Kerala has increased marginally from 1,100 in 2019-20 to 1,122 in 2020-21. More than half of the total number of working societies is primary cooperative societies are engaged in the yarn sector. Compared to 2019-20, the total number of primary cooperative in yarn sector has increased. The non-yarn sector includes manufacturing societies (mats and mattings) and small scale producers' co-operative societies. The total number of manufacturing societies (mats and mattings) increased from 40 in 2018-19 to 41 in 2019-20. Though there was no change in the total number of manufacturing societies that were operational (31), the number of profitable societies increased from 12 in 2018-19 to 19 in 2019-20. The total number of small scale producers' co-operative societies increased from 50 in 2018-19 to 57 in 2019-20. However the number of societies that were operational decreased marginally from 46 numbers in 2018-19 to 45 by 2019-20.

The Kerala State Co-operative Coir Marketing Federation (Coirfed)

COIRFED is the apex federation of primary coir co-operative societies spread all over Kerala. It is entrusted with the task of procuring products from co-operative societies and marketing them. At present COIRFED has two factories engaged in the manufacture of value added products – one producing rubberized coir products and the other rubber backed coir mats. COIRFED has four defibering units. Income from sales has increased from ₹58.77 crore in 2015-16 to 125.72 crore in 2019-20.

Kerala State Coir Corporation (KSCC)

KSCC caters to the needs of the small-scale coir manufacturers by providing them facilities for manufacturing and marketing. Its diversified operations include curled coir

manufacturing and allied products sectors. KSCC has been implementing the Purchase Price Stabilization (PPS) scheme in the coir sector. Under the scheme the KSCC directly procures coir products from small-scale producers and co-operatives, thereby avoiding middle men. The Kerala State Coir Corporation has 3 production facilities in Kerala. One more unit is being established in Adoor. The products produced / traded by the corporation include PVC tufted Coir mats/ mattings, Coir pith, Coir yarn, Coir fibre, and curled rope. Value of procurement under the PPSS has increased from Rs. 98.22 crore in 2016-17 to Rs. 170.08 crore in 2019-20. The turnover of the corporation has increased from ₹104.10 crore in 2016-17 to ₹184.99 crore in 2019-20 and ₹231.72 crore in 2020-21.

Foam Mattings India Ltd. (FOMIL)

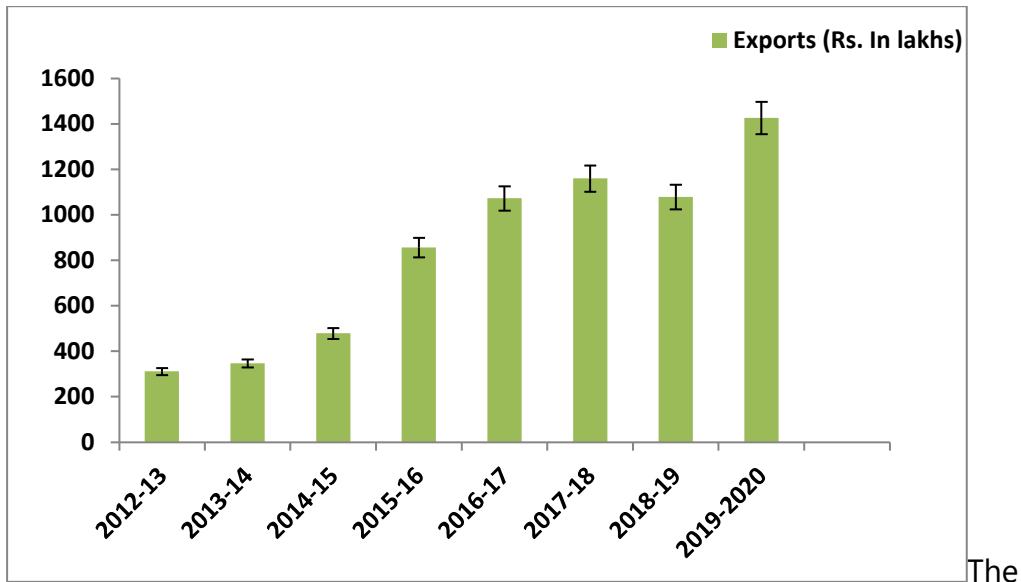
FOMIL was established in 1979 to help the development of value-added coir products. It has emphasised the use of technology and machinery in coir industry. It has introduced Latex Backing Plant, which produces latex backed mattings, Modern Dye House, Semi Automatic and Fully automatic Power loom, Auxiliary facilities and uninterrupted power system. The products include door mats, mattings, carpets, rugs, coir geo-textiles, and car mats which are sold in domestic and overseas markets, coir pith manure and coir tiles have good demand in the market. A new factory for manufacturing coir composite boards has been established and sales worth ₹19.37 lakh has been achieved.

Co-operatives in Coir

Coir co-operative societies play substantial role in collecting husk, defibring and producing varieties of coir products in Kerala

Table 6.4.1 Export of Coir and Coir Products by Coir Public Sector Undertakings/Coir fed
(value - Rs. in lakh)

Year	Kerala State Coir Corporation		Foam Mattings (India) Ltd.		Coir fed		Total
	Value	Qty (Sq. M)	value	Qty (tonne)	value	Qty (tonne)	value
2015-16	814	232571	13.05	12 HS Jute	29.17	22.34	856.22
2016-17	1016	290285	56.41	36 jute and HS jute	0.14	0.08	1072.55
2017-18	1131	343554	18.82	9 tonne jute and sisal	10		1159.83
2018-19	1117	360323	36	18	29.48		1182.48
2019-20	1400	451613	nil	nil	25.86		1425.86
2020-21	1360.78	383321	nil	nil	53		1413.78
Source: Directorate of Coir Development, Thiruvananthapuram							



6.5 BAMBOO INDUSTRY

Bamboo is a highly productive renewable and eco-friendly resource, and has several applications. In Kerala, 28 species of bamboo were recorded. Bamboos from the Kerala forest are being supplied mainly to the pulp and rayon units under concessional rates. It is estimated that there are about one lakh people in the State dependent on bamboo for their livelihood. It is notable that 67.3 % of the extracted bamboo in Kerala comes from home gardens rather than from the forests.

The **Kerala State Bamboo Corporation** was incorporated in 1971 as a Government of Kerala undertaking to promote the welfare of the traditional Bamboo workers in the state. The main objective of the Corporation is to develop and promote industries based on bamboo, reed, cane and rattan and to undertake manufacturing and trading of the above products, provide financial, technical and other assistance and guidance to the traditional workers. The artisans in the rearing sector around Angamali region is supported by the Kerala State Bamboo Corporation. An Innovation Centre for Bamboo Development and Development of Premium Designs for Mementos are being set up.

Two factories are functioning under the Corporation viz (1) Bamboo Board Factory at Angamaly for manufacture of Bamboo ply (2) Hi-Tech Bamboo Flooring Tile Factory at Nallalam Calicut for manufacture of Bamboo Flooring Tiles, Bamboo furniture and other

allied products. The main products of the corporation are bamboo mats, bamboo ply, flattened bamboo boards, bamboo flooring tile, bamboo furniture, and handicraft items. Kerala State Bamboo Corporation Ltd. has three Feeder/ Primary Processing Units at Palakkad, Mananthavady, and Nadapuram for the purpose of processing raw bamboo into strips of various thicknesses by weaving it as bamboo curtains for the production of Flattened Bamboo Board at Bamboo Board Factory, Angamaly. The waste bamboo, arising out of the above process ranging from 50 per cent to 70 percent are further used for the manufacturing of value added products such as toothpick, curtain blinds, bamboo curtains, and incense sticks.

Kerala State Bamboo Mission (KSBM) constituted in the year 2003 is designated as the Bamboo Development Agency (BDA) of the State for implementation of the various schemes of the National Bamboo Mission (NBM), under the Department of Agriculture & Cooperation, Ministry of Agriculture and Farmers' Welfare, Government of India. Bamboo Innovation Centre was established at Angamaly, Ernakulam on 16/08 2016. It acts as the Resource Centre for the development of bamboo sector in the State. The main objective was to develop a database about propagation, design, process development, and technology. Bamboo Supply Chain -To ensure the availability of raw/treated bamboo to the artisans/ craftsman in various locations of the state. Bamboo Information System - Information dissemination among beneficiaries.

6.6 HANDICRAFT SECTOR

In India, the handicrafts sector employs 68.86 lakh artisans, out of which 30.25 lakh were male and 38.61 lakh were female artisans. The export of handicrafts including handmade carpet in 2019-20, up to September, 2019 was Rs. 18,679.60 crore. (Source: Annual Report 2019-20, Ministry of Textiles, Government of India).

Handicrafts

80 % of the traditional artisans engaged in production of handicrafts belong to socially and economically backward classes. There are about 1.7 lakh handicrafts artisans actively

engaged in the handicraft sector in Kerala. Kerala has the tradition of making beautiful handicrafts with ivory, bamboo, palm leaves, seashells, wood, coconut shells, clay, cloth, coir, metals, stone, and lacquer ware. There are 32 different listed crafts in Kerala, of which ivory carving, wood and horn carving, bell metal casting, hand embroidery, and coconut shell carving are important commercial items.

Kerala State Handicrafts Apex Co-operative Society (SURABHI), Handicrafts Development Corporation of Kerala (HDCK), and Kerala Artisans Development Corporation (KADCO) are the major agencies for the promotion of the handicraft industry in Kerala.

Handicrafts Development Corporation of Kerala (HDCK) is engaged in procuring and marketing handicraft products by giving fair returns to artisans through Sree Moolam Shashtyabdapurthi Memorial Institute (SMSMI) and Kairali emporia spread all over India. In 2020-21, Corporation achieved a sales turnover of ₹285.26 lakh.

The Kerala Artisans Development Corporation (KADCO) is one of the State agencies providing assistance to artisans for establishing production units, promoting marketing of products, and providing employment opportunities through trade fairs and marketing centers.

Kerala State Handicrafts Apex Co-operative Society (SURABHI)

SURABHI is the apex organisation of primary handicrafts co-operatives established with a view to uplift the artisans by marketing their products and supporting them through the welfare schemes of GoK and Gol. In 2020-21, there were 38 Cooperative societies under SURABHI. The turnover of the society in 2020-21 was ₹38.91 lakh.

Handicrafts Development Corporation of Kerala (HDCK)

In 2020-21, Corporation has targeted a sales turnover of ₹1,900 lakh, but achieved a total sales of only ₹285.26 lakh .

6.7 PLANT NURSERIES

Agribusiness is an emerging field in Kerala ensuring substantial income and employment opportunity. The dominance of commercial and horticultural crops in Kerala offers a great possibility for a variety of agribusiness opportunities. A good number of nurseries have sprung up in the state during the past few years.

Nursery- the green industry of Kerala

This study provides a comprehensive analysis into the growth and strength of the Green Industry of Kerala- Nurseries. As part of the present study total nurseries in the state has been identified as 1394. District wise Thiruvananthapuram -102, Kollam – 55, Pathanamthitta- 57, Kottayam -121, Alappuzha -41, Ernakulum-162, Idukki -43, Thrissur - 202, Palakkad -101, Malappuram-188, Wayanad -59, Kozikode-104, Kannur-53, Kasaragod- 106. In 2020, the survey results highlighted the impact of a year of flood and COVID-19 pandemic on the industry and its growth.

The nursery survey was conducted in 760 plant nurseries in all the 14 districts of Kerala by using an ODK format (Appendix 1) and a questionnaire with the help of 14 NCC cadets from one college of each district, the project fellows and 14 district co-ordinators of KSBB. The survey focused on the economic status, available plant resources, their cultivation, trade, supply chain and also the constraints and challenges faced by the industry.





Table 6.7.1 Total number of nurseries surveyed district wise

Sl no.	District	Total no. of nursery	Nurseries surveyed
1	Thiruvananthapuram	102	47
2	Kollam	55	45
3	Alappuzha	41	51
4	Pathanamthitta	57	24
5	Kottayam	117	61
6	Ernakulam	162	69
7	Idukki	43	61
8	Thrissur	202	88
9	Palakkad	101	69
10	Malappuram	188	46
11	Wayanad	59	55
12	Kozhikode	104	62

13	Kannur	53	38
14	Kasargode	106	44
Total		1390	760

Highlights from the 2020-21 survey include:

1. 760 nurseries in 14 districts were analyzed
2. Seedlings self-propagated (14.2%), Self-propagated & purchased with in state from large dealers (19.1%), Self-propagated & purchased from Govt. institutes (23.6%), Self-propagated & purchased from Govt. institutes & large dealers (26.3%) & Self-propagated & purchased within & from other states (16.8%)
3. The total number of plant species/varieties available in the nurseries were 1725 numbers
4. Grower - wholesale only (13%), Grower retail &/or whole sale (28%), Retail sale only (30%), Landscaper /Interior sale only (6%) & Agri sale only (23%)
5. Woody plants (plantation, shade) (30%), annuals (22%), perennials (12%), aquatic plants (7%), Special green house plants (5%), High decorative plants bonsai (6%), Lower plants like ferns, pine (6%) , Special plants like orchid, Anthurium (12%).
6. Approximate income generated was between Rs 3 – 5 crores.
7. Economic status in terms of annual turnover: between less than Rs.1lakh (183 nos.), between 1-5 lakh (180 nos.), between 5-10 lakh (349 numbers) and above 10 lakh (48 nos.)
8. Species/ varieties which are highly priced / traded in high quantity was also recorded district-wise. In Thiruvananthapuram nearly 65 species were high priced eg. Bonsai Adenium yellow (Rs.2640), Araucaria, Chinese doll & Golden bachmarali palm valued at Rs.2000. Kollam had 11 species and Foxtail fern priced at Rs 1400/- was one of the highest. Only 3 species with high value was recorded from Pathanamthitta, 25 in Ernakulam district with highest price of Rs.3000 for miracle fruit plant. Idukki had 9 high priced items among which, *Crystostachys*

renda and *Howea forsteriana* were Rs.800, Thrissur 11 items with *Durio ziberthinus* having highest price of Rs.3000, Malappuram with 25 items of which cactus variety was noticed to be the highest with around Rs.4000. 8 items in Wayanad and Jade plant worth Rs.1500, was highest. Kozhikode with 6 items and the highest price was recorded for Durian fruit Rs.1300. Kannur with 12 items among which Birth star plant of Rs.1000 was highest. In Kasargode, Kepel worth Rs.1800 was the most highly priced variety among the 8 items.

9. In Thiruvananthapuram, 29 plant items were sold in large volume, among which Rubber RRI 105 and Rubber RRI 600 were sold in volume of around 45000 numbers annually. In Kollam, 101 plant items are traded of which rose variety was in high demand with over 12700 numbers sold / year. 27 plant items in Alappuzha and among them nandhiarvattom recorded the maximum with 1300 numbers sold yearly. In Pathanamthitta, 20 items with the maximum of 2550 numbers of *Tabernae montana diverticata* sold / year. While, in Kottayam 156 items with 5600 numbers of rose varieties were sold annually. In Ernakulam Aglonima was sold about 2300 numbers in a year. In Idukki, 95 items and coconut was sold in bulk with 6500 numbers in a year. Thrissur with 14 items, Palakkad, 20 items with 2374 for bougainvillea. In Malappuram, 110 items with *Santalum paniculatum* was sold of 400055 numbers per year. In Wayanad, 44 items with pepper being sold around 40000 yearly. In Kozhikode 6 items and banana (njalippovan variety) was sold in large volume of 6500 numbers.
10. Some of the major concerns raised by the nursery owners includes change in economy (28.9%), labour (27.6%) high costs (11.8%) and competition (9.2%), finding reliable skilled employees, weather/climate change, fund flow, pest & diseases, government support
11. The sector employed nearly 32,000 individuals as full and part time laborers

12. The species recommended for revenue generation in the state were plantation crops like Rubber, coconut, pepper, banana varieties, ornamentals including rose varieties, aglonima, bougainvillea, bonsai of ficus, anthurium, orchids, etc.



1. Source of plant materials

The data analysis showed that most of the nurseries were propagating the planting materials either by budding, grafting, stem cuttings, seedling rising. Self-propagated (108 nos. i.e., 14.2%), Self-propagated & purchased with in state from large dealers (145 nos. i.e., 19.1%), Self-propagated & purchased from Govt. institutes (179 nos. i.e., 23.6%), Self-propagated & purchased from Govt. institutes & large dealers (200 nos. i.e., 26.3%) & Self-propagated & purchased within & from other states (128 nos. i.e., 16.8%). Nurseries also purchase planting materials from government institutes like KFRI, Forest department, KAU, Malabar Botanical garden, NBPGR. Planting materials and seedlings are also sourced from other states such as Bangalore, Tamil Nadu, Pune, Andhra Pradesh and Hubli. The plants were mainly traded locally within the state only.

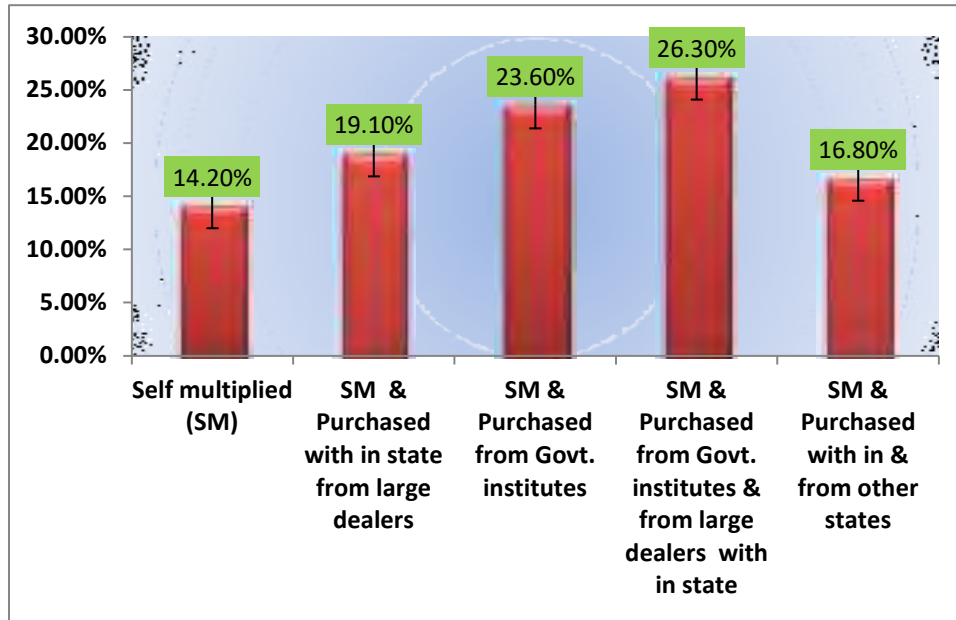


Fig1 Source of plant materials

2. Economic status

The surveyed nurseries were classified into four groups based on the annual turnover ranging between less than Rs.1 lakh to above Rs. 10 lakh. The details of number of nurseries in each district and their income based classification are given. 183 nurseries were in the group I (< 1 lakh) and most of them were run as a part time business during the COVID pandemic period. 180 nurseries were between 1-5 lakh annual turnover group. The group III represents the larger category with 349 nurseries between 5-10 lakh annual turnover. 48 nurseries were in the group have annual turnover above 10 lakhs.



Table 6.7.2 Classification of nurseries based on annual turnover

SI no	District	Annual turnover			
		Below Rs.1 lakh	Between 1-5 lakh	Between 5-10 lakh	Above 10 lakh
1	Thiruvananthapuram	7	10	27	03
2	Kollam	16	9	19	01
3	Alappuzha	17	15	18	01
4	Pathanamthitta	7	6	10	01
5	Kottayam	10	12	37	02
6	Ernakulam	9	11	45	04
7	Idukki	22	15	20	4
8	Thrissur	05	17	55	11
9	Palakkad	20	24	22	03
10	Malappuram	16	11	18	1
11	Wayanad	15	17	19	4
12	Kozhikode	11	11	31	9
13	Kannur	08	10	17	3
14	Kasargode	20	12	11	1
Total		183	180	349	48
		24.07%	23.7%	45.9%	6.3%

3. Sales by Business Function

It was noticed that 13% nurseries were growers and whole sale dealers. Land scaping and interior décor nurseries were 6% and plantation /agro crops were 23%. 28% were retailers.

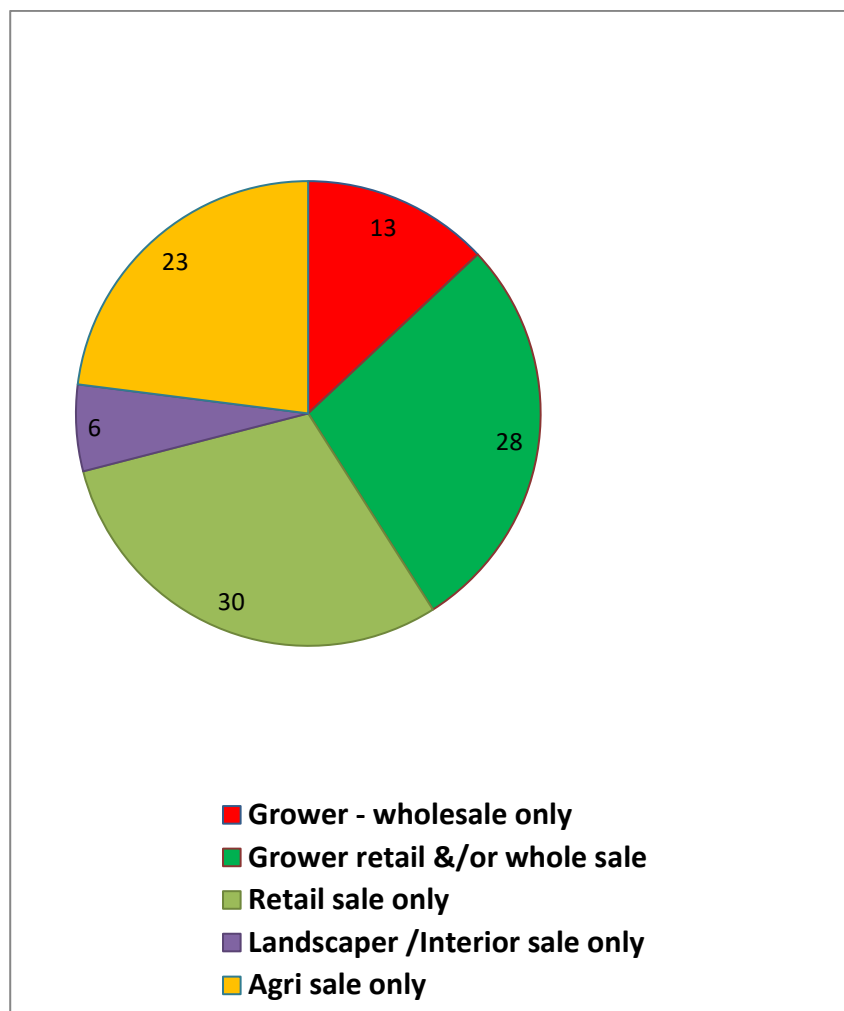


Fig 2 Sales by business function

4. Plant species and varieties available

The plant species and the varieties sold through the nurseries are listed below. Table 6.7.3 summarizes the total number of plant varieties that were under sale from different nurseries from each district. Nurseries from Thrissur documented with highest number of plant species/varieties (1398) followed by Thiruvananthapuram (951) and Ernakulam (908). Alappuzha (304), Kannur (318), Wayanad (312) represents the nurseries with low numbers of plant species.

Table 6.7.3 Plant species/varieties under sale in each district

Sl no.	District	Total no. of plant sp/varieties
1	Thiruvananthapuram	951
2	Kollam	383
3	Alappuzha	304
4	Pathanamthitta	287
5	Kottayam	773
6	Ernakulam	908
7	Idukki	453
8	Thrissur	1398
9	Palakkad	696
10	Malappuram	452
11	Wayanad	312
12	Kozhikode	740
13	Kannur	318
14	Kasargode	539

5. Categories of plant species / varieties

Plantation crops represent the maximum number of species/varieties in most of the nurseries in the state i.e., with 678 numbers, followed by leafy ornamentals 198 numbers and orchids 178. Total number of species/varieties recorded in the state was 1632

numbers. Most of the nurseries from Thrissur recorded trade of orchids and plantation crops. In Kottayam plantation crops, while in Trivandrum the ornamental species topped the list. Other popular items were Shade trees (43) and Shrubby forms (89). Ernakulam nurseries are also known for ornamental species and also for lawn grasses.

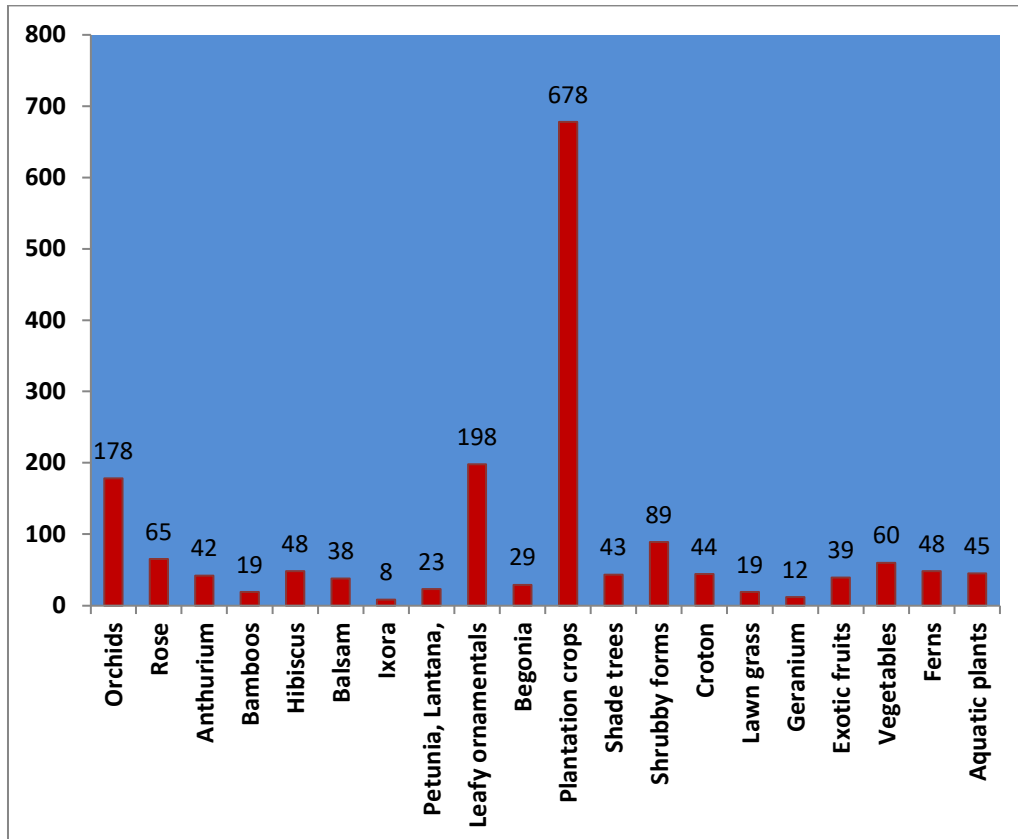


Fig 6.3 List of categories of plant species / varieties

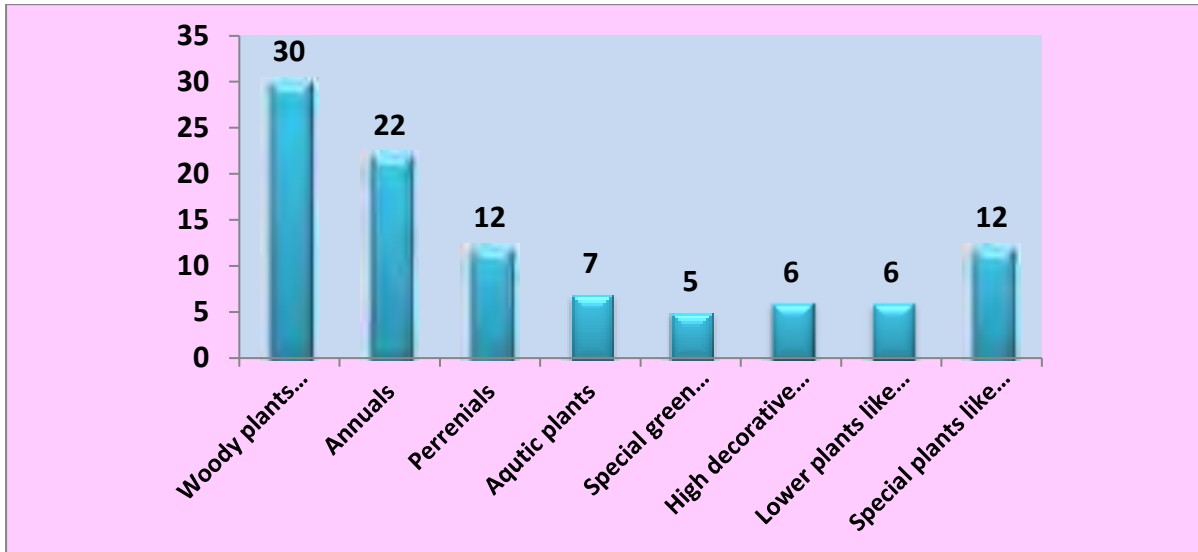


Fig 6.4 .Types of plants traded by the nurseries

6. Types of plants sold

Woody plants and annuals, dominated the agri/horticulture industry sales. These two plant types accounted for 52% of sales. Herbaceous perennials and other plant types (seeds, bulbs, etc.), reported similar sales at 12%. Aquatic plants, and Christmas trees, accounted for 18% of total sales. On oral interview with respondents most of the owners recorded sales increase during the COVID19 pandemic.

7. Highly priced plant species

The listed plant varieties were analyzed based on the unit price of each variety which showed that the price ranged from Rs. 10 to 4500 between the species/varieties. From this data, the plant variety whose unit price was above Rs 500 was categorized as high priced species. In Thiruvananthapuram district, there were 65 high priced items and among which, Bonsai varieties recorded the highest unit price of Rs.2640. In Kollam district, 11 items were in this category with foxtail fern recorded the highest priced of Rs.1400. All plant varieties were below Rs.500 in Alappuzha district (fixed price). Only 3 varieties were categorised as highly priced ones in Pathanamthitta district. While in

Kottayam district, 13 items belonged to this category with Bonsai variety of Rs.4500 as the most highly priced item. There were 25 high priced items in Ernakulam district with highest price of Rs.3000 observed for miracle fruit plant. In Idukki, there were 9 high priced items among which, *Crystostachysrenda* and *Howea forsteriana* of Rs.800 recorded the highest price. In Thrissur district, 11 items belonged to this category with *Durio ziberthinus* recording the highest price of Rs.3000. All plant varieties were below Rs.500 in Palakkad district. In Malappuram district, 25 items were highly priced and cactus variety was noticed to be the highest with around Rs.4000. 8 items belonged to this category in Wayanad district and Jade plant worth Rs.1500 was the highest of them. In Kozhikode district, there were 6 items in this category and the highest price was recorded for Durian fruit with Rs.1300. In Kannur district, 12 items belonged to this category and among this Birth star plant of Rs.1000 recorded the highest price. In Kasargode district, Kepel worth Rs.1800 was the most highly priced variety among the 8 items in this category.

Table 6.7.4 District-wise High priced plant varieties

District	Sl. No	Plant species	Unit prize
Thiruvananthapuram	1	Bonsai Adenium yellow	2640
	2	Araucaria own	2000
	3	Chinese doll	2000
	4	Golden bachmarali palm	2000
	5	Melastoma	1500
	6	Bonsai ficus	1495
	7	Fern bonzai	1400
	8	Casuarina	1200
	9	Cybedium	1200
	10	Grammatophyllum	1020
	11	Traveler palm	1000
	12	Money tree	1000
	13	Aglaomemiasp	1000

14	Fern wrinkled	1000
15	Mandevilla pink	950
16	Cattleya (Epi)	940
17	Red palm big	900
18	Yellow palm miniature	800
19	Zamioculcus	800
20	Bird of paradise	800
21	Fiddle fig veranda	800
22	Dendrobium spp	800
23	Dendrobium spp	800
24	Encyclia	780
25	Cateleya	780
26	Foxtail palm	780
27	Bonsai ficus	750
28	Aquavanda	750
29	Mokara	740
30	Grammatophyllum hybrid	750
31	Hanging pot of money plant	750
32	Millon hearts	720
33	Catteleya (hybrid)	720
34	Dendrobium hybrid	720
35	Grass buffallow 1 bag	700
36	Fern variegated	700
37	Bougainvillea potted	700
38	Fox tail palm	660
39	Grammatophyllum	660
40	Emerald rince [philodendron]	650
41	Brownia	650
42	Gramatophyllum hybrid 3	649
43	Hoya	600
44	Birds nest fern	600
45	Eugenia [v]	600
46	Lonopsis	600
47	Loropetalum	600
48	Buffalo grass hybrid/bag	600
49	Epidendrum	580
50	Cattleya hybrid	570
51	Oncidium Sharry baby	560

	52	Oncidium sphacelatum hybrid	560
	53	Lava burst	550
	54	Daflow dahnia	550
	55	Dipladenia	550
	56	Lonopsis hybrid	540
	57	Hanging mokara variety 1	540
	58	Mokara hanging variety 2	540
	59	Black cardinal	540
	60	Elanthapazham	540
	61	Bauhinia kockiana	540
	62	Mokkara hybrid	515
	63	Aglaomemia coloured sp	500
	64	Chembakam	500
	65	Philodendron selum	400-700
Kollam	1	Foxtail fern	1400
	2	Succulents Crassulent species	1200
	3	Ornamental Cactus	1200
	4	Water hyssop	980
	5	Yellow fern	880
	6	Champagne farm	870
	7	Red fern	850
	8	Dhurian	600
	9	Plantains	550
	10	Royal fermn	500
	11	Murali spp.	500
Alappuzha		Ornamental species were Rs. 500/-	
Pathana mthitta	1	<i>Aglaonima</i>	850
	2	Eugenia uniflora	525
	3	<i>Bambusa ventricosa</i>	500
Kottayam	1	Bonsai spp.	4500
	2	Bonsai hybrids	2750
	3	Mirchimaria palm	2000
	4	Bonsai ficus	1800
	5	Bonsai ficus	1500
	6	Bonsai ficus	1200
	7	Lotus	1200
	8	Bottle palm	1200
	9	Dendrobium hybrid	800
	10	Hanging garden spp.	700

	11	Bonsai hybrids	600
	12	Flowering plants Ixora, Bauhinia	500
	13	Anthurium	500
Ernakulam	1	Miracle fruit Synsepalum dulcificum	3000
	2	Sapotta	2200
	3	Golden Cyprus	2000
	4	Maparang	1800
	5	Eugenia	1500
	6	Egg tree	1500
	7	Longan	1500
	8	Kepel	1400
	9	Rambhutan (N18)	1400
	10	All season red	1300
	11	Longan fruit hybrid	1100
	12	Dhuriyan	1000
	13	Dracaena	1000
	14	Siyonvarikkachakka	800
	15	Cocktail palm	750
	16	Lopapettalllum	700
	17	Rambhutan hybrid2	650
	18	Seedless fruit spp	650
	19	Termania	650
	20	Yellow palm	600
	21	Milk fruit	550
	22	Santol	500
	23	Mallika	500
	24	Egg fruit	500
	25	Kenpalm	500
Idukki	1	<i>Crystostachysrenda</i>	800
	2	<i>Howeaforsteriana</i>	800
	3	<i>Durio zibethinus</i>	750
	4	<i>Myristica fragrans</i>	700
	5	<i>Dioscorea esculenta</i>	700
	6	<i>Dimocarpus longan</i>	625
	7	<i>Garcinia gummi-gutta</i>	600
	8	<i>Garcinia humilis</i>	600
	9	<i>Boswellia serrata</i>	500
Thris sur	1	<i>Durio ziberthinus</i>	3000
	2	<i>Juniperus chinensis</i>	1000

	3	<i>Aglonema commutatum</i>	1000
	4	<i>Adiantum capillus-veneris</i>	900
	5	<i>California juniper</i>	900
	6	<i>Aspleniummanciquum</i>	720
	7	<i>Anthurium</i>	700
	8	<i>Psidium guajava</i>	650
	9	<i>Epipremnum aureum</i>	580
	10	<i>Ficus elastica</i>	500
	11	<i>Hevea brasiliensis</i>	500
Palakkad		All species are Rs. 500/-	
Malappuram	1	Cactus varieties	60-4000
	2	Heliconia	50-2900
	3	Dragon fruit	60-2500
	4	<i>Ficus carica</i>	50-2000
	5	Coconut-nadan	270- 2000
	6	Eugenia	70-1500
	7	Chembakam	70-1200
	8	Kuttikurumulaku	100-1199
	9	<i>Aracano draco</i>	1000
	10	Ayur jack	60-1000
	11	Gerbera	60-1000
	12	Green chamba	1000
	13	<i>Lora petalum</i>	50-900
	14	<i>Dragna dragism</i>	450-760
	15	Longan	150-750
	16	<i>Annona reticulata</i>	150-700
	17	Lubika	650
	18	Calathea	70-600
	19	Coconut hybrid	100-500
	20	Jack fruit- Early Jack	75- 500
	21	Arillus	70-500
	22	Golden cypress	500
	23	Longan fruit	500
	24	Lantana hybrid	20-500
	25	Aglonema coloured	28-500
Wayanad	1	Jade plant	1500
	2	Cocos nucifera	300-1200
	3	Kolamb mango	1200
	4	Alphonsa mango	350-800

	5	Aglomema	80-650
	6	Calathea red	400-500
	7	Malgova mango	170-600
	8	Mangostin	150-500
Kozhikode	1	Durian fruit	1300
	2	Kepel	750
	3	Milk fruit	700
	4	Zamioculcas plant	650
	5	Mango (moovandan)	600
	6	Mango(nasik)	600
Kannur	1	Birth star plant	1000
	2	Kepel	1000
	3	Cinnamomum	830
	4	Black sapotta	800
	5	Red sapotta	800
	6	Jaboticaba	720
	7	Pepper wild	700
	8	Raasi plant	600
	9	Kiwi	500
	10	Strawberry	500
	11	Banganapalli mango	500
	12	Viyatnam super jack	500
Kasargode	1	Kepel	1800
	2	Chinese plam	100-600
	3	Aglonema 11 ornamental varieties	75-600
	4	Aglonima red	550
	5	Begonia	500
	6	Vettiver grass	500
	7	Mirchi gold	500
	8	Lotus	500

8. High volume traded species/annum

The most demanded plants which were sold in large volume were identified from the analysed data. Those varieties whose sale was above 500 numbers per year were categorized as high volume traded species and a district-wise list was prepared which is presented in the table. In Thiruvananthapuram district, 29 plant items were sold in large

volume, among which Rubber RRI 105 and Rubber RRI 600 were sold in volume of around 45000 numbers annually. In the case of Kollam district, 101 plant items belonged to this category of large volume sale and rose variety was observed to be the item in most demand with over 12700 numbers sold per year. 27 plant items were sold largely in Alappuzha district among which nandhiarvattom recorded the maximum with 1300 numbers sold yearly. In Pathanamthitta district, 20 items were largely under sale with the maximum of 2550 numbers of *Tabernaemontanadiverticata* sold / year. While, in Kottayam district 156 items belonged to this category of large volume sale. Among them, around 5600 numbers of rose varieties were sold annually. In Ernakulam district Aglonima was the only item sold in large volume with about 2300 numbers in a year. In Idukki, 95 items were categorized as largely traded ones and *Cocos nucifera* was sold in bulk with 6500 numbers in a year. In Thrissur district, 14 items belonged to this category with 10 items sold around 4000 numbers in two months. In Palakkad district, 20 items were sold in large volume and among which highest number of 2374 was observed for bougainvillea. In Malappuram district, 110 items belonged to this category of high volume sale and *Santalumpaniculatum* was sold in very large volume of 400055 numbers per year. In Wayanad district, 44 items were sold in large volume with pepper being sold around 40000 yearly. In Kozhikode district, there were 6 items belonging to this category and banana (njalippovan variety) was sold in large volume of 6500 numbers. The data of Kannur and Kasargode districts were not properly recorded.



Table 6.7.5 High volume varieties in each district

District	Sl no	Plant species	Number of plants sold per year
Thiruvananthapuram	1	Rubber RRI 105	45000
	2	Rubber RRI600	45000
	3	Rubber RRI 430	35000
	4	Zong wine spot	25000
	5	Nanthiarvattom	3140
	6	Buffalo grass/bag	1890
	7	Green nandhiarvattom	1700
	8	Anthurium 1	1230
	9	Marantta	1200
	10	Bougainvillea 25	1200
	11	Nandhiarvattom yellow	1050
	12	Bush pepper	960

	13	Rose small	870
	14	Chrysanthimum	850
	15	Bougainvillea	850
	16	Aglaomemia	755
	17	Indoor ornamental plants	700
	18	Aatha graft	690
	19	Alphonsa/malgova mango	675
	20	Adenium	650
	21	Begonia ornamental	650
	22	Begonia flowering	650
	23	Aatha/athi	640
	24	Rambootan	600
	25	Golden dracaena	560
	26	18 patta dwarf coconut	555
	27	Heliconia	550
	28	Coconut 18patta	540
	29	Adenium with pot	530
Kollam	1	Rose	12700
	2	Hibiscus	12000
	3	Jack fruit	7100
	4	Bougainville	6100
	5	Jasmine	6000
	6	Mini pala	5600
	7	Bigonia	5530
	8	Pepper	5400
	9	Hanging potted plant	5070
	10	Guava	4780
	11	Daliya	4600
	12	Melastoma	4600
	13	Arinelli	4500
	14	Strawberry	4500
	15	Arutha	4250
	16	Dianthus	4380
	17	Aglonima	4200
	18	Dhurian	4200
	19	Coconut	3800
	20	Miracle fruit	3600
	21	Money plant	3600

22	Musantha	3600
23	Hydrangea	3590
24	Devadharu	3500
25	Ixora	3500
26	Peperomia	3500
27	Cyperus plant	3430
28	Arelia	3200
29	Kufiya	3200
30	Star fruit	3200
31	Yellow bamboo	3200
32	Orange	3200
33	Danthapala	3230
34	Golden cypreus	3000
35	Mango	2800
36	Rambootan	2780
37	Pitonia	2700
38	Arali	2700
39	Daccoma	2600
40	Drumstick	2530
41	Grapes	2500
42	Thuja	2500
43	Red palm	2500
44	Snake plant	2500
45	Mangosteen	2500
46	Passion fruit	2500
47	Cyprus	2450
48	Avocado	2400
49	Spider plant	2400
50	Eugenia	2300
51	Lotus	2300
52	Zinconia	2300
53	Red lady	2300
54	Kalanchoe	2100
55	Ambazham	2000
56	Celosia	2000
57	Fern ornamentals	2000
58	Finger tree	2000
59	Musa	2000
60	Lucky bamboo	2000

61	Vadamali	2000
62	Medinila	1850
63	Adenium	1790
64	Nelli	1700
65	Thulasi	1700
66	Cactus	1500
67	Papaya	1500
68	Lovalolika	1500
69	Lemon	1400
70	Arecanut	1300
71	Vishari fern	1300
72	Mirchimeei gold	1240
73	Peace lilly	1200
74	Orchid	1200
75	Water bamboo	1200
76	Cuphaea	1000
77	Lily	1000
78	Jamba	950
79	Episcia	880
80	Chembagam	850
81	Aloe vera	800
82	Ficus	800
83	Indigoferatinctoria	800
84	Orange Chen thengu	750
85	Thaipan grass	700
86	Salvia	680
87	Ground orchid	650
88	Yellow fern	600
89	Kudampuli	600
90	Tapeworm plant	580
91	Jerabera	560
92	Anthurium	500
93	Jamanthi	500
94	Nanthiarvattom	500
95	Radha Krishna rose	500
96	Rosida	500
97	Royal fern	550
98	Saflora	500
99	Sun rose	500

	100	Variety athi	500
	101	Toreniafourneri	500
Alappuzha	1	Nanthiarvattom	1380
	2	Anthurium small	1300
	3	Bougainvilla large	1220
	4	Neelayamari	1200
	5	Mango spl	1100
	6	Bougainvilla small	1050
	7	Aloe vera	950
	8	Bendhi plant	950
	9	Anthurium large	840
	10	Brinjal seedling	800
	11	Rose varieties small	800
	12	Mango large	780
	13	Rose budded	770
	14	Mango small	740
	15	Euphorbia	730
	16	Coconut dwarf	725
	17	Begonia	700
	18	Rose varieties large	700
	19	Jasmine	610
	20	Tomato seedling	600
	21	Pepper bush	600
	22	Chethi	550
	23	Chamba	530
	24	Coconut hybrid	525
	25	Green chilli seedling	525
	26	Jackfruit	520
	27	Ficus small	520
Pathanathitta	1	<i>Tabearnae montana diverticata</i>	2550
	2	<i>Oxalis triangularis</i>	2330
	3	<i>Ixora coccinea</i>	1560
	4	<i>Cocos nucifera</i>	1500
	5	<i>Mangifera indica</i>	1140
	6	<i>Artocarpus heterophyllus</i>	770
	7	<i>Melastomata</i>	750
	8	<i>Hibiscus rosasinensis</i>	750
	9	<i>Bougainvillea glabra</i>	670

	10	<i>Aglaonima</i>	660
	11	<i>Cyrtosta chysrenda</i>	643
	12	<i>Bougainvillea glabra</i>	600
	13	<i>Crossandra infundibuliformis</i>	550
	14	<i>Manilkara zapota</i>	550
	15	<i>Passiflora edulis</i>	545
	16	<i>Eugenia uniflora</i>	530
	17	<i>Vitex nigundu</i>	520
	18	<i>Eugenia caryophyllatta</i>	510
	19	<i>Kalanchoe pinnatta</i>	510
	20	<i>Bougainvillea glabra</i>	510
Kottayam	1	Rose	5600
	2	Orchid	4560
	3	Bougainvillea	4500
	4	Coconut tree	4150
	5	Ornamental Creeper	3400
	6	Rubber RRII 430	3000
	7	Rubber RRTI 105	3000
	8	Ixora	2750
	9	Arali	2700
	10	Chethi	2600
	11	Rambhutan N 18	2500
	12	Anthurium	2500
	13	Chembakam	2500
	14	Loranthus	2400
	15	Jack	2350
	16	10 manipoovu	2300
	17	Adenium	2300
	18	Moni plant	2300
	19	Bottle brush	2300
	20	Mango	2280
	21	Areca nut	2250
	22	Aglonima	2220
	23	Aleovera	2200
	24	Money plant coloured	2150
	25	Ficus	2150
	26	Euphorbia	2130
	27	Begonia	2100

28	Snake plant	2100
29	Chembarathi	2100
30	Melastoma	1900
31	Hibiscus	1850
32	Nut mug	1800
33	Adianum	1780
34	Calanchoe	1700
35	Dreacaena	1650
36	Malphigia	1600
37	Cashew	1550
38	Jasmin	1500
39	Wall Ficus	1500
40	Tomato	1500
41	Pentas	1450
42	Eugenia	1350
43	Catus	1350
44	Mangosteen	1350
45	Euphorbia	1300
46	Mussanda	1270
47	Brinjal	1200
48	Lemon	1200
49	Lily	1200
50	Arootha	1150
51	Nelli	1150
52	Theak	1100
53	Arya vepp	1100
54	Zinnia	1100
55	Bamboo	1080
56	Kanikomnna	1050
57	Guava	1050
58	Ground orchid	1020
59	Eucalyptus	1000
60	Zinnia hybrids	1000
61	Grape fruit	980
62	Red palm	980
63	Mullatha	950
64	Cyprus	950
65	Exicolima	950
66	Red lady papaya	940

67	Garcinia	900
68	Vadamalli	900
69	Lady bamboo	900
70	Hanging ornamental plant	890
71	Rhoeo	890
72	Hydrangia	860
73	Chilli	850
74	Lantana	850
75	Marigold	850
76	Chamba	850
77	Golden cyprus	850
78	Torenia	850
79	Jerbara	820
80	Chrysanthamum	800
81	Indoor plants	800
82	Balsam	800
83	Curry leaf	780
84	Papaya	780
85	Gerbara	780
86	Logan fruit	780
87	Orange	770
88	Palm	760
89	Passion fruit	750
90	Petunia	750
91	Ball aralia	750
92	Christmas tree	750
93	Crepe jasmine	750
94	Zinnia	750
95	Vayambu	750
96	Yello form	750
97	Red fern	750
98	Njaval	750
99	Bottle palm	750
100	Kuttikurumulak	750
101	Butter fruit	725
102	Cheera	700
103	Avacado	700
104	Kurumulaku	700

105	Sarvasugandhi	700
106	Annona	685
107	Flame violet	670
108	Pea nut butter	650
109	Pentas	650
110	Pepper	650
111	Jamun	650
112	Capricum	650
113	English ivy	600
114	Eranthium	580
115	Ilanji	600
116	Fittonia	500
117	Noni	600
118	Finer aralia	600
119	Gooseberry	600
120	Chrysanthamum	600
121	Sandal	600
122	Lichi	650
123	Musambi	650
124	Marble pothos	650
125	Manjakoova	650
126	Mulaku	600
127	Balsam	590
128	Cabbage	575
129	Licola	575
130	Golden pathos	565
131	Turtile vine	560
132	Vertical ornamental plant	560
133	Palackcheera	560
134	String of banana	550
135	Elangii	550
136	Zamioculcaszamiifolia plant	550
137	Wandering jew	550
138	Holiac	550
139	Rajamalli	550
140	Medimilla	550
141	Canadian konna	540
142	Atalodakan	540

	143	Koovalam	540
	144	Rubi tree	540
	145	Maranta	540
	146	Lucky bamboo	500
	147	Pilavu	500
	148	Mulla	500
	149	Tissue culture banana	500
	150	Eugine	500
	151	Sreelankanmulla	500
	152	Impatiens	500
	153	Hanging orchid	500
	154	Rosida	500
	155	Sauhrudacheera	500
	156	Kattarvazha	500
Ernakulam	1	Aglongima	2300
Idukki	1	Cocos nucifera	6500
	2	<i>Capsicum frutescens</i>	5700
	3	<i>Myristica fragrans</i>	5200
	4	<i>Coffea arabica</i>	4700
	5	<i>Aloe vera</i>	4650
	6	<i>Mangifera indica</i>	4790
	7	<i>Mentha piperita</i>	4500
	8	<i>Bougainvillea glabra</i>	4500
	9	<i>Tabernae montana divaricata</i>	4500
	10	<i>Solanum lycopersicum</i>	4000
	11	<i>Spinacia oleracea</i>	4000
	12	<i>Musa paradisiaca</i>	3750
	13	<i>Theobroma cacao</i>	3500
	14	<i>Coriandrum sativum</i>	3500
	15	<i>Bellis perennis</i>	3350
	16	<i>Vitis vinifera</i>	3400
	17	<i>Garcinia humilis</i>	3000
	18	<i>Carica papaya</i>	2800
	19	Rosa	2800
	20	<i>Piper nigrum</i>	2800
	21	<i>Eletteria cardamomum</i>	2800
	22	<i>Anacardium occidentale</i>	2750
	23	<i>Artocarpus heterophyllus</i>	2600

24	<i>Syzygium aromaticum</i>	2600
25	<i>Fragaria ananassa</i>	2500
26	<i>Melastoma malabathricum</i>	2500
27	<i>Syzygium cumini</i>	2500
28	<i>Brassica oleracea</i>	2500
29	<i>Curcuma longa</i>	2000
30	<i>Citrus limon</i>	1960
31	<i>Areca catechu</i>	1940
32	<i>Anthurium andraeanum</i>	1850
33	<i>Begonia sp</i>	1830
34	<i>Alternanthera sp</i>	1800
35	<i>Manilkara zapota</i>	1800
36	<i>Ixora coccinea</i>	1640
37	<i>Nephelium lappaceum</i>	1600
38	<i>Cactus cacti</i>	1560
39	<i>Hibiscus sabdariffa</i>	1500
40	<i>Moringa oleifera</i>	1500
41	<i>Trichosanthes cucumerina</i>	1500
42	<i>Caltha orbifolia</i>	1485
43	<i>Brassica botrytis</i>	1400
44	<i>Garcinia gummi-gutta</i>	1400
45	<i>Aglaonema commutatum</i>	1400
46	<i>Mertensia virrginica</i>	1400
47	<i>Kalanchia pinnata</i>	1400
48	<i>Chrysanthemum indicum</i>	1360
49	<i>Barbara golias</i>	1350
50	<i>Gerbera jamesonii</i>	1300
51	<i>Brassica italica</i>	1300
52	<i>Duranta erecta</i>	1250
53	<i>Epipremnum aureum</i>	1000
54	<i>Impatiens balsamina</i>	1050
55	<i>Passiflora edulis</i>	1000
56	<i>Bunchosia glandulifera</i>	1000
57	<i>Cucumis sativus</i>	1000
58	Marigolds	1000
59	<i>Dahlia pinnata</i>	980
60	<i>Dimocarpus longan</i>	950
61	<i>Hydrangea macrophylla</i>	950

	62	<i>Lantana camera</i>	930
	63	<i>Solanum melongena</i>	900
	64	<i>Cynodon dactylon</i>	900
	65	<i>Acalypha wikesiana</i>	890
	66	<i>Vicia faba</i>	860
	67	<i>Spathiphyllum sp</i>	850
	68	<i>Benjamin ficus</i>	850
	69	<i>Monstera deliciosa</i>	850
	70	<i>Maranta leuconeura</i>	840
	71	<i>Dianthes chinensis</i>	830
	72	<i>Vigna unguiculata</i>	800
	73	<i>Eugenia uniflora</i>	800
	74	<i>Jasminium grandiflourm</i>	790
	75	<i>Geranium cenerium</i>	780
	76	<i>Psidium guajav</i>	780
	77	<i>Persea americana</i>	750
	78	<i>Plucronthes sp</i>	750
	79	<i>Buxus sp</i>	750
	80	<i>Canna indica</i>	750
	81	<i>Brassica pekinensis</i>	730
	82	<i>Dracaena sanderiana</i>	725
	83	<i>Hedera helix</i>	720
	84	<i>Garcinia mangostana</i>	700
	85	<i>Coccinia grandis</i>	670
	86	<i>Impatiens balsamina</i>	650
	87	<i>Sygiuums amarangense</i>	600
	88	<i>Asparagus aethiopicus</i>	580
	89	<i>Zennia elegans</i>	560
	90	<i>Phyllanthus emblica</i>	560
	91	<i>Mussaenda erythrophylla</i>	540
	92	<i>Chamaecostus cuspidatus</i>	520
	93	<i>Dioscorea esculenta</i>	500
	94	<i>Phaseolus vulgaris</i>	500
	95	<i>Musa acuuminata</i>	500
Thrissur	1	<i>Adenium obesum</i>	4000 plants in 2 months
	2	<i>Aglonema commutatum</i>	4000 plants in 2 months
	3	<i>Aloe barbadensis miller</i>	4000 plants in 2

			months
	4	<i>Bambusoideae</i>	4000 plants in 2 months
	5	<i>Sucus</i>	4000 plants in 2 months
	6	<i>Tracheophyta</i>	4000 plants in 2 months
	7	<i>Epipremnum aureum</i>	4000 plants in 2 months
	8	<i>Sansevieria trifasciata</i>	4000 plants in 2 months
	9	<i>Malus domestica</i>	4000 plants in 2 months
	10	<i>Orchidaceae</i>	4000 plants in 2 months
	11	<i>Philodendron selloum</i>	2000 plants in 2 months
	12	<i>Cactaceae</i>	2000 plants in 2 months
	13	<i>Cryptanthus acaulis</i>	2000 plants in 2 months
	14	<i>Lilium</i>	2000 plants in 2 months
Palakkad	1	Bougain villa	2374
	2	Hibiscus	1910
	3	Cocosnucifera	1753
	4	Guava	1435
	5	Rose	1240
	6	Okra	1200
	7	Brinjal	1200
	8	Anthurium	979
	9	Tomato	960
	10	Artocarpus	720
	11	Dahlia	645
	12	Marigold	600
	13	Chrysanthemum	600
	14	Thechi	587
	15	Chendumalii	587
	16	Mango tree	545

	17	Chamba	535
	18	Lilly	535
	19	Aglaonima	530
	20	Salvia	527
Malappuram	1	<i>Santalum paniculatum</i>	400055
	2	<i>Pelargonium</i>	120000
	3	<i>Bunchosia glandulifera</i>	100000
	4	<i>Chrysanthemum</i>	80100
	5	<i>Nephelium mutabile</i>	80060
	6	<i>Dimocarpus longan</i>	62500
	7	Coconut-naadan	50345
	8	Pepper plant	50000
	9	Areca palm	44699
	10	Hardlay	31490
	11	Guava tree	30010
	12	<i>Catharanthus roseus</i>	30000
	13	Rubber plant	30000
	14	Jet rose	28057
	15	Ornamental cabbage	26903
	16	Citrus plant	25000
	17	Petunia	20620
	18	<i>Mussaenda erythrophylla</i>	20000
	19	Ambazhanga	15416
	20	Murraya	15090
	21	Longan fruit	15000
	22	<i>Passiflora edulis</i>	13266
	23	Curry leaf	11985
	24	Alocasia	10216
	25	Adenium	8716
	26	Gerbera	8570
	27	Pandanus	7650
	28	Sapodilla sapota	6500
	29	Anthurium plant	6461
	30	Orchid	6267
	31	<i>Mesembryanthemum cordifolium</i>	6000
	32	Chikku	5818
	33	Jade plant	5700
	34	Bamboo	5610

35	Papaya	5610
36	Jack fruit- Early Jack	5600
37	Alovera	4120
38	Lamprocapnos	4000
39	Money plant	3825
40	Green palm	3450
41	Rubber fig	3343
42	Bigonia	3115
43	Salma	3100
44	Dahlia	3036
45	Begonia	2699
46	Aracauria	2557
47	Orange	2520
48	Pomegranate	2492
49	Kalanchoe	2315
50	Jamantia	2306
51	Cherry	2164
52	Lucky bamboo	2145
53	Picture plant	1920
54	Caladium	1743
55	Fittonia	1600
56	Peperomia	1580
57	Java apple	1500
58	Dragon tree	1500
59	Bird of paradise	1500
60	Dog rose	1500
61	Finger aralia	1490
62	Raya	1470
63	Chambakka	1460
64	Guava	1420
65	Ribbon grass	1410
66	Rio dipladenias	1393
67	Aglonema	1360
68	Limonia	1302
69	Dianthus	1274
70	Cuphea	1240
71	Pedalanthus	1225
72	Lemonia	1200
73	Phyllodenron	1000

	74	Geranium	966
	75	Amazone blue	900
	76	Kolambi	900
	77	Pionsetia green	900
	78	Coconut	884
	79	Monster plant	775
	80	Mallika	766
	81	Cactus	727
	82	Gooseberry plant	720
	83	Dischidia	700
	84	Neem	687
	85	Murikoodi	685
	86	Peace lilly	664
	87	Lemon	655
	88	Aralia ball	650
	89	Aadathodavasica	610
	90	Aralia	607
	91	Goosberry	605
	92	Lantana	605
	93	Java plum	600
	94	Kanaka chambakam	600
	95	Cheera	600
	96	Eugenia	578
	97	Balsum	575
	98	Aloe vera	570
	99	Melastoma	558
	100	Hibiscus	550
	101	Nerium	550
	102	Calathea	535
	103	Ayur jack	535
	104	Neelayamari	530
	105	Capsicum frutescence	530
	106	Hibiscus	510
	107	Hydrangea	510
	108	Annonareticulata	510
	109	Aracanodraco	500
	110	Araucaria	500
Waya nad	1	Pepper	40000
	2	<i>Cucumis melo</i>	25000

3	Kakkari	25000
4	Kappi	25000
5	Sorghum bicolor	11000
6	Peechikka	10000
7	Beetroot	10000
8	Churakka	10000
9	Rose	8845
10	Melastoma	6650
11	Kanthari	5000
12	Bougainvilla	4626
13	Dianthas	3490
14	Dahlia	3050
15	Chinese balsam	2700
16	Heliconia	2400
17	Pentaas	2390
18	Bamboo	2010
19	Jamadhi	1980
20	Ixoracoccinea	1916
21	Golden aralia	1870
22	Arali	1778
23	Hanging ornamental plant	1620
24	Malgova mango	1535
25	Jarbara	1500
26	Sapotta	1485
27	Carica papaya	1460
28	Jasmine	1400
29	Aster	1355
30	Citrus lemon	1328
31	Mary gold	1150
32	Fig	1150
33	Jack fruit tree	1135
34	<i>Moringa oleifera</i>	1100
35	<i>Manikara zapota</i>	1070
36	Chinese balsam	1000
37	Citrus X sinensis	994
38	Golden cypress	600
39	Xmas tree	600
40	Anthurium	550

	41	Banana	500
	42	<i>Solanum lycopersicum</i>	500
	43	Kalappia	500
	44	Rose	500
Kozhikode	1	Banana-njaalipovan	5500
	2	Banana-mysur	5200
	3	Banana-nenthran	5000
	4	Banana-robust	5000
	5	Banana-poovan	4900
	6	Banana-kadali	3500
Kannur	Volume of sale not received		
Kasargode	Volume of sale not received		

9. Key challenges

The nursery survey also aimed to record the factors that limit growth or caused problems to their business. The results indicated that labour, economy and high costs were the main factors that were limiting growth. As shown below, respondents from 210 nurseries said that labour was the largest factor limiting growth i.e., 27.6%. Labour issues included management of rising minimum wage rates, and the high cost of doing business. The nurseries in Kerala were facing several other constraints such as shortage of water and issues related to climate change. Some nurseries have also reported the non-availability of sufficient seedlings, diseases and pest infestation.

Most nurseries produce a variety of crops, and are interested in learning more about crops that they currently produce, as well as crops that they are not currently producing, with interest in learning more about perennials. Large and medium sized growers expressed more interest than small and other growers in learning about several plant production techniques, including automation of greenhouse functions, nutritional management, plant growth regulators and managing wastewater and runoff.

Table 6.7.6 Challenges and suggestions of respondents

Sl. no	District	Challenges	Suggestions
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1.	Thiruvananthapuram	Shortage of water, climatic variation, heat, rent money etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
2.	Kollam	Shortage of water, climatic variation, heat, rent money etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
3.	Alappuzha	Shortage of water, climatic variation, heat, rent money inadequate land etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
4.	Pathanamthitta	Shortage of water, climatic variation, heat, rent money inadequate land etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
5.	Kottayam	Shortage of water, climatic variation, heat, rent money inadequate land etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
6.	Ernakulam	Shortage of water, climatic variation, heat, rent money inadequate land etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
7.	Idukki	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products
8.	Thrissur	Shortage of water, climatic variation, heat, rent money inadequate	Awareness about importance of plants to be spread, 'Need

		land, Pest and diseases, Price variations and availability, etc	economic support, quality products
9.	Palakkad	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products Government subsidy.
10.	Malappuram	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products Government subsidy.
11.	Wayanad	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products Government subsidy.
12.	Kozhikode	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products Government subsidy.
13.	Kannur	Shortage of water, climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	Awareness about importance of plants to be spread, 'Need economic support, quality products Government subsidy.
14.	Kasargode	Shortage of water,	Awareness about

		climatic variation, heat, rent money inadequate land, Pest and diseases, Price variations and availability, etc	importance of plants to be spread, 'Need economic support, quality products Government subsidy.
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10. Revenue for the state

The species which will fetch revenue include plantation crops like Rubber RRI 105, Rubber RRI 600, coconut, pepper, banana varieties, ornamentals including rose varieties, Aglonima, bougainvillea, nandhiarvattom and trees including sandal wood. Similarly bonsai of ficus, Anthurium, hybrid orchids, Araucaria also are recommended.

Horticultural nurseries play a prime role in wealth generation and socio economic status of the farmers. It provides employment opportunities for technical, skilled, semi-skilled and unskilled labour. Nursery itself can be a remunerative enterprise in the changing national scenario. But the private sector nurseries in most of the states are not monitored and regulated properly. Even though the India Seeds Act and Nursery Registration Act are in operation since 1966, it was not properly implemented in various states.



Appendix 1

ODK- 1

Data sheet - Nurseries (Govt. and Private institutions/ agencies/societies)

Sl.No	General Details	
1.	Name of the Agency	
2.	Address, Phone number, E mail	
3.	Name of the respondent	
4.	Date of establishment	
5.	Annual expenditure for running the establishment	
6.	Annual Turnover of agency	
7.	Name and address of the	Give details

	suppliers of seeds/ planting materials	
8.	Are you getting materials from outside Kerala	outside the state outside the country Give details- Species Quantity
9.	Are you supplying outside Kerala	outside the state outside the country Give details- Species Quantity
10.	Criteria for fixing price	
11.	Is there price variation	Yes No Give details – Range, Average
12.	Status of availability	Give details
13.	Challenged faced	
14.	Suggestions for improvement	
15.	Other information if any	

Details of Plant species

Sl.No	Plant species	Local name	Botanical name	Source (collection Locality) Cultivated/ collect from other sources	Unit/item	Buying price	Selling Price	Annual quantity and Price Year-wise					
								2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	
	Ornamental												
	Medicinal												
	Fruit crops												
	Agri crops												
	Plantation items												
	Horti crops												
	Other items if any												
	Value added products as Biofertilizer Biopesticides Growth promoters Organic manure												

6.8 TRADE OF RAW DRUGS (DRY & FRESH) IN KERALA

6.8.1 RAW DRUG TRADE IN KERALA – MARKET SURVEY

The Codified Indian System of Medicine recognizes the use of about 2400 medicinal plants, though about 6000 higher plant species are used in several folk healthcare traditions. The trade includes different plant parts such as fruits, leaf, stem, bark and roots. The total world herbal trade is currently assessed at US\$ 120 billion. The market for medical plants in India stood at Rs. 4.2 billion (US\$ 56.6 million) in 2019 and is expected to increase at a CAGR 38.5% to Rs. 14 billion (US\$ 188.6 million) by 2026. Unlike ayurvedic polyherbal products, single herbs have easy access to global markets as dietary supplements. The trend-setter in this sector was Himalaya Herbal Health Care. Now single herb capsules are manufactured by a few export oriented companies, like KAL and Nagarjuna. Such products do not figure in Nagarjuna's routine product catalogue, but its export brochure lists 11 single herb products including *brahmi*. The firm makes 25 pure herb capsules, which also includes, *koovalam*. Extraction technology has the potential to transform the ayurvedic commodity life of herbs, by overcoming the problem of perishability and seasonality. Herbal extracts are in demand from various quarters, the cosmetic industry, food industry, and especially for exports. Despite abundant availability of fresh herbs in Kerala most of the large extract industries are located in North India, often owned by large raw drug suppliers for whom it serves as a highly profitable route to value addition. Arjuna and Elixir are among the few companies in Kerala that supply extracts, but very few ayurvedic manufacturers in Kerala are manufacturing herbal extracts. Currently trade of medicinal plants as raw herbal drugs (fresh or dried) occurs through wholesale dealers or angadipachamanurunu kadas. Trade involves several intermediates and not much data on species traded, source of collection and price are available.

The consolidated commercial demand of herbal raw drugs for the year 2014-15 has been estimated at 5,12,000 MT by a study conducted by NMPB. Estimated Exports of Herbal Raw Drugs, including Extracts has been estimated 1,34,500 MT in 2014-15. Estimated Consumption by Domestic Herbal Industry has been estimated 1,95,000 MT 2014-15. An Estimated 1,67,500 MT of Herbal Raw Drugs are also Used by Rural Households every year. About 1178 medicinal plant species recorded in the practices of trade. Out of which, 242 plant species are used in annual quantities of more than 100MT

Kerala State Biodiversity Board (KSBB) initiated a study of the trade of raw drug through Raw drug shops in Kerala where raw drugs both dry & fresh, medicinal spices, value added products, and also base materials like various oils, clarified butter (ghee), honey etc are sold. A separate study was conducted on supply chain network of raw drugs mainly used for the preparation of various classical Ayurvedic drugs, proprietary drugs, health care products etc., in the AYUSH industry. The present study excluded the consumption of raw drugs (Dry & Fresh) by the tribal/folk healers of Kerala. It is suggested that this may be carried out during the second phase of the study. There is no secondary data available on the subject and therefore the data collected is considered as primary data. When the team started surveying with specific designed questionnaire initially there were lot of apprehension among the stakeholders and in many occasion they declined to interact with the survey team members because of their confusion related to imposing tax, and raising questions about the registrations, licensing etc. This has been cleared partially or fully during the consultative workshops at Thiruvananthapuram, Thrissur and Kozhikode and field survey.

Currently these shops are neither registered nor having license to trade the raw drugs because in the past it was considered only as a livelihood improvement for individuals who are engaged in the marketing of raw drugs locally known as Angadi Pachamarunnu Kada. Based on the annual turnover raw material shops are classified in to large, medium and small raw drug shops located in all districts of Kerala. Present studies reveal that the total number of Angadi Pachamarunnukada in Kerala is approximately estimated as 1100 (large scale 10, medium scale, 50 and small scale 1040).

In the past, the small shop keepers were collecting the raw materials/ base materials locally and the same was also sold to the local vaidyas residing in nearby places. Some of the tribal/folk healers usually collect their raw materials by themselves or with the help of labourers. The nature of selling network is limited to a Village/ Panchayat level. But the situation today is entirely different, and trends in trade have been much improved and some shopkeepers or agencies are even taking part in e-tendering etc., to sell their raw materials not only within the state but also supplying to the other states and some of the specific medicinal plants, as per the demand are exported to the foreign countries. Chappangam/Pathimugam, Erukku, Ilavarngam are the raw drugs exported through Angadi Pachamarunnukada to Middle East countries at a rate of 2 fold (600.78 within India vs 1183 outside India). This reveals that we can identify more export potential plant species and generate more income on regular basis. Ilavarngam was imported to Kerala from Sri Lanka because of the low price compared to the cinnamomum species available in Kerala.



One of the key observation noted based on the study after interacting with selected raw drugs dealers, is that the annual turnover is above 5 crore (Wholesale/retails), medium level sellers (wholesale and retails), is below 5 to 1 crore and small scale is limited to below one crore and varies from 1 lakh to 50 lakh, 50 to 75 lakh & 75 to 99 lakh

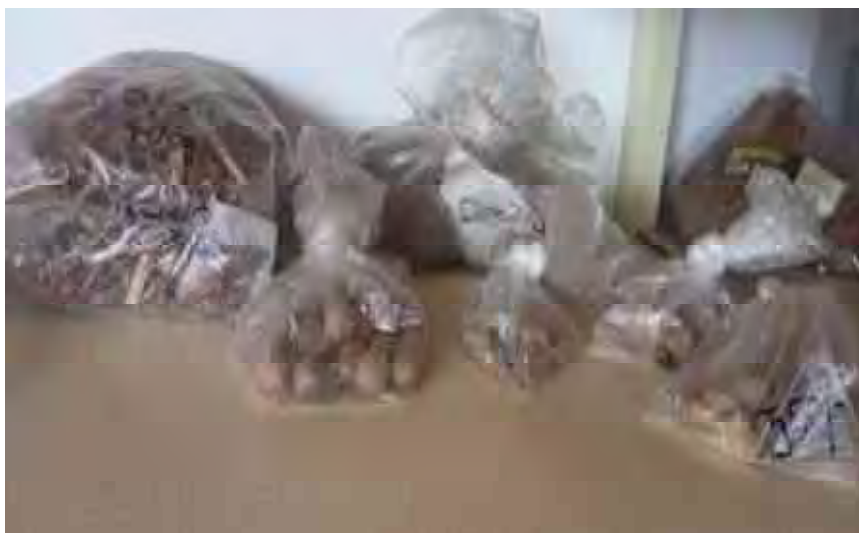
Even though the marketing network is improved the physical and storage conditions have not improved much except the space of their warehouse. One of the important recommendations based on the study is Angadi pachamarunnu shops need a face lift and need to be converted in to smart Angadi Pachamarunnu shops in terms of its hygiene, storage conditions, introduction of good collection processing, storage and selling practise.

It is also highly essential to introduce a registration and license to the raw materials shop keepers, under the local administration. This will help to regulate and improve the present status of the raw material shop with a view to maintain the standards of raw materials and labelling the expiry date of each species and value added products they sold.



Survey Of Raw Drug Shops

Survey of selected shops were done and data collected in a prescribed format. Fourteen NCC students from each district was selected for data collection related to the marketing of raw drugs/value added products sold through Angadi pachamarunnu shops in all the districts of Kerala. One day training was given to the NCC cadets and they were equipped for systematic documentation. The NCC cadets were deployed in each district under the supervision of District Coordinators of KSBB. Questionnaire and ODK format were designed for the data collection and was discussed with the cadets and DCs through an online programme. (ODK format attached as Appendix 1) The list of medicinal plants resources and value added products sold through a major Angadi Pachamarunnukada at Trivandrum is given as Appendix 2



Total Angadikkada identified in the state is approximately 1100. Out of that the District wise angadikkada identified during the study was 695. From this total number of Angadikkada selected for the survey was 235 only (Phase I).

A supply chain format out flow and inflow was also designed for collecting the source of data, selling network and marketing strategies of raw drugs (Appendix 3). The list of medicinal plants resources and value added products sold through Angadi Pachamarunnukada is given as Appendix 4. The list of district wise Angadi Pachamarunnukada (Raw drug shop) is given as Annexure 6.8.1. After the completion of survey in all the 14 districts of Kerala, 7 districts were prioritized for the detailed analysis and interpretation (Thiruvananthapuram, Alapuzha, Idukki, Thrissur, Maalppuram, Wayanadu and Kasaragode)

SL.No	District wise angadikada Identified	Number	Number of Angadikkada selected for the survey
1	Thiruvananthapuram	56	36
2	Kollam	48	16
3	Pathanamthitta	39	6
4	Alappuzha	48	13
5	Kottayam	80	1
6	Idukki	62	30
7	Ernakulam	34	10
8	Thrissur	44	15
9	Palakkad	82	20
10	Malappuram	57	25
11	Wayanadu	22	13
12	Kozhikod	36	10
13	Kannur	44	12
14	Kasaragod	43	35
Total		695	235

Approximately there are 1100 shops in the state. 241 shops surveyed. Quantity of raw materials projected to the respective districts and then computed to the state.

Quantity = $\sum_{i=1}^{14} \frac{q_i \times m_i \times N}{m}$, q_i - quantity of the i th district obtained in the survey, m_i is the number of shops surveyed in the i th district, m is the number of shops identified in the district, N is the total number of shops in the state.

Total quantity of raw materials collected from all 7 districts was 1, 77,603 kgs and the trade generated about Rupees 2, 92, 94034. Chappangam/Pathimugam, Erukku, Ilavarngam are the raw drugs exported through Angadi Pachamarunnukada to Middle East countries to a rate of 2 fold (Rs 600 within India vs 1183 outside India). This reveals that we can identify more export potential plant species and generate more income on regular basis. Ilavarngam was imported to Kerala from Sri Lanka because of the low price compared to the cinnamomum species available in Kerala. Karingali, Cheenikkaya, Incha, Vayambu, Kattarvazha, Chappangam, Kasthurimanjal and Nellikka species were traded above 3000 kgs per annum. 54 species such as Kunni, Vella Kunthirikkam, Thathiri etc were traded above 1000 kgs/annum. 188 species for example Chuuku, Kattinchi, Mullilam, Thumpoonalary, Amukkooram etc were traded below 1000 kgs/annum. Raw drugs such as Jathipathri, Jadamchi, Rakthachandanam, Sarppagandhi/amalppori, Chandhanam and Thakara represents high value species traded from Kerala.



Table 6.8.1. Species traded through Angdikada from seven selected district of Kerala

Values in brackets indicate number of angadikada surveyed and total number of anagdikada in the district

STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/ 57)		WYD (13/22)		KSG (35/43)		Total Quantity	Total Price
Sl no.		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1	PL0003	Kunni	<i>Abrus precatorius</i>	Root	517	115808	260	15600	530	86000	0	0	0	0	528	4240	351	745	2186	222393
2	PL0005	Karingali	<i>Acacia catechu</i>	Bark	1365.5	279585	650	65000	373	40375	120	7800	320	26000	185	7528	205	10437	3218	436725
3	PL0006	Cheevaikka	<i>Acacia concinna</i>	Fruit	607	64342	0	0	0	0	0	0	0	0	0	0	0	0	607	64342
4	PL0007	Karivelam	<i>Acacia nilotica</i>	Bark	412	49440	0	0	184	9670	0	0	525	45750	230	5990	22	560	1373	111410
5	PL0604	Karinja	<i>Acacia pennata</i>	Bark	1	60	0	0	36	1625	0	0	0	0	15	145	52	570	104	2400
6	PL0008	Cheenikkaya	<i>Acacia sinuata</i>	Fruit	6722	248714	0	0	185	13340	180	21600	20	1800	10	2000	1	245	7118	287699
7	PL0605	Incha	<i>Acacia torta</i>	Bark	2798	372134	390	15600	725	94750	15	3000	0	0	186	7030	1	250	4115	492764
8	PL0010	Kuppameni	<i>Acalypha indica</i>	Leaf	210	12600	0	0	0	0	0	0	25	1500	20	160	10	1500	265	15760
9	PL0011	Kadaladi	<i>Achyranthus aspera</i>	Root	500	30000	0	0	67	2010	0	0	0	0	505	155	196	8345	1268	40510
10	PL0016	Vayambu	<i>Acorus calamus</i>	Rhizome	2410	306070	0	0	145	31840	180	25200	80	14200	233	22625	108	14080	3156	414015
11	PL0018	Nanmukhap pullu	<i>Actiniopteris radiata</i>	Leaf	350	21000	0	0	0	0	0	90	230	15400	1	210	3	725	584	37425
12	PL0019	Manjadi	<i>Adenantha pavonina</i>	Root	541	172579	0	0	0	0	0	0	0	0	0	0	1	205	542	172784
13	PL0606	Chittadalodakam	<i>Adhatoda beddomei</i>	Root	12	1800	0	0	30	2400	0	0	0	0	94	7870	0	0	136	12070
14	PL0300	Aadalodakam	<i>Justicia adhatoda</i>	Root	812	73892	130	7800	15	2250	120	12000	200	18000	0	0	0	0	1277	113942
15	PL0021	Koovalam	<i>Aegle marmelos</i>	Root	762	70104	260	13000	134	16220	150	9000	320	31800	200	12680	83	640	1909	153444

16	PL0022	Cheroola	<i>Aerva lanata</i>	Whole plant	262	18602	260	7800	125	4720	105	6825	225	38000	101	6350	14	660	1092	82957
17	PL0607	Perumaratholi	<i>Alanthus triphysa</i>	Bark	10	1800	0	0	0	0	0	0	0	0	100	3000	6	150	116	4950
18	PL0025	Ankolam	<i>Alangium salviifolium</i>	Fruit	11	3300	0	0	0	0	1	300	0	0	5	850	32	1630	49	6080
19	PL0030	Kattarvazha	<i>Aloe vera</i>	Whole plant	2573	112774	130	7800	260	7200	120	4800	50	1500	850	2220	7	2626	3990	138920
20	PL0032	kolinchi/Chitaratha	<i>Alpinia galanga</i>	Rhizome	800	136000	0	0	20	3000	105	1575	10	3600	7	650	2	550	944	145375
21	PL0031	Chittaratha	<i>Alpinia calcarata</i>	Rhizome	1016	217170	0	0	10	2250	225	45000	400	120000	96	2847	1	280	1748	387547
22	PL0034	Ezhilampala	<i>Alstonia scholaris</i>	Root	50	3060	0	0	0	0	0	0	0	0	0	0	0	0	50	3060
23	PL0037	Kattalam /Vempadapatta	<i>Amomum subulatum</i>	Bark	66	39336	0	0	0	0	1	140	0	0	1	1960	5	540	73	41976
24	PL0038	Kattuchena	<i>Amorphophallus paenifolius</i>	Rhizome	200	36000	0	0	0	0	0	0	0	0	0	0	0	0	200	36000
25	PL0039	Andipparippu	<i>Anacardium occidentale</i>	Seed	139	87200	0	0	0	0	0	0	0	0	0	0	0	0	139	87200
26	PL0608	Pathalagarudi/pollakkaya	<i>Anamirta cocculus</i>	Seed	0	0	0	0	0	0	0	0	0	0	71	13719	55	2755	126	16474
27	PL0041	Kiriyathu	<i>Andrographis paniculata</i>	Whole plant	527	85374	0	0	60	10350	225	38250	270	127400	0	0	11	2175	1093	263549
28	PL0609	Maravuri	<i>Antiaris toxicaria</i>	Bark	0	0	0	0	61	14325	300	66000	0	0	0	0	0	0	361	80325
29	PL0046	Omam	<i>Apium graveolens</i>	Seed	903	309729	0	0	23	5650	330	82500	0	0	395	54860	82	8926	1733	461665
31	PL0052	Erumakkalli	<i>Argemone mexicana</i>	Whole plant	200	12060	0	0	0	0	1	50	0	0	0	0	0	0	201	12110
32	PL0054	Aaduthindapala	<i>Aristolochia Bracteata</i>	Root	100	10000	0	0	0	0	1	40	0	0	0	0	0	0	101	10040
33	PL0055	Garudakodi	<i>Aristolochia indica</i>	Root	340	33320	0	0	0	0	0	0	0	0	12	300	2	110	354	33730
34	PL0060	Sathavari	<i>Asparagus racemosus</i>	Tuberous root	1048	78600	390	15600	15	525	30	3000	600	42000	538	18545	105	795	2726	159065
35	PL0610	Kattumuthira	<i>Atylosia scarabaeoids</i>	Seed	7	1750	0	0	155	8600	105	14700	25	2000	45	8180	0	0	337	35230
36	PL0063	Veppinpatta	<i>Azhardiricta indica</i>	Bark	1360	68000	0	0	205	10250	120	7200	300	39000	60	1590	4	375	2049	126415

37	PL0062	Yasankinveru	<i>Azima tetraantha</i>	Root	212	31800	0	0	0	0	0	0	0	0	0	0	0	0	212	31800
38	PL0064	Brahmi	<i>Bacopa Monnieri</i>	Whole plant	1220	61000	260	13000	0	0	120	1800	15	450	78	1450	31	450	1724	78150
39	PL0065	Athithippali	<i>Balanophora fungosa</i>	Fruit	430	86000	260	12600	5	3500	0	30	70	11200	29	2815	14	510	808	116655
40	PL0611	Nagadanthi	<i>Baliospermum solanifolium</i>	Root	1	150	0	0	0	0	0	0	0	0	75	15	21	410	97	575
41	PL0068	Mula	<i>Bambusa bambos</i>	Seed	30	14400	0	0	0	0	0	0	0	0	0	0	0	0	30	14400
42	PL0074	Neykumpalam	<i>Benincasa hispida</i>	Fruit	1800	108000	780	39000	0	0	1	140	0	0	6	100	4	20	2591	147260
43	PL0081	Elavu	<i>Bombax ceiba</i>	Gum	1	20	0	0	0	0	0	0	0	0	0	0	4	560	5	580
44	PL0080	Thazhuthama	<i>Boerhavia diffusa</i>	Whole plant	1132	230928	0	0	0	0	1	70	350	57750	90	9680	117	11150	1690	309578
45	PL0083	Panamkalkandam	<i>Borassus flabellifer</i>	Product	43	9310	0	0	0	0	0	0	0	0	0	0	0	0	43	9310
46	PL0519	Thaarthaval	<i>Spermacoce hispida</i>	Root	700	42000	0	0	130	21200	0	0	0	0	0	0	21	340	851	63540
47	PL0084	Sambrani/Kungilyam	<i>Boswellia serrata</i>	Gum	8	3680	0	0	0	0	0	0	0	0	0	0	0	0	8	3680
48	PL0086	Ellu	<i>Brassica juncea</i>	Seed	10	1600	0	0	0	0	0	0	0	0	87	6450	1	300	98	8350
49	PL0091	Chamatha/Plash	<i>Butea monosperma</i>	Bark	5000	100	260	10400	0	0	0	0	0	0	0	0	0	0	5260	10500
50	PL0092	Kazhanchi	<i>Caesalpinia bonduc</i>	Seed	241	46513	0	0	0	0	120	12000	0	0	16	450	32	900	409	59863
52	PL0094	*Chappangam/Pathimugam	<i>Caesalpinia sappan</i>	Wood	*3073-1400	1846197	0	0	0	0	180	10800	0	0	112	3270	331.1	41545	3073	1846197
53	PL0099	*Erukku	<i>Calotropis gigantea</i>	Root	*836+100(936)	51,440+18000=69440	390	23400	175	6750	0	0	0	0	3.2	288	0	0	1504	81,878
54	PL0102	Thellippayin/Karutha kunthirikkam	<i>Canarium strictum</i>	Gum	200	60000	0	0	0	0	0	0	0	0	0	0	0	0	200	60000
55	PL0109	Uzhinja	<i>Cardiospermum halicacabum</i>	Whole plant	450	22500	0	0	151	12240	0	0	0	0	0	0	20	100	621	34840
56	PL0113	Chinnamukkaiyila	<i>Cassia angustifolia</i>	Root	419	41900	0	0	0	0	225	22500	0	0	158	17430	388	8735	1190	90565
57	PL0612	Aavaram/Ponnaveeram	<i>Cassia auriculata</i>	Flower	10	1800	0	0	35	4950	15	1200	0	0	0	0	0	0	60	7950

58	PL0114	Kanikonna	<i>Cassia fistula</i>	Bark	418	75240	0	0	0	0	120	12000	200	16000	25	824	186	5690	949	109754
59	PL0119	Devadaaram	<i>Cedrus deodara</i>	Wood	126	18960	0	0	0	0	0	0	0	0	0	0	0	0	126	18960
60	PL0120	Cherupunna yari	<i>Celastrus paniculatus</i>	Seed	262	94582	0	0	197	64460	1	270	200	68000	64	9372	50	9500	774	246184
61	PL0522	Peenari	<i>Sterculia foetida</i>	Bark	562	94416	0	0	0	0	120	33600	15	2400	32	1060	21	995	750	132471
62	PL0124	Kudangal/Kodakan	<i>Centalla asiatica</i>	Whole plant	0	0	0	0	300	11300	0	0	0	0	0	0	0	0	300	11300
63	PL0613	Perumkurum paveru	<i>Chonemorpha macrophylla</i>	Root	192	28800	0	0	0	0	0	0	0	0	7	530	1	340	200	29670
64	PL0131	Ramacham	<i>Chrysopogon zizanioides</i>	Root	1525	190625	260	39000	379	54310	120	8640	200	28000	170	11110	101	930	2755	332615
66	PL0133	Pacha Karpooram	<i>Cinnamomum camphora</i>	Gum	0	0	0	0	0	0	0	0	0	0	0	0	5	14120	5	14120
67	PL0135	*Ilavarngam	* <i>Cinnamomum malabatum</i>	Bark	300 +92 (392)	343,240	130	32500	0	0	0	0	40	13200	15	900	0	0	577	90040
68	PL0137	Karuva/Vayanapoo	<i>Cinnamomum verum</i>	Bark	0	0	0	0	260	92800	0	0	0	0	0	0	0	0	260	92800
69	PL0141	Changalam Paranda	<i>Cissus quadrangularis</i>	Stem	200	30	0	0	0	0	1	260	0	0	70	4200	0	0	271	4490
70	PL0142	Kattuvellari	<i>Citrullus colocynthis</i>	Fruit	412	82400	0	0	0	0	0	0	100	22000	14	1153	11	440	537	105993
71	PL0147	Naivela /Thaivela	<i>Cleome gynandra</i>	Seed	0	0	0	0	0	0	0	0	0	0	1	125	0	0	1	125
72	PL0152	Cheruthekku veru	<i>Clerodendrum serratum</i>	Root	17	4400	0	0	0	0	0	0	60	7200	0	1538	21	540	98	13678
73	PL0162	GulGulu	<i>Commiphora wightii</i>	Gum	5	6100	0	0	0	0	0	0	0	0	0	0	0	0	5	6100
74	PL0166	Maramanjai	<i>Coscinium fenestratum</i>	Bark	524	94320	0	0	70	19050	120	18000	0	0	41	5527	31	860	786	137757
75	PL0154	Koval	<i>Coccinia grandis</i>	Whole plant	200	30	0	0	0	0	1	90	0	0	0	0	0	0	201	120
76	PL0167	Channakoov a	<i>Costus speciosus</i>	Rhizome	150	18000	0	0	0	0	0	0	0	0	0	0	0	0	150	18000
77	PL0169	Neermathalam	<i>Crateva nurvala</i>	Bark	500	90000	0	0	240	28800	0	90	0	0	17	954	0	0	757	119844
78	PL0171	Neervalam	<i>Croton tiglium</i>	Seed	50	17500	0	0	0	0	1	370	0	0	5	2250	1	400	57	20520
79	PL0174	Karkokil Ari	<i>Cullen corylifolium</i>	Seed	68	23800	0	0	260	29000	105	21000	250	21250	64	2263	63	7900	810	105213
80	PL0175	Jeerakam	<i>Cuminum cyminum</i>	Seed	627	153615	0	0	140	30800	105	31500	0	0	175	38310	53	14669	1100	268894

81	PL0176	Nilappana	<i>Curculigo orchioides</i>	Tuberos root	12	2400	0	0	0	0	105	30450	0	0	48	10030	52	10420	217	53300
82	PL0177	Kasthurimantal	<i>Curcuma aromatica</i>	Rhizome	3762	376150	260	18200	105	19350	75	14400	100	10000	134	3500	22	630	4458	442230
83	PL0614	Manjal	<i>curcuma domestica</i>	Rhizome	805	104650	0	0	0	0	0	0	0	0	0	0	0	0	805	104650
84	PL0178	Kudamanjal	<i>Curcuma longa</i>	Rhizome	1856	225064	0	0	0	0	75	6000	15	1800	79	11980	1	800	2026	245644
85	PL0179	Kachooram Manjakoova	<i>Curcuma zedoaria</i>	Rhizome	13	4040	0	0	15	10500	0	0	0	0	47	8430	10	900	85	23870
86	PL0183	Eenthappana	<i>Cycas circinalis</i>	Fruit	25	3000	0	0	0	0	1	90	0	0	0	0	100	170	126	3260
87	PL0184	Padathali	<i>Cyclea peltata</i>	Tuberos root	574	287000	0	0	0	0	1	65	0	0	46	26630	5	2010	626	315705
88	PL0185	Chonakappullu	<i>Cymbopogon citratus</i>	Whole plant	110	19800	0	0	0	0	75	3750	0	0	3	312	1	340	189	24202
89	PL0189	Karuka	<i>Cynodon dactylon</i>	Whole plant	44	9600	0	0	305	9075	0	0	0	0	0	0	0	0	349	18675
90	PL0191	Muthanga	<i>Cyperus rotundus</i>	Tuberos root	1276	153120	130	7800	205	18400	75	7500	50	4000	121	7070	1	340	1858	198230
91	PL0196	Ummam	<i>Datura stramonium</i>	Fruit	300	18000	0	0	0	0	0	0	0	0	55	4125	0	0	355	22125
92	PL0093	Kooramkolly, Koomullu	<i>Caesalpinia mimosoides</i>		0	0	0	0	0	0	1	120	0	0	13	426	1	270	15	816
93	PL0199	Orila	<i>Desmodium gangeticum</i>	Root	518	77700	0	0	195	28950	75	6000	70	8400	72	12443	51	640	981	134133
94	PL0202	Aattudharbha	<i>Desmostachya bipinnata</i>	Root	0	0	520	26000	1085	33050	75	3750	0	0	0	0	0	0	1680	62800
95	PL0615	Kalppain	<i>Dipterocarpus indicus</i>	Wood	0	0	0	0	0	0	1	160	0	0	0	0	0	0	1	160
96	PL0616	Karakil	<i>Dysoxylum ficiforme</i>	Wood	12	2400	0	0	620	61500	0	50	60	6000	7	210	23	890	722	71050
97	PL0207	Vellakil	<i>Dysoxylum malabaricum</i>	Wood	0	0	0	0	0	0	75	4500	0	0	0	0	0	0	75	4500
98	PL0210	Kaithonni	<i>Eclipta prostrata</i>	Whole plant	800	40000	0	0	0	0	0	0	0	0	0	0	29	365	829	40365
99	PL0213	Anachuvadi	<i>Elephantopus scaber</i>	Whole plant	50	2500	0	0	0	0	1	2200	0	0	0	0	0	0	51	4700
100	PL0214	Elam	<i>Elettaria cardamomum</i>	Seed	235	470000	0	0	0	0	75	195000	5	1050	41	79600	1	4730	357	750380

101	PL0215	Koovaragu	<i>Eleusine coracana</i>	Seed	741	29640	0	0	0	0	1	900	0	0	0	0	1	80	743	30620
102	PL0216	Vizhalari	<i>Embelia ribes</i>	Seed	512	307200	0	0	0	0	120	120000	20	16200	55	14036	17	3800	724	461236
103	PL0407	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind	1237	247400	0	0	1365	165750	180	36000	50	8000	798	114612	43	1305	3673	573067
104	PL0219	Kakkumkai	<i>Entada rheedii</i>	Seed kernal	50	3500	0	0	0	0	1	160	0	0	0	0	0	0	51	3660
105	PL0226	Nilamppala	<i>Euphorbia thymifolia</i>	Whole plant	0	0	0	0	0	0	0	0	0	0	4	200	0	0	4	200
106	PL0228	Vishnukrant hi	<i>Evolvulus alsinoides</i>	Whole plant	50	6000	0	0	0	0	240	12000	0	0	5	750	1	340	296	19090
107	PL0234	Peral	<i>Ficus benghalensis</i>	Bark	1000	40000	0	0	130	7800	210	6300	100	4000	51	350	0	0	1491	58450
108	PL0239	Athi	<i>Ficus racemosa</i>	Bark	1300	52000	0	0	150	8900	180	10800	0	0	4	200	26	310	1660	72210
109	PL0240	Arayal	<i>Ficus religiosa</i>	Bark	1300	52000	0	0	150	8250	0	0	0	0	4	200	26	310	1480	60760
110	PL0617	Ithi	<i>Ficus retusa</i>	Bark	1300	52000	0	0	150	8300	300	9000	0	0	4	200	51	350	1805	69850
112	PL0241	Mulli,Agori, Vayyammkatha	<i>Flacourtia indica</i>	Fruit	0	0	0	0	0	0	0	0	0	0	6	300	0	0	6	300
113	PL0242	Kayam	<i>Foeniculum vulgare</i>	Gum	6	900	0	0	0	0	0	0	0	0	0	0	0	0	6	900
115	PL0618	Kudampuli/ Malabaripuli	<i>Garcinia cambogia</i>	Fruit	1	120	0	0	0	0	0	0	0	0	0	0	10	900	11	1020
116	PL0246	Kudampuli	<i>Garcinia gummi-gutta</i>	Fruit	549	87840	0	0	0	0	0	0	0	0	0	0	0	0	549	87840
117	PL0619	Karinthali	<i>Geophila repens</i>	Whole plant	0	0	0	0	0	0	1	240	0	0	0	0	0	0	1	240
118	PL0249	Irattimadthuram	<i>Glycyrrhiza glabra</i>	Root,Stem	941	228710	0	0	0	0	0	0	0	0	0	0	0	0	941	228710
119	PL0250	Kumpil/Kum izhu	<i>Gmelina arborea</i>	Bark	324	32400	0	0	455	44800	105	6300	0	0	88	5280	60	120	1032	88900
120	PL0255	Chakkarakolli	<i>Gymnema sylvestre</i>	Leaf	22	5500	0	0	0	0	0	140	0	0	15	1200	11	460	48	7300
121	PL0266	Chittalam/V atham parathi	<i>Heracleum rigens</i>	Seed	0	0	260	23400	0	0	0	0	0	0	20	2994	10	2200	290	28594
122	PL0262	Idampiri/ Valampiri	<i>Helicteres isora</i>	Fruit	122	18300	0	0	0	0	75	11250	60	4800	17	1400	12	460	286	36210
123	PL0263	Thekkada vere	<i>Heliotropium indicum</i>	Root	10	500	130	7800	0	0	225	20250	0	0	2	360	1	200	368	29110

124	PL0264	Narunandi	<i>Hemidesmus indicus</i>	Tuberos root	1224	1224000	0	0	0	0	120	96000	50	32500	113	43850	11	2480	1518	1398830
125	PL0266	Chittalam/Vatham parathi	<i>Heracleum rigens</i>	Seed	1	400	0	0	0	0	60	45000	150	97500	0	0	0	0	211	142900
126	PL0270	Kudakappala	<i>Holarrhena pubescens</i>	Seed	13	3900	0	0	0	0	180	21600	150	10500	27	3689	11	1500	381	41189
127	PL0271	Aaviltholi	<i>Holoptelia integrifolia</i>	Bark	412	72512	0	0	0	0	105	7350	0	0	20	660	1	270	538	80792
128	PL0272	Adakodiyan	<i>Holostemmaada -kodiyan</i>	Tuberos root	305	61000	0	0	0	0	120	84000	0	0	63	20512	20	1600	508	167112
129	PL0274	Barley/Yavam	<i>Hordeum vulgare</i>	Seed	738	38580	0	0	0	0	0	0	0	0	0	0	0	0	738	38580
130	PL0275	Karthottyveru	<i>Hugonia mystax</i>	Root	250	60000	0	0	0	0	75	5400	0	0	6	876	2	300	333	66576
131	PL0277	Vayalchulli	<i>Hygrophila auriculata</i>	Whole plant	320	48000	0	0	8	3200	75	3750	60	8400	539	4045	72	590	1074	67985
132	PL0280	Palvally	<i>Ichnocarpus frutescens</i>	Tuberos root	200	24000	260	15600	0	0	1	60	0	0	12	2160	5	370	478	42190
133	PL0281	Thakkolam	<i>Illicium verum</i>	Fruit	67	26800	0	0	675	38250	75	90000	0	0	23	11550	14	2265	854	168865
134	PL0283	Neelamari	<i>Indigofera tinctoria</i>	Leaf	824	288400	260	65000	109	20540	180	27000	10	4000	120	40980	1	400	1504	446320
135	PL0286	Paalmuthak	<i>Ipomoea mauritiana</i>	Tuberos root	306	38250	260	18200	0	0	225	11250	70	4200	33	1510	2	1200	896	74610
136	PL0288	Thiruthali	<i>Ipomoea obscura</i>	Whole plant	12	1440	0	0	0	0	150	9000	0	0	0	0	0	0	162	10440
137	PL0290	Pulichuvadi	<i>Ipomoea pes-tigridis</i>	Whole plant	35	2625	0	0	0	0	0	0	0	0	4	600	4	600	43	3825
138	PL0293	Thetti veru	<i>Ixora coccinea</i>	Root	250	30000	0	0	0	0	105	12600	0	0	0	0	0	0	355	42600
139	PL0300	Adalodakam	<i>Justicia adhatoda</i>	Root	5	800	0	0	0	0	0	0	0	0	0	0	0	0	5	800
140	PL0303	Kacholam	<i>Kaempferia galanga</i>	Rhizome	824	123600	0	0	140	32000	75	30000	55	23650	545	20370	0	0	1639	229620
141	PL0304	Changazhiner kizhangu	<i>Kaempferia rotunda</i>	Tuberos root	122	59360	0	0	0	0	75	15000	0	0	10	1850	1	135	208	76345
142	PL0312	Aasali	<i>Lepidium sativum.</i>	Seed	215	43000	0	0	139	22680	120	9600	60	8400	100	4194	24	780	658	88654
143	PL0315	Kaakoli	<i>Lilium polyphyllum</i>	Bulb	150	81000	0	0	0	0	75	45000	0	0	13	5080	0	0	238	131080

144	PL0620	Peechinga	<i>Luffa aegyptiaca</i>	Fruit	2400	81000	0	0	0	0	225	1800	0	0	0	0	0	0	2625	82800
145	PL0320	Mutira	<i>Macrotyloma uniflorum</i>	Seed	1372	138040	0	0	175	13700	270	17550	0	0	18	1440	0	0	1835	170730
146	PL0621	Ilippa	<i>Madhuca neriifolia</i>	Wood	100	60	0	0	0	0	0	0	0	0	6	300	21	430	127	790
147	PL0363	Peenari	<i>Nothapodytes nimmoniana</i>	Bark	1	60	0	0	0	0	0	0	0	0	2	320	0	0	3	380
148	PL0622	Jeevakam	<i>Malaxis rheedii</i>	Rhizome	25	12000	0	0	0	0	0	0	0	0	8	2760	0	0	33	14760
149	PL0333	Prasarini	<i>Merremia tridentata</i>	Whole plant	250	18000	0	0	80	5720	105	8400	0	0	34	3199	1	200	470	35519
150	PL0335	Nagapoo	<i>Mesua ferrea</i>	flower	6	1500	0	0	108	19640	120	24000	150	49500	45	7250	12	1960	441	103850
151	PL0346	Karimkoovalam	<i>Monochoria vaginalis</i>	Whole plant	74	11100	0	0	0	0	0	0	0	0	0	0	0	0	74	11100
152	PL0350	Naikkurunam	<i>Mucuna pruriens</i>	Seed	637	92365	0	0	13	11700	150	21000	30	5400	53	5249	22	1295	905	137009
153	PL0352	Musumusukk	<i>Mukia maderaspatana</i>	Whole plant	150	10500	0	0	0	0	0	0	0	0	0	0	0	0	150	10500
154	PL0359	Jathipathri	<i>Myristica malabarica</i>	Aril	221	165750	0	0	0	0	225	157500	0	0	5	2850	0	0	451	326100
155	PL0362	Jadamchi	<i>Nardostachysjata mansi</i>	Root	127	178250	130	54600	0	0	0	0	0	0	0	0	0	0	257	232850
156	PL0364	Thamara	<i>Nelumbo nucifera</i>	Flower	32	8800	0	0	0	0	0	0	0	0	0	0	0	0	32	8800
157	PL0371	Karimjeerakam	<i>Nigella sativa</i>	Seed	15	5859	0	0	148	35600	75	9000	100	30000	201	23112	40	3089	579	106660
158	PL0375	Aampal	<i>Nymphaea nouchali</i>	Flower	20	3000	260	52000	0	0	0	0	0	0	0	0	0	0	280	55000
159	PL0378	Kattuthulasi	<i>Ocimum gratissimum</i>	Root	30	3600	0	0	0	0	0	0	0	0	0	0	0	0	30	3600
160	PL0381	Thulasi	<i>Ocimum tenuiflorum</i>	Leaf	124	7440	0	0	0	0	0	0	0	0	0	0	0	0	124	7440
161	PL0382	Parppidakapullu	<i>Oldenlandia corymbosa</i>	Whole plant	312	93600	0	0	0	0	120	36000	60	13200	73	26950	0	0	565	169750
162	PL0384	Palakapayyanni	<i>Oroxylum indicum</i>	Root	412	32960	0	0	108	7960	105	6300	20	2200	78	6940	60	100	783	56460
163	PL0386	Njavara	<i>Oryza sativa</i>	Seed	495	74750	0	0	0	0	120	6000	30	2100	111	3825	71	310	827	86985
164	PL0388	Puliyarila	<i>Oxalis corniculata</i>	Whole plant	35	2800	260	32500	275	5100	90	4500	0	0	0	0	0	0	660	44900
165	PL0391	Pookaitha	<i>Pandanus odoratissimus</i>	Root	110	19800	0	0	0	0	0	0	0	0	18	1800	0	0	128	21600
166	PL0623	Chamayari	<i>Panicum miliare</i>	Seed	177	23010	0	0	0	0	75	4500	0	0	60	7200	0	0	312	34710

168	PL0404	Chiteenthal	<i>Phoenix pusilla</i>	Root	40	2400	0	0	0	0	0	0	0	0	0	0	0	0	40	2400
169	PL0406	Keezharnelli	<i>Phyllanthus amarus</i>	Whole plant	40	3200	0	0	470	8750	120	7200	0	0	4	792	1	270	635	20212
170	PL0407	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind	1194	250200	0	0	0	0	60	9000	60	9600	464	111360	30	185	1808	380345
171	PL0164	Arenukam	<i>Corchorus trilocularis</i>	Seed	24	10880	0	0	4	1120	210	18900	0	0	1	161	11	605	250	31666
172	PL0415	Thippali	<i>Piper longum</i>	Fruit	543	543000	0	0	23	18700	120	66000	75	45000	214	49990	17	1645	992	724335
173	PL0417	Kurumulaku	<i>Piper nigrum</i>	Seed	765	882250	130	45000	131	33580	75	26250	80	34400	40	9340	16	1150	1237	1031970
174	PL0429	Chuvannako duveli	<i>Plumbago zeylanica</i>	Tuberos root	324	97200	130	65000	0	0	75	15000	0	0	43	9460	21	3675	593	190335
175	PL0432	Pacholi	<i>Pogostemon heyneanus</i>	Leaf	300	75000	0	0	0	0	225	33750	0	0	18	8670	20	170	563	117590
176	PL0436	Unge	<i>Pongamia pinnata</i>	Bark	200	10000	0	0	0	0	75	7500	0	0	3	275	1	300	279	18075
177	PL0440	Munja	<i>Premna serratifolia</i>	Root	615	46125	0	0	0	0	105	4200	0	0	95	7220	31	520	846	58065
178	PL0444	Badham	<i>Prunus dulcis</i>	Fruit	131	79700	0	0	0	0	0	0	0	0	0	0	0	0	131	79700
179	PL0445	Moovila	<i>Pseudarthria viscida</i>	Root	624	93600	0	0	0	0	270	37800	80	9200	99	14850	51	560	1124	156010
180	PL0447	Venga	<i>Pterocarpus marsupium</i>	Wood	587	73375	0	0	25	3750	225	13500	90	4500	44	4150	51	400	1022	99675
181	PL0448	Raktachandanam	<i>Pterocarpus santalinus</i>	Wood	284	291750	0	0	0	0	1	400	0	0	6	3740	1	1000	292	296890
182	PL0455	sarppagandhi/amalppori	<i>Rauvolfia serpentina</i>	Root	600	570000	195	39000	0	0	1	950	0	0	11	11540	2	2000	809	623490
183	PL0456	Kattuthipali	<i>Rhaphidophora pertusa</i>	Fruit	24	5160	0	0	0	0	1	160	0	0	13	2960	0	0	38	8280
184	PL0418	Karkidakasringi	<i>Pistacia chinensis</i>	Leaf	112	33600	0	0	0	0	75	72750	70	15400	11	2790	0	0	268	124540
185	PL0458	Aavanakku	<i>Ricinus communis</i>	Root	417	83400	0	0	223	4700	225	20250	90	7200	63	1270	36	1860	1054	118680
186	PL0462	Kallurvanchi	<i>Rotula aquatica</i>	Whole plant	224	67200	0	0	180	17200	150	33000	75	13500	141	22230	10	1100	780	154230
187	PL0463	Manchatti	<i>Rubia cordifolia</i>	Root	377	339300	0	0	0	0	75	15000	80	24000	34	4409	20	120	586	382829
188	PL0469	Ponkorandi	<i>Salacia reticulata</i>	Root	788	197000	0	0	0	0	105	26250	50	8000	80	16780	10	60	1033	248090
189	PL0472	Chandhanam	<i>Santalum album</i>	Wood	162	264000	0	0	0	0	0	0	0	0	0	0	0	0	162	264000
190	PL0474	Soapinkaya	<i>Sapindus trifoliatus</i>	Fruit	655	52400	0	0	0	0	135	8100	0	0	17	3100	0	0	807	63600

191	PL0475	Asokam	<i>Saraca asoca</i>	Bark	1991	412137	0	0	0	0	0	0	0	0	13	4110	20	160	2024	416407
192	PL0479	Kottam	<i>Saussurea costus</i>	Root	3	2430	0	0	0	0	0	0	0	0	0	0	0	0	3	2430
193	PL0624	Odakkuru	<i>Sarcostigma kleinii</i>	Seed	10	2000	0	0	0	0	0	0	0	0	0	0	0	0	10	2000
194	PL0477	Somalatha	<i>Sarcostemma acidum</i>	Whole plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
195	PL0481	Poovanam	<i>Schleichera oleosa</i>	Seed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
196	PL0485	Cherkuru,Th emprakkai	<i>Semecarpus anacardium</i>	Seed	92	14720	0	0	0	0	0	0	0	0	0	0	1	200	93	14920
197	PL0491	Thakara	<i>Senna tora</i>	Root	36	8400	0	0	82	156260	0	0	10	9600	6	7120	11	460	145	181840
198	PL0492	Ellu	<i>Sesamum indicum</i>	Seed	2564	338240	0	0	60	13250	60	13200	50	14000	63	3300	2	800	2799	382790
199	PL0494	Thina	<i>setaria italica</i>	Seed	100	5000	260	52000	75	3400	16	680	90	3600	3	94	11	185	555	64959
200	PL0496	Cheruparuva	<i>Sida acuta</i>	Root	0	0	230	13000	0	0	120	16800	20	2000	20	350	40	240	430	32390
201	PL0625	Kurumthotti	<i>Sida cordata</i>	Root	19	2185	0	0	320	7800	0	0	100	18000	0	0	40	160	479	28145
202	PL0497	Ven kurunthotti	<i>Sida cordifolia</i>	Root	0	0	0	0	0	0	105	2100	0	0	466	63500	0	0	571	65600
203	PL0499	Kattooram	<i>Sida spinosa</i>	Root	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204	PL0498	Kurumthotti	<i>Sida rhombifolia</i>	Root	570	79230	0	0	90	2250	0	0	0	0	0	0	1	350	661	81830
205	PL0504	Putharichunda	<i>Solanum anguivi</i>	Root	312	37440	0	0	0	0	0	0	0	0	22	535	0	0	334	37975
206	PL0515	Njerinjampuli	<i>Solena amplexicaulis</i>	Fruit	35	8400	0	0	0	0	0	0	0	0	0	0	0	0	35	8400
207	PL0526	Poopathiri	<i>Stereospermum tetragonum</i>	Bark	16	900	0	0	0	0	0	0	70	6650	70	8930	0	0	156	16480
208	PL0527	Paruva maram	<i>Streblus asper</i>	Bark	0	0	0	0	0	0	225	21600	0	0	0	0	0	0	225	21600
209	PL0372	Karimkurinji	<i>Nilgirianthus ciliatus</i>	Root	12	1440	0	0	0	0	75	3375	40	4400	81	6040	34	430	242	15685
210	PL0532	Kanjiram	<i>Strychnos nuxvomica</i>	Seed	105	20450	0	0	0	0	0	0	0	0	0	0	0	0	105	20450
211	PL0533	Thettamparal	<i>Strychnos potatorum</i>	Seed	322	15740	0	0	0	0	0	0	60	14400	85	2606	1	270	468	33016
212	PL0535	Pachotti	<i>Symplocos cochinchinensis</i>	Bark	137	20340	0	0	0	0	300	48000	50	8000	31	4130	20	360	538	80830
213	PL0537	Grampoo	<i>Syzygium aromaticum</i>	Flower bud	82	57470	0	0	0	0	0	0	0	0	0	0	0	0	82	57470

214	PL0539	Njaval	<i>Syzygium cumini</i>	Fruit	312	25440	0	0	235	11850	120	24000	60	3900	41	550	1	270	769	66010
215	PL0542	Valanpuli	<i>Tamarindus indica</i>	Fruit	10	3600	0	0	0	0	150	9750	0	0	0	0	0	0	160	13350
216	PL0548	Neermaruth	<i>Terminalia arjuna</i>	Bark	381	56290	0	0	0	0	0	0	0	0	8	790	1	270	390	57350
217	PL0549	Thanii	<i>Terminalia bellirica</i>	Fruit rind	1,119	113100	130	9100	0	0	225	22500	60	5100	218	1865	41	320	1793	151985
218	PL0551	Kadukka	<i>Terminalia chebula</i>	Fruit rind	1308	158426	0	0	0	0	0	0	100	8000	160	4220	52	444	1620	171090
219	PL0626	Alpam	<i>Thottea siliquosa</i>	Root	0	0	130	7800	0	0	150	6000	0	0	0	0	81	285	361	14085
220	PL0554	Chittamruth	<i>Tinospora cordifolia</i>	Stem	1774	65520	0	0	0	0	0	0	50	1250	196	8750	0	0	2020	75520
221	PL0627	Kattamruth	<i>Tinospora malabarica</i>	Stem	100	3000	0	0	70	10500	225	4500	0	0	0	0	76	220	471	18220
222	PL0628	Chandana vembu	<i>Toona ciliata</i>	Bark	0	0	0	0	0	0	1	20	0	0	0	0	0	0	1	20
223	PL0557	Ayamodhakam	<i>Trachyspermum ammi</i>	Seed	828	185040	0	0	10	3000	0	0	80	20800	71	15385	1	386	990	224611
224	PL0559	Kodithuva veru	<i>Tragia involucrata</i>	Root	362	81440	0	0	0	0	300	48000	15	3600	25	4040	0	0	702	137080
225	PL0561	Njerinjil	<i>Tribulus terrestris</i>	Fruit	513	92060	0	0	8	2000	30	4800	40	9600	210	168335	22	725	823	277520
226	PL0562	Padavalam	<i>Trichosanthes cucumerina</i>	Whole plant	524	154200	195	19500	60	2400	210	46200	0	0	0	0	10	90	999	222390
227	PL0564	Kattupadavalam	<i>Trichosanthes lobata</i>	Whole plant	600	180000	0	0	0	0	195	58500	80	17600	16	5060	1	800	892	261960
228	PL0567	Uluvaa	<i>Trigonella foenum-graecum</i>	Seed	12	1020	0	0	0	0	0	0	0	0	0	0	0	0	12	1020
229	PL0568	Soochi gothambe	<i>Triticum aestivum</i>	Seed	0	0	0	0	0	0	1	300	0	0	20	2000	0	0	21	2300
230	PL0629	Vallippala	<i>Tylophora indica</i>	Leaf	0	0	0	0	0	0	1	110	0	0	0	0	0	0	1	110
231	PL0569	Elephant Grass, Aanapullu	<i>Typha elephantina</i>	Whole plant	25	3000	0	0	0	0	0	0	0	0	0	0	0	0	25	3000
232	PL0630	Cheriya orila	<i>Uraria lagopodoides</i>	Root	0	0	0	0	0	0	1	70	0	0	70	12600	0	0	71	12670
233	PL0573	Thagaram	<i>Valeriana wallichii</i>	Root	3	2760	0	0	0	0	0	0	0	0	0	0	0	0	3	2760
234	PL0631	Chuvannaratha	<i>Vanda tessellata</i>	Whole plant	12	1560	0	0	0	0	120	24000	0	0	35	4230	1	270	168	30060
235	PL0574	Vella Kunthirikka	<i>Vateria indica</i>	Gum	1024	204800	0	0	0	0	105	16800	75	10500	9	2650	10	210	1223	234960

		m																		
236	PL0575	Vempadappa atta	<i>Ventilago maderaspatana</i>	Bark	375	156330	130	52000	0	0	180	72000	30	12000	75	6450	1	540	791	299320
237	PL0577	Poovankuru nnal	<i>Vernonia cinerea</i>	Whole plant	245	9800	0	0	180	3750	0	0	25	8500	0	0	0	0	450	22050
238	PL0131	Ramacham	<i>Chrysopogon zizanioides</i>	Root	18	930	0	0	0	0	0	0	0	0	0	0	0	0	18	930
239	PL0632	Kattupayar	<i>Vigna pilosa</i>	Whole plant	210	13650	0	0	0	0	325	19,500	0	0	25	2,000	0	0	560	35150
240	PL0584	Kattuzhunnu	<i>Vigna vexillata</i>	Whole plant	150	49500	0	0	0	0	150	9000	0	0	22	1720	0	0	322	60220
241	PL0588	Karinochi	<i>Vitex negundo</i>	Leaf	150	54500	0	0	0	0	150	18000	0	0	32	1750	1	270	333	74520
242	PL0590	Unakkamunt hiri	<i>Vitis vinifera</i>	Fruit	613	172480	0	0	0	0	0	0	0	0	0	0	0	0	613	172480
243	PL0592	Amukkoora m	<i>Withania Somnifera</i>	Root	622	429156	0	0	0	0	0	0	0	0	0	0	0	0	622	429156
244	PL0593	Thathiri	<i>Woodfordia fruticosa</i>	Flower	712	169800	0	0	180	9800	120	7200	0	0	240	19910	1	270	1253	206980
245	PL0594	Vettupala/D anthapala	<i>Wrightia tinctoria</i>	Leaf	50	5000	0	0	90	900	1	45	0	0	0	0	0	0	141	5945
247	PL0597	Mullilam, Thumpoonal ary	<i>Zanthoxylum.ar matum</i>	Seed	0	0	0	0	0	0	1	50	50	4750	0	0	0	0	51	4800
248	PL0598	Chuuku	<i>zingiber officinale</i>	Rhizom e(Dry)	624	239960	0	0	0	0	0	0	0	0	0	0	0	0	624	239960
249	PL0633	Kattinchi	<i>Zingiber zerumbet</i>	Rhizom e	200	14000	0	0	220	4750	1	140	0	0	0	0	0	0	421	18890
																	Grand Total Species Quantity & Price		177603	29294034

Table 6.8.2 Major medicinal plants exported through Angadi Pachamarunnukada

Sl. No	Local Name	Botanical Name	Parts used	Price/Kg	Quantity	Total Price
1	Chappangam /Pathimugam	<i>Caesalpinia sappan</i>	Wood	1183	1400	1656000
2	Erukku	<i>Calotropis gigantea</i>	Root	180	100	18000
3	*Ilavarngam	* <i>Cinnamomum malabatum</i>	Bark	1000	300	300000
	Grand Total				1800	1,974,000

Table 6.8.3 Major medicinal plants imported from Srilanka through Angadi Pachamarunnukada

Sl.No	Local Name	Botanical Name	Parts used	Price/Kg	Quantity	Total Price
1.	*Ilavarngam	<i>Cinnamomum verum</i> (* <i>Cinnamomum zeylanicum</i> (Synonym))	Bark	470	92	43,240

Table 6.8.4 Species traded in high volume (above 3000 Kgs/annum)

Study on Angadi Pachamarunnukada in Kerala-PHASE-I (7 Districts)																				
STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/57)		WYD (13/22)		KSG (35/43)		Total Quantity	Total Price
SI No		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1.	PL0005	Karingali	<i>Acacia catechu</i>	Bark	1365.5	279585	650	65000	373	40375	120	7800	320	26000	185	7528	205	10437	3,218.00	436,725
2.	PL0008	Cheenikkay a	<i>Acacia sinuata</i>	Fruit	6722	248714	0	0	185	13340	180	21600	20	1800	10	2000	1	245	7,118	287,699
3.	PL0605	Incha	<i>Acacia torta</i>	Bark	2798	372134	390	15600	725	94750	15	3000	0	0	186	7030	1	250	4115	492764
4.	PL0016	Vayambu	<i>Acorus calamus</i>	Rhizom e	2410	306070	0	0	145	31840	180	25200	80	14200	233	22625	108	14080	3156	414015
5.	PL0030	Kattarvazh a	<i>Aloe vera</i>	Whole plant	2573	112774	130	7800	260	7200	120	4800	50	1500	850	2220	7	2626	3990	138920
6.	PL0094	*Chappang am/Pathim ugam	<i>Caesalpin ia sappan</i>	Wood	*3073-1400	1846197	0	0	0	0	180	10800	0	0	112	3270	331.1	41545	3,073	1,846,197
7.	PL0177	Kasthurima njal	<i>Curcuma aromatic a</i>	Rhizom e	3762	376150	260	18200	105	19350	75	14400	100	10000	134	3500	22	630	4458	442230
8.	PL0407	Nellikka	<i>Phyllanth us emblica</i>	Fruit rind (F)	1237	247400	0	0	1365	165750	180	36000	50	8000	798	114612	43	1305	3673	573067

Table 6.8.5 Species traded above 1000 Kg/annum

Study on Angadi Pachamarunnukada in Kerala-PHASE-I (7 Districts)																				
STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/ 57)		WYD (13/22)		KSG (35/43)		Total Quantity	Total Price
Sl no.		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1.	PL0003	Kunni	<i>Abrus precatorius</i>	Root	517	115808	260	15600	530	86000	0	0	0	0	528	4240	351	745	2186	222393
2.	PL0005	Karingali	<i>Acacia catechu</i>	Bark	1365.5	279585	650	65000	373	40375	120	7800	320	26000	185	7528	205	10437	3218	436725
3.	PL0007	Karivelam	<i>Acacia nilotica</i>	Bark	412	49440	0	0	184	9670	0	0	525	45750	230	5990	22	560	1373	111410
4.	PL0008	Cheenikkay a	<i>Acacia sinuata</i>	Fruit	6722	248714	0	0	185	13340	180	21600	20	1800	10	2000	1	245	7118	287699
5.	PL0605	Incha	<i>Acacia torta</i>	Bark	2798	372134	390	15600	725	94750	15	3000	0	0	186	7030	1	250	4115	492764
6.	PL0011	Kadaladi	<i>Achyranthus aspera</i>	Root	500	30000	0	0	67	2010	0	0	0	0	505	155	196	8345	1268	40510
7.	PL0016	Vayambu	<i>Acorus calamus</i>	Rhizome	2410	306070	0	0	145	31840	180	25200	80	14200	233	22625	108	14080	3156	414015
8.	PL0300	Aadalodak am	<i>Justicia adhatoda</i>	Root	812	73892	130	7800	15	2250	120	12000	200	18000	0	0	0	0	1277	113942
9.	PL0021	Koovalam	<i>Aegle marmelos</i>	Root	762	70104	260	13000	134	16220	150	9000	320	31800	200	12680	83	640	1909	153444
10.	PL0022	Cheroola	<i>Aerva lanata</i>	Whole plant	262	18602	260	7800	125	4720	105	6825	225	38000	101	6350	14	660	1092	82957
11.	PL0030	Kattarvazh	<i>Aloe vera</i>	Whole	2573	112774	130	7800	260	7200	120	4800	50	1500	850	2220	7	2626	3990	138920

28.	PL0191	Muthanga	<i>Cyperus rotundus</i>	Tuberos root	1276	153120	130	7800	205	18400	75	7500	50	4000	121	7070	1	340	1858	198230
29.	PL0202	Aattudharbha	<i>Desmostachya bipinnata</i>	Root	0	0	520	26000	1085	33050	75	3750	0	0	0	0	0	0	1680	62800
30.	PL0407	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind (F)	1237	247400	0	0	1365	165750	180	36000	50	8000	798	114612	43	1305	3673	573067
31.	PL0234	Peral	<i>Ficus benghalensis</i>	Bark	1000	40000	0	0	130	7800	210	6300	100	4000	51	350	0	0	1491	58450
32.	PL0239	Athi	<i>Ficus racemosa</i>	Bark	1300	52000	0	0	150	8900	180	10800	0	0	4	200	26	310	1660	72210
33.	PL0240	Arayal	<i>Ficus religiosa</i>	Bark	1300	52000	0	0	150	8250	0	0	0	0	4	200	26	310	1480	60760
34.	PL0617	Ithi	<i>Ficus retusa</i>	Bark	1300	52000	0	0	150	8300	300	9000	0	0	4	200	51	350	1805	69850
35.	PL0250	Kumpil/Kumizhu	<i>Gmelina arborea</i>	Bark	324	32400	0	0	455	44800	105	6300	0	0	88	5280	60	120	1032	88900
36.	PL0264	Narunandi	<i>Hemidesmus indicus</i>	Tuberos root	1224	122400	0	0	0	0	120	96000	50	32500	113	43850	11	2480	1518	1398830
37.	PL0277	Vayalchulli	<i>Hygrophila auriculata</i>	Whole plant	320	48000	0	0	8	3200	75	3750	60	8400	539	4045	72	590	1074	67985
38.	PL0283	Neelamari	<i>Indigofera tinctoria</i>	Leaf	824	288400	260	65000	109	20540	180	27000	10	4000	120	40980	1	400	1504	446320
39.	PL0303	Kacholam	<i>Kaempferia galanga</i>	Rhizome	824	123600	0	0	140	32000	75	30000	55	23650	545	20370	0	0	1639	229620
40.	PL0620	Peechinga	<i>Luffa aegyptiaca</i>	Fruit	2400	81000	0	0	0	0	225	1800	0	0	0	0	0	0	2625	82800
41.	PL0320	Mutira	<i>Macrotylo ma uniflorum</i>	Seed	1372	138040	0	0	175	13700	270	17550	0	0	18	1440	0	0	1835	170730
42.	PL0407	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind (D)	1194	250200	0	0	0	0	60	9000	60	9600	464	111360	30	185	1808	380345
43.	PL0417	Kurumulaku	<i>Piper nigrum</i>	Seed	765	882250	130	45000	131	33580	75	26250	80	34400	40	9340	16	1150	1237	1031970
44.	PL0445	Moovila	<i>Pseudarthria viscida</i>	Root	624	93600	0	0	0	0	270	37800	80	9200	99	14850	51	560	1124	156010

45.	PL0447	Venga	<i>Pterocarpus marsupium</i>	Wood	587	73375	0	0	25	3750	225	13500	90	4500	44	4150	51	400	1022	99675
46.	PL0458	Aavanakku	<i>Ricinus communis</i>	Root	417	83400	0	0	223	4700	225	20250	90	7200	63	1270	36	1860	1054	118680
47.	PL0469	Ponkorandi	<i>Salacia reticulata</i>	Root	788	197000	0	0	0	0	105	26250	50	8000	80	16780	10	60	1033	248090
48.	PL0475	Asokam	<i>Saraca asoca</i>	Bark	1991	412137	0	0	0	0	0	0	0	0	13	4110	20	160	2024	416407
49.	PL0492	Ellu	<i>Sesamum indicum</i>	Seed	2564	338240	0	0	60	13250	60	13200	50	14000	63	3300	2	800	2799	382790
50.	PL0549	Thanii	<i>Terminalia bellirica</i>	Fruit rind	1,119	113100	130	9100	0	0	225	22500	60	5100	218	1865	41	320	1793	151985
51.	PL0551	Kadukka	<i>Terminalia chebula</i>	Fruit rind	1308	158426	0	0	0	0	0	0	100	8000	160	4220	52	444	1620	171090
52.	PL0554	Chittamruth	<i>Tinospora cordifolia</i>	Stem	1774	65520	0	0	0	0	0	0	50	1250	196	8750	0	0	2020	75520
53.	PL0574	Vella Kunthirikkam	<i>Vateria indica</i>	Gum	1024	204800	0	0	0	0	105	16800	75	10500	9	2650	10	210	1223	234960
54.	PL0593	Thathiri	<i>Woodfordia fruticosa</i>	Flower	712	169800	0	0	180	9800	120	7200	0	0	240	19910	1	270	1253	206980
														Grand Total Species Quantity & Price				177603	29294034	

Table 6.8.6 Species traded below 1000 kg/annum

Study on Angadi Pachamarunnukada in Kerala-PHASE-I (7 Districts)																				
STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/ 57)		WYD (13/22)		KSG (35/43)		Total Qua	Total Price
Sl. No.		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1.	PL0006	Cheevaikka	<i>Acacia concinna</i>	Fruit	607	64342	0	0	0	0	0	0	0	0	0	0	0	0	607	64342
2.	PL0604	Karinja	<i>Acacia pennata</i>	Bark	1	60	0	0	36	1625	0	0	0	0	15	145	52	570	104	2,400
3.	PL0010	Kuppameni	<i>Acalypha indica</i>	Leaf	210	12600	0	0	0	0	0	0	25	1500	20	160	10	1500	265	15760
4.	PL0018	Nanmukhap pullu	<i>Actiniopteri s radiata</i>	Leaf	350	21000	0	0	0	0	0	90	230	15400	1	210	3	725	584	37425
5.	PL0019	Manjadi	<i>Adenanther a pavonina</i>	Root	541	172579	0	0	0	0	0	0	0	0	0	0	1	205	542	172784
6.	PL0606	Chittadaloda kam	<i>Adhatoda beddomei</i>	Root	12	1800	0	0	30	2400	0	0	0	0	94	7870	0	0	136	12070
7.	PL0607	Perumaratholi	<i>Ailanthus triphysa</i>	Bark	10	1800	0	0	0	0	0	0	0	0	100	3000	6	150	116	4950
8.	PL0025	Ankolam	<i>Alangium salviifolium</i>	Fruit	11	3300	0	0	0	0	1	300	0	0	5	850	32	1630	49	6080
9.	PL0032	kolinchi/Chitaratha	<i>Alpinia galanga</i>	Rhizome	800	136000	0	0	20	3000	105	1575	10	3600	7	650	2	550	944	145375
10.	PL0034	Ezhilampala	<i>Alstonia</i>	Root	50	3060	0	0	0	0	0	0	0	0	0	0	0	0	50	3060

			<i>scholaris</i>																	
11.	PL0037	Kattelam /Vempadapatta	<i>Amomum subulatum</i>	Bark	66	39336	0	0	0	0	1	140	0	0	1	1960	5	540	73	41976
12.	PL0038	Kattuchena	<i>Amorphophallus paenifolius</i>	Rhizome	200	36000	0	0	0	0	0	0	0	0	0	0	0	200	36000	
13.	PL0039	Andipparippu	<i>Anacardium occidentale</i>	Seed	139	87200	0	0	0	0	0	0	0	0	0	0	0	139	87200 (627)	
14.	PL0608	Pathalagarudi/pollakkaya	<i>Anamirta cocculus</i>	Seed	0	0	0	0	0	0	0	0	0	0	71	13719	55	2755	126	16474
15.	PL0609	Maravuri	<i>Antiaris toxicaria</i>	Bark	0	0	0	0	61	14325	300	66000	0	0	0	0	0	0	361	80325
16.	PL0052	Erumakkalli	<i>Argemone mexicana</i>	Whole plant	200	12060	0	0	0	0	1	50	0	0	0	0	0	0	201	12110
17.	PL0054	Aaduthindapala	<i>Aristolochia Bracteata</i>	Root	100	10000	0	0	0	0	1	40	0	0	0	0	0	0	101	10040
18.	PL0055	Garudakodi	<i>Aristolochia indica</i>	Root	340	33320	0	0	0	0	0	0	0	0	12	300	2	110	354	33730
19.	PL0610	Kattumuthira	<i>Atylosia scarabaeoides</i>	Seed	7	1750	0	0	155	8600	105	14700	25	2000	45	8180	0	0	337	35230
20.	PL0062	Yasankinveru	<i>Azima tetraacantha</i>	Root	212	31800	0	0	0	0	0	0	0	0	0	0	0	0	212	31800
21.	PL0065	Athithippali	<i>Balanophora fungosa</i>	Fruit	430	86000	260	12600	5	3500	0	30	70	11200	29	2815	14	510	808	116655
22.	PL0611	Nagadanthi	<i>Baliospermum solanifolium</i>	Root	1	150	0	0	0	0	0	0	0	0	75	15	21	410	97	575
23.	PL0068	Mula	<i>Bambusa bambos</i>	Seed	30	14400	0	0	0	0	0	0	0	0	0	0	0	0	30	14400
24.	PL0081	Elavu	<i>Bombax ceiba</i>	Gum	1	20	0	0	0	0	0	0	0	0	0	0	4	560	5	580
25.	PL0083	Panamkalkandam	<i>Borassus flabellifer</i>	Product	43	9310	0	0	0	0	0	0	0	0	0	0	0	0	43	9310

26.	PL0519	Thaarthaval	<i>Spermacoce hispida</i>	Root	700	42000	0	0	130	21200	0	0	0	0	0	0	21	340	851	63540
27.	PL0084	Sambrani/Kungilyam	<i>Boswellia serrata</i>	Gum	8	3680	0	0	0	0	0	0	0	0	0	0	0	0	8	3680
28.	PL0086	Ellu	<i>Brassica juncea</i>	Seed	10	1600	0	0	0	0	0	0	0	0	87	6450	1	300	98	8350
29.	PL0092	Kazhanchi	<i>Caesalpinia bonduc</i>	Seed	241	46513	0	0	0	0	120	12000	0	0	16	450	32	900	409	59863
30.	PL0102	Thellipayin/Karutha kunthirikkam	<i>Canarium strictum</i>	Gum	200	60000	0	0	0	0	0	0	0	0	0	0	0	0	200	60000
31.	PL0109	Uzhinja	<i>Cardiospermum halicacabum</i>	Whole plant	450	22500	0	0	151	12240	0	0	0	0	0	0	20	100	621	34840
32.	PL0612	Aavaram/Ponnaveeram	<i>Cassia auriculata</i>	Flower	10	1800	0	0	35	4950	15	1200	0	0	0	0	0	0	60	7950
33.	PL0114	Kanikonna	<i>Cassia fistula</i>	Bark	418	75240	0	0	0	0	120	12000	200	16000	25	824	186	5690	949	109754
34.	PL0119	Devadaaram	<i>Cedrus deodara</i>	Wood	126	18960	0	0	0	0	0	0	0	0	0	0	0	0	126	18960
35.	PL0120	Cherupunnayari	<i>Celastrus paniculatus</i>	Seed	262	94582	0	0	197	64460	1	270	200	68000	64	9372	50	9500	774	246184
36.	PL0522	Peenari	<i>Sterculia foetida</i>	Bark	562	94416	0	0	0	0	120	33600	15	2400	32	1060	21	995	750	132471
37.	PL0124	Kudangal/Kodakan	<i>Centalla asiatica</i>	Whole plant	0	0	0	0	300	11300	0	0	0	0	0	0	0	0	300	11300
38.	PL0613	Perumkurumpaveru	<i>Chonemorpha macrophylla</i>	Root	192	28800	0	0	0	0	0	0	0	0	7	530	1	340	200	29670
39.	PL0133	Pacha Karpooram	<i>Cinnamomum camphora</i>	Gum	0	0	0	0	0	0	0	0	0	0	0	0	5	14120	5	14120
40.	PL0135	*Ilavarngam	* <i>Cinnamomum malabattrum</i>	Bark	300 +92 (392)	343240	130	32500	0	0	0	0	40	13200	15	900	0	0	577	90040
41.	PL0137	Karuva/	<i>Cinnamom</i>	Bark	0	0	0	0	260	92800	0	0	0	0	0	0	0	0	260	92800

		Vayanapoo	<i>um verum</i>																	
42.	PL0141	Changalam Paranda	<i>Cissus quadrangularis</i>	Stem	200	30	0	0	0	0	1	260	0	0	70	4200	0	0	271	4490
43.	PL0142	Kattuvellari	<i>Citrullus colocynthis</i>	Fruit	412	82400	0	0	0	0	0	0	100	22000	14	1153	11	440	537	105993
44.	PL0147	Naivela /Thaivela	<i>Cleome gynandra</i>	Seed	0	0	0	0	0	0	0	0	0	0	1	125	0	0	1	125
45.	PL0152	Cheruthekku veru	<i>Clerodendrum serratum</i>	Root	17	4400	0	0	0	0	0	0	60	7200	0	1538	21	540	98	13678
46.	PL0162	GulGulu	<i>Commiphora wightii</i>	Gum	5	6100	0	0	0	0	0	0	0	0	0	0	0	0	5	6100
47.	PL0166	Maramanjala	<i>Coscinium fenestratum</i>	Bark	524	94320	0	0	70	19050	120	18000	0	0	41	5527	31	860	786	137757
48.	PL0154	Koval	<i>Coccinia grandis</i>	Whole plant	200	30	0	0	0	0	1	90	0	0	0	0	0	0	201	120
49.	PL0167	Channakoov a	<i>Costus speciosus</i>	Rhizome	150	18000	0	0	0	0	0	0	0	0	0	0	0	0	150	18000
50.	PL0169	Neermathalam	<i>Crateva nurvala</i>	Bark	500	90000	0	0	240	28800	0	90	0	0	17	954	0	0	757	119844
51.	PL0171	Neervalam	<i>Croton tiglium</i>	Seed	50	17500	0	0	0	0	1	370	0	0	5	2250	1	400	57	20520
52.	PL0174	Karkokil Ari	<i>Cullen corylifolium</i>	Seed	68	23800	0	0	260	29000	105	21000	250	21250	64	2263	63	7900	810	105213
53.	PL0176	Nilappana	<i>Curculigo orchoides</i>	Tuberous root	12	2400	0	0	0	0	105	30450	0	0	48	10030	52	10420	217	53300
54.	PL0614	Manjal	<i>curcuma domestica</i>	Rhizome	805	104650	0	0	0	0	0	0	0	0	0	0	0	0	805	104650
55.	PL0179	Kachooram Manjakoova	<i>Curcuma zedoaria</i>	Rhizome	13	4040	0	0	15	10500	0	0	0	0	47	8430	10	900	85	23870
56.	PL0183	Eenthappana	<i>Cycas circinalis</i>	Fruit	25	3000	0	0	0	0	1	90	0	0	0	0	100	170	126	3260
57.	PL0184	Padathali	<i>Cyclea peltata</i>	Tuberous root	574	287000	0	0	0	0	1	65	0	0	46	26630	5	2010	626	315705

58.	PL0185	Chonakappulu	<i>Cymbopogon citratus</i>	Whole plant	110	19800	0	0	0	0	75	3750	0	0	3	312	1	340	189	24202
59.	PL0189	Karuka	<i>Cynodon dactylon</i>	Whole plant	44	9600	0	0	305	9075	0	0	0	0	0	0	0	0	349	18675
60.	PL0196	Ummam	<i>Datura stramonium</i>	Fruit	300	18000	0	0	0	0	0	0	0	0	55	4125	0	0	355	22125
61.	PL0093	Kooramkolly, Koomullu	<i>Caesalpinia mimosoides</i>		0	0	0	0	0	0	1	120	0	0	13	426	1	270	15	816
62.	PL0199	Orila	<i>Desmodium gangeticum</i>	Root	518	77700	0	0	195	28950	75	6000	70	8400	72	12443	51	640	981	134133
63.	PL0615	Kalppain	<i>Dipterocarpus indicus</i>	Wood	0	0	0	0	0	0	1	160	0	0	0	0	0	0	1	160
64.	PL0616	Karakil	<i>Dysoxylum ficiforme</i>	Wood	12	2400	0	0	620	61500	0	50	60	6000	7	210	23	890	722	71050
65.	PL0207	Vellakil	<i>Dysoxylum malabaricum</i>	Wood	0	0	0	0	0	0	75	4500	0	0	0	0	0	0	75	4500
66.	PL0210	Kaithonni	<i>Eclipta prostrata</i>	Whole plant	800	40000	0	0	0	0	0	0	0	0	0	0	29	365	829	40365
67.	PL0213	Anachuvadi	<i>Elephantopus scaber</i>	Whole plant	50	2500	0	0	0	0	1	2200	0	0	0	0	0	0	51	4700
68.	PL0214	Elam	<i>Elettaria cardamomum</i>	Seed	235	470000	0	0	0	0	75	195000	5	1050	41	79600	1	4730	357	750380
69.	PL0215	Koovaragu	<i>Eleusine coracana</i>	Seed	741	29640	0	0	0	0	1	900	0	0	0	0	1	80	743	30620
70.	PL0216	Vizhalari	<i>Embelia ribes</i>	Seed	512	307200	0	0	0	0	120	120000	20	16200	55	14036	17	3800	724	461236
71.	PL0219	Kakkumkai	<i>Entada rheedii</i>	Seed kernal	50	3500	0	0	0	0	1	160	0	0	0	0	0	0	51	3660
72.	PL0226	Nilamppala	<i>Euphorbia thymifolia</i>	Whole plant	0	0	0	0	0	0	0	0	0	0	4	200	0	0	4	200
73.	PL0228	Vishnukranthi	<i>Evolvulus alsinoides</i>	Whole plant	50	6000	0	0	0	0	240	12000	0	0	5	750	1	340	296	19090
74.	PL0241	Mulli, Agori,	<i>Flacourtia</i>	Fruit	0	0	0	0	0	0	0	0	0	0	6	300	0	0	6	300

		Vayyankath a	<i>indica</i>																	
75.	PL0242	Kayam	<i>Foeniculum vulgare</i>	Gum	6	900	0	0	0	0	0	0	0	0	0	0	0	0	6	900
76.	PL0618	Kudampuli/ Malabaripuli	<i>Garcinia cambogia</i>	Fruit	1	120	0	0	0	0	0	0	0	0	0	10	900	11	1020	
77.	PL0246	Kudampuli	<i>Garcinia gummi- gutta</i>	Fruit	549	87840	0	0	0	0	0	0	0	0	0	0	0	549	87840	
78.	PL0619	Karinthali	<i>Geophila repens</i>	Whole plant	0	0	0	0	0	1	240	0	0	0	0	0	0	1	240	
79.	PL0249	Irattimadhur am	<i>Glycyrrhiza glabra</i>	Root,Ste m	941	228710	0	0	0	0	0	0	0	0	0	0	0	941	228710	
80.	PL0255	Chakkarakolli	<i>Gymnema sylvestre</i>	Leaf	22	5500	0	0	0	0	140	0	0	15	1200	11	460	48	7300	
81.	PL0266	Chittalam/Va tham parathi	<i>Heracleum rigens</i>	Seed	0	0	260	2340	0	0	0	0	0	20	2994	10	2200	290	28594	
82.	PL0262	Idampiri/ Valampiri	<i>Helicteres isora</i>	Fruit	122	18300	0	0	0	75	11250	60	4800	17	1400	12	460	286	36210	
83.	PL0263	Thekkada vere	<i>Heliotropiu m indicum</i>	Root	10	500	130	7800	0	0	225	20250	0	0	2	360	1	200	368	29110
84.	PL0266	Chittalam/Va tham parathi	<i>Heracleum rigens</i>	Seed	1	400	0	0	0	60	45000	150	97500	0	0	0	0	211	142900 (677)	
85.	PL0270	Kudakappala	<i>Holarrhena pubescens</i>	Seed	13	3900	0	0	0	180	21600	150	10500	27	3689	11	1500	381	41189	
86.	PL0271	Aaviltholi	<i>Holoptelia integrifolia</i>	Bark	412	72512	0	0	0	105	7350	0	0	20	660	1	270	538	80792	
87.	PL0272	Adakodiyam	<i>Holostemm aada- kodiem</i>	Tuberou s root	305	61000	0	0	0	120	84000	0	0	63	20512	20	1600	508	167112	
88.	PL0274	Barley/Yava m	<i>Hordeum vulgare</i>	Seed	738	38580	0	0	0	0	0	0	0	0	0	0	0	738	38580	
89.	PL0275	Karthottyver u	<i>Hugonia mystax</i>	Root	250	60000	0	0	0	75	5400	0	0	6	876	2	300	333	66576	
90.	PL0280	Palvally	<i>Ichnocarpus frutescens</i>	Tuberou s root	200	24000	260	1560	0	0	1	60	0	0	12	2160	5	370	478	42190
91.	PL0281	Thakkolam	<i>Illicium verum</i>	Fruit	67	26800	0	0	675	38250	75	90000	0	0	23	11550	14	2265	854	168865

92.	PL0286	Paalmuthak	<i>Ipomoea mauritiana</i>	Tuberous root	306	38250	260	18200	0	0	225	11250	70	4200	33	1510	2	1200	896	74610
93.	PL0288	Thiruthali	<i>Ipomoea obscura</i>	Whole plant	12	1440	0	0	0	0	150	9000	0	0	0	0	0	0	162	10440
94.	PL0290	Pulichuvadi	<i>Ipomoea pes-tigridis</i>	Whole plant	35	2625	0	0	0	0	0	0	0	0	4	600	4	600	43	3825
95.	PL0293	Thetti veru	<i>Ixora coccinea</i>	Root	250	30000	0	0	0	0	105	12600	0	0	0	0	0	0	355	42600
96.	PL0300	Adalodakam	<i>Justicia adhatoda</i>	Root	5	800	0	0	0	0	0	0	0	0	0	0	0	0	5	800
97.	PL0304	Changazhiner kizhangu	<i>Kaempferia rotunda</i>	Tuberous root	122	59360	0	0	0	0	75	15000	0	0	10	1850	1	135	208	76345
98.	PL0312	Aasali	<i>Lepidium sativum.</i>	Seed	215	43000	0	0	139	22680	120	9600	60	8400	100	4194	24	780	658	88654
99.	PL0315	Kaakoli	<i>Lilium polyphyllum</i>	Bulb	150	81000	0	0	0	0	75	45000	0	0	13	5080	0	0	238	131080
100.	PL0621	Ilippa	<i>Madhuca nerifolia</i>	Wood	100	60	0	0	0	0	0	0	0	0	6	300	21	430	127	790
101.	PL0363	Peenari	<i>Nothapodytes nimmoniana</i>	Bark	1	60	0	0	0	0	0	0	0	0	2	320	0	0	3	380
102.	PL0622	Jeevakam	<i>Malaxis rheedii</i>	Rhizome	25	12000	0	0	0	0	0	0	0	0	8	2760	0	0	33	14760
103.	PL0333	Prasarini	<i>Merremia tridentata</i>	Whole plant	250	18000	0	0	80	5720	105	8400	0	0	34	3199	1	200	470	35519
104.	PL0335	Nagapoo	<i>Mesua ferrea</i>	flower	6	1500	0	0	108	19640	120	24000	150	49500	45	7250	12	1960	441	103850
105.	PL0346	Karimkoovalam	<i>Monochoria vaginalis</i>	Whole plant	74	11100	0	0	0	0	0	0	0	0	0	0	0	0	74	11100
106.	PL0350	Naikkurunam	<i>Mucuna pruriens</i>	Seed	637	92365	0	0	13	11700	150	21000	30	5400	53	5249	22	1295	905	137009
107.	PL0352	Musumusukk	<i>Mukia maderaspatana</i>	Whole plant	150	10500	0	0	0	0	0	0	0	0	0	0	0	0	150	10500
108.	PL0359	Jathipathri	<i>Myristica malabarica</i>	Aril	221	165750	0	0	0	0	225	157500	0	0	5	2850	0	0	451	326100 (723)

109.	PL0362	Jadamchi	<i>Nardostachys jatamansi</i>	Root	127	178250	130	54600	0	0	0	0	0	0	0	0	0	0	257	232850 (906)
110.	PL0364	Thamara	<i>Nelumbo nucifera</i>	Flower	32	8800	0	0	0	0	0	0	0	0	0	0	0	0	32	8800
111.	PL0371	Karimjeerakam	<i>Nigella sativa</i>	Seed	15	5859	0	0	148	35600	75	9000	100	30000	201	23112	40	3089	579	106660
112.	PL0375	Aampal	<i>Nymphaea nouchali</i>	Flower	20	3000	260	52000	0	0	0	0	0	0	0	0	0	0	280	55000
113.	PL0378	Kattuthulasi	<i>Ocimum gratissimum</i>	Root	30	3600	0	0	0	0	0	0	0	0	0	0	0	0	30	3600
114.	PL0381	Thulasi	<i>Ocimum tenuiflorum</i>	Leaf	124	7440	0	0	0	0	0	0	0	0	0	0	0	0	124	7440
115.	PL0382	Parppidakapullu	<i>Oldenlandia corymbosa</i>	Whole plant	312	93600	0	0	0	0	120	36000	60	13200	73	26950	0	0	565	169750
116.	PL0384	Palakapayyanni	<i>Oroxylum indicum</i>	Root	412	32960	0	0	108	7960	105	6300	20	2200	78	6940	60	100	783	56460
117.	PL0386	Njavara	<i>Oryza sativa</i>	Seed	495	74750	0	0	0	0	120	6000	30	2100	111	3825	71	310	827	86985
118.	PL0388	Puliyarila	<i>Oxalis corniculata</i>	Whole plant	35	2800	260	32500	275	5100	90	4500	0	0	0	0	0	0	660	44900
119.	PL0391	Pookaitha	<i>Pandanus odoratissimus</i>	Root	110	19800	0	0	0	0	0	0	0	0	18	1800	0	0	128	21600
120.	PL0623	Chamayari	<i>Panicum miliare</i>	Seed	177	23010	0	0	0	0	75	4500	0	0	60	7200	0	0	312	34710
121.	PL0404	Chiteenthal	<i>Phoenix pusilla</i>	Root	40	2400	0	0	0	0	0	0	0	0	0	0	0	0	40	2400
122.	PL0406	Keezharnelli	<i>Phyllanthus amarus</i>	Whole plant	40	3200	0	0	470	8750	120	7200	0	0	4	792	1	270	635	20212
123.	PL0164	Arenukam	<i>Corchorus trilocularis</i>	Seed	24	10880	0	0	4	1120	210	18900	0	0	1	161	11	605	250	31666
124.	PL0415	Thippali	<i>Piper longum</i>	Fruit	543	543000	0	0	23	18700	120	66000	75	45000	214	49990	17	1645	992	724335
125.	PL0429	Chuvannakoduveli	<i>Plumbago zeylanica</i>	Tuberous root	324	97200	130	65000	0	0	75	15000	0	0	43	9460	21	3675	593	190335

126.	PL0432	Pacholi	<i>Pogostemon heyneanus</i>	Leaf	300	75000	0	0	0	0	225	33750	0	0	18	8670	20	170	563	117590
127.	PL0436	Unge	<i>Pongamia pinnata</i>	Bark	200	10000	0	0	0	0	75	7500	0	0	3	275	1	300	279	18075
128.	PL0440	Munja	<i>Premna serratifolia</i>	Root	615	46125	0	0	0	0	105	4200	0	0	95	7220	31	520	846	58065
129.	PL0444	Badham	<i>Prunus dulcis</i>	Fruit	131	79700	0	0	0	0	0	0	0	0	0	0	0	0	131	79700
130.	PL0448	Rakthachandanam	<i>Pterocarpus santalinus</i>	Wood	284	291750	0	0	0	0	1	400	0	0	6	3740	1	1000	292	296890 (1016)
131.	PL0455	sarppagandhi/amalppori	<i>Rauvolfia serpentina</i>	Root	600	570000	195	3900	0	0	1	950	0	0	11	11540	2	2000	809	623490 (770.)
132.	PL0456	Kattuthipali	<i>Rhaphidophora pertusa</i>	Fruit	24	5160	0	0	0	0	1	160	0	0	13	2960	0	0	38	8280
133.	PL0418	Karkidakasingi	<i>Pistacia chinensis</i>	Leaf	112	33600	0	0	0	0	75	72750	70	15400	11	2790	0	0	268	124540
134.	PL0462	Kallurvanchi	<i>Rotula aquatica</i>	Whole plant	224	67200	0	0	180	17200	150	33000	75	13500	141	22230	10	1100	780	154230
135.	PL0463	Manchatti	<i>Rubia cordifolia</i>	Root	377	339300	0	0	0	0	75	15000	80	24000	34	4409	20	120	586	382829
136.	PL0472	Chandhanam	<i>Santalum album</i>	Wood	162	264000	0	0	0	0	0	0	0	0	0	0	0	0	162	264000
137.	PL0474	Soapinkaya	<i>Sapindus trifoliatus</i>	Fruit	655	52400	0	0	0	0	135	8100	0	0	17	3100	0	0	807	63600
138.	PL0479	Kottam	<i>Saussurea costus</i>	Root	3	2430	0	0	0	0	0	0	0	0	0	0	0	0	3	2430
139.	PL0624	Odalkkuru	<i>Sarcostigma kleinii</i>	Seed	10	2000	0	0	0	0	0	0	0	0	0	0	0	0	10	2000
140.	PL0477	Somalatha	<i>Sarcostema acidum</i>	Whole plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141.	PL0481	Poovanam	<i>Schleichera oleosa</i>	Seed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
142.	PL0485	Cherkuru, The mprakkai	<i>Semecarpus anacardium</i>	Seed	92	14720	0	0	0	0	0	0	0	0	0	0	1	200	93	14920
143.	PL0491	Thakara	<i>Senna tora</i>	Root	36	8400	0	0	82	156260	0	0	10	9600	6	7120	11	460	145	181840

144.	PL0494	Thina	<i>setaria italica</i>	Seed	100	5000	260	5200	0	75	3400	16	680	90	3600	3	94	11	185	555	64959
145.	PL0496	Cheruparuva	<i>Sida acuta</i>	Root	0	0	230	1300	0	0	0	120	16800	20	2000	20	350	40	240	430	32390
146.	PL0625	Kurumthotti	<i>Sida cordata</i>	Root	19	2185	0	0	320	7800	0	0	100	18000	0	0	40	160	479	28145	
147.	PL0497	Ven kurunthotti	<i>Sida cordifolia</i>	Root	0	0	0	0	0	0	105	2100	0	0	466	63500	0	0	571	65600	
148.	PL0499	Kattooram	<i>Sida spinosa</i>	Root	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149.	PL0498	Kurumthotti	<i>Sida rhombifolia</i>	Root	570	79230	0	0	90	2250	0	0	0	0	0	0	1	350	661	81830	
150.	PL0504	Putharichunda	<i>Solanum anguivi</i>	Root	312	37440	0	0	0	0	0	0	0	0	22	535	0	0	334	37975	
151.	PL0515	Njerinjampuli	<i>Solena amplexicaulis</i>	Fruit	35	8400	0	0	0	0	0	0	0	0	0	0	0	0	35	8400	
152.	PL0526	Pooppathiri	<i>Stereospermum tetragonum</i>	Bark	16	900	0	0	0	0	0	0	70	6650	70	8930	0	0	156	16480	
153.	PL0527	Paruva maram	<i>Streblus asper</i>	Bark	0	0	0	0	0	0	225	21600	0	0	0	0	0	0	225	21600	
154.	PL0372	Karimkurinji	<i>Nilgiranthus ciliatus</i>	Root	12	1440	0	0	0	0	75	3375	40	4400	81	6040	34	430	242	15685	
155.	PL0532	Kanjiram	<i>Strychnos nux vomica</i>	Seed	105	20450	0	0	0	0	0	0	0	0	0	0	0	0	105	20450	
156.	PL0533	Thettamparal	<i>Strychnos potatorum</i>	Seed	322	15740	0	0	0	0	0	0	60	14400	85	2606	1	270	468	33016	
157.	PL0535	Pachotti	<i>Symplocos cochinchinensis</i>	Bark	137	20340	0	0	0	0	300	48000	50	8000	31	4130	20	360	538	80830	
158.	PL0537	Grampoo	<i>Syzygium aromaticum</i>	Flower bud	82	57470	0	0	0	0	0	0	0	0	0	0	0	0	82	57470	
159.	PL0539	Njaval	<i>Syzygium cumini</i>	Fruit	312	25440	0	0	235	11850	120	24000	60	3900	41	550	1	270	769	66010	
160.	PL0542	Valanpuli	<i>Tamarindus indica</i>	Fruit	10	3600	0	0	0	0	150	9750	0	0	0	0	0	0	160	13350	
161.	PL0548	Neermaruth	<i>Terminalia</i>	Bark	381	56290	0	0	0	0	0	0	0	0	8	790	1	270	390	57350	

			<i>arjuna</i>																	
162.	PL0626	Alpam	<i>Thottea siliquosa</i>	Root	0	0	130	7800	0	0	150	6000	0	0	0	0	81	285	361	14085
163.	PL0627	Kattamruthe	<i>Tinospora malabarica</i>	Stem	100	3000	0	0	70	10500	225	4500	0	0	0	0	76	220	471	18220
164.	PL0628	Chandana vembu	<i>Toona ciliata</i>	Bark	0	0	0	0	0	0	1	20	0	0	0	0	0	0	1	20
165.	PL0557	Ayamodhaka m	<i>Trachyspermum ammi</i>	Seed	828	185040	0	0	10	3000	0	0	80	20800	71	15385	1	386	990	224611
166.	PL0559	Kodithuva veru	<i>Tragia involucrata</i>	Root	362	81440	0	0	0	0	300	48000	15	3600	25	4040	0	0	702	137080
167.	PL0561	Njerinjil	<i>Tribulus terrestris</i>	Fruit	513	92060	0	0	8	2000	30	4800	40	9600	210	168335	22	725	823	277520
168.	PL0562	Padavalam	<i>Trichosanthes cucumerina</i>	Whole plant	524	154200	195	19500	60	2400	210	46200	0	0	0	0	10	90	999	222390
169.	PL0564	Kattupadavalam	<i>Trichosanthes lobata</i>	Whole plant	600	180000	0	0	0	0	195	58500	80	17600	16	5060	1	800	892	261960
170.	PL0567	Uluvaa	<i>Trigonella foenum-graecum</i>	Seed	12	1020	0	0	0	0	0	0	0	0	0	0	0	0	12	1020
171.	PL0568	Soochi gothambe	<i>Triticum aestivum</i>	Seed	0	0	0	0	0	0	1	300	0	0	20	2000	0	0	21	2300
172.	PL0629	Vallippala	<i>Tylophora indica</i>	Leaf	0	0	0	0	0	0	1	110	0	0	0	0	0	0	1	110
173.	PL0569	Elephant Grass, Aanapullu	<i>Typha elephantina</i>	Whole plant	25	3000	0	0	0	0	0	0	0	0	0	0	0	0	25	3000
174.	PL0630	Cheriyar orila	<i>Uraria lagopoides</i>	Root	0	0	0	0	0	0	1	70	0	0	70	12600	0	0	71	12670
175.	PL0573	Thagaram	<i>Valeriana wallichii</i>	Root	3	2760	0	0	0	0	0	0	0	0	0	0	0	0	3	2760
176.	PL0631	Chuvannaratha	<i>Vanda tessellata</i>	Whole plant	12	1560	0	0	0	0	120	24000	0	0	35	4230	1	270	168	30060
177.	PL0575	Vempadappatta	<i>Ventilago maderaspatana</i>	Bark	375	156330	130	52000	0	0	180	72000	30	12000	75	6450	1	540	791	299320

178.	PL0577	Poovankurun nal	<i>Vernonia cinerea</i>	Whole plant	245	9800	0	0	180	3750	0	0	25	8500	0	0	0	0	450	22050		
179.	PL0131	Ramacham	<i>Chrysopog on zizanioides</i>	Root	18	930	0	0	0	0	0	0	0	0	0	0	0	0	18	930		
180.	PL0632	Kattupayar	<i>Vigna pilosa</i>	Whole plant	210	13650	0	0	0	0	325	19500	0	0	25	2,000	0	0	560	35150		
181.	PL0584	Kattuzhunnu	<i>Vigna vexillata</i>	Whole plant	150	49500	0	0	0	0	150	9000	0	0	22	1720	0	0	322	60220		
182.	PL0588	Karinochi	<i>Vitex negundo</i>	Leaf	150	54500	0	0	0	0	150	18000	0	0	32	1750	1	270	333	74520		
183.	PL0590	Unakkamunt hiri	<i>Vitis vinifera</i>	Fruit	613	172480	0	0	0	0	0	0	0	0	0	0	0	0	613	172480		
184.	PL0592	Amukkoora m	<i>Withania Somnifera</i>	Root	622	429156	0	0	0	0	0	0	0	0	0	0	0	0	622	429156 (689.)		
185.	PL0594	Vettupala/Da nthapala	<i>Wrightia tinctoria</i>	Leaf	50	5000	0	0	90	900	1	45	0	0	0	0	0	0	141	5945		
186.	PL0597	Mullilam, Thumpoonala ry	<i>Zanthoxylu m.armatu m</i>	Seed	0	0	0	0	0	0	1	50	50	4750	0	0	0	0	51	4800		
187.	PL0598	Chuuku	<i>zingiber officinale</i>	Rhizome (Dry)	624	239960	0	0	0	0	0	0	0	0	0	0	0	0	624	239960		
188.	PL0633	Kattinchi	<i>Zingiber zerumbet</i>	Rhizome	200	14000	0	0	220	4750	1	140	0	0	0	0	0	0	421	18890		
																			Grand Total Species Quantity & Price		1776 03	29294034

Table 6.8.7: High value species

Study on Angadi Pachamarunnukada in Kerala-PHASE-I (7 Districts)																				
STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/57)		WYD (13/22)		KSG (35/43)		Total Quantity	Total Price in Rs and price/kg
SI No.		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1.	PL0359	Jathipathri	<i>Myristica malabarica</i>	Aril	221	165750	0	0	0	0	225	157500	0	0	5	2850	0	0	451	326100 (723)
2.	PL0362	Jadamchi	<i>Nardostachys jatamansi</i>	Root	127	178250	130	54600	0	0	0	0	0	0	0	0	0	0	257	232850 (906)
3.	PL0448	Rakthachandanam	<i>Pterocarpus santalinus</i>	Wood	284	291750	0	0	0	0	1	400	0	0	6	3740	1	1000	292	296890 (1016)
4.	PL0455	sarppagandhi/amalppori	<i>Rauvolfia serpentina</i>	Root	600	570000	195	39000	0	0	1	950	0	0	1	11540	2	2000	809	623490 (770.)
5.	PL0472	Chandhanam	<i>Santalum album</i>	Wood	162	264000	0	0	0	0	0	0	0	0	0	0	0	0	162	264000 (1,629)
6.	PL0491	Thakara	<i>Senna tora</i>	Root	36	8400	0	0	82	156260	0	0	0	9600	6	7120	1	460	145	181840 (1,254)

Table 6.8.8: High Volume species

Study on Angadi Pachamarunnukada in Kerala-PHASE-I (7 Districts)																				
STUDY PHASE-I					TVM (35/56)		ALP (13/48)		IDK (30/62)		TSR (15/44)		MLP (25/57)		WYD (13/22)		KSG (35/43)		Total Quantity	Total Price in Rs and price/kg
SI no.		Common Name	Scientific name	Parts used	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)	Quantity (Kg)	Total Amount (Rs)		
1.	PL0005	Karingali	<i>Acacia catechu</i>	Bark	1365.5	279585	650	65000	373	40375	120	7800	320	26000	185	7528	205	10437	3218	436725
2.	PL0605	Incha	<i>Acacia torta</i>	Bark	2798	372134	390	15600	725	94750	15	3000	0	0	186	7030	1	250	4115	492764
3.	PL0016	Vayambu	<i>Acorus calamus</i>	Rhizome	2410	306070	0	0	145	31840	180	25200	80	14200	233	22625	108	14080	3156	414015
4.	PL0094	Chappangam/ Pathimugam	<i>Caesalpinia sappan</i>	Wood	*3073-1400	1846197	0	0	0	0	180	10800	0	0	112	3270	331.1	41545	3073	1846197
5.	PL0177	Kasthurimanjil	<i>Curcuma aromatica</i>	Rhizome	3762	376150	260	18200	105	19350	75	14400	100	10000	134	3500	22	630	4458	442230
6.	PL0407	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind (F)	1237	247400	0	0	1365	165750	180	36000	50	8000	798	114612	43	1305	3673	573067

Trade of raw frugs in terms of volume and revenue in the state

Approximately there are 1100 shops in the state. 241 shops surveyed. Quantity of raw materials was projected to the respective districts and then computed to the state as follows.

Quantity = $\sum_{i=1}^{14} \frac{q_i \times m_i \times N}{m}$, q_i - quantity of the i^{th} district obtained in the

survey, m_i is the number of shops surveyed in the i^{th} district, m is the number of shops identified in the district, N is the total number of shops in the state.

Table 6.8.9 Projected trade of raw drugs (Dry and fresh) in Kerala

Sl. No.	Scientific Name	Common Name	Quantity (Kg)	Minimum Price	Maximum Price	Average Price	Total Price
1	<i>Abrus precatorius</i>	Kunni	7,448.9	21	450	192.2	1431678.6
2	<i>Acacia catechu</i>	Karingali	11,564.9	40	320	121.1	1400509.4
3	<i>Acacia concinna</i>	Cheevaikka	1,517.5	106	106	106	160855
4	<i>Acacia nilotica</i>	Karivelam	4,218.9	25	125	66.6	280978.7
5	<i>Acacia pennata</i>	Karinja	283.8	11	225	87.6	24860.9
6	<i>Acacia sinuata</i>	Cheenikkaya	19,655.6	37	263	137.1	2694782.8
7	<i>Acacia torta</i>	Incha	12,944.1	38	473	195.7	2533160.4
8	<i>Acalypha indica</i>	Kuppameni	731.8	60	1,250	290	212222
9	<i>Achyranthus aspera</i>	Kadaladi	3,230.2	30	288	90	290718
10	<i>Acorus calamus</i>	Vayambu	9,440.2	60	488	188.1	1775701.6
11	<i>Actiniopteris radiata</i>	Nanmukhappullu	1,734.6	60	550	225.7	391499.2
12	<i>Adenantha pavonina</i>	Manjadi	2,205.4	40	400	241	531501.4
13	<i>Aegle marmelos</i>	Koovalam	7,602.8	8	600	144.3	1097084
14	<i>Aerva lanata</i>	Cheroola	4,752.0	30	263	91.7	435758.4
15	<i>Ailanthus triphysa</i>	Perumaratholi	882.4	25	450	171.3	151155.1
16	<i>Alangium salviifolium</i>	Ankolam	470.3	53	600	312.1	146780.6
17	<i>Aloe vera</i>	Kattarvazha	16,062.7	3	357	77.5	1244859.3
18	<i>Alpinia calcarata</i>	Chittaratha	5,948.2	30	400	215.4	1281242.3
19	<i>Alpinia galanga</i>	kolinchi/Chittaratha	3,414.3	93	360	239.4	817383.4
20	<i>Alstonia scholaris</i>	Ezhilampala	490.8	61	680	397.1	194896.7
21	<i>Amomum subulatum</i>	Kattelam /Vempadapatta	3,428.8	108	1,400	661.5	2268151.2
22	<i>Amorphophallus paeniifolius</i>	Kattuchena	1,411.8	50	200	125	176475
23	<i>Anacardium occidentale</i>	Andipparippu	347.5	627	627	627.3	217986.8

24	<i>Anamirta cocculus</i>	Pathala garudi/pollakkaya	968.7	50	350	216.9	210111
25	<i>Andrographis paniculata</i>	Kiriyathu	4,620.4	162	750	339.9	1570474
26	<i>Antiaris toxicaria</i>	Maravuri	1,899.3	220	420	291.6	553835.9
27	<i>Apium graveolens</i>	Omam	6,279.2	109	1,440	384.6	2414980.3
28	<i>Argemone mexicana</i>	Erumakkalli	504.7	50	60	55.2	27859.4
29	<i>Aristolochia Bracteata</i>	Aaduthindappala	542.7	40	400	180	97686
30	<i>Aristolochia indica</i>	Garudakodi	1,252.0	25	300	155.6	194811.2
31	<i>Asparagus racemosus</i>	Sathavari	10,496.9	35	460	130.1	1365646.7
32	<i>Atylosia scarabaeoids</i>	Kattumuthira	1,450.0	56	250	134.6	195170
33	<i>Azhardirecta indica</i>	Veppinpatta	7,652.8	27	207	95.3	729311.8
34	<i>Azima tetraacantha</i>	Yasankinveru	890.0	150	420	285	253650
35	<i>Bacopa Monnieri</i>	Brahmi	5,934.0	15	218	81.7	484807.8
36	<i>Balanophora fungosa</i>	Athithippali	3,333.8	36	700	193.5	645090.3
37	<i>Baliospermum solanifolium</i>	Nagadanthi	244.9	0	150	56.6	13861.3
38	<i>Bambusa bambos</i>	Mula	583.0	350	480	415	241945
39	<i>Benincasa hispida</i>	Neykumpalam	9,687.5	50	167	89.5	867031.3
40	<i>Boerhavia diffusa</i>	Thazhuthama	4,999.3	45	340	164.1	820385.1
41	<i>Bombax ceiba</i>	Elavu	10.1	20	140	80	808
42	<i>Borassus flabellifer</i>	Panamkalkandam	425.0	80	217	125.5	53337.5
43	<i>Boswellia serrata</i>	Sambrani/Kungilyam	267.0	460	542	501.1	133793.7
44	<i>Brassica juncea</i>	Ellu	364.8	74	300	201	73324.8
45	<i>Butea monosperma</i>	Chamatha/Plash	14,019.6	40	350	195	2733822
46	<i>Caesalpinia bonduc</i>	Kazhanchi	1,270.5	100	193	123.3	156652.7
47	<i>Caesalpinia pulcherrima</i>	Rajamally	566.5	388	388	387.7	219632.1
48	<i>Caesalpinia sappan</i>	Chappangam/Pathimugam	7,461.4	60	1,104	339.9	2536129.9
49	<i>Calotropis gigantea</i>	Erukku	5,249.9	39	150	78.7	413167.1
50	<i>Canarium strictum</i>	Thellippayin/Karutha	1,111.0	230	425	318.3	353631.3

		kunthirikkam					
51	<i>Cardiospermum halicacabum</i>	Uzhinja	1,701.6	50	183	108.4	184453.4
52	<i>Cassia angustifolia</i>	Chinnamukkiyila	3,268.8	23	110	83.2	271964.2
53	<i>Cassia auriculata</i>	Aavaram/Ponnaveeram	159.3	141	300	207.1	32991
54	<i>Cassia fistula</i>	Kanikonna	3,161.5	31	400	153.7	485922.6
55	<i>Cedrus deodara</i>	Devadaaram	896.8	150	225	175.2	157119.4
56	<i>Ceiba pentandra</i>	Panjimaram	67.5	34	34	34.4	2322
57	<i>Celastrus paniculatus</i>	Cherupunnayari	2,818.3	146	361	269.2	758686.4
58	<i>Centalla asiatica</i>	Kudangal/Kodakan	990.0	38	38	37.7	37323
59	<i>Chonemorpha macrophylla</i>	Perumkurumpaveru	501.9	72	340	187.2	93955.7
60	<i>Chrysopogon zizanioides</i>	Ramacham	65.6	52	110	80.9	5307
61	<i>Chrysopogon zizanioides</i>	Ramacham	14,249.1	12	268	116.8	1664294.9
62	<i>Cinnamomum camphora</i>	Pacha Karpooram	1,404.7	67	2,705	1386	1946914.2
63	<i>Cinnamomum malabattrum</i>	Karuva	3,205.6	60	340	198.5	636311.6
64	<i>Cinnamomum verum</i>	Karuva/ Vayanapoo	858.0	357	357	356.9	306220.2
65	<i>Cissus quadrangularis</i>	Changalam Paranda	716.9	60	260	183.8	131766.2
66	<i>Citrullus colocynthis</i>	Kattuvellari	1,460.1	40	300	168	245296.8
67	<i>Cleome gynandra</i>	Naivela	1.4	250	250	250	350
68	<i>Clerodendrum serratum</i>	Cheruthekku veru	332.9	26	259	154.2	51333.2
69	<i>Coccinia grandis</i>	Koval	504.7	20	90	55	27758.5
70	<i>Commiphora wightii</i>	GulGulu	22.8	1,200	1,220	1210	27588
71	<i>Coscinium fenestratum</i>	Maramanjai	2,292.1	28	272	159.1	364673.1
72	<i>Costus speciosus</i>	Channakoova	1,645.0	120	120	120	197400
73	<i>Crateva nurvala</i>	Neermathalam	3,376.4	55	267	154.3	520978.5
74	<i>Croton tiglium</i>	Neervalam	145.1	350	450	392.5	56951.8
75	<i>Cullen corylifolium</i>	Karkokil Ari	3,990.5	35	1,500	318.4	1270575.2

76	<i>Cuminum cyminum</i>	Jeerakam	4,691.8	40	350	237.5	1114302.5
77	<i>Curculigo orchoides</i>	Nilappana	788.6	200	500	291.9	230192.3
78	<i>Curcuma aromatica</i>	Kasthurimanjal	12,650.6	26	395	174.6	2208794.8
79	<i>curcuma domestica</i>	Manjal	2,012.5	130	130	130	261625
80	<i>Curcuma longa</i>	Kudamanjal	6,473.5	80	800	226.6	1466895.1
81	<i>Curcuma zedoaria</i>	Kachooram Manjakoova	880.2	90	700	391.9	344950.4
82	<i>Cycas circinalis</i>	Eenthappana	257.2	70	120	93.3	23996.8
83	<i>Cyclea peltata</i>	Padathali	1,595.3	65	579	366	583879.8
84	<i>Cymbopogon citratus</i>	Chonakappullu	4,559.6	50	340	156.3	712665.5
85	<i>Cynodon dactylon</i>	Karuka	1,145.2	30	218	117	133988.4
86	<i>Cyperus rotundus</i>	Muthanga	5,550.5	58	340	121.7	675495.9
87	<i>Datura stramonium</i>	Ummam	915.9	60	200	111.7	102306
88	<i>Dendrocalamus strictus</i>	Kooramkolly	50.8	35	340	191.3	9718
89	<i>Desmodium gangeticum</i>	Orila	6,586.0	36	275	129.3	851569.8
90	<i>Desmostachya bipinnata</i>	Aattudharbha	16,854.0	31	90	54.5	918543
91	<i>Dipterocarpus indicus</i>	Kalppain	4.7	160	160	160	752
92	<i>Dysoxylum ficiforme</i>	Karakil	2,758.8	30	305	121.8	336021.8
93	<i>Dysoxylum malabaricum</i>	Vellakil	352.5	60	60	60	21150
94	<i>Eclipta prostrata</i>	Kaithonni	2,456.7	13	1,110	315.7	775580.2
95	<i>Elephantopus scaber</i>	Anachuvadi	135.5	50	2,200	780	105690
96	<i>Elettaria cardamomum</i>	Elam	1,238.2	210	4,300	1898.2	2350351.2
97	<i>Eleusine coracana</i>	Koovaragu	1,864.8	40	900	405	755244
98	<i>Embelia ribes</i>	Vizhalari	2,210.9	106	1,000	498.8	1102796.9
99	<i>Entada rheedii</i>	Kakkumkai	129.7	70	160	115	14915.5
100	<i>Euphorbia thymifolia</i>	Nilappala	10.8	50	50	50	540
101	<i>Evolvulus alsinoides</i>	Vishnukranthi	1,285.8	50	340	180.7	232344.1
102	<i>Ficus benghalensis</i>	Peral	5,791.7	7	175	59	341710.3

103	<i>Ficus racemosa</i>	Athi	6,271.6	12	70	45.2	283476.3
104	<i>Ficus religiosa</i>	Arayal	5,425.6	12	70	42	227875.2
105	<i>Ficus retusa</i>	Ithi	6,386.7	7	300	78.9	503910.6
106	<i>Firmiana simplex</i>	Chinese Parosol Tree	4.7	90	90	90	423
107	<i>Flacourtia indica</i>	Karimulli	16.2	50	50	50	810
108	<i>Foeniculum vulgare</i>	Kayam	138.6	150	183	166.7	23104.6
109	<i>Fritillaria cirrhosa</i>	Karkokil Ari	1,348.4	200	505	311.2	419622.1
110	<i>Garcinia cambogia</i>	Kudampuli	21.5	90	120	105	2257.5
111	<i>Garcinia gummi-gutta</i>	Kudampuli	1,395.7	160	425	292.5	408242.3
112	<i>Geophila repens</i>	Karinthali	4.7	240	240	240	1128
113	<i>Glycyrrhiza glabra</i>	Irattimadhuram	2,537.9	243	1,089	666	1690241.4
114	<i>Gmelina arborea</i>	Kumpil/Kumizhu	4,394.7	60	300	134	588889.8
115	<i>Gymnema sylvestre</i>	Chakkarakolli	1,641.5	42	250	122.4	200919.6
116	<i>Helicteres isora</i>	Idampiri/ Valampiri	2,320.1	38	285	118.9	275859.9
117	<i>Heliotropium indicum</i>	Thekkada vere	1,089.3	50	200	135	147055.5
118	<i>Hemidesmus indicus</i>	Narunandi	4,367.3	226	1,700	737.1	3219136.8
119	<i>Heracleum rigens</i>	Chittelam/Vatham parathi	824.5	400	750	600	494700
120	<i>Heracleum rigens</i>	Chittelam/Vatham parathi	72.4	153	215	183.7	13299.9
121	<i>Holarrhena pubescens</i>	Kudakappala	2,808.6	70	600	276.9	777701.3
122	<i>Holoptelia integrifolia</i>	Aaviltholi	3,399.4	33	270	121.1	411667.3
123	<i>Holostemmaada-kodien</i>	Adakodiyam	1,535.7	80	700	325.9	500484.6
124	<i>Hordeum vulgare</i>	Barley/Yavam	2,846.1	52	960	364.3	1036834.2
125	<i>Hugonia mystax</i>	Karthottyveru	998.6	72	240	149.7	149490.4
126	<i>Hygrophila auriculata</i>	Vayalchulli	4,511.0	50	600	195.2	880547.2
127	<i>Ichnocarpus frutescens</i>	Palvally	546.6	60	180	108.5	59306.1
128	<i>Illicium verum</i>	Thakkolam	4,612.5	57	1,481	578.2	2666947.5
129	<i>Indigofera tinctoria</i>	Neelamari	5,220.6	70	438	304.2	1588106.5

130	<i>Ipomoea mauritiana</i>	Paalmuthak	2,184.8	46	600	194	423851.2
131	<i>Ipomoea obscura</i>	Thiruthali	735.0	60	120	90	66150
132	<i>Ipomoea pes-tigridis</i>	Pulichuvadi	105.9	75	150	125	13237.5
133	<i>Ixora coccinea</i>	Thetti veru	1,118.5	120	120	120	134220
134	<i>Justicia beddomei</i>	Chittadalodakam	732.0	50	383	134.4	98380.8
135	<i>Justicia adhatoda</i>	Aadalodakam	5,978.4	50	348	164.2	981653.3
136	<i>Justicia adhatoda</i>	Adalodakam	454.5	160	197	178.3	81037.4
137	<i>Kaempferia galanga</i>	Kacholam	5,148.2	37	430	259.6	1336472.7
138	<i>Kaempferia rotunda</i>	Changazhineerkizhangu	686.4	135	487	251.7	172766.9
139	<i>Lepidium sativum.</i>	Aasali	2,987.7	33	1,200	259.7	775905.7
140	<i>Lilium polyphyllum</i>	Kaakoli	761.3	406	600	515.5	392450.2
141	<i>Luffa aegyptiaca</i>	Peechinga	7,057.5	28	34	30.9	218076.8
142	<i>Macrotyloma uniflorum</i>	Mutira	6,845.8	65	101	80	547664
143	<i>Madhuca neriifolia</i>	Ilippa	304.8	21	60	45	13716
144	<i>Malaxis rheedii</i>	Jeevakam	82.8	368	480	424	35107.2
145	<i>Merremia tridentata</i>	Prasarini	1,492.2	72	467	164	244720.8
146	<i>Mesua ferrea</i>	Nagapoo	2,100.5	160	700	268.3	563564.2
147	<i>Monochoria vaginalis</i>	Karimkoovalam	185.0	150	150	150	27750
148	<i>Mucuna pruriens</i>	Naikkurunam	3,280.1	59	900	255.3	837409.5
149	<i>Mukia maderaspatana</i>	Musumusukk	375.0	70	70	70	26250
150	<i>Myristica malabarica</i>	Jathipathri	2,464.0	420	1,235	773.1	1904918.4
151	<i>Nardostachysjatamansi</i>	Jadamchi	317.5	1,404	1,404	1403.5	445611.3
152	<i>Nelumbo nucifera</i>	Thamara	90.3	200	275	237.5	21446.3
153	<i>Nigella sativa</i>	Karimjeerakam	4,704.7	77	480	272.4	1281560.3
154	<i>Nilgirianthus ciliatus</i>	Karimkurinji	884.1	13	558	148.5	131288.9
155	<i>Nothapodytes nimmoniana</i>	Peenari	6.8	60	200	130	884
156	<i>Nymphaea nouchali</i>	Aampal	50.0	150	150	150	7500

157	<i>Ocimum gratissimum</i>	Kattuthulasi	465.0	52	120	85.9	39943.5
158	<i>Ocimum tenuiflorum</i>	Thulasi	321.4	60	650	355	114097
159	<i>Oldenlandia corymbosa</i>	Parppidakapullu	1,757.1	220	369	297.3	522385.8
160	<i>Oroxylum indicum</i>	Palakapayyanni	2,307.4	60	300	111.8	257967.3
161	<i>Oryza sativa</i>	Njavara	5,431.1	35	151	85.6	464902.2
162	<i>Oxalis corniculata</i>	Puliyarila	2,778.8	19	80	49.5	137550.6
163	<i>Pandanus odoratissimus</i>	Pookaitha	323.6	100	180	140	45304
164	<i>Panicum miliare</i>	Chamayari	957.0	60	130	103.3	98858.1
165	<i>Phoenix pusilla</i>	Chiteenthal	100.5	60	250	155	15577.5
166	<i>Phyllanthus amarus</i>	Keezharnelli	2,234.5	19	270	114.8	256520.6
167	<i>Phyllanthus emblica</i>	Nellikka	18,106.2	31	550	208.3	3771521.5
168	<i>Piper cubeba</i>	Arenukam	2,277.8	55	453	233.5	531866.3
169	<i>Piper longum</i>	Thippali	3,766.9	96	1,000	529	1992690.1
170	<i>Piper nigrum</i>	Kurumulaku	4,659.2	71	1,153	451.5	2103628.8
171	<i>Pistacia chinensis</i>	Karkidakasringi	914.5	220	970	435.4	398173.3
172	<i>Plumbago zeylanica</i>	Chuvannakoduveli	1,324.3	175	300	239	316507.7
173	<i>Pogostemon heyneanus</i>	Pacholi	1,944.3	9	495	249.6	485297.3
174	<i>Pongamia pinnata</i>	Unge	861.2	50	300	140	120568
175	<i>Premna serratifolia</i> Linn.	Munja	2,368.3	17	400	143	338666.9
176	<i>Prunus dulcis</i>	Badham	327.5	608	608	608.4	199251
177	<i>Pseudarthria viscida</i>	Moovila	3,823.3	110	200	143.6	549025.9
178	<i>Pterocarpus marsupium</i>	Venga	3,235.4	50	210	120.9	391159.9
179	<i>Pterocarpus santalinus</i>	Rakthachandanam	1,984.7	200	1,027	520.1	1032242.5
180	<i>Rauvolfia serpentina</i>	sarppagandhi/amalppori	1,543.9	200	1,049	829.8	1281128.2
181	<i>Rhaphidophora pertusa</i>	Kattuthipali	423.5	35	237	161.7	68480
182	<i>Ricinus communis</i>	Aavanakku	8,598.6	15	200	68.3	587284.4

183	<i>Rotula aquatica</i>	Kallurvanchi	2,550.4	96	300	182.9	466468.2
184	<i>Rubia cordifolia</i>	Manchatti	1,836.6	131	1,338	496	910953.6
185	<i>Salacia reticulata</i>	Ponkorandi	2,950.5	160	260	230	678615
186	<i>Santalum album</i>	Chandhanam	1,302.0	150	1,630	652.4	849424.8
187	<i>Sapindus trifoliatus</i>	Soapinkaya	2,749.9	60	182	95.6	262890.4
188	<i>Saraca asoca</i>	Asokam	5,422.0	207	700	424.6	2302181.2
189	<i>Sarcostemma acidum</i>	Somalatha	144.0	2,000	2,000	2000	288000
190	<i>Sarcostigma kleinii</i>	Odalkkuru	385.0	200	350	275	105875
191	<i>Saussurea costus</i>	Kottam	28.1	810	900	855	24025.5
192	<i>Schleichera oleosa</i>	Poovanam	288.0	200	200	200	57600
193	<i>Semecarpus anacardium</i>	Cheru,Themprakkai	951.9	100	200	153.3	145926.3
194	<i>Senna tora</i>	Thakara	461.8	42	1,906	801.8	370271.2
195	<i>Sesamum indicum</i>	Ellu	11,518.5	50	381	217.7	2507577.5
196	<i>setaria italica</i>	Thina	5,036.4	17	500	127.3	641133.7
197	<i>Sida acuta</i>	Cheruparuva	1,143.1	18	600	196.8	224962.1
198	<i>Sida cordata</i>	Kurumthotti	1,971.5	115	700	275.8	543739.7
199	<i>Sida cordifolia</i>	Ven kurunthotti	2,792.3	20	400	204.6	571304.6
200	<i>Sida rhombifolia</i>	Kurumthotti	2,012.1	25	480	240.6	484111.3
201	<i>Sida spinosa</i>	Kattooram	360.0	180	180	180	64800
202	<i>Solanum anguivi</i>	Putharichunda	851.6	24	300	147.9	125951.6
203	<i>Solena amplexicaulis</i>	Njerinjampuli	88.6	180	240	210	18606
204	<i>Spermacoce hispida</i>	Thaarthaval	2,218.9	16	163	79.8	177068.2
205	<i>Sterculia foetida</i>	Peenari	2,910.2	34	400	181.5	528201.3
206	<i>Stereospermum tetragonum</i>	Poopathiri	481.0	56	128	93	44733
207	<i>Streblus asper</i>	Paruva maram	1,057.5	96	96	96	101520
208	<i>Strychnos nux vomica</i>	Kanjiram	262.5	195	195	194.8	51135
209	<i>Strychnos potatorum</i>	Thettamparal	1,251.9	31	270	147.4	184530.1

210	<i>Symplocos cochinchinensis</i>	Pachotti	2,054.2	18	160	123.9	254515.4
211	<i>Syzygium aromaticum</i>	Grampoo	689.1	701	757	729.2	502491.7
212	<i>Syzygium cumini</i>	Njaval	2,446.8	14	270	113.4	277467.1
213	<i>Tamarindus indica</i>	Valanpuli	741.4	65	360	165	122331
214	<i>Terminalia arjuna</i>	Neermaruth	1,761.7	70	320	184.8	325562.2
215	<i>Terminalia bellirica</i>	Thanii	5,300.8	78	290	126.6	671081.3
216	<i>Terminalia chebula</i>	Kadukka	5,423.2	60	320	142.4	772263.7
217	<i>Thottea siliquosa</i>	Alpam	858.9	35	40	37.5	32208.8
218	<i>Tinospora cordifolia</i>	Chittamruth	8,544.8	25	100	47.3	404169
219	<i>Tinospora malabarica</i>	Kattamruthe	1,682.9	20	150	57.3	96430.2
220	<i>Toona ciliata</i>	Chandana vembu	4.7	20	20	20	94
221	<i>Trachyspermum ammi</i>	Ayamodhakam	2,605.6	217	322	270.3	704293.7
222	<i>Tragia involucrata</i>	Kodithuva veru	2,436.5	160	240	196.7	479259.6
223	<i>Tribulus terrestris</i>	Njerinjil	3,860.0	33	802	240.7	929102
224	<i>Trichosanthes cucumerina</i>	Padavalam	2,525.4	40	294	140.9	355828.9
225	<i>Trichosanthes lobata</i>	Kattupadavalam	2,787.4	200	800	365.8	1019630.9
226	<i>Trigonella foenum-graecum</i>	Uluvaa	30.0	85	85	85	2550
227	<i>Triticum aestivum</i>	Soochi gothambe	70.1	60	300	153.3	10746.3
228	<i>Tylophora indica</i>	Vallippala	16.1	110	200	155	2495.5
229	<i>Typha elephantina</i>	Elephant Grass	62.5	120	120	120	7500
230	<i>Uraria lagopodoides</i>	Cheriyar orila	205.1	70	200	150	30765
231	<i>Valeriana wallichii</i>	Thagaram	7.5	920	920	920	6900
232	<i>Vanda tessellata</i>	Chuvannaratha	706.4	121	270	186.8	131955.5
233	<i>Vateria indica</i>	Vella Kunthirikkam	4,126.7	21	500	245	1011041.5
234	<i>Ventilago maderaspatana</i>	Vempadappatta	2,106.2	86	700	423.8	892607.6
235	<i>Vernonia cinerea</i>	Poovankurunnal	1,477.8	21	389	187.9	277678.6
236	<i>Vigna muerjeanus</i>	Kattupayar	1,333.3	84	200	146.8	195728.4

237	<i>Vigna pilosa</i>	Kattupayar	1,640.6	60	86	70.2	115170.1
238	<i>Vigna vexillata</i>	Kattuzhunnu	1,138.1	60	330	156.7	178340.3
239	<i>Vitex negundo</i>	Karinochi	1,185.7	55	363	196.9	233464.3
240	<i>Vitis vinifera</i>	Unakkamunthiri	1,584.0	281	300	290.7	460468.8
241	<i>Withania Somnifera</i>	Amukkooram	2,016.5	690	1,000	845	1703942.5
242	<i>Woodfordia fruticosa</i>	Thathiri	3,587.9	54	270	127.2	456380.9
243	<i>Wrightia tinctoria</i>	Vettupala/Danthapala	438.3	10	350	126.3	55357.3
244	<i>Zanthoxylum rhetsa</i>	Mullilam	1,744.7	50	385	176.5	307939.6
245	<i>zingiber officinale</i>	Chuuku	5,132.0	70	400	183.5	941722
246	<i>Zingiber zerumbet</i>	Kattinchi	730.7	22	140	80.8	59040.6
	Total		657,761.1				132,512,032.2

Total quantity (Tonnes)	Total Price (Crores)
657.8	13.3

6.8.2 RAW DRUG DEALERS AT KOZHIMJAMPARA

Interactions were held with Kozhinjampara group of raw drug traders located near the border of Tamilnadu and Kerala (Velanthavalam, Palakkad district). Kozhinjampara groups are the genuine suppliers of raw drugs (Angadi marunnu), Pachamarunnu-(Fresh herbs) and Pettimarunnu (Medicinal spices). According to Brito who is one of the leading traders in the kozhinjampara group, successfully trading the raw materials, Kozhinjampara group has long history of selling traditional raw materials. They started the business about 250 years back and their business is still flourishing in a fruitfull manner. Currently they are collecting more than 75 fresh/ dry raw material directly or through e-tender.

They are currently engaged in supplying 30 raw items of medicinal plants through direct supply or through agencies to the different raw drugs dealers/ institutions including the National Research Institute of Panchakarma (CCRAS), Govt. of India, Cheruthuruthy, Thrissur District. They are also supplying fresh herbs to 24 raw material shops, located at Palakkad Ottappalam, Malappuram, Thrissur and Care - Keralam Koratty, Thrissur District.

Supply Chain network

Channel -1

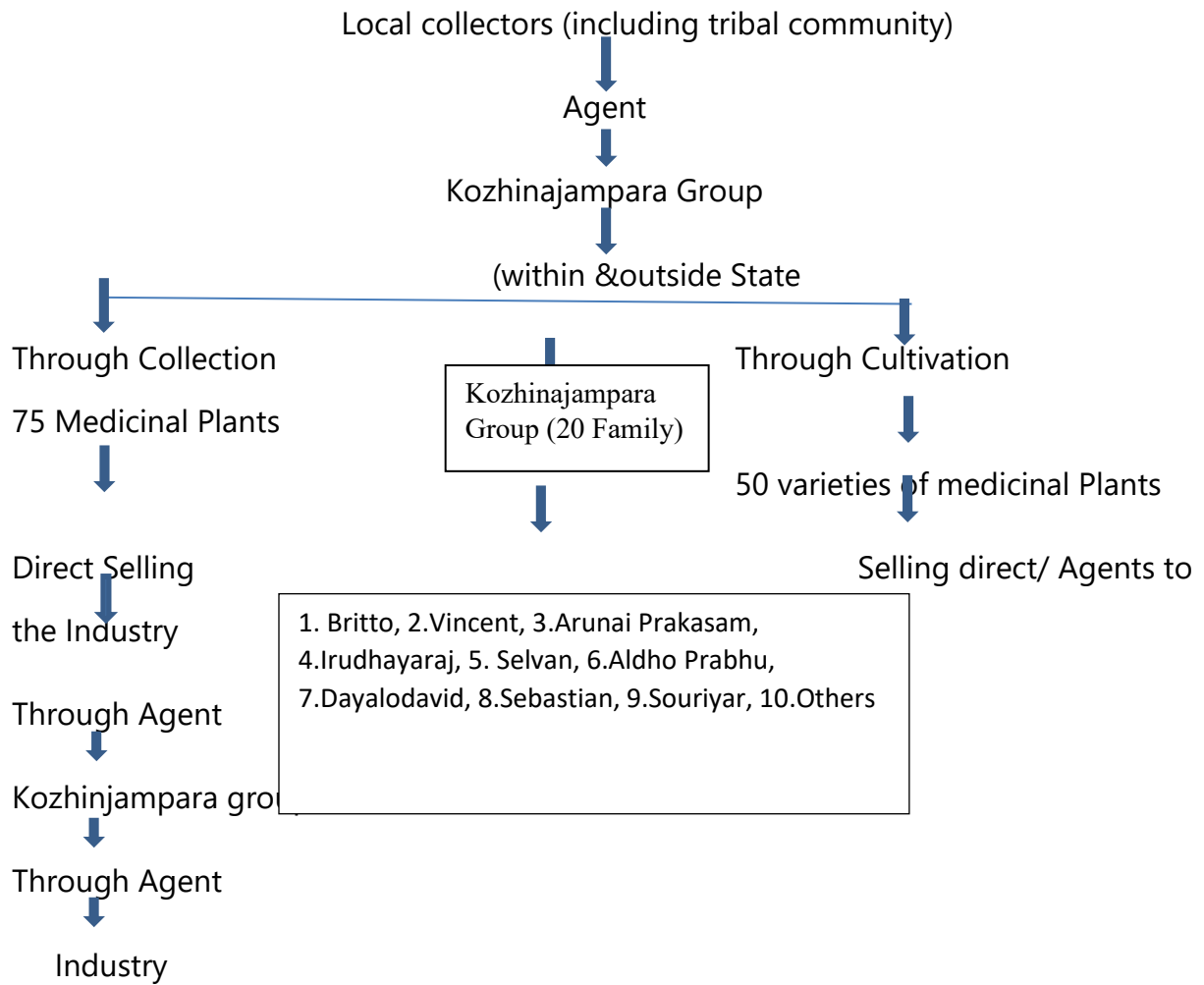


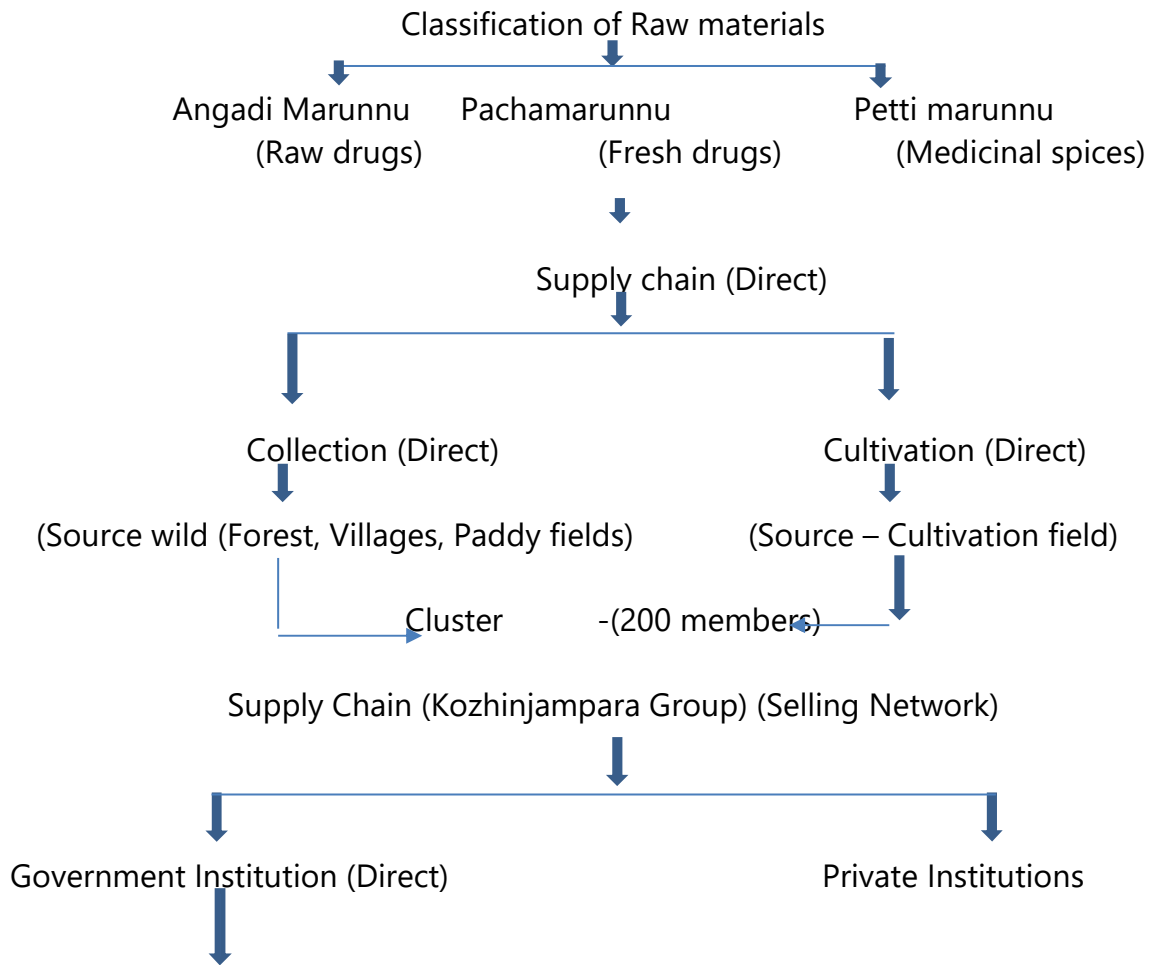
Table 6.8.10 Major Medicinal Plants (in Kg) collected from Kerala

Sl. No	Plant Name Local & Botanical Name	Parts Used	Fresh/ Dried	Wild/ cultivated/ Road side, Paddy fields
1	Kayyonni (<i>Eclipta prostrate</i>)	Whole plant	Fresh	Cultivation
2	Brahmi (<i>Bacopa monnieri</i>)	Whole plant	Fresh	Cultivation
3	Kurumthotty (<i>Sida alnifolia</i>)	Whole plant	Fresh/Dried	Road side/Paddy fields
4	Vazhuthina (<i>Solanum melongena</i>)	Root	Dried	Cultivation
5	Vayalchulli (<i>Hygrophila auriculata</i>)	Whole plant	Dried	Road side, Paddy fields.

(Turnover is approximately calculated as Rs 25 Crore)

Table 6.8.11 Major Medicinal Plants (in Kg) from Outside Kerala

Sl. No	Plant Name Local & Botanical Name	Parts Used	Fresh / Dried	Wild cultivate/ Road side, Paddy fields	Collection locality	Quantity in kg and price in Rs. 2020	
						Q	P/Kg
1	Kattarvazha (<i>Aloe vera</i>)	Whole plant	Fresh	Cultivation	Tamilnadu	1000	50/kg
2	Chittamruth (<i>Tinospora cordifolia</i>)	Stem	Fresh	Forest area, Road side	Tamilnadu	10000	60/kg
3	Satahavari (<i>Asparagus racemosus</i>)	Tuberous root	Fresh	Forest, collected from agents	Tamilnadu	5000	50/kg



<ol style="list-style-type: none"> 1. Oushadhi, Thrissur 2. National Research Panchakarma Institution (CCARS), Govt.of India Cheruthuruthy, Thrissur 3. Govt. Ayurveda College, Thripunithura (Nature of supply)- Direct through transportation e-tender paying GST 4. CARE Keralam- Direct through transportation e-tender paying GST 	<ol style="list-style-type: none"> 1. Kottaikkal Arya Vaidyasala 2. Thrissur District, Whole sale &Retails shops Angadikkada 3. Malappuram District- Whole sale &Retails shops Angadikkada 4. Kozhikode - Whole sale &Retails shops Angadikkada 5. Ernakulam District- Whole sale &Retails shops Angadikkada 6. Vadakara- Medicinal plant market (Mundi) 7. Nature of supply direct through transportation e-tender paying GST
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Season preference to collecting/harvesting of medicinal plants from the field

Sl. No	Local Name	Botanical Name	Parts Used	Fresh/Dry	Season/Harvesting
1	Kaithonni	<i>Eclipta prostrate</i>	Whole plant	Fresh	June-July
2	Uzhinja	<i>Cardiospermum halicacabum</i>	Whole plant	Fresh	June-July
3	Chittarartha	<i>Alpinia calcarata</i>	Rhizome	Fresh	August

Table 6.8.12 Highly traded Medicinal plants (above 1000 Kg) supplied (dry) from Kozhinjampara group.

Sl.No	Name of species	Local Name	Parts applied	Quantity selling annually (Kg)	Selling price per Kg (2020-21)
1.	<i>Sida alnifolia</i>	Kurumthotty	Root (dry)	Above 1000	100-125
2.	<i>Holoptelea integrifolia</i>	Aviltholi	Bark	Above 1000	100-125
3.	<i>Desmodium gangeticum</i>	Orila	Root	Above 1000	100-125
4.	<i>Pseudarthria viscida</i>	Moovila	Root	Above 1000	100-125
5.	<i>Phyllanthus emblica</i>	Nellikka	Fruit rind	Above 1000	100-125
6.	<i>Amorphophallus commutatus</i>	Kattuchena	Corm	Above 1000	150-200
7.	<i>Ficus racemosa</i>	Athi	Bark	Above 1000	100-125
8.	<i>Ficus micro carpa</i>	Ithi	Bark	Above 1000	100-125
9.	<i>Ficus religiosa</i>	Arayal	Bark	Above 1000	100-125
10.	<i>Ficus benghalensis</i>	Peral	Bark	Above 1000	100-125
11.	<i>Stereospermum chelonoides</i>	Pathiri	Root, Bark	Above 1000	125-150
12.	<i>Gmelina arborea</i>	Kumpil	Root, Bark	Above 1000	120-130
13.	<i>Pajanelia longifolia</i>	Payyazhantha	Root, Bark	Above 1000	130-150
14.	<i>Aegle marmelos</i>	Koovalam	Root, wood, Fruit	Above 1000	130-150
15.	<i>Saraca asoca</i>	Asokam	Bark, Flower	Above 1000	130-150

16.	<i>Solanum melongena</i>	Cheruvazhuthina	Root	Above 1000	100-125
17.	<i>Hygrophila auriculata</i>	Vayalchulli	Whole plant	Above 1000	120-130
18.	<i>Ixora coccinea</i>	Thetti	Fruit	Above 1000	150-160
19.	<i>Hemidesmus indicus</i>	Naruneendi kizhangu	Tuberous root	Above 1000	150-170
20.	<i>Oldenlandia corymbosa</i>	Parppidakapullu	Whole plant	Above 1000	100-125
21.	<i>Vateria indica</i>	Kunthirikam	Gum	Above 1000	150-170
22.	<i>Azadirachta indica</i>	Veppu	Bark, Leaf	Above 1000	75-100
23.	<i>Solanum anguivi</i>	Putharichunda	Root	Above 1000	75-100
24.	<i>Premna serratifolia</i>	Munja	Root	Above 1000	150-170
25.	<i>Justicia adhatoda</i>	Aadalodakam	Root, Leaf	Above 1000	100-125
26.		Dasamoolam	Formulation wise supply (All ingredients together) 10 Roots	Above 1000	125-150

Table 6.8.13 Highly traded Medicinal plants (above 1000Kg) supplied (Fresh) from Kozhinjampara

Sl. No	Name of species	Local Name	Parts applied	Quantity selling annually (Kg)	Selling price (2020-21)
1.	<i>Eclipta prostrata</i>	Kaithonni	Whole plant	Above 1000	70
2.	<i>Bacopa monnieri</i>	Brahmi	Whole plant	Above 1000	70
3.	<i>Aloe vera</i>	Kattarvazha	Leaf	Above 1000	50
4.	<i>Alpinia calcarata</i>	Chittaratha	Stem/Rhizome/Leaf	Above 1000	70
5.	<i>Asparagus racemosus</i>	Sathavari	Tuberous root	Above 1000	50-70
6.	<i>Indigofera tinctoria</i>	Vella Amari	Leaf	Above 1000	75-100
7.	<i>Indigofera tinctoria</i>	Neela Amari	Leaf	Above 1000	100-125
8.	<i>Cardiospermum halicacabum</i>	Uzhinja	Whole plant	Above 1000	75

9.	<i>Cyanthillium cinereum</i>	Poovamkur umthal	Whole plant	Above 1000	100
10.	<i>Cynodon dactylon</i>	Karuka	Whole plant	Above 1000	60
11.	<i>Leucas aspera</i>	Thumba	Whole plant	Above 1000	100-125
12.	<i>Magnolia champaca</i>	Chembakam	Flower	Above 1000	100-125
13.	<i>Vitex negundo</i>	Karinochi	Leaf	Above 1000	100-125
14.	<i>Tamarindus indica</i>	Puliyila	Leaf	Above 1000	30-50
15.	<i>Ricinus communis</i>	Aavanakku	Leaf	Above 1000	75
16.	<i>Mussaenda frondosa</i>	Vellia	Leaf	Above 1000	100-125
17.	<i>Murrayakoenigii</i>	Kari veppila	Leaf	Above 1000	75
18.	<i>Ixora coccinea</i>	Thettipoo	Flower	Above 1000	100
19.	<i>Calotropis gigantea</i>	Erukku	Flower	Above 1000	50-75
20.	<i>Ocimum tenuiflorum</i>	Krishna Thulasi	Leaf	Above 1000	75
21.	<i>All ingredients of murivenna</i>	Murivenna (oil)	Formulation wise - All ingredients		

Table 6.8.14 Pettimarunnu supplied from Kozhinjampara

Sl. No	Name of Species	Local Name	Parts
1.	<i>Piper nigrum</i>	Kurumulaku	Seed
2.	<i>Cinnamomum malabatum</i>	Elavargapatta	Bark
3.	<i>Piper longum</i>	Thippali	Seed
4.	<i>Cinnamomum verum</i>	Karuva patta (3 species)	Bark
5.	<i>Alpinia calcarata</i>	Chittaratha	Rhizome
6.	<i>Zingiber officinale</i>	Inchi	Rhizome
7.	<i>Zingiber officinale</i>	Chukku	Rhizome
8.	<i>Syzygium aromaticum</i>	Grampoo	Flower
9.	<i>Cuminum cyminum</i>	Jeerakam	Seed
10.	<i>Curcuma longa</i>	Manjal	Rhizome
11.	<i>Trigonella foenum-graecum</i>	Uluva	Seed
12.	<i>Myristica fragrans</i>	Jathi	Seed/aril
13.	<i>Nigella sativa</i>	Karimjeerakam	Seed
14.	<i>Piper cubeba</i>	Valmulaku	Seed
15.	<i>Cinnamomum camphora</i>	Karpooram(Pacha karpooram/ Chooda Karpooram)	Synthetic products

ODK FORMAT

Data sheet - Angadi Pachamarunnu kada (Raw material shops)

Plant species/Medicinal plants

Sl.No	General Details	
1.	Name of the Agency	
2.	Address, Phone number, E mail	
3.	Name of the respondent	
4.	Date of establishment	
5.	Annual expenditure for running the establishment	
6.	Annual Turnover of agency	
7.	Are you doing any value addition on the raw materials	No Yes If Yes details
8.	Name and address of the suppliers of raw drugs	Individual Eco development group (EDC) Vanasmarakshna samithi (VSS) Oorukuttam Any others Give details
9.	Are you getting materials from outside Kerala	outside the state outside the country Give details- Species Area Quantity
10.	Are you supplying outside Kerala	outside the state outside the country Give details- Species Area Quantity
11.	Criteria for fixing price	
12.	Is there price variation	Yes No Give details – Range, Average

13.	Status of availability	Give details
14.	Challenges faced	
15.	Suggestions for improvement	
16.	Other information if any	
17.	Details of	Medicinal Plants By products / Value added products/Extracts

Details of Medicinal plants

Sl.No	Local name	Botanical name	Parts used	Dry/fresh	Source (collection Locality)	Unit/kg	Buying price	Selling Price	Buyers	Annual Quantity and Price Year-wise				

By products/ value added products/Extracts

Sl.No	Value added Products	By products	Extracts	Source (collection Locality)/	Unit/kg	Buying price	Selling Price	Buyers	Annual quantity and Price Year-wise					
1.		Honey												
2.		Lac (Kol arrukku)												
3.		White Dammer												
4.		Black Dammer												
5.		Pacha karpuram												
6.		Chodan karpuram												
7.		Other item												

Appendix 2 Trade of medicinal plants through a major Angadikada at Trivandrum

	Local Name of Plant						
1	Kunni	<i>Abrus precatorius</i>	Root	Kerala	Dry	500	80
2	Karingali	<i>Acacia catechu</i>	Bark	Tamilnadu	D	1200	80
3	Karivelam	<i>Acacia nilotica</i>	Wood	Tamilnadu	D	400	50
4	Karinja	<i>Acacia pennata</i>	Bark	Tamilnadu	D	1	100
5	Cheevaikka	<i>Acacia sinuata</i>	Nuts	Kerala,TN	D	600	120
6	Incha	<i>Acacia torta</i>	Bark	Kerala	D	1500	100
7	Kuppameni	<i>Acalypha indica</i>	Leaf	Local	F	200	50
8	Vayambu	<i>Acorus calamus</i>	Tuber	Tamilnadu	D	700	130
9	Kadaladi	<i>Achyranthus aspera</i>	root	Kerala	D	350	60
10	Nanmukhappullu	<i>Actiniopteris radiata</i>	Leaf	Tamilnadu	D	200	100
11	Manjadi	<i>Adenantha pavonina</i>	Seed	Kerala	D	450	300
12	Aadalodakam	<i>Justicia adhatoda</i>	Root	Kerala,TN	D	500	120
13	Cheroola	<i>Aerva lanata</i>	Whole plant	Kerala	D	200	80
14	Koovalam	<i>Aegle marmelos</i>	Root	Tamilnadu	D	350	100
15	Ankolam	<i>Alangium salviifolium</i>	Fruit	Tamilnadu	F	1	100
16	Chittarartha	<i>Alpinia calcarata</i>	Rhizome	Delhi	D	1000	300
17	Kolinji	<i>Alpinia calcarata</i>	Rhizome	Kerala		800	170
18	Kattarvazha	<i>Aloe vera</i>	Leaf	Kerala,TN	F	1000	40
19	Ezhilampala	<i>Alstonia scholaris</i>	Leaf, root	Local	D	1	100
20	Kattuchena	<i>Amorphophallus paeoniifolius</i>	Rhizome	Tamilnadu	F	100	60
21	Kattelam /Vempadapatta	<i>Amomum subulatum</i>	Bark	Tamilnadu	D	1	650
22	Kiriyathu	<i>Andrographis paniculata</i>	Root	Kerala,TN	F	300	100
23	Omam	<i>Apium graveolens</i>	Seed	Kerala, T.N, North India	D	700	250
24	Erumakkalli	<i>Argemone mexicana</i>	Leaf	Local	D	1	30
25	Garudakodi	<i>Aristolochia indica</i>	Whole plant	Tamilnadu, Local	D	100	150
26	Aaduthindappala	<i>Aristolochia Bracteata</i>		Tamilnadu	D	100	100

27	Sathavari	<i>Asparagus racemosus</i>	Tuberous root	Kerala & TN	F	1000	70
28	Kattumuthira	<i>Atylosia scarabaeoids</i>		Local	F	1	70
29	Veppinpatta	<i>Azhardirecta indica</i>	Bark	Local	F	1000	40
30	Yasankinveru	<i>Azima tetracantha</i>	Root	Tamilnadu	F	150	70
31	Athithippali	<i>Balanophora fungosa</i>	Fruit	Tamilnadu	D	100	200
32	Nagadanthi	<i>Baliospermum solanifolium</i>	Root	Utharakhand	D	1	150
33	Mula	<i>Bambusa bambos</i>	Seed	Local	D and F	1	50
34	Brahmi	<i>Bacopa Monnieri</i>	Whole plant	Tamilnadu, Local	F	1000	50
35	Neykumpalam	<i>Benincasa hispida</i>	Fruit	Keralam	F	1500	100
36	Elavu	<i>Bombax ceiba</i> Linn	root	Local	D	1	20
37	Thaarthaval	<i>Borreria hispida</i>	Leaf	Local, Tamilnadu	D and F	500	40
38	Thazhuthama	<i>Boerhavia diffusa</i>	root	Local, Tamilnadu	NA	300	40
39	Chamatha/Plash	<i>Butea monosperma</i>	Bark	Local, Keralam	NA	5000	100
40	Kazhanchi	<i>Caesalpinia bonduc</i>	seed	Tamilnadu	NA	100	180
41	Chappangam/Pathimugam	<i>Caesalpinia sappan</i>	Bark	Keralam, Tamilnadu	d	1300	80
42	Pullanji	<i>Calycopteris floribunda</i>		Local			50
43	Erukku	<i>Calotropis gigantea</i>	Root	Tamilnadu, Keralam	D and F	800	40
44	Thelippayin/Karutha kunthirikkam	<i>Canarium strictum</i>	Gum	Tamilnadu, Keralam		200	300
45	Vella Kunthirikkam	<i>Vateria indica</i>	Gum	Tamilnadu, Keralam		1000	
46	Uzhinja	<i>Cardiospermum halicacabum</i>	Whole plant	Tamilnadu, Keralam	D and F	250	30
47	Aavaram/Ponnaveeram	<i>Cassia auriculata</i>	Root	Tamilnadu	D and F	100	60
48	Chinnamukkiyila	<i>Cassia angustifolia</i>	root	North India		400	80
49	Oolan Thakara	<i>Senna occidentalis</i>		Keralam	both	50	20
50	Thakara	<i>Senna tora</i>		Keralam		50	20
51	Kudangal/Kodakan	<i>Centalla asiatica</i>		Keralam, Tamilandu,	both	300	60

				North India			
52	Cherupunnayari	<i>Celastrus paniculatus</i>	seed	Delhi	d	200	350
53	Panjimaram	<i>Ceiba pentandra</i>	seed		d	1	
54	Peenari	<i>Celtis philippensis</i>	wood	Tamil nadu	d	500	150
55	Ramacham	<i>Chrysopogon zizanioides</i>	root	Keralam, Tamilnadu	d	1	100
56	Channakoova	<i>Costus speciosus</i>	root	Keralam	d	1	50
57	Perumkurumpaveru	<i>Chonemorpha macrophylla</i>	root	Keralam , Tamilnadu	d	180	150
58	Chuvannakil	<i>Dysoxylum gotadhora</i>			d	500	120
59	Vellakil	<i>Dysoxylum malabaricum</i>				1	300
60	Naivela /Thaivela	<i>Cleome gynandra</i>			both	250	
61	Sankumkuppi	<i>Clerodendrum inerme</i>	leaf	Local		250	50
62	Cheruthekku	<i>Clerodendrum serratum</i>	Root			300	
63	Karukapullu	<i>Cynodondactylon</i>	Whole plant			100	30
64	Karuva	<i>Cinnamomum malabattrum</i>	bark	Keralam,Tamilnadu, Srilanka	d	300	1000
65	Malathangi	<i>Cissampelos pareira</i>		Kerala	both	100	50
66	Changalam Paranda	<i>Cissus quadrangularis</i>	full	Keralam, Tamilnadu		200	30
67	Kattuvellari	<i>Citrullus colocynthis</i>	full	Punjab	dry	400	150
68	Maramanjil	<i>Coscinium fenestratum</i>	Bark	Calcutta	d	350	130
69	Manjal	<i>Curcuma longa</i>	root		d	800	
70	Koval	<i>Coccinia grandis</i>		Local		200	30
71	Channakoova	<i>Costus speciosus</i>	root	Keralam	fresh	100	100
72	Neermathalam	<i>Crateva nurvala</i>	Bark	Tamilnadu	d	300	100
73	Neervalam	<i>Croton tiglium</i>	seed	Tamilnadu		50	350
74	Karkokil Ari	<i>Cullen corylifolium</i>	seed	Madhyapradesh	d	120	70
75	Nilappana	<i>Curculigo orchioides</i>	root	Tamilnadu	d	300	300
76	Jeerakam	<i>Cuminum cyminum</i>	seed	Gujarath	d	600	200
77	Karimjeerakam	<i>Carum carvi / Nigella sativa</i>	Seed	North India	d	1000	350
78	Manga inchi	<i>Curcuma amada</i>	root	Keralam	d	1	50
79	Kasthurimanjal	<i>Curcuma aromatica</i>	root	Keralam,Tamilnadu	d	2000	95
80	Padathali	<i>Cyclea peltata</i>	root	Keralam,Tamilnadu	d	500	800

81	Muthanga	<i>Cyperus rotundus</i>	root	Tamilnadu	d	700	80
82	Chonakappullu	<i>Cymbopogon citratus</i>		Tamilnadu	both	100	130
83	Inchipullu	<i>Cymbopogon flexuosus</i>		Keralam, Tamilnadu	both	100	80
84	Ummam	<i>Datura stramonium</i>	Full	Local		100	60
85	Mahali	<i>Decalepis hamiltonii</i>	root	Tamilnadu, Andrapradesh	dry	800	700
86	Kallanmula	<i>Dendrocalamus strictus</i>		Keralam, Tamilnadu	both	1	50
87	Orila	<i>Desmodium gangeticum</i>	root	Keralam		300	130
88	Dharbha	<i>Imperata cylindrica</i>	Whole plant	Local, Tamilnadu	full	500	70
89	Kaithonni	<i>Eclipta prostrata</i>	Whole plant	Local, Tamilnadu	full	600	30
90	Kudamanjal	<i>Curcuma zedoaria</i>	root	Tamilnadu	d	1	90
91	Anachuvadi	<i>Elephantopus scaber</i>	leaf	Local		50	50
92	Elam	<i>Elettaria cardamomum</i>	seed	Keralam	d	100	1800
93	Koovaraku, Raggi	<i>Eleusine coracana</i>	seed	Tamilnadu	d	600	40
94	Vizhalari	<i>Embelia ribes</i>	seed	North India	d	500	600
95	Nellikka	<i>Phyllanthus emblica</i>	fruit	North India	d	1200	180
96	Parandakkai	<i>Entada rheedii</i>	seed	Kerala	d	50	70
97	Vishnukranthi	<i>Evolvulus alsinoides</i>		Tamilnadu	both	50	120
98	Peral	<i>Ficus benghalensis</i>	Bark	Tamilnadu	d	1000	40
99	Athi	<i>Ficus racemosa</i>	Bark	Tamilnadu	d	1000	
100	Ithi	<i>Ficus retusa</i>	Bark	Tamilnadu	d	1000	
101	Blankay, Agori	<i>Limonia acidissima</i>	seed	Tamilnadu	d	100	100
102	Malabaripuli	<i>Garcinia cambogia</i>	fruit	Keralam	d	1	120
103	Kudampuli	<i>Garcinia gummi-gutta</i>	fruit	Keralam	d	200	90
104	Menthonni	<i>Gloriosa superba</i>	root	Tamilnadu	d	5	220
105	Kumpil	<i>Gmelina arborea</i>	root	Keralam, Tamilnadu	d	300	60
106	Chakkarakkolly	<i>Gymnema sylvestre</i>	leaf	Tamilnadu	d	10	150
107	Idampiri, Valampiri	<i>Helicteres isora</i>	seed	Keralam, Tamilnadu	d	80	80
108	Thekkada	<i>Heliotropium indicum</i>	full	Keralam, Tamilnadu	d	10	50
109	Narunandi	<i>Hemidesmus indicus</i>	Tuberous root	Keralam, Tamilnadu	d	1000	100
110	Chittelam	<i>Heracleum rigens</i>	root	Tamilnadu	d	1	400

111	Kudakappala	<i>Holarrhena pubescens</i>	Bark	West Bengal	d	1	120
112	Kudakappala	<i>Holarrhena pubescens</i>	Seed	West Bengal	D	1	400
113	Aavil	<i>Holoptelia integrifolia</i>	Bark	Tamilnadu	d	200	80
114	Adapathiyar	<i>Holostemma ada-kodien</i>	root	Keralam	d	300	200
115	Aatuvanchi	<i>Homonoia riparia</i>		Keralam		10	0
116	Karthottyveru	<i>Hugonia mystax</i>	root	Tamilnadu	d	100	100
117	Marotti	<i>Hydnocarpus pentandrus</i>	seed	Keralam	NA	200	1300
118	Vayalchulli	<i>Hygrophila auriculata</i>	seed	North India, Tamilnadu	d	200	300
119	Parvally	<i>Ichnocarpus frutescens</i>	full	Keralam	d	100	50
120	Thakkolam	<i>Illicium verum</i>	seed	Delhi	d	50	1600
121	Thiruthali	<i>Ipomoea obscura</i>	full	Keralam	d	25	40
122	Paalmuthak	<i>Ipomoea mauritiana</i>	root	Keralam, Tamilnadu	d	100	120
123	Pulichuvadi	<i>Ipomoea pes-tigridis</i>	full	Keralam	d	10	100
124	Neelamari	<i>Indigofera tinctoria</i>		Tamilnadu		500	300
125	Thechi	<i>Ixora coccinea</i>	root	Keralam	d	200	100
126	kacholam	<i>Kaempferia galanga</i>	root	Tamilnadu, Keralam	d	600	100
127	Changazhineerkizhangu	<i>Kaempferia rotunda</i>	root	Keralam, West bengal	d	10	300
128	Kulamavu, Chuvannapaine	<i>Persea macrantha</i>		Keralam		0	150
129	Aasali	<i>Lepidium sativum</i>	seed	Delhi	d	100	120
130	Thumpa	<i>Leucas aspera</i>	full	Keralam	d	50	50
131	Kakoli	<i>Lilium polyphyllum</i>	root	Punjab	d	50	540
132	Ethilkanni	<i>Loranthus longiflorus</i>	full	Keralam	d	5	50
133	Peechinga	<i>Luffa aegyptiaca</i>	seed	Tamilnadu	d	2000 nos	10
134	Devadali	<i>Luffa echinata Roxb</i>				0	
135	Muthira	<i>Macrotyloma uniflorum</i>	seed	Tamilnadu	d	600	70
136	lippa	<i>Madhuca neriifolia</i>	wood	Tamilnadu	d	100	60
137	Peenari	<i>Nothapodytes nimmoniana</i>	full	Tamilnadu	d	1	60
138	Prasarini	<i>Merremia tridentata</i>	full	Keralam, Tamilnadu	d	50	60
139	Nagappo, Nankinkuru	<i>Mesua ferrea</i>		Keralam		30	100
140	Karimkoovalam	<i>Monochoria hastaeifolia</i>	full	Keralam	d	10	100

141	Kattupavaikka	<i>Momordica dioica</i>		Keralam		0	0
142	Thottavadi	<i>Mimosa pudica</i>	full	Keralam, Tamilandu	d	100	50
143	Elanji	<i>Mimusops elengi</i>	flower	Tamilandu	d	10	300
144	Naikkarunam	<i>Mucuna pruriens</i>	seed	Tamilnadu, North India	d	500	150
145	Musumusuk	<i>Mukia scabrella</i>	full	Tamilnadu, Keralam	d	100	60
146	Jathi/ponnaampoo	<i>Myristica dactyloides</i>	flower	Tamilnadu, Keralam	d	100	200
147	Pattiripoo, Adaikkapaine	<i>Stereospermum chelonoides</i>		Keralam		50	100
148	Chathuramulla	<i>Myxopyrum smilacifolium</i>	full	Keralam	d	1	100
149	Thamara	<i>Nelumbo nucifera</i>	flower, seed	Tamilandu		10	200
150	Orila thamara	<i>Nervilia concolor</i>	full	Tamilnadu		1	300
151	Karimkurinji	<i>Nilgiranthus ciliates</i>		Tamilnadu, Keralam	d	400	60
152	Aambal	<i>Nymphaea nouchali</i>	root	Tamilnadu, Keralam	d	10	100
153	Kattuthulasi	<i>Ocimum gratissimum</i>	full	Tamilnadu, Keralam	d	10	60
154	Krsihna Thulasi	<i>Ocimum tenuiflorum</i>	full	Tamilnadu, Keralam	d	100	60
155	Parppidakappullu	<i>Oldenlandia corymbosa</i>	full	Tamilnadu	d	100	300
156	Njavara rice	<i>Oryza sativa</i>	full	Tamilnau		1000	50
157	Palakapayyanni	<i>Oroxylum indicum</i>	root	Keralam	d	400	70
158	Puliyarila	<i>Oxalis corniculata</i>		Keralam		10	70
159	Pali, Palikkuru	<i>Palaquium ellipticum</i>	full	Keralam	d	1	500
160	Pookaitha	<i>Pandanus odoratissimus</i>	root	Tamilnadu, Keralam	d	100	50
161	Chamayari	<i>Panicum miliaceum</i>		Tamilnadu		50	140
162	Velipparuthi	<i>Pergularia daemia</i>	full	Tamilnadu, Keralam	d	20	80
163	Thina	<i>Setaria italica</i>				10	
164	Kattupayar	<i>Phaselous trilobus</i>	full	Keralam	d	10	100
165	Chittenthal	<i>Phoenix pusilla</i>	root	Tamilnadu	d	40	60
166	Keezharnelli	<i>Phyllanthus amarus</i>	full	Tamilnadu, Keralam	d	30	100
167	Thippali	<i>Piper longum</i>	seed	North India	d	100	1200
168	Kurumulaku	<i>Piper nigrum</i>	seed	Keralam, Tamilnadu	d	1000	500
169	Chukku	<i>Zingiber officinale</i>	seed	Keralam	d	800	
170	Koduveli	<i>Plumbago indica</i>	root	Keralam	d	300	300

171	Pachotti	<i>Pogostemon heyneanus</i>	Bark	Keralam	d	200	160
172	Ungu	<i>Pongamia pinnata</i>	full	Keralam, Tamilnadu	d	200	50
173	Munja	<i>Premna mollissima</i>	root	Keralam, Tamilnadu	d	400	60
174	Moovila	<i>Pseudarthria viscida</i>	root	Keralam, Tamilnadu	d	400	120
175	Venga	<i>Pterocarpus marsupium</i>	wood	Tamilnadu	d	400	40
176	Rakthachandhanam	<i>Pterocarpus santalinus</i>	wood	Tamilnadu	d	300	400
177	Karimgotta	Quassia indica	oil	Keralam	NA	100	1000
178	Anathippali	<i>Rhaphidophora pertusa</i>	full	Keralam	d	200	300
179	Sarppagandhi. Amalpori	<i>Rauvolfia serpentina</i>	root	West bengal	d	600	950
180	Karkidakasringi	<i>Rhus succedanea</i>	seed	Tamilnadu, Karnadaka	d	100	200
181	Aavanakku	<i>Ricinus communis</i>	root	Keralam	d	200	300
182	Kallorvanchi	<i>Rotula aquatica</i>		Keralam	d	100	300
183	Manchatti	<i>Rubia cordifolia</i>	root	Iran	d	300	500
184	Ponkorandi	<i>Salacia reticulata</i>	root	Tamilnadu	d	500	300
185	Chandhanam	<i>Santalum album</i>	wood	Keralam	d	100	1200
186	Soapinkai	<i>Sapindus trifoliatus</i>	seed	Tamilnadu	d	50	100
187	Asokam	<i>Saraca asoca</i>	bark	Tamilnadu, Keralam, North India	d	60	100
188	Odal	<i>Sarcostigma kleinii</i>	seed	Keralam, Orrisa	d	10	200
189	Cherkkuru	<i>Semecarpus anacardium</i>	seed	Tamilnadu	d	30	60
190	Ellu	<i>Sesamum indicum</i>	seed	Tamilnadu, Keralam, North India	d	500	200
191	Kurumthotti	<i>Sida cordifolia</i>	full	Tamilnadu	d	1	80
192	Putharichunda	<i>Solanum anguivi</i>	root	Tamilnadu	d	300	70
193	Aanachunda	<i>Solanum torvum</i>	root	Tamilnadu	d	100	70
194	Cheruchunda	<i>Solanum anguivi</i>	root	Tamilnadu	d	300	70
195	Njerinjampuli	<i>Solena amplexicaulis</i>	root	Keralam	d	10	100
196	Poopathiri	<i>Stereospermum tetragonum</i>	root	Keralam	d	10	40
197	Padarchunda	<i>Solanum trilobatum</i>	full	Keralam, Tamilnadu	d	30	200
198	Kanjiram	<i>Strychnos nux-vomica</i>	root	Keralam, Tamilnadu	d	100	200

199	Thettamparal	<i>Strychnos potatorum</i>		Keralam, Tamilnadu		300	40
200	Njaval	<i>Syzygiumcumini</i>		Tamilnadu, Keralam		300	80
201	Valanpuli	<i>Tamarindus indica</i>		Tamilnadu		0	0
202	Neermaruth	<i>Terminalia arjuna</i>		Tamilnadu		100	100
203	Thanni	<i>Terminalia bellirica</i>	fruit rind	Tamilnadu	d	600	100
204	Kadukka	<i>Terminalia chebula</i>	seed	Tamilnadu, North India	d	1000	100
205	Chittamruth	<i>Tinospora cordifoila</i>	full	Kerala, Tamilnadu	d	1500	30
206	Kattamruth	<i>Tinospora malabarica</i>	full	Kerala, Tamilnadu	d	100	30
207	Ayamodhakam	<i>Trachyspermumroxburghianum</i>	seed	North India, Tamilnadu	d	600	200
208	Kodithuva	<i>Tragia involucrata</i>	full	Kerala, Tamilnadu	d	250	200
209	Njerinjil	<i>Tribulus terrestris</i>	seed	Tamilnadu	d	500	180
210	Padavalam	<i>Trichosanthes Anguina</i>	fruit	Kerala, Tamilnadu	d	500	300
211	Kattupadavalam	<i>Trichosanthes lobata</i>	fruit	Kerala, Tamilnadu	d	500	300
212	Aattudharbha	<i>Desmostachya bipinnata</i>	Whole plant	Kerala, Tamilnadu		10	140
213	Cheriya orila	<i>Uraria lagopodoides</i>		Kerala, Tamilnadu		0	100
214	chuvanna aratha	<i>Alpinia galanga</i>		Delhi		0	200
215	Vempadappatta	<i>Ventilago maderaspatana</i>	root	North India	d	200	450
216	Puvankurunal	<i>Vernonia cinerea</i>	full	Keralam	d	120	50
217	Thottavadi	<i>Mimosa pudica</i>				100	
218	Kattupayar	<i>Vigna pilosa</i>	full	Keralam	d	50	150
219	Kattuzhunnu	<i>Vigna vexillata</i>	full	Keralam, Tamil Nadu	d	50	150
220	Karinochi	<i>Vitex negundo</i>	root	Keralam, Tamil Nadu	d	50	100
221	Dhanthappala	<i>Wrightia tinctoria</i>	leaf	Keralam, Tamil Nadu	d	40	60
222	Thathiri	<i>Woodfordia fruticosa</i>	flower	Uttarpradesh	d	200	90
223	Kattinchi	<i>Zingiber zerumbet</i>	root	Keralam	d	200	70

Appendix 3 A supply chain format out flow and inflow for collecting the source of data, selling network and marketing strategies of raw drugs

Name and address of the Angadikkada (Whole sale/ Retail) Small, Medium and large (√)	Angadi Pachamarunnu Kada (Raw material shops) (Dried and fresh medicinal plants, by products, value added products extracts and finished products if any. Supply Chain Source - within the forest/Outside the forest (In Flow)	Phone & Email, Name of the Owner	
Chanel- 1 Direct supply (Outside/Inside the forest)	→ Individual (Plant collectors → Direct supply → Mode of transportation	Buying price → Unit/Kilo →	Angadi Pachamarunnu Kada (inflow)
Chanel- 2 Local Collection (Outside/Inside the forest)	→ Individual (Plant collectors) → Collection point → Received by Agencies/Society/ Middlemen → Mode of transportations	Buying price → Unit/Kilo →	
Chanel-3 Local Collection (Inside the forest)	→ Individual /Group (Plant collectors)VSS, EDC, Oorukoottam → Collection point → Received by Agency/Society/ Middleman → Mode of transportations	Buying price → Unit/Kilo →	

Chanel- 4 From cultivation filed Farmers /Women group/Kudumbashree	Direct supply → collection point → Received by Agency/ Society/ Middleman → Mode of transportations	Buying price → Unit/Kilo →	
Chanel -5 Outside the state/ Country Import	From where they are collecting Address, email, Phone Details of raw materials(Species/by products wise) → Nature of supply by Air, Rail, Ship, Road	Buying price → Unit/Kilo →	
Chanel-6 Any other source, provide details ((inflow)	From where they are collecting Address, email, Phone Details of raw materials (Species/ by products wise) → Nature of supply by Air, Rail, Ship, Road	Buying price → Unit/Kilo →	

Name and Address of the Angadikkada (Whole sale) Supply Chain ↓	Angadi Pachamarunnu Kada (Raw material shops) (Dried and fresh medicinal plants, by products, value added products extracts and finished products if any.) Supply Chain ↓			Phone & Email, Name of the Owner
Whole sale → Small, Medium and Large Manufactures of AYUSH drugs. Buyers Name & Address Phone Number email Outflow ↓				
Items	Within the state(Rs)	Outside the state (Rs)	Outside the country (Export items) (Rs)	Grand Total
Total Annual Selling Price (Dried and Fresh) + By Products + Semi Processed Products + Value Added Products + Extracts →				
(Out Flow) Retail ↓				Total Annual Selling Price
Small Scale Manufactures	1) Sales, based on prescription (Individuals) →			
	2) Sales based on individual request (Species level, By products, Semi Processed Products Value Added Products) →			
Medium Scale Manufactures	1) Sales based on prescription (Individuals) →			
	2) Sales based on individual request →			
	3) AYUSH drug manufactures Selling price (Species level, By products, semi processed products value added products, Semi processed items) →			
Large Scale Manufactures →	1) Sales based on prescription (Individuals) →			
2) Sales based on individual request →				
3) AYUSH manufacturing Units (Small, Medium & Large) →				
4) AYUSH Hospitals/ Dispensary Selling price (Species level, By Products, Semi Processed Products Value Added Products) →				

Appendix 4. List of medicinal plants resources and value added products sold through Angadi Pachamarunnukada.

SL. No	Common Name	Scientific name	Parts used
1.	Kunni	<i>Abrus precatorius</i>	Root
2.	Karingali	<i>Acacia catechu</i>	Bark
3.	Cheevaikka	<i>Acacia concinna</i>	Fruit
4.	Karivelam	<i>Acacia nilotica</i>	Bark
5.	Karinja	<i>Acacia pennata</i>	Bark
6.	Cheenikkaya	<i>Acacia sinuata</i>	Fruit
7.	Incha	<i>Acacia torta</i>	Bark
8.	Kuppameni	<i>Acalypha indica</i>	Leaf
9.	Kadaladi	<i>Achyranthus aspera</i>	Root
10.	Vayambu	<i>Acorus calamus</i>	Rhizome
11.	Nanmukhappullu	<i>Actiniopteris radiata</i>	Leaf
12.	Manjadi	<i>Adenantha pavonina</i>	Root
13.	Chittadalodakam	<i>Adhatoda beddomei</i>	Root
14.	Aadalodakam	<i>Justicia adhatoda</i>	Root
15.	Koovalam	<i>Aegle marmelos</i>	Root
16.	Cheroola	<i>Aerva lanata</i>	Whole plant
17.	Perumaratholi	<i>Ailanthus triphysa</i>	Bark
18.	Ankolam	<i>Alangium salviifolium</i>	Fruit
19.	Kattarvazha	<i>Aloe vera</i>	Whole plant
20.	kolinchi/Chittaratha	<i>Alpinia galanga</i>	Rhizome
21.	Chittarartha	<i>Alpinia calcarata</i>	Rhizome
22.	Ezhilampala	<i>Alstonia scholaris</i>	Root
23.	Kattelam /Vempadapatta	<i>Amomum subulatum</i>	Bark
24.	Kattuchena	<i>Amorphophallus paeniifolius</i>	Rhizome
25.	Andipparippu	<i>Anacardium occidentale</i>	Seed
26.	Pathala garudi/pollakkaya	<i>Anamirta cocculus</i>	Seed
27.	Kiriyathu	<i>Andrographis paniculata</i>	Whole plant
28.	Maravuri	<i>Antiaris toxicaria</i>	Bark
29.	Omam	<i>Apium graveolens</i>	Seed
30.	Erumakkalli	<i>Argemone mexicana</i>	Whole plant
31.	Aaduthindappala	<i>Aristolochia Bracteata</i>	Root
32.	Garudakodi	<i>Aristolochia indica</i>	Root
33.	Sathavari	<i>Asparagus racemosus</i>	Tuberous root

34.	Kattumuthira	<i>Atylosia scarabaeoids</i>	Seed
35.	Veppinpatta	<i>Azhardirecta indica</i>	Bark
36.	Yasankinveru	<i>Azima tetracantha</i>	Root
37.	Brahmi	<i>Bacopa Monnieri</i>	Whole plant
38.	Athithippali	<i>Balanophora fungosa</i>	Fruit
39.	Nagadanthi	<i>Baliospermum solanifolium</i>	Root
40.	Mula	<i>Bambusa bambos</i>	Seed
41.	Neykumpalam	<i>Benincasa hispida</i>	Fruit
42.	Elavu	<i>Bombax ceiba</i>	Gum
43.	Thazhuthama	<i>Boerhavia diffusa</i>	Whole plant
44.	Panamkalkandam	<i>Borassus flabellifer</i>	Product
45.	Thaarthaval	<i>Spermacoce hispida</i>	Root
46.	Sambrani/Kungilyam	<i>Boswellia serrata</i>	Gum
47.	Ellu	<i>Brassica juncea</i>	Seed
48.	Chamatha/Plash	<i>Butea monosperma</i>	Bark
49.	Kazhanchi	<i>Caesalpinia bonduc</i>	Seed
50.	*Chappangam/Pathimugam	<i>Caesalpinia sappan</i>	Wood
51.	*Erukku	<i>Calotropis gigantea</i>	Root
52.	Thellippayin/Karutha kunthirikkam	<i>Canarium strictum</i>	Gum
53.	Uzhinja	<i>Cardiospermum halicacabum</i>	Whole plant
54.	Chinnamukkiyila	<i>Cassia angustifolia</i>	Root
55.	Aavaram/Ponnaveeram	<i>Cassia auriculata</i>	Flower
56.	Kanikonna	<i>Cassia fistula</i>	Bark
57.	Devadaaram	<i>Cedrus deodara</i>	Wood
58.	Cherupunnayari	<i>Celastrus paniculatus</i>	Seed
59.	Peenari	<i>Sterculia foetida</i>	Bark
60.	Kudangal/Kodakan	<i>Centalla asiatica</i>	Whole plant
61.	Perumkurumpaveru	<i>Chonemorpha macrophylla</i>	Root
62.	Ramacham	<i>Chrysopogon zizanioides</i>	Root
63.	Pacha Karpooram	<i>Cinnamomum camphora</i>	Gum
64.	*Ilavarngam	* <i>Cinnamomum malabatum</i>	Bark
65.	Karuva/ Vayanapoo	<i>Cinnamomum verum</i>	Bark
66.	Changalam Paranda	<i>Cissus quadrangularis</i>	Stem
67.	Kattuvellari	<i>Citrullus colocynthis</i>	Fruit
68.	Naivela /Thaivela	<i>Cleome gynandra</i>	Seed
69.	Cheruthekkuru veru	<i>Clerodendrum serratum</i>	Root
70.	GulGulu	<i>Commiphora wightii</i>	Gum

71.	Maramanjai	<i>Coscinium fenestratum</i>	Bark
72.	Koval	<i>Coccinia grandis</i>	Whole plant
73.	Channakoova	<i>Costus speciosus</i>	Rhizome
74.	Neermathalam	<i>Crateva nurvala</i>	Bark
75.	Neervalam	<i>Croton tiglium</i>	Seed
76.	Karkokil Ari	<i>Cullen corylifolium</i>	Seed
77.	Jeerakam	<i>Cuminum cyminum</i>	Seed
78.	Nilappana	<i>Curculigo orchioides</i>	Tuberous root
79.	Kasthurimanjal	<i>Curcuma aromatica</i>	Rhizome
80.	Manjal	<i>curcuma domestica</i>	Rhizome
81.	Kudamanjal	<i>Curcuma longa</i>	Rhizome
82.	Kachooram Manjakoova	<i>Curcuma zedoaria</i>	Rhizome
83.	Eenthappana	<i>Cycas circinalis</i>	Fruit
84.	Padathali	<i>Cyclea peltata</i>	Tuberous root
85.	Chonakappullu	<i>Cymbopogon citratus</i>	Whole plant
86.	Karuka	<i>Cynodon dactylon</i>	Whole plant
87.	Muthanga	<i>Cyperus rotundus</i>	Tuberous root
88.	Ummam	<i>Datura stramonium</i>	Fruit
89.	Kooramkolly, Koomullu	<i>Caesalpinia mimosoides</i>	
90.	Orila	<i>Desmodium gangeticum</i>	Root
91.	Aattudharbha	<i>Desmostachya bipinnata</i>	Root
92.	Kalppain	<i>Dipterocarpus indicus</i>	Wood
93.	Karakil	<i>Dysoxylum ficiforme</i>	Wood
94.	Vellakil	<i>Dysoxylum malabaricum</i>	Wood
95.	Kaithonni	<i>Eclipta prostrata</i>	Whole plant
96.	Anachuvadi	<i>Elephantopus scaber</i>	Whole plant
97.	Elam	<i>Elettaria cardamomum</i>	Seed
98.	Koovaragu	<i>Eleusine coracana</i>	Seed
99.	Vizhalari	<i>Embelia ribes</i>	Seed
100.	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind
101.	Kakkumkai	<i>Entada rheedii</i>	Seed kernal
102.	Nilamppala	<i>Euphorbia thymifolia</i>	Whole plant
103.	Vishnukranthi	<i>Evolvulus alsinoides</i>	Whole plant
104.	Peral	<i>Ficus benghalensis</i>	Bark
105.	Athi	<i>Ficus racemosa</i>	Bark
106.	Arayal	<i>Ficus religiosa</i>	Bark
107.	Ithi	<i>Ficus retusa</i>	Bark
108.	Mulli, Agori, Vayyamkatha	<i>Flacourtia indica</i>	Fruit
109.	Kayam	<i>Foeniculum vulgare</i>	Gum

110.	Kudampuli/Malabaripuli	<i>Garcinia cambogia</i>	Fruit
111.	Kudampuli	<i>Garcinia gummi-gutta</i>	Fruit
112.	Karinthali	<i>Geophila repens</i>	Whole plant
113.	Irattimadhuram	<i>Glycyrrhiza glabra</i>	Root,Stem
114.	Kumpil/Kumizhu	<i>Gmelina arborea</i>	Bark
115.	Chakkarakolli	<i>Gymnema sylvestre</i>	Leaf
116.	Chittelam/Vatham parathi	<i>Heracleum rigens</i>	Seed
117.	Idampiri/ Valampiri	<i>Helicteres isora</i>	Fruit
118.	Thekkada vere	<i>Heliotropium indicum</i>	Root
119.	Narunandi	<i>Hemidesmus indicus</i>	Tuberous root
120.	Chittelam/Vatham parathi	<i>Heracleum rigens</i>	Seed
121.	Kudakappala	<i>Holarrhena pubescens</i>	Seed
122.	Aaviltholi	<i>Holoptelia integrifolia</i>	Bark
123.	Adakodiyam	<i>Holostemmaada-kodien</i>	Tuberous root
124.	Barley/Yavam	<i>Hordeum vulgare</i>	Seed
125.	Karthottyveru	<i>Hugonia mystax</i>	Root
126.	Vayalchulli	<i>Hygrophila auriculata</i>	Whole plant
127.	Palvally	<i>Ichnocarpus frutescens</i>	Tuberous root
128.	Thakkolam	<i>Illicium verum</i>	Fruit
129.	Neelamari	<i>Indigofera tinctoria</i>	Leaf
130.	Paalmuthak	<i>Ipomoea mauritiana</i>	Tuberous root
131.	Thiruthali	<i>Ipomoea obscura</i>	Whole plant
132.	Pulichuvadi	<i>Ipomoea pes-tigridis</i>	Whole plant
133.	Thetti veru	<i>Ixora coccinea</i>	Root
134.	Adalodakam	<i>Justicia adhatoda</i>	Root
135.	Kacholam	<i>Kaempferia galanga</i>	Rhizome
136.	Changazhineer kizhangu	<i>Kaempferia rotunda</i>	Tuberous root
137.	Aasali	<i>Lepidium sativum.</i>	Seed
138.	Kaakoli	<i>Lilium polyphyllum</i>	Bulb
139.	Peechinga	<i>Luffa aegyptiaca</i>	Fruit
140.	Mutira	<i>Macrotyloma uniflorum</i>	Seed
141.	Ilippa	<i>Madhuca neriifolia</i>	Wood
142.	Peenari	<i>Nothapodytes nimmoniana</i>	Bark
143.	Jeevakam	<i>Malaxis rheedii</i>	Rhizome
144.	Prasarini	<i>Merremia tridentata</i>	Whole plant
145.	Nagapoo	<i>Mesua ferrea</i>	flower
146.	Karimkoovalam	<i>Monochoria vaginalis</i>	Whole plant

147.	Naikkurunam	<i>Mucuna pruriens</i>	Seed
148.	Musumusukk	<i>Mukia maderaspatana</i>	Whole plant
149.	Jathipathri	<i>Myristica malabarica</i>	Aril
150.	Jadamchi	<i>Nardostachysjatamansi</i>	Root
151.	Thamara	<i>Nelumbo nucifera</i>	Flower
152.	Karimjeerakam	<i>Nigella sativa</i>	Seed
153.	Aampal	<i>Nymphaea nouchali</i>	Flower
154.	Kattuthulasi	<i>Ocimum gratissimum</i>	Root
155.	Thulasi	<i>Ocimum tenuiflorum</i>	Leaf
156.	Parppidakapullu	<i>Oldenlandia corymbosa</i>	Whole plant
157.	Palakapayyanni	<i>Oroxylum indicum</i>	Root
158.	Njavara	<i>Oryza sativa</i>	Seed
159.	Puliyarila	<i>Oxalis corniculata</i>	Whole plant
160.	Pookaitha	<i>Pandanus odoratissimus</i>	Root
161.	Chamayari	<i>Panicum miliare</i>	Seed
162.	Chiteenthal	<i>Phoenix pusilla</i>	Root
163.	Keezharnelli	<i>Phyllanthus amarus</i>	Whole plant
164.	Nellikka	<i>Phyllanthus emblica</i>	Fruit rind
165.	Arenukam	<i>Corchorus trilocularis</i>	Seed
166.	Thippali	<i>Piper longum</i>	Fruit
167.	Kurumulaku	<i>Piper nigrum</i>	Seed
168.	Chuvannakoduveli	<i>Plumbago zeylanica</i>	Tuberous root
169.	Pacholi	<i>Pogostemon heyneanus</i>	Leaf
170.	Unge	<i>Pongamia pinnata</i>	Bark
171.	Munja	<i>Premna serratifolia</i>	Root
172.	Badham	<i>Prunus dulcis</i>	Fruit
173.	Moovila	<i>Pseudarthria viscida</i>	Root
174.	Venga	<i>Pterocarpus marsupium</i>	Wood
175.	Rakthachandanam	<i>Pterocarpus santalinus</i>	Wood
176.	sarppagandhi/amalppori	<i>Rauwolfia serpentina</i>	Root
177.	Kattuthipali	<i>Rhaphidophora pertusa</i>	Fruit
178.	Karkidakasringi	<i>Pistacia chinensis</i>	Leaf
179.	Aavanakku	<i>Ricinus communis</i>	Root
180.	Kallurvanchi	<i>Rotula aquatica</i>	Whole plant
181.	Manchatti	<i>Rubia cordifolia</i>	Root
182.	Ponkorandi	<i>Salacia reticulata</i>	Root
183.	Chandhanam	<i>Santalum album</i>	Wood
184.	Soapinkaya	<i>Sapindus trifoliatus</i>	Fruit
185.	Asokam	<i>Saraca asoca</i>	Bark
186.	Kottam	<i>Saussurea costus</i>	Root
187.	Odalkkuru	<i>Sarcostigma kleinii</i>	Seed

188.	Somalatha	<i>Sarcostemma acidum</i>	Whole plant
189.	Poovanam	<i>Schleichera oleosa</i>	Seed
190.	Cherkuru, Themprakkai	<i>Semecarpus anacardium</i>	Seed
191.	Thakara	<i>Senna tora</i>	Root
192.	Ellu	<i>Sesamum indicum</i>	Seed
193.	Thina	<i>setaria italica</i>	Seed
194.	Cheruparuva	<i>Sida acuta</i>	Root
195.	Kurumthotti	<i>Sida cordata</i>	Root
196.	Ven kurunthotti	<i>Sida cordifolia</i>	Root
197.	Kattooram	<i>Sida spinosa</i>	Root
198.	Kurumthotti	<i>Sida rhombifolia</i>	Root
199.	Putharichunda	<i>Solanum anguivi</i>	Root
200.	Njerinjampuli	<i>Solena amplexicaulis</i>	Fruit
201.	Poopathiri	<i>Stereospermum tetragonum</i>	Bark
202.	Paruva maram	<i>Streblus asper</i>	Bark
203.	Karimkurinji	<i>Nilgirianthus ciliatus</i>	Root
204.	Kanjiram	<i>Strychnos nux vomica</i>	Seed
205.	Thettamparal	<i>Strychnos potatorum</i>	Seed
206.	Pachotti	<i>Symplocos cochinchinensis</i>	Bark
207.	Grampoo	<i>Syzygium aromaticum</i>	Flower bud
208.	Njaval	<i>Syzygium cumini</i>	Fruit
209.	Valanpuli	<i>Tamarindus indica</i>	Fruit
210.	Neermaruth	<i>Terminalia arjuna</i>	Bark
211.	Thanii	<i>Terminalia bellirica</i>	Fruit rind
212.	Kadukka	<i>Terminalia chebula</i>	Fruit rind
213.	Alpam	<i>Thottea siliquosa</i>	Root
214.	Chittamruth	<i>Tinospora cordifolia</i>	Stem
215.	Kattamruthe	<i>Tinospora malabarica</i>	Stem
216.	Chandana vembu	<i>Toona ciliata</i>	Bark
217.	Ayamodhakam	<i>Trachyspermum ammi</i>	Seed
218.	Kodithuva veru	<i>Tragia involucrata</i>	Root
219.	Njerinjil	<i>Tribulus terrestris</i>	Fruit
220.	Padavalam	<i>Trichosanthes cucumerina</i>	Whole plant
221.	Kattupadavalam	<i>Trichosanthes lobata</i>	Whole plant
222.	Uluvaa	<i>Trigonella foenum-graecum</i>	Seed
223.	Soochi gothambe	<i>Triticum aestivum</i>	Seed
224.	Vallippala	<i>Tylophora indica</i>	Leaf
225.	Elephant Grass, Aanapullu	<i>Typha elephantina</i>	Whole plant
226.	Cheriyar orila	<i>Uraria lagopodoides</i>	Root
227.	Thagaram	<i>Valeriana wallichii</i>	Root

228.	Chuvannaratha	<i>Vanda tessellata</i>	Whole plant
229.	Vella Kunthirikkam	<i>Vateria indica</i>	Gum
230.	Vempadappatta	<i>Ventilago maderaspatana</i>	Bark
231.	Poovankurunnal	<i>Vernonia cinerea</i>	Whole plant
232.	Ramacham	<i>Chrysopogon zizanioides</i>	Root
233.	Kattupayar	<i>Vigna pilosa</i>	Whole plant
234.	Kattuzhunnu	<i>Vigna vexillata</i>	Whole plant
235.	Karinochi	<i>Vitex negundo</i>	Leaf
236.	Unakkamunthiri	<i>Vitis vinifera</i>	Fruit
237.	Amukkooram	<i>Withania Somnifera</i>	Root
238.	Thathiri	<i>Woodfordia fruticosa</i>	Flower
239.	Vettupala/Danthapala	<i>Wrightia tinctoria</i>	Leaf
240.	Mullilam, Thumpoonalary	<i>Zanthoxylum.armatum</i>	Seed
241.	Chuuku	<i>zingiber officinale</i>	Rhizome(Dry)
242.	Kattinchi	<i>Zingiber zerumbet</i>	Rhizome

EXPORT OF BIORESOURCES BASED PRODUCTS

Tracing the bio-resources back to their source location is essential as the Biodiversity Act mandates that 95% of the benefits received are to be shared with the providers of the bio-resources. Identifying the providers of the bio-resources, their source locations or even the BMC is an integral part of the ABS process, to ensure the effective implementation of the benefit-sharing mechanism. When premium brands procure the produce, they ensure that certain standards and prerequisites are met, which are guaranteed through traceability. Such an assurance can raise the potential for export, especially to developed markets. In the absence of traceability, it is difficult to calculate the revenue from export of bioresources through ports. The present chapter gives a detailed analysis of export of Agricultural and process food products. **The data is obtained from APEDA and Cochin chamber of commerce but it is stressed that although the bioresources are being exported through the ports located in Kerala, the source of origin of cultivation need not be Kerala, and the data is indicative only.**

7.1 Agricultural and Processed Food products

The data of export of Agricultural and processed food products was collected from Agricultural and Processed Food Products Export Development Authority (APEDA) and is based on exports from Kerala ports, hence the source of origin may not be Kerala. 25 items were exported via various ports from Kerala from 2015-2021.

Non-Basmati Rice exported from Kerala via Cochin Sea, Cochin airport, ICD Kottayam Kerala, and Trivandrum airport to 47 countries. The statistical analyzes of export of Non-Basmati Rice revealed that it increased from 2015-16 to 2018-19 i.e., 51,544.22 MTs to 58,895.92 MTs and the income generated was Rs. 18,986.53 lakhs to 25,803.98 lakhs. In 2019-2020 and 2020-2021 the respective amounts were Rs. 24,293.30 and 33,286.07 lakhs.

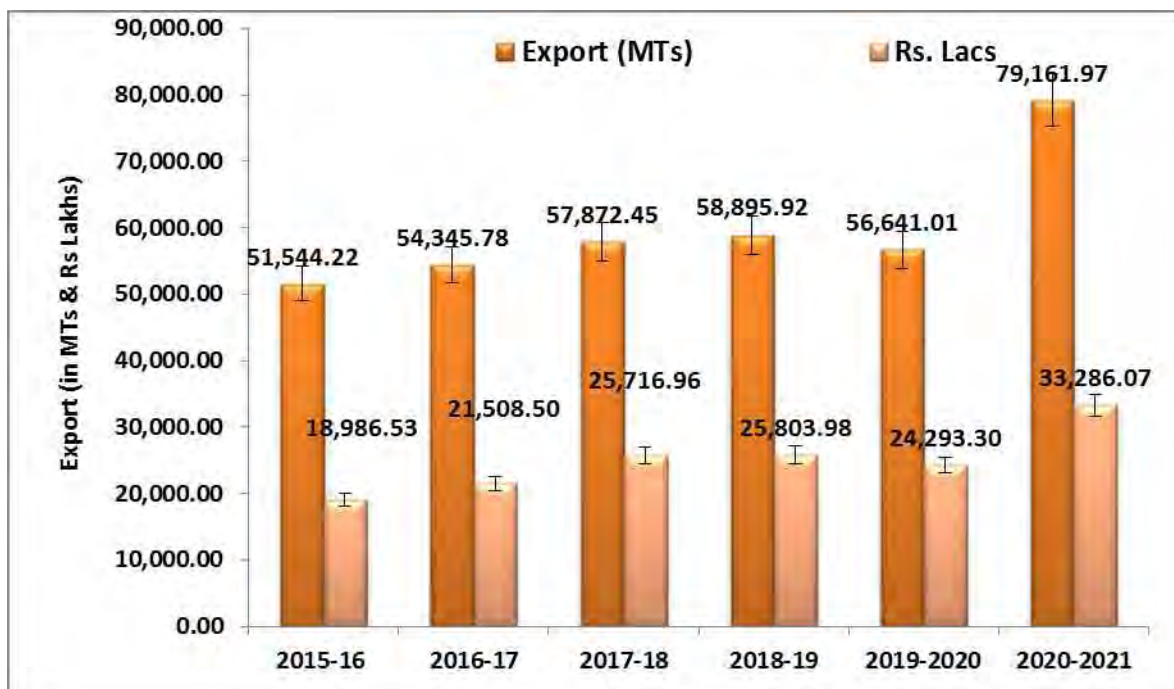


Fig 7.1 Non-Basmati Rice exports in terms of MTs and money earned in lakhs from 2015-2021

Cereal Preparations Rolled/Flaked Grains of Oats, Malted Milk (Including Powder) exported from Kerala during 2019-2020 were 17,681.58 MTs via Cochin Sea, Cochin airport, SEZ Cochin, ACC Calicut, Karipur Airport, Vizhinjam Sea, and Trivandrum airport to 39 countries. Rs 18,330.38 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 17167.92 MTs (Rs. 17608.37 lakhs) and minimum via Trivandrum airport (15.23 MTs & 38.23 lakhs). The first two positions of countries were United Arab Emirates (4584.38 MTs & 3713.7 lakhs), USA (3023.78 MTs & 3938.16 lakhs) and the least was Kenya (0.02MTs & 0.01 lakhs).

During 2020-21 (April-February) Cereal Preparations Rolled/Flaked Grains of Oats, Malted Milk (Including Powder) exported from Kerala were 18,295.52 MTs via Cochin Sea, Cochin airport, SEZ Cochin, ACC Calicut, Karipur Airport, Vizhinjam Sea, and Trivandrum airport to 42 countries. Rs 21,439.81 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 18146.5 MTs (Rs. 21079.46 lakhs) and minimum via Trivandrum airport (11.57 MTs & 23.07 lakhs).

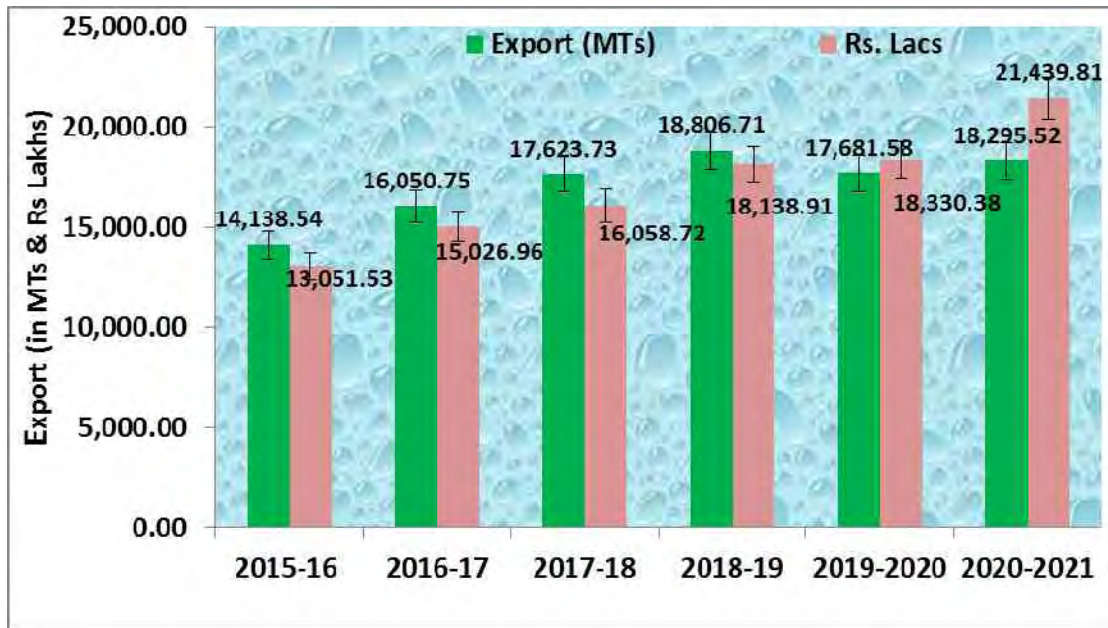


Fig 7.2 Cereal Preparations Rolled/Flaked Grains of Oats, Malted Milk (Including Powder) exports in terms of MTs and money earned in lakhs from 2015-2021 to various countries via different ports

Other cereals It included rye of seed quality , rye other ,barley of seed quality , barley other , oats of seed quality oats other , grain sorghum of seed quality , grain sorghum other than seed , buckwheat of seed quality , millet (jawar) of seed quality , buckwheat other than seed , millet (bajra) of seed quality , millet (ragi) of seed quality , millet (jawar) other than seed , millet (bajra) other than seed , millet (ragi) other than seed , millet (canary) of seed quality , millet (canary) other than seed , fonio (digitaria spp.) , quinoa(chenopodium quinoa) , triticale etc

Other cereals exported from Kerala during 2019-20 were 183.56 MTs via Cochin Sea, trivandrum airport and cochin airpoRT to 19 countries. Rs. 106.49 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 183.52 MTs (rs. 106.34 lakhs) and minimum via trivandrum airport (0.01 mts & 0.01 lakhs). The first two positions of countries were Saudi arab (27.44 mts & 18.02), Kuwait 23.03 mts & 16.9), and the least was Maldives (0.11 MTs & 0.01 lakhs).

During 2020-21 (April-February) the other cereals exported from Kerala were 359.9 MTs via Cochin Sea, Trivandrum airport to 20 countries. Rs. 213.52 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 359.8 MTs (Rs. 213.41 lakhs) and minimum via Trivandrum airport (0.1 MTs & 0.11 lakhs). The first two

positions of countries were U ARAB EMTS (117.66 MTs & 54.78), U S A (32.22 MTs & 28.83), and the least was COTE D IVOIRE (0.01 MTs & 0.01 lakhs).

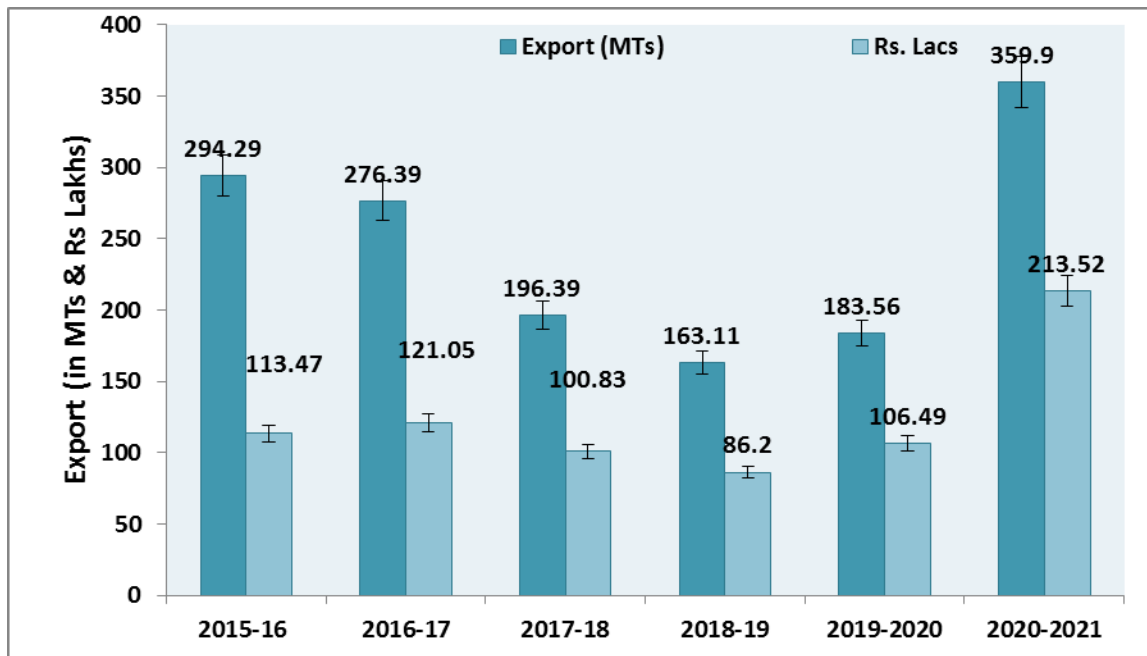


Fig 7.3 Other cereals exports in terms of MTs and money earned in lakhs from 2015-2021

Milled products It consists of Wheat/Meslin Flour, Wheat/Meslin Flour , Maize (Corn) Flour , Rye Flour , Other Cereal Flour Other Than That Of Wheat, Meslin, Rye, Maize (Corn) , Groats Of Wheat , Meal Of Wheat , Groats/Meal Of Maize (Corn) , Groats/Meal Of Cereals Other Than Wheat & Maize (Corn) Of Other Cereals . During 2020-21 (April-February) the Milled products exported from Kerala were 27,704.33 MTs via Cochin Sea and Trivandrum airport to 37 countries. Rs. 499.64 lakhs was earned via this trade in Kerala. Rs. 12,229.93 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 27700.43 MTs (Rs 12227.8 lakhs) and minimum via Trivandrum airport (0.55 MTs & 0.29 lakhs).

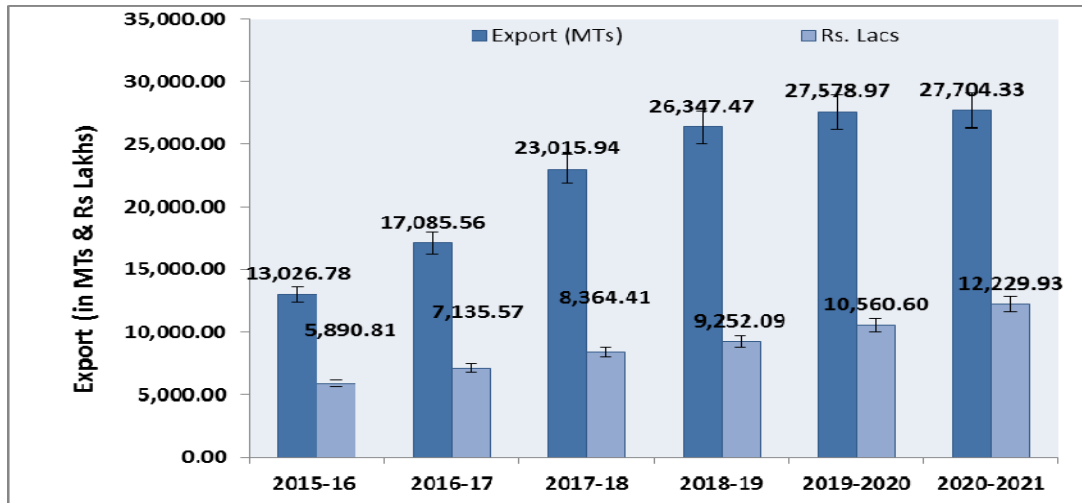


Fig 7.4 Milled products exports in terms of MTs and money earned in lakhs from 2015-2021

Betel Leaves & Nuts were exported via Cochin Sea, Cochin airport, Vizhinjam Sea, ACC Calicut, Karipur Airport and Trivandrum airport to 07 countries. The statistical analyzes of export revealed that it was decreased from 2015-16 to 2016-17 i.e., 222.95 MTs to 69.15 MTs and the income generated was Rs. 379.71 lakhs to 122.48 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 125.97, 36.4, 638.89 and 704.85 lakhs. During 2020-21 (April-February) the Betel Leaves & Nuts exported from Kerala were 188.05 MTs via Cochin Sea, Cochin airport, and Trivandrum airport to 9 countries. Rs. 704.85 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 186.54 MTs (Rs. 701.53 lakhs) and minimum via Cochin airport (0.09 MTs & 0.21 lakhs). The first two positions of countries were Maldives (166.72MTs & 649.25), Saudi Arabia (18 MTs & 45.9) and the least was USA (0.02 MTs & 0.02 lakhs).

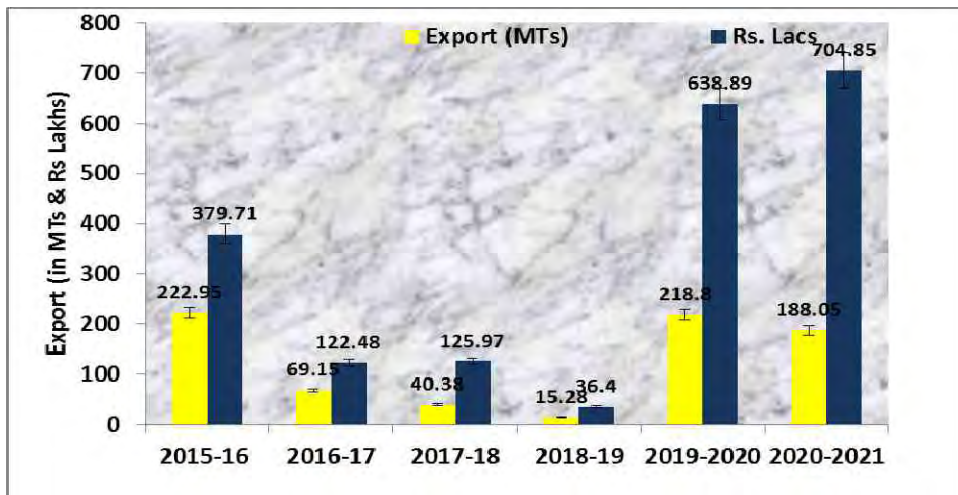


Fig 7.5 Betel Leaves & Nuts exports in terms of MTs and money earned in lakhs from 2015-2021

Cocoa Products exported from Kerala during 2015-16 were 4,155.18 MTs via Cochin Sea, Cochin airport and SEZ Cochin to 20 countries. The statistical analyzes of export of Cocoa Products revealed that it was highest during 2015-16 4155.18 MTs and earned an amount of Rs. 9197.39 lakhs. In 2016-17 the quantity of export was reduced to 197.68 MTs (Rs. 1776.98 lakhs). In 2017-18 and 2018-19 the respective values were 407.71 & 250.55 MTs; 2428.77 & 2128.18 lakhs. In 2019-2020 and 2020-2021 the respective amounts were Rs. 2441.54 and 1093.03 lakhs. During 2020-21 (April-February) the Cocoa Products exported from Kerala were 229.26 MTs via via Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, Trivandrum Airport and SEZ Cochin to 29 countries. Rs. 1,093.03 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 123.98 MTs (Rs. 717.58 lakhs) and minimum via ACC Calicut, Karipur Airport (0.03 MTs & 0.01 lakhs). The first two positions of countries were Netherland (52.96MTs & 306.85 lakhs), U ARAB EMTS (89.23 MTs & 233.72 lakhs), and the least was Qatar & Philippines (0.01MTs).

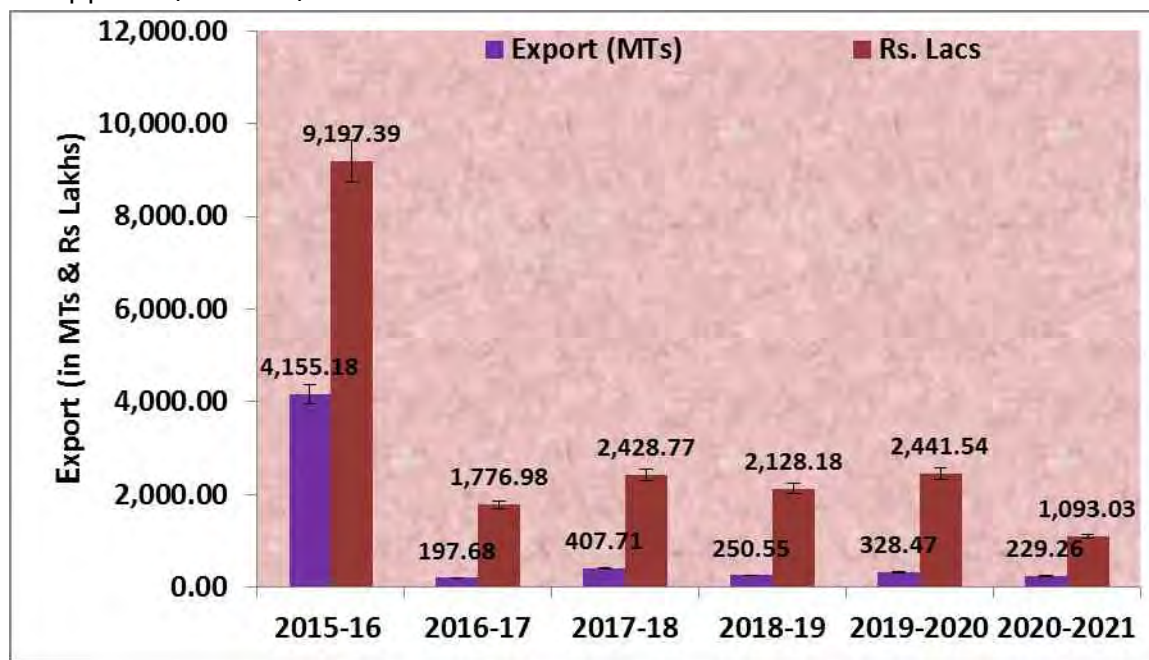


Fig 7.6 Cocoa Products exports in terms of MTs and money earned in lakhs from 2015-2021

Cucumber and Gherkins (Prepared & preserved) exported from Kerala during 2016-17 were 1.77 MTs via Cochin Sea, Cochin airport and ACC Calicut, Karipur Airport to 04 countries. The export was initiated from 2016-17 only. The statistical analyzes of export of Cucumber and Gherkins (Prepared & Preserved) revealed that it was increased from 2016-17 to 2017-18 i.e., 1.77 MTs to 3.06 MTs and the income generated was Rs. 0.84 lakhs to 0.62 lakhs. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 0.54, 0.81 and 15.34 lakhs. During 2020-21 (April-February) Cucumber and Gherkins (Prepared & Preserved) exported from Kerala were 26.08 MTs via Cochin Sea, Cochin airport and ACC Calicut, Karipur Airport to 5 countries. Rs. 15.34 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 24.77 MTs (Rs. 14.41 lakhs) and minimum via ACC Calicut, Karipur Airport (0.59 MTs & 0.4 lakhs). The first two positions of countries were United Arab Emts (17.03 MTs & 11.52), Kuwait (6.0 MTs & 2.29 lakhs) and the least was New Zealand (0.12 MTs & 0.12 lakhs).

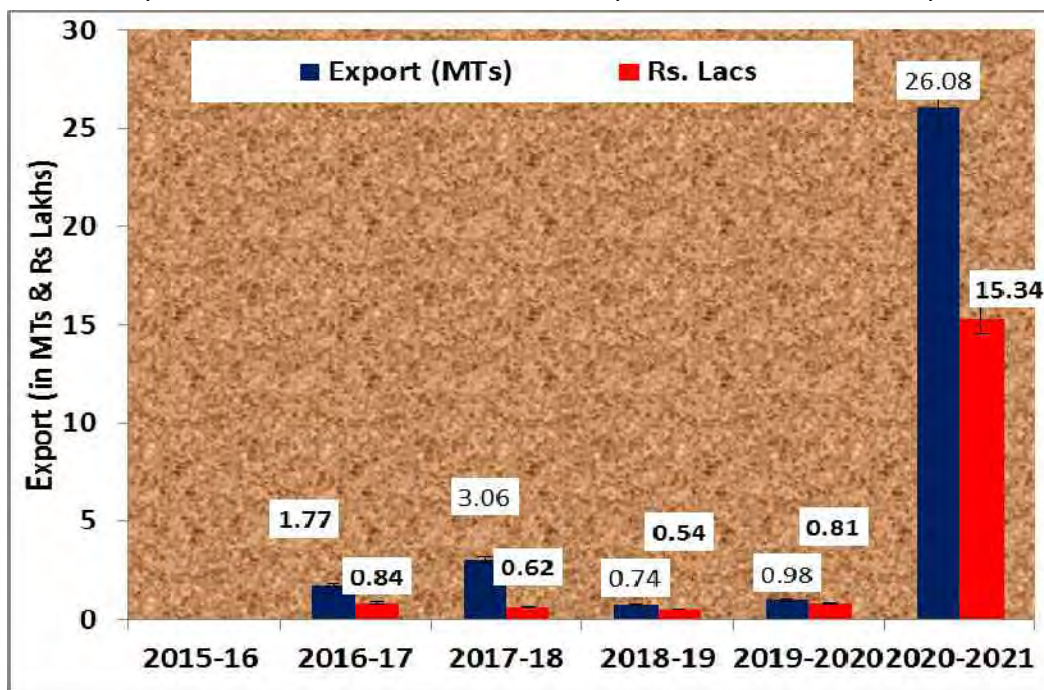


Fig 7.7 Cucumber and Gherkins (Prepared & Preserved) exports in terms of MTs and money earned in lakhs from 2015-2021

Total fruits & vegetables seeds According to FAO (2019), India is the largest producer of ginger and okra amongst vegetables and ranks second in production of potatoes, onions, cauliflowers, brinjal, Cabbages, etc. Amongst fruits, the country ranks

first in production of Bananas (26.08%), Papayas (44.05%) and Mangoes (including mangosteens and guavas) (45.89%). The vast production base offers India tremendous opportunities for export. During 2020-21, India exported fruits and vegetables worth Rs. 9,940.95 crores/ 1,342.14 USD Millions which comprised of fruits worth Rs. 4,971.22 crores/ 674.53 USD Millions and vegetables worth Rs. 4,969.73 crores/ 667.61 USD Millions.

Grapes, Pomegranates, Mangoes, Bananas, Oranges account for larger portion of fruits exported from the country while Onions, Mixed Vegetables, Potatoes, Tomatoes, and Green Chilly contribute largely to the vegetable export basket. The major destinations for Indian fruits and vegetables are Bangladesh, UAE, Netherland, Nepal, Malaysia, UK, Sri Lanka, Oman and Qatar. Though India's share in the global market is still nearly 1% only, there is increasing acceptance of horticulture produce from the country. exported from Kerala during 2015-16 were 123.79 MTs via Cochin Sea, Cochin airport and Trivandrum airport to 14 countries. The statistical analyzes of export of fruits & vegetables seeds revealed that it was increased from 2015-16 to 2017-18 i.e., 123.79 MTs to 195.78 MTs and the income generated was Rs. 610.13 lakhs to 1107.89 lakhs. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 1271.61, 817.8 and 499.64 lakhs. During 2020-21 (April-February) the total fruits & vegetables seeds exported from Kerala were 72.54 MTs via Cochin Sea, Cochin airport and SEZ Cochin to 9 countries. Rs. 499.64 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 66.14 MTs (Rs. 430.37 lakhs) and minimum via SEZ Cochin (0.01MTs & 0.19 lakhs). The first two positions of countries were Malaysia (63.15 MTs & 442.38), Singapore (5.0 MTs & 48.75) and the least was New Zealand (0.01MTs & 0.10 lakhs).

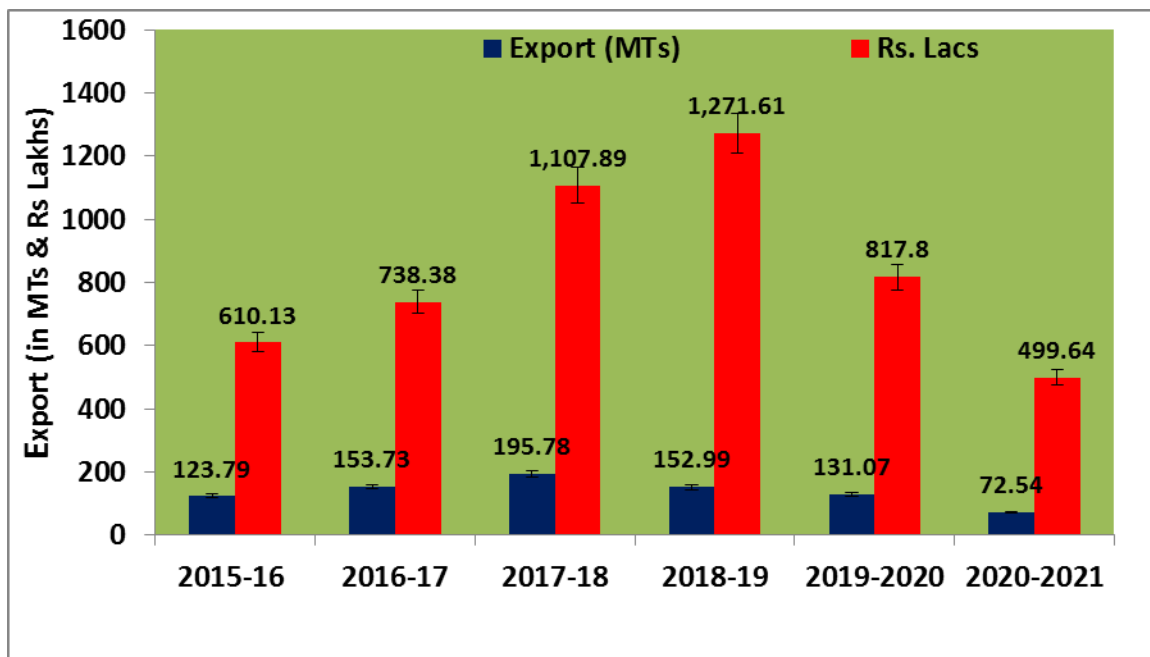


Fig 7.8 Fruits & vegetables seeds exports in terms of MTs and money earned in lakhs from 2015-2021

Groundnuts exported from Kerala via Cochin Sea, Vizhinjam Sea and Cochin airport to 4 countries. The statistical analyzes of export of Groundnuts revealed that it was increased from 2015-16 to 2016-17 i.e., 9.39 MTs to 46.25 MTs and the income generated was Rs. 4.25 lakhs to 40.84 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 2.17 (3.1 MTs), 2.84 (2.89 MTs), 1.13 (0.89 MTs) and 15.5 lakhs (15.44 MTs). In 2020-2021 Groundnuts export was improved than previous years. During 2020-21 (April-February) the Groundnuts exported from Kerala were 15.44MTs via via Cochin Sea to 02 countries. Rs. 15.5 lakhs was earned via this trade in Kerala. The two countries were U ARAB EMTS (10.03 MTs & 8.99) and OMAN (5.41MTs & 6.51 lakhs).

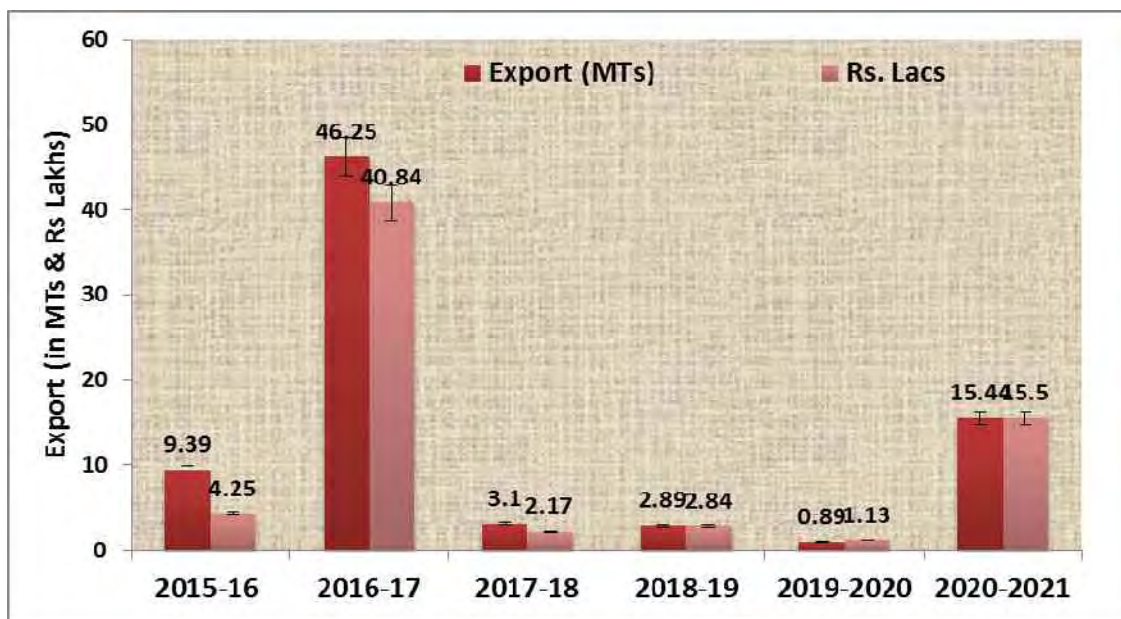


Fig 7.9 Groundnuts exports in terms of MTs and money earned in lakhs from 2015-2021

Processed Fruits, Juices & Nuts Raisins (Grapes Dried) exported from Kerala during 2015-16 were 6,422.8 0MTs via Cochin Sea, SEZ Cochin, Cochin airport, ICD Kottiyam Kerala, Vizhinjam Sea, ACC Calicut, Karipur Airport, ICD Thrissur, Kerala and Trivandrum airport to 30 countries. The statistical analyzes of export of Processed Fruits, Juices & Nuts Raisins (Grapes Dried) revealed that it was increased from 2015-16 to 2017-18 i.e., 6,422.80 MTs to 8,041.70 MTs and the income generated was Rs. 14,922.60 lakhs to 24,817.60 lakhs. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 19,701.95 (7150.34 MTs), 24,409.04 (8397.65 MTs) and 22,073.62 lakhs (8136.87 MTs). During 2020-21 (April-February) the Processed Fruits, Juices & Nuts Raisins (Grapes Dried) exported from Kerala were 8,136.87 MTs via via Cochin Sea, SEZ Cochin, Cochin airport, ACC Calicut, Karipur Airport, KERALA INDUS INFRA SEZ and Trivandrum airport to 34 countries. Rs. 22,073.62 lakhs was earned via this trade in Kerala. COCHIN SEA was top in the order with 6011.7 MTs (Rs. 10742.27 lakhs) and minimum via KERALA INDUS INFRA SEZ (7.53 MTs & 4.79 lakhs). The first two positions of countries were U S A (3177.62 MTs & 14078.27), U ARAB EMTS (1377.18 MTs & 2085.23) and the least was MALAWI (0.1 MTs & 0.19 lakhs).

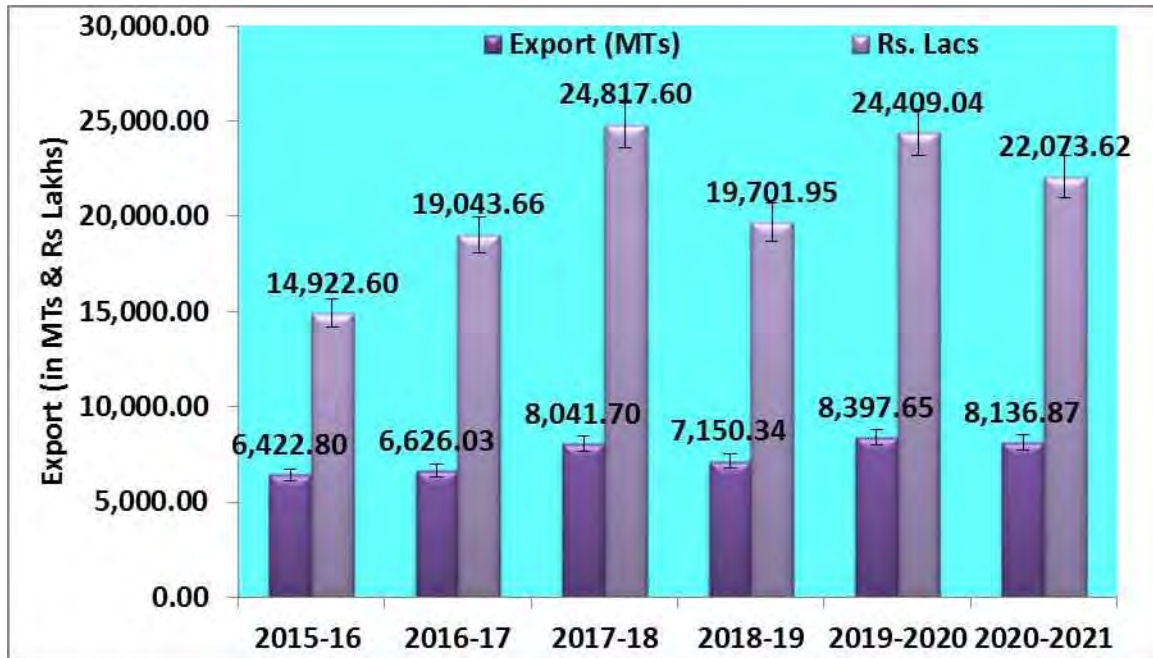


Fig 7.10 Processed Fruits, Juices & Nuts Raisins (Grapes Dried) exports in terms of MTs and money earned in lakhs from 2015-2021

Mango includes alphonso (Hapus), Banganapalli , Chausa, Dasherri , Langda , Kesar , Totapuri , Mallika and other Mangoes. Mango exported from Kerala via Cochin Sea, Cochin airport Vizhinjam Sea, ACC Calicut, Karipur Airport and Trivandrum airport to 10 countries. The statistical analyzes of export of mango revealed that it was increased from 2015-16 to 2016-17 i.e., 1544.67 MTs to 2251.94 MTs and the income generated was Rs. 1694.67 lakhs to 2399.13 lakhs. In 2017-18 the export and money earned was 1970.93 MTs and 1959.42. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 2120.1, 1552.27 and 548.99 lakhs.

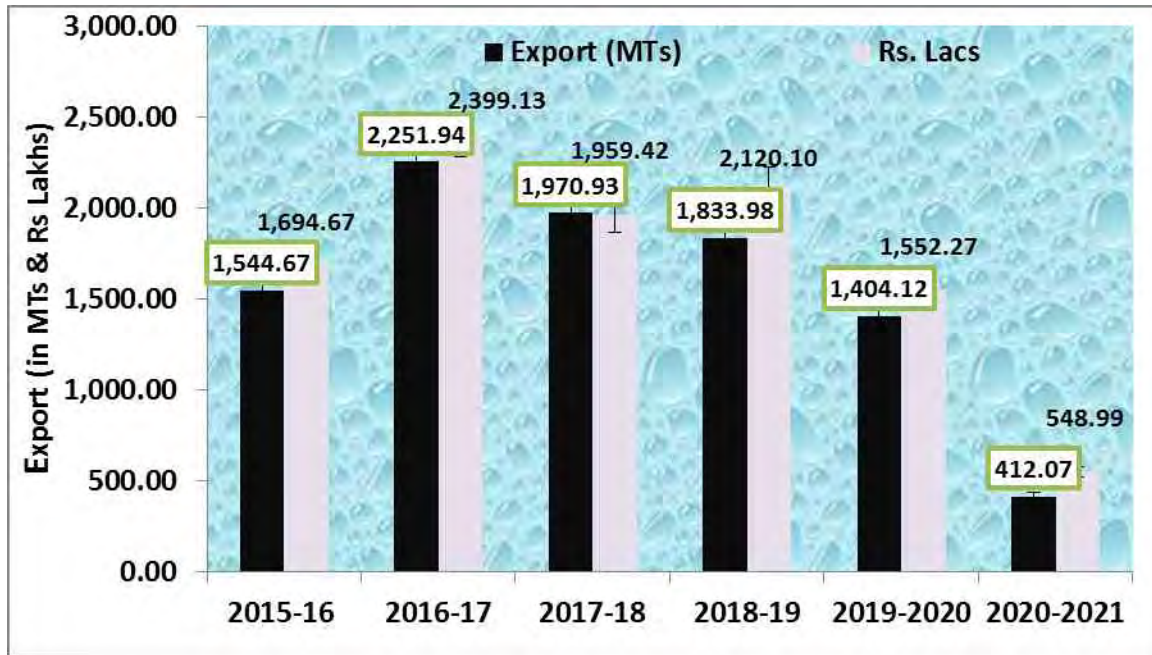
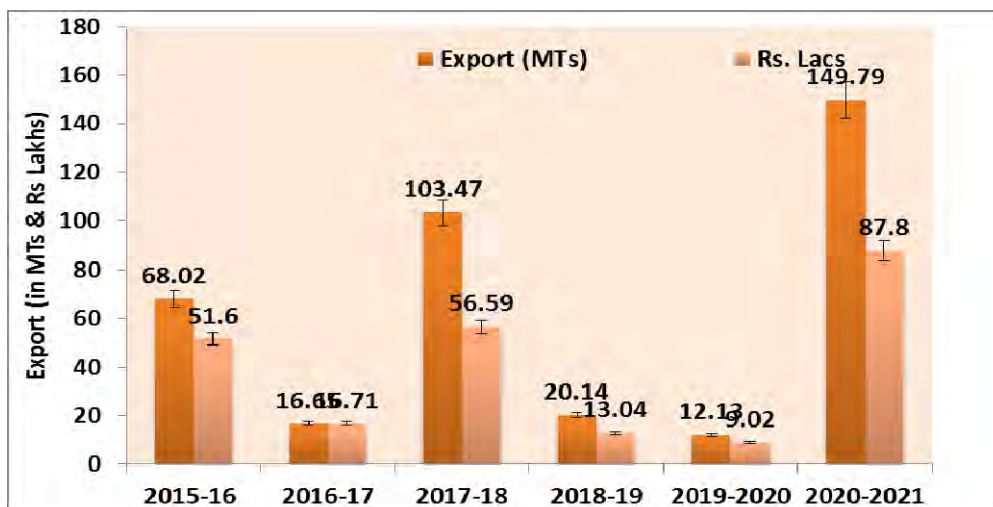


Fig 7.11 Mango exports in terms of MTs and money earned in lakhs from 2015-2021

Mango Pulp

Mango Pulp exported from Kerala during 2020-21 (April-February) were 149.79 MTs via Cochin Sea, ACC CALICUT, KARIPUR Airport and TRIVANDRUM AIRPORT to 05 countries. Rs. 87.8 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 148.25 MTs (Rs. 86.42 lakhs) and minimum via Trivandrum airport (1.36 MTs & 1.17 lakhs). The first two positions of countries were EMEN REPUBLIC (111.6 MTs & 63.19), NETHERLAND (34.4 MTs & 20.87) and the least was SAUDI ARAB (0.44 MTs & 0.37 lakhs).

Mango Pulp exported from Kerala via Cochin Sea, Cochin airport and Trivandrum airport to 05 countries. The statistical analyzes of export of Mango Pulp revealed that it was decreased from 2015-16 to 2016-17 i.e., 68.02 MTs to 16.65 MTs and the income generated was Rs. 51.6 lakhs to 16.71 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 56.59, 13.04, 9.02 and 87.8 lakhs. The maximum export was recorded during 2020-2021 (Table.7.18 a-l; Fig. 7.18)).



1. **Fig. 7.12: Mango Pulp exports in terms of MTs and money earned in lakhs from 2015-2021**

The **fresh onion** The major varieties found in India are Agrifound Dark Red, Agrifound Light Red, NHRDF Red, Agrifound White, Agrifound Rose and Agrifound Red, Pusa Ratnar, Pusa Red, Pusa White Round. There are certain varieties in yellow onion which are suitable for export in European countries Tana F1, Arad-H, Suprex, Granex 55, HA 60 and Granex 429.

During 2020-21 (April-February) fresh onion exported from Kerala was 843.12 MTs via Cochin Sea, Cochin airport, Trivandrum airport and SEZ Cochin to 17 countries. Rs. 322.43 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 66.14 MTs (Rs. 430.37 lakhs) and minimum via SEZ Cochin (0.01MTs & 0.19 lakhs). The first two positions of countries were United Arab Emirates (334.81 MTs & 122.82), Kuwait (285.44 MTs & 97.47) and the least was Oman (0.05MTs & 0.01 lakhs). Fresh onions exported from Kerala via Vizhinjam Sea, Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, Trivandrum airport and SEZ Cochin to 20 countries. The statistical analyzes of export of fresh onion revealed that it was decreased from 2015-16 to 2019-2020 i.e., 3016.95 MTs to 254.56 MTs and the income generated was Rs. 1061.81 lakhs to 162.09 lakhs. In 2020-2021, the amount of export was enhanced to 843.12 MTs and the respective earning was Rs. 322.43 lakhs.

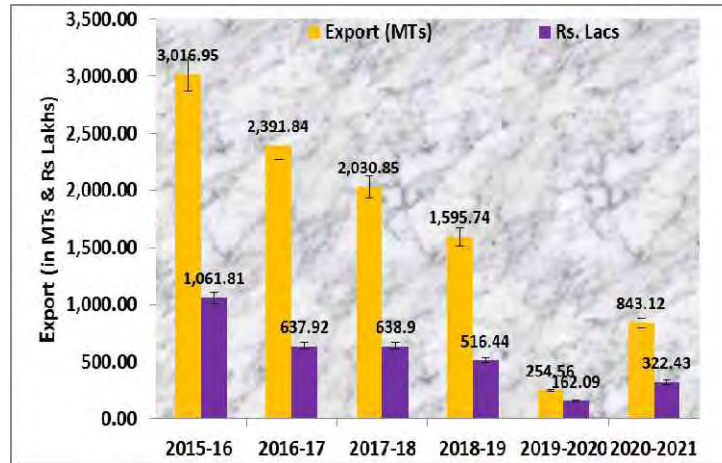


Fig 7.13 Fresh onion exports in terms of MTs and money earned in lakhs from 2015-2021

Other Fresh Fruits includes Plantain (Bananas, Fresh) Chhohara Or Kharek, Guavas (Fresh/Dried) Other Mangosteen Fresh / Dried Oranges, Fresh/Dried, Citrus (Limon/Limonum) & Limes (Citrus, Aura), Dates, Fresh/Dried (Excluding Wet Dates), Dates Soft (Khayzur Or Wet Dates) , Dates Hard (Chhohara Or Kharek) , Other Dates , Figs, Fresh/Dried, Other Figs Exclndg Fresh, Pineapples Fresh Or Dried , Avocados, Fresh/Dried, Guavas Fresh/Dried , Other Mangosteen Fresh / Dried , Oranges, Fresh/Dried , Mandarins (including tangerines and satsumas) , Clementines, Other Oranges, wilkings and similar citrus hybrid , Grapefruit Including Pomelos, Fresh/Dried , Lemons (Citrus Limon/Limonum) & Limes (Citrus Aurantifolia/Latifolia) Fresh / Dried, Other Citrus Fruit Fresh/Dried, Watermelons, Fresh , Musk Melons , Other Melons , Papaws (Papayas), Fresh/Dried , Apples, Fresh, Pears, Fresh, Quinces, Fresh, Apricots, Fresh, Sour Cherries (Prunus Cerasus), Peaches, Including Nectarines, Fresh, Plums & Sloes, Fresh, Strawberries, Fresh, Raspberries, Blackberries, Mulberries & Loganberries, Fresh, Black/White/Red Currants & Gooseberries, Fresh , Cranberries, Bilberries & Other Fruits Of The Genus Vaccinium, Fresh, Kiwi Fruits Fresh / Dried, Durians Fresh / Dried, Persimmons , Pomegranates Fresh , Tamarind, Fresh , Sapota (Chico) Fresh, Custurd Apple (Ata) , Bore , Litchi , Other Fresh Fruits. Other Fresh Fruits exported from Kerala during 2020-2021 (April-February) were 22,007.38 MTs via Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, SEZ Cochin and Trivandrum airport to 30 countries. Rs. 13,014.50 lakhs was earned via this trade in Kerala. Cochin airport was top in the order with 10958.68 MTs (Rs. 5340.1 lakhs) and minimum via SEZ Cochin (3.54 MTs & 5.23

lakhs). The countries in the first two positions were United Arab Emirates (14634.43 MTs & 7707.7 lakhs), Qatar (2596.46 MTs & 1800.18 lakhs) and the least was COTE D IVOIRE (0.01 MTs & 0.01 lakhs).

Other fresh fruits exported via Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, Vizhinjam Sea, and Trivandrum airport to 38 countries. The statistical analyzes of export of other Fresh Fruits revealed that it was increased from 2015-16 to 2016-17 i.e., 33791.43 MTs to 36365.44 MTs and the income generated was Rs. 20699.96 lakhs to 21638.97 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 19203.54 (35025.53 MTs), 15753.88, 17817.64 and 13014.5 lakhs (22007.38 MTs) respectively.

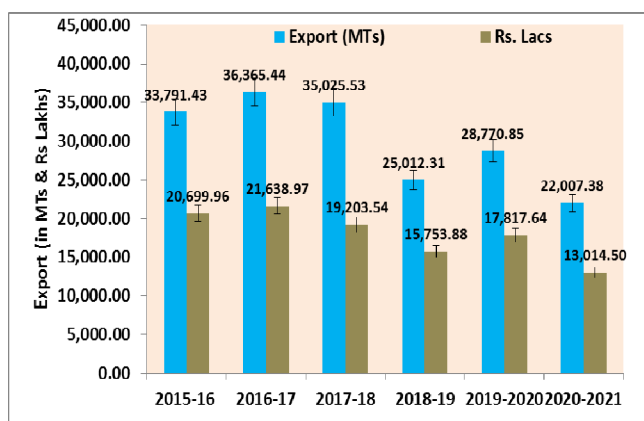


Fig 7.14 Other Fresh Fruits exports in terms of MTs and money earned in lakhs from 2015-2021

Total other fresh vegetables Total other fresh vegetables exported from Kerala during 2020-2021 (April-February) was 31,263.00 MTs via Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, SEZ Cochin and Trivandrum airport to 49 countries. Rs. 21,845.30 lakhs was earned via this trade in Kerala. Cochin airport was top in the order with 9182.31 MTs (Rs. 7083.17 lakhs) and minimum via SEZ Cochin (386.45 MTs & 211.39 lakhs). The first two positions of countries were United Arab Emirates (13088.06 MTs & 8697.67 lakhs), Kuwait (4288.22 MTs & 3135.45 lakhs) and the least was Japan (0.03 MTs & 0.11 lakhs).

Export from Kerala via Vizhinjam Sea, Cochin Sea, Cochin airport, ACC Calicut, Karipur Airport, SEZ Cochin and Trivandrum airport to 46 countries. The statistical analyzes of export of other fresh vegetables revealed that it was decreased from 2015-16 to 2018-

2019 i.e., 51227.38 MTs to 35913.4 MTs and the income generated was Rs. 33074.83 lakhs to 21545.28 lakhs. In 20190-2020, the amount of export was enhanced to 46451.34 MTs and the respective earning was Rs. 27494.07 lakhs. But, in 2020-2021 it was displayed a reduction in the respective values i.e., 31263 MTs & 21845.3.

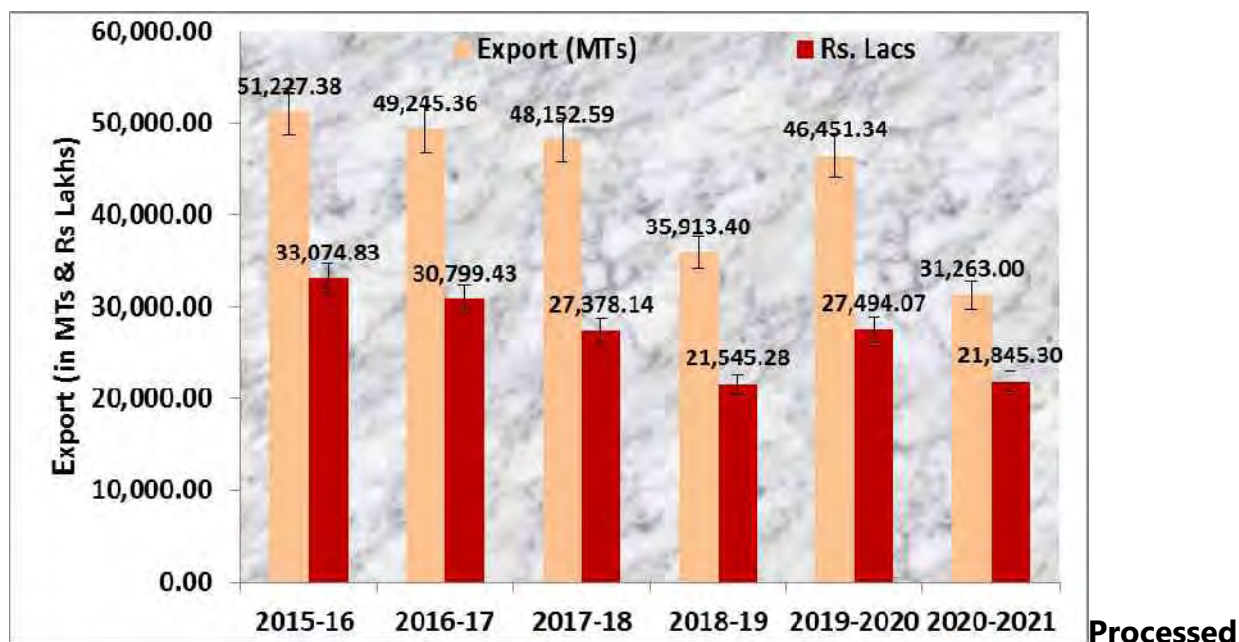


Fig 7.15 Other fresh vegetables exports in terms of MTs and money earned in lakhs from 2015-2021

Vegetables exported from Kerala during 2017-18 were 8,976.88 MTs via Cochin Sea, Cochin airport, ICD Kottayam Kerala, Vizhinjam Sea, SEZ Cochin, ACC CALICUT, Karipur Airport and Trivandrum airport to 49 countries. The statistical analyzes of export of Processed Vegetables revealed that it was increased from 2015-16 to 2017-18 i.e., 7,267.05 MTs to 8,976.88 MTs and the income generated was Rs. 10,022.41 lakhs to 12,654.99 lakhs. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 12,358.45, 11,312.30 and 14,400.63 lakhs.

Mango Pulp exported from Kerala via Cochin Sea, Cochin airport and Trivandrum airport to 05 countries. The statistical analyzes of export of Mango Pulp revealed that it was decreased from 2015-16 to 2016-17 i.e., 68.02 MTs to 16.65 MTs and the income generated was Rs. 51.6 lakhs to 16.71 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 56.59, 13.04, 9.02 and 87.8 lakhs. The maximum export was recorded during 2020-2021.

Pulses Pulses Green Peas, Bengal gram, Beans of the spp Vigna Mungo Small Red (Adzuki) Beans (*Phaseolus/Vigna* Angulari, Kidny Bens Incl White Pea Bens Dried & Shld, Cow peas (*Vigna unguiculata*), *Cajanus cajan*). Yellow Peas, Green Peas , Kabuli Chana, Othr Dried And Shld Leguminous Vegtbls, other than Split, Bengal gram (desi chana) , Other chickpeas, Beans Of The Spp Vigna Mungo (L.) Hepper Beans Of The Spp Vigna Radiata (L.) Wilczek, Small Red (Adzuki) Beans (*Phaseolus/Vigna* Angularis), Dried, Shelled, Whether Or Not Skinned/Split) Kidny Bens Incl White Pea Bens Dried & Shld, Bambara beans (*Vigna subterranea* or *Voandzeia subterranea*) Cow peas (*Vigna unguiculata*) Guar Seeds, Dried Leguminous Vegetables, Shelled, Whether Or Not Skinned Or Split Other Dried Leguminous Vegetables (Excluding Guar Seeds) Lentils, Dried, Shelled, Whether Or Not Skinned/Split Broad Beans (*Vicia Faba* Var. Major) & Horse Beans (*Vicia Faba* Var. Equina, *Vicia Faba* Var Minor Pigeon peas (*Cajanus cajan*) Othr Dried And Shld Leguminous Vegtbls, Split

exported from Kerala via Cochin Sea, and Trivandrum airport to 10 countries. The statistical analyzes of export of Pulses revealed that it was decreased from 2015-16 to 2016-17 i.e., 28.49 MTs to 25.92 MTs and the income generated was Rs. 20.64 lakhs to 34.81 lakhs. From 2017-18 to 2020-2021 the respective amounts were 77.74 & 63.05; 98.45 & 73.88; 119.38 & 115.45 and 735.64 & 759.9.

During 2020-21 (April-February) the Pulses exported from Kerala were 735.64 MTs via Cochin Sea, COCHIN AIRPORT, TRIVANDRUM AIRPORT and SEZ Cochin to 26 countries. Rs. 759.9 lakhs was earned via this trade in Kerala. Cochin sea was top in the order with 734.31 MTs (Rs. 758.93 lakhs) and minimum via COCHIN AIRPORT (0.2 MTs & 0.25 lakhs). The first two positions of countries were U ARAB EMTS (359.9 MTs & 387.02), U K (129.37MTs & 118.42) and the least was MALDIVES (0.03 MTs & 0.02 lakhs).

Pulses exported from Kerala via Cochin Sea, and Trivandrum airport to 10 countries. The statistical analyzes of export of Pulses revealed that it was decreased from 2015-16 to 2016-17 i.e., 28.49 MTs to 25.92 MTs and the income generated was Rs. 20.64 lakhs to 34.81 lakhs. From 2017-18 to 2020-2021 the respective amounts were 77.74 & 63.05; 98.45 & 73.88; 119.38 & 115.45 and 735.64 & 759.9

Green Peas, Bengal gram, BEANS OF THE SPP VIGNA MUNGO Small Red (Adzuki) Beans (*Phaseolus/Vigna* Angulari, Kidny Bens Incl White Pea Bens Dried & Shld, Cow peas (*Vigna unguiculata*), *Cajanus cajan*) (Table.19 a-I), (Fig 7.19).

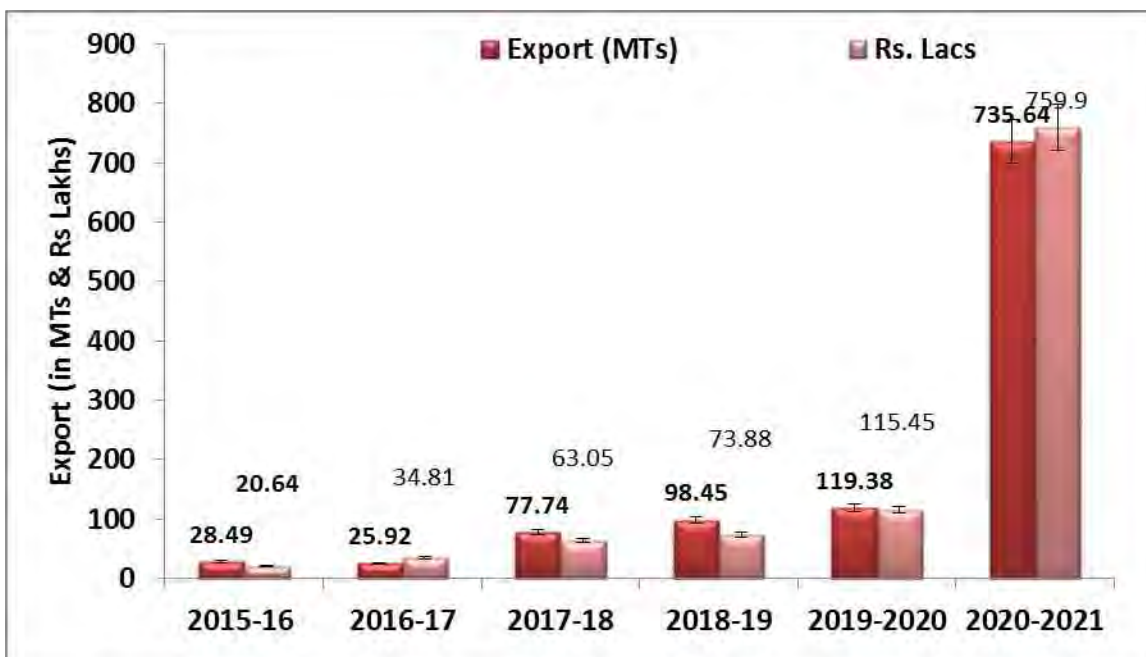


Fig. 7.16: Pulses exports in terms of MTs and money earned in lakhs Natural Honey exported from Kerala via Cochin Sea, Cochin Airport and Trivandrum airport to 10 countries. The statistical analyzes of export of Natural Honey revealed that it was decreased from 2015-16 to 2016-17 i.e., 1.45 MTs to 0.91 MTs and the income generated was Rs. 6.49 lakhs to 4.1 lakhs. In 2016-17, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 5.91 (2.23 MTs), 261.82 (118.16 MTs), 223.19 (99.11 MTs) and 112.62 lakhs (50.83 MTs).

Alcoholic Beverages were exported from Kerala via Cochin Sea and SEZ Cochin to 11 countries. The statistical analyzes of export of Alcoholic Beverages revealed that it was decreased from 2015-16 to 2016-17 i.e., 1,807.53 MTs to 1,048.28 MTs and the income generated was Rs. 11241.27 lakhs to 12,369.34 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 11,059.32, 8,512.35, 9,761.19 and 4,687.95 lakhs. 2015-16 recorded the maximum export as compared to previous years. During 2020-21 (April-February) the Natural Honey exported from Kerala were 50.83 MTs via Cochin Sea and Trivandrum airport to 9 countries. Rs. 499.64 lakhs was earned via this trade in Kerala. Rs. 112.62 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 49.83 MTs (Rs 106.98 lakhs) and minimum via Trivandrum Airport (1 MTs & 5.64 lakhs). The first two positions of countries were Botswana (36.5 MTs & 80.29), Netherlandantil (40 MTs & 73.71) and the least was QATAR (0.01MTs & 0.01 lakhs). During 2020-21 (April-February) the Alcoholic Beverages exported from

Kerala were 445.36 MTs via Cochin Sea and SEZ Cochin to 11 countries. Rs. 4,687.95 lakhs was earned via this trade in Kerala. SEZ Cochin was top in the order with 311.25 MTs (Rs 4490.93 lakhs) and minimum via COCHIN SEA (134.11 MTs & 197.02lakhs). The first two positions of countries were SINGAPORE (124.41 MTs & 1894.24), NETHERLAND (49.38 MTs & 963.32) and the least was U K (2.1MTs & 9.66 lakhs).

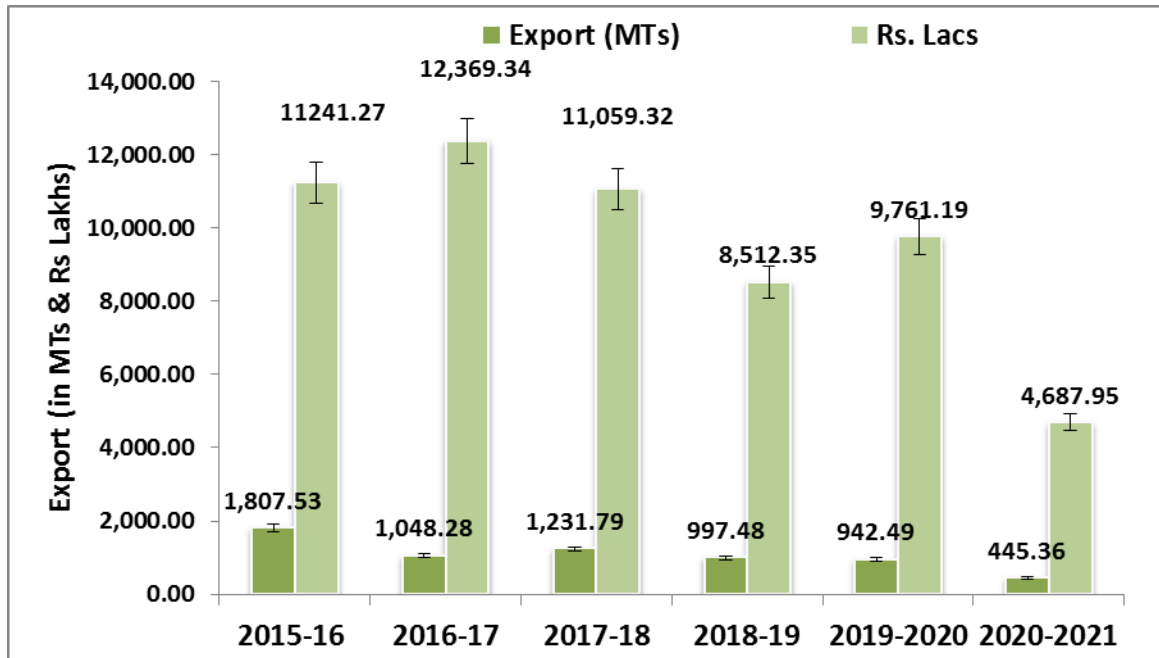


Fig 7.17 Alcoholic beverage exports in terms of MTs and money earned in lakhs from 2015-2021

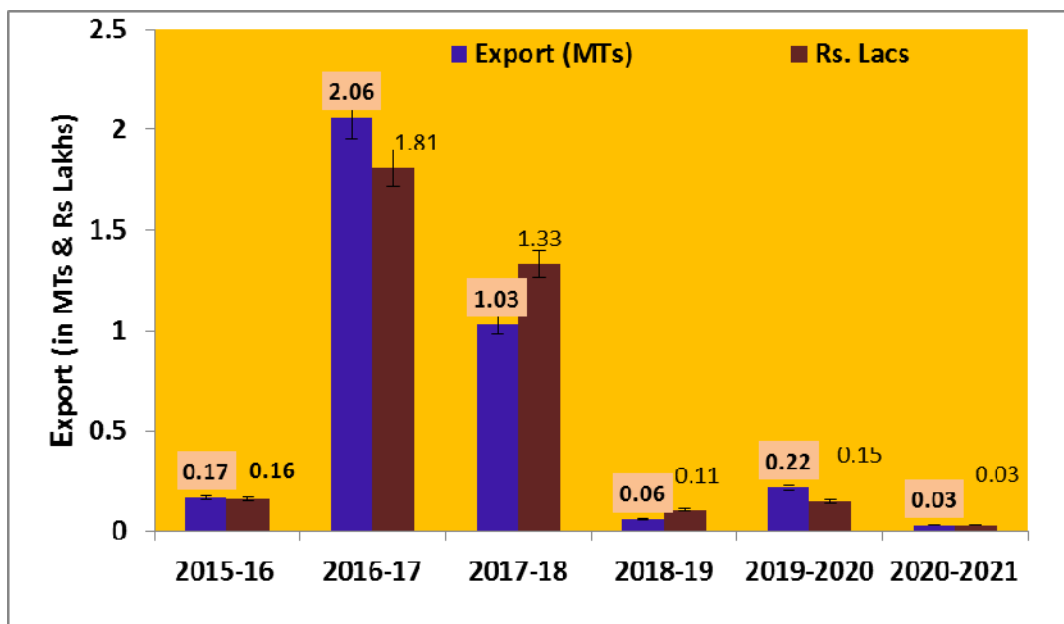


Fig 7.19 Natural Honey exports in terms of MTs and money earned in lakhs from 2015-2021

Miscellaneous Preparations It comprises Flour, Meal & Powder Of Potatoes, Flakes, Granules & Pellets Of Potatoes Flour, Meal & Powder Of The Dried Leguminous Vegetables Of Heading, Flour, Meal & Powder Of Sago, Flour, Meal & Powder Of Manioc, Flour, Meal & Powder Of Other Roots And Tubers Of Heading, Flour, Meal & Powder Of Tamarind Of Ch.8, Flour, Meal & Powder Of Singoda, Flour Of Mango, Other Flour, Meal & Powder , Malt, Not Roasted, Malt, Roasted , Wheat Starch , Maize (Corn) Starch , Potato Starch , Manioc (Cassava) Starch , Sago Starch , Other Starch , Inulin , Peanut Butter , Active Culture Yeasts , Baker'S Yeast 21021090 Other Yeasts , Inactive Yeasts, Other Single Cell Micro-Organisms, Dead , Prepared Baking Powders , Soya Sauce , Tomato Ketchup & Other Tomato Sauces , Mustered Flour And Meal And Prepared Mustard , Curry Paste , Chilli Sauce , Mayonnaise And Salad Dressings , Mixed, Condiments And Mixed Seasoning , Othr Mixed Condiments And Mixed Seasonings ,Dried Soups & Broths & Preparations , Other Soups And Broths & Preparations , Homogenized Composite Food Preparation , Ice Cream & Other Edible Ice, Whether Or Not Containing Cocoa , Protein Concentrates & Textured Protein Substances , Soft Drink Concentrates, Sharbat , Other Soft Drink Concentrates , Pan Masala , Betel Nut Products Known As "Supari" , Sugar-Syrups Containing Added Flavouring Or Coloring Matter, Not Elsewhere Specified Or Included, Lactose, Syrup, Glucose Syrup And Malto Dextrine

Syrup ,Compound Preparations For Making Non-Alcoholic Beverages , Food Flavoring Material , Churna For Pan 2, Custard Powder , Other Diabetic Food ,Sterlized or Pasteurized Millstone , Other Food Preparation Not Elsewhere Specified ,Mineral Waters , Aerated Waters , Ice & Snow , Other Water (Including Natural Waters) , Areated Waters Containing Sugar ,emonade , Other Than Lemonade , Nonalcoholic beer , Soya Milk Drinks, Whether Or Not Sweetened or Flavoured , Fruit Pulp Or Fruit Juice Based Drinks , Beverages Containing Milk , Other Sweetened Flavoured Waters , Brewed Vinegar , Synthetic Vinegar , Other Vinegar and Substitutes. During 2020-21 (April-February) the miscellaneous preparations exported from Kerala were 11,380.50 MTs via Cochin Sea, Cochin airport, SEZ Cochin and Trivandrum airport to 77 countries. Rs. 499.64 lakhs was earned via this trade in Kerala. Rs. 18,362.53 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 11230.16 MTs (Rs 17990.5 lakhs) and minimum via Trivandrum Airport (8.68 MTs & 3.74 lakhs). The first two positions of countries were USA (2151.53 MTs & 4176.04), UAE (1413.91 MTs & 2705.63 lakhs) and the least was Argentina (0.02 MTs & 0.49 lakhs).

The statistical analyzes of export of Miscellaneous preparations revealed that it was increased from 2015-16 to 2016-17 i.e., 10,029.94 MTs to 11,044.48 MTs and the income generated was Rs. 14,637.58 lakhs to 15,360.47 lakhs. In 2017-18, 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs13, 433.41, 16,834.13, 19,534.87 and 18,362.53 lakhs (11,380.50 MTs).

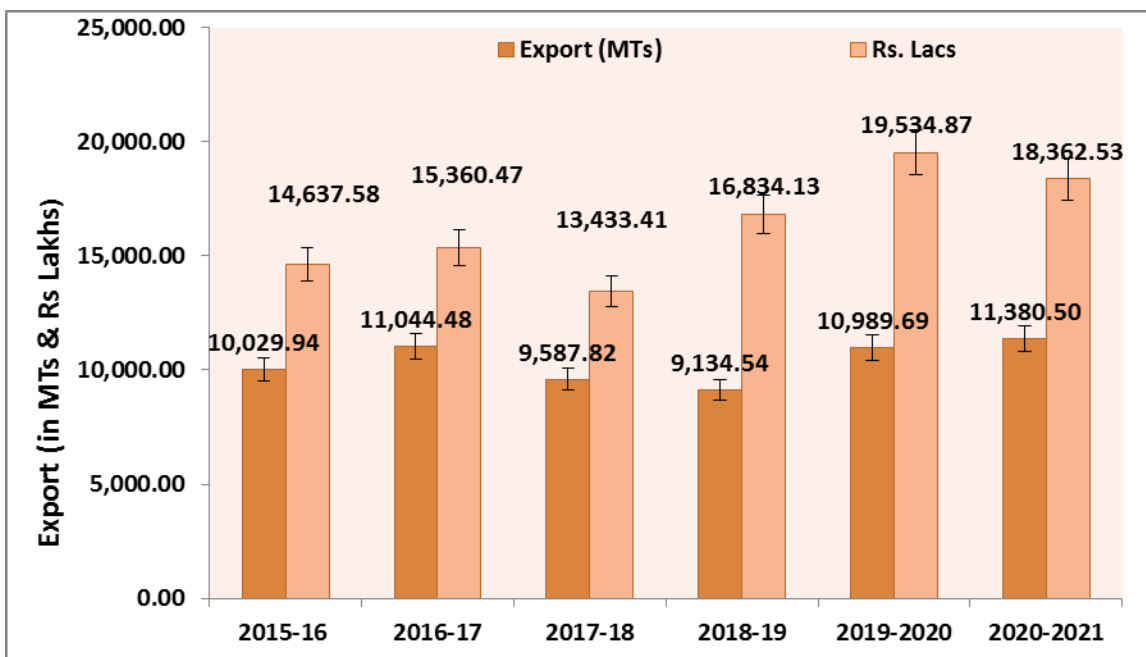


Fig 7.20 Miscellaneous Preparations exports in terms of MTs and money earned in lakhs from 2015-2021

Processed Vegetables

It consists of Potatoes, Uncooked/Cooked By Steaming/Boiling, Beans (Vigna Spp., Phaseolus Spp.), Shelled/Unshelled Peas (Pisum Sativum), Shelled/Unshelled, Frozen, Beans (Vigna Spp., Phaseolus Spp.), Other Leguminous Vegetables Shelled/Unshelled, Not Frozen, Spinach, New Zealand Spinach & Orache Spinach, Sweet Corn, Frozen, Tarragon, Other Vegetables, Frozen Mixture Of Vegetables Frozen Olives, Provisionally Preserved, Mushrooms Of The Genus Agaricus, Provisionally Preserved Green Pepper In Brine Assorted Canned Vegetables, Other Vegetables Provisionally Preserved, Onions, Dried, Whole/Cut/Sliced/Broken/In, Powder But Not Further Prepared, Mushrooms Of The Genus Agaricus, Dried But, Not Further Prepared, Wood Ears (Agricultaria Spp.), Dried, Jelly Fungi (Tremella Spp.) Others (E.G. Truffles Etc.) Dried. Asparagus, Dried Dehydrated Garlic Powder, Dehydrated Garlic Flakes, Garlic, Dried, Marjoram Oregano, Dried, Potatoes, Dried, Other Dehydrated Vegetables, Dried Other Edible Parts Of Plants Prepared or Preserved By Vinegar/Acetic Acid, Tomatoes Whole Or In Pieces, Tomatoes, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Whole/In Pieces, Mushrooms Of The Genus Agaricus, Prepared/Preserved

Otherwise Than By Vinegar/Acetic Acid, Truffles, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid Other Mushrooms Or Truffles Prepd./ Presvd. Potatoes, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Frozen, Other Than Products Other Vegetables & Mixtures Of Vegetables, , Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid Homogenised Vegetables, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen, Potatoes, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen Peas (*Pisum Sativum*), Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen Beans (*Vigna Spp.*, *Phaseolus Spp.*), Shelled, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen Others Beans (Excl. *Vigna Spp.*, *Phaseolus Spp.*), Shelled, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen Asparagus, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen, Sweet Corn (*Zea Mays Var. Saccharata*), Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid, Not Frozen, Bamboo Shoots, Other Roasted And Fried Vegetable Products

During 2020-21 (April-February) Processed Vegetables exported from Kerala were 9,175.01 MTs via Cochin Sea, Cochin airport, SEZ Cochin, ACC CALICUT, KARIPUR Airport and Trivandrum airport to 50 countries. Rs. 14,400.63 lakhs was earned via this trade in Kerala. Cochin Sea was top in the order with 9076.32 MTs (Rs. 14205.51 lakhs) and minimum via ACC CALICUT, KARIPUR Airport (3.99 MTs & 3.77 lakhs). The first two positions of countries were U ARAB EMTS (2695.19 MTs & 3698.21), USA (1379.43 MTs & 2310.8) and the least were PHILIPPINES (0.02MTs & 0.05).

Processed Vegetables exported from Kerala during 2017-18 were 8,976.88 MTs via Cochin Sea, Cochin airport, ICD Kottiyam Kerala, Vizhinjam Sea, SEZ Cochin, ACC CALICUT, KARIPUR Airport and Trivandrum airport to 49 countries. The statistical analyzes of export of Processed Vegetables revealed that it was increased from 2015-16 to 2017-18 i.e., 7,267.05 MTs to 8,976.88 MTs and the income generated was Rs. 10,022.41 lakhs to 12,654.99 lakhs. In 2018-19, 2019-2020 and 2020-2021 the respective amounts were Rs. 12,358.45, 11,312.30 and 14,400.63 lakhs (Table.7.17 a-l; Fig. 7.17).

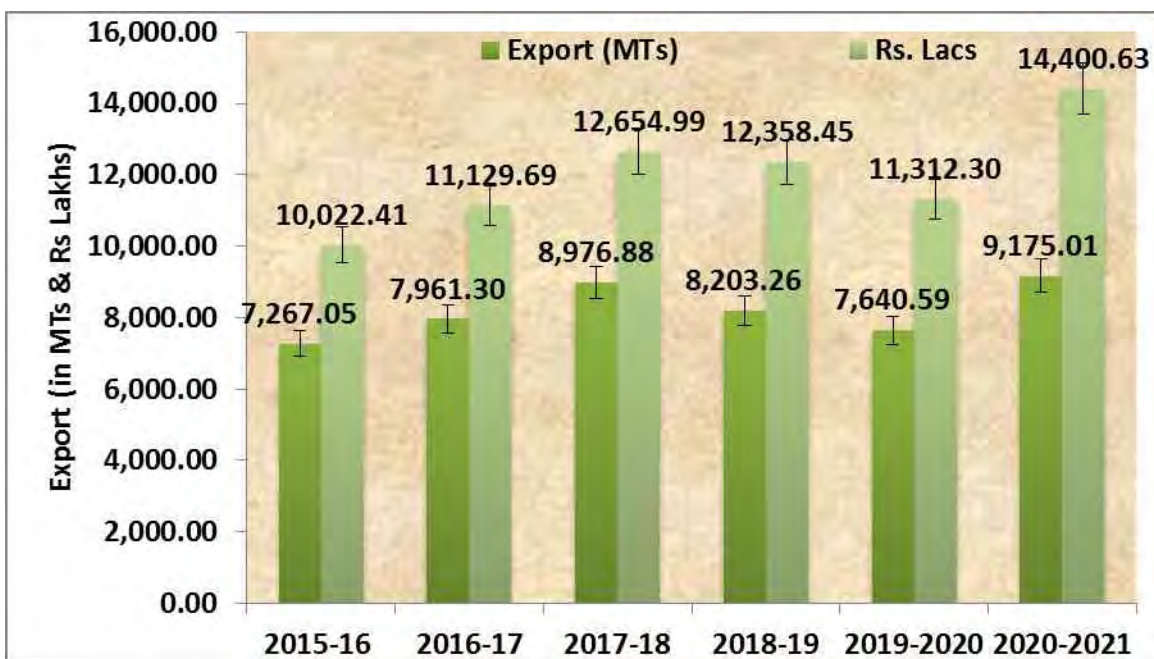


Fig. 7.21: Processed Vegetables exports in terms of MTs and money earned in lakhs from 2015-2021

Floriculture products

It mainly consist of cut flowers, pot plants, cut foilage, seeds bulbs, tubers, rooted cuttings and dried flowers or leaves. The important floricultural crops in the international cut flower trade are rose, carnation, chrysanthemum, gargera, gladiolus, gypsophila, liastris, nerine, orchids, archilea, anthurium, tulip, and lilies. Floriculture crops like gerberas, carnation, etc. are grown in green houses. The open field crops are chrysanthemum, roses, gaillardia, lily marygold, aster, tuberose etc. Bulbs, Tubers, Tuberos Roots, Corms, Crowns & Rhizomes, Dormant, Bulbs Horticultural, Chicory Plants, Chicory Roots, Other Blbs, Tubrs, Tubrus Roots etc, Unrooted Cuttings And Slips Of Live Plants, Edible Fruit Or Nut Trees, Grafted Or Not, Cactus, Other Trees, Shrubs And Bushes, Rhododendrons And Azaleas, Grafted Or Not, Roses, Grafted Or Not, Mushroom Spawn, Flowering Plants (Excluding Roses And Rhododendrons), Tissue Culture Plants and Other Live Plants. During 2020-21 (April-February) was 674.20 MTs via sea and airports to 40 countries. Rs. 2,210.09 lakhs was earned via this trade in Kerala. Cochin airport was top in the order with 388.66 MTs (Rs. 921.53 lakhs) and minimum via SEZ Cochin (7.85 MTs). The first two positions of countries were United Arab Emirates (365.46 MTs & 761.97), U S A (85.69 MTs & 445.22) and the least were Taiwan, Vietnam Soc Rep Ireland and Guatemala (0.01 MTs).

The statistical analyzes of export of floriculture products revealed that it was declining from 2015 to 2021 i.e., 1,392.19 MTs to 674.20 MTs, while the income generated was improved from 2015 to 2019 was Rs. 2,373.57 lakhs to 2937.49 lakhs. In 2019-2020 and 2020-2021 the respective amounts were Rs. 2,280.64 and 2,210.09 lakhs (Table.6.6 a-I, Fig. 7.6).

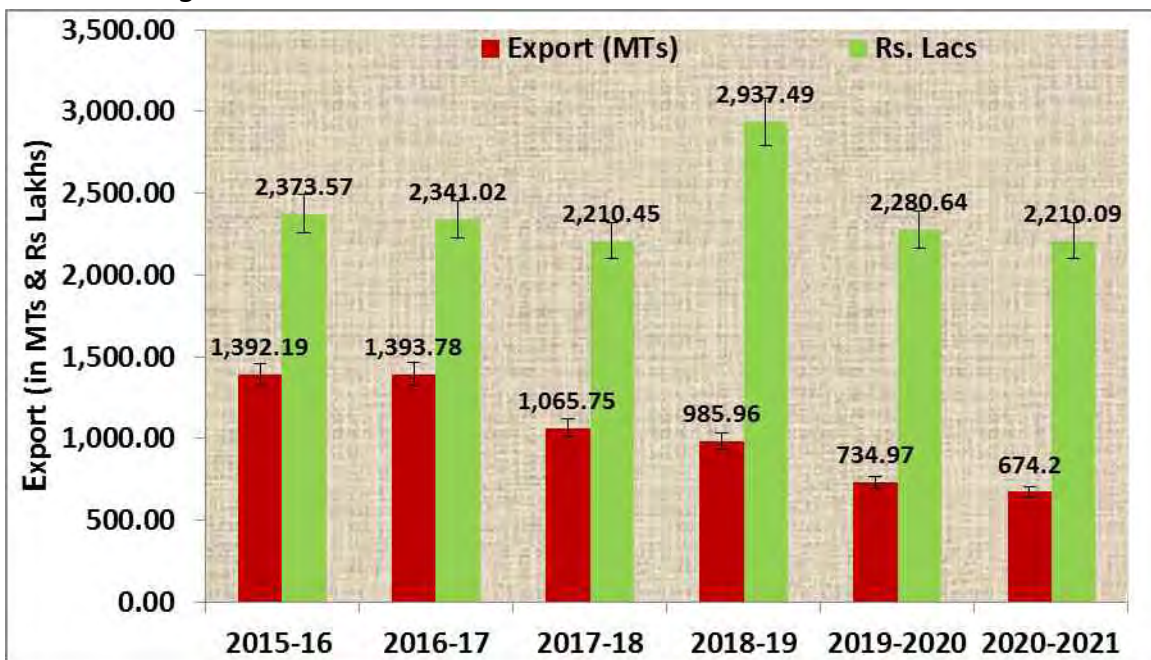


Fig. 7.22: Floriculture products export in terms of MTs and money earned in lakhs from 2015-2021

Documentation of Export of bioresources from Kochi (2019-2020)

The major port in Kerala from where bioresources are exported is Kochi, hence detailed data of export for the year 2019-20 from Kochi was obtained from Cochin Chambers of Commerce for the following 12 products

- 1.Cashew 2.Coffee 3.Coir Product Others 4.Coir Products 5.Coir yarnb 6.Cotton Goods
7. Cotton yarn 8. Jute Products 9. Oleoresins10. Spices 11.Tea 12.Miscellaneous

The various bioresources exported from Cochin port were Coffee, Cashew, Coir products, Coir yarn, Cotton goods, Cotton yarn, Jute, Oleoresin, Spices Tea and Miscellaneous items (includes Tyre retreading materials – 83, 4437; Rosewood products – 892066; Valves 14, 69824; Rubber mats 45855850; Rice 35766378; Paper cup 1567234; Plywood 29189098; Lemongrass oil 57,723; Handicrafts 19,7010; Latex gloves 17, 30481; Food stuffs 639, 99577; Chappals 22, 15400; Condoms 11,14446; Coconuts

297, 05439; Coconut shells\cups 12, 61150; Coconut oil 85, 33371; Ayurveda products 42, 7675; and Cigarettes 47, 671 Kgs; Thailam 194 Kgs; Nutraceutical Products 1400 Kgs; Caffeine Powder 4167 Kgs; Marigold Oleoresin 811060 Kgs; Arecanut 304453 Kgs & V.S.Exports&Imports Chongqing 87720 Kgs; Herbal Mineral Products 18676 Kgs; Perfumery 1892 Kgs; Animal Products 33770 Kgs; Basil Oil 36320 Kgs; Gingelly Oil 135474 Kgs; Gherkins in Brine 5610 Kgs; Lavender Arcmacushion 3168 Kgs ; Peanuts 12096 Kgs; 3582 Kgs; Tooth Powder 99676 Kgs by K.P.Namboodiri ; Neelibringadi Hair Oil 2803 Kgs; Palmarosa Oil Marseilles 1080 Kgs; Bamboo Mats 2400 Kgs; Ghee Biriyan, Ghee 111162; 3696 Kgs of Agar Food Grade; Marine Hydro Colloids and Chitin 167981 Kgs; Soya Bean and Soya 17409 Kgs & 9874 Kgs via Damam port; 2635010 Kgs of soya Sakthi Sugars Ltd; Multicare Palm Leaf Plates 111518 Kgs; Plant Lipids Ltd. exported Cinnamon Oil 2014 Kgs via, Garlic Oil 100, Hdpe Pails 16, Pepper Oil 400, Rosemary Oil 100 Kgs; Onion 85200 Kgs, 40200 Kgs by Uniglo Exports&Services; R.K.Ganapathy Chettiar exported Ghee 1525419 Kgs; Ramesh Flowers P.Ltd. exported dry flowers 14031Kgs; Vegetables 19713 Kgs via Jebel Ali; Vezby Nature Products P.Ltd. 84500 Kgs vegetables; VRS Dreamland Fresh P.Ltd. (1939722 Kgs; 46919 Kgs of Mangoes; Brahmi Oil 1239; Similia Homeo Laboratory exported Homeo Pathic Medicines 32 Kgs; via Poultry Products 300 Kgs; Cattle Feeds 74750 Kgs; Frozen Chicken 9984 Kgs; Synthite Industries Ltd. Celery Seed Oil 300 Kgs, Clove Oil 65 Kgs, Coriander Oil 300 Kgs, Dill Seed Oil 120 Kgs, Essential Oil 20 Kgs, Garlic Oil 4595 Kgs, Ginger Oil 30 Kgs, Marigold Oleoresin 14100 Kgs, Mustard Oil 5 Kgs, Nutmeg Oil 200 Kgs, Onion 5 Kgs, Pepermint Oil 100 Kgs, Pepper Oil 100 Kgs, Soap Nut Extract 895 Kgs; Bose Wellia Serrata Extracts 500 Kgs; Almond Syrup 125566 Kgs by Volga Food Products; Western India Plywoods Ltd. exported Hard Board 2480293 Kgs; Wilton Weavers P.Ltd. Woolen Carpets exported 212797 Kgs. Other items include Herbal Extracts, Banana Chips, Packing Materials, Heat Resistant Latex Rubber Pl, Rubber Mouldes Goodsp.P.Woven Bags, Pappads, Rice Flakes, Freeze Dired Green Peas, Wood Products, Pickles, Fruits, Pineapple, Furniture, Tyres/Tubes, Maida, Puttu Podi, Canned Marine Products, Chocolate Products, Natural Rubber, Jaggery, Fruit Jams, Tapioca, Surgical Gloves, P.P.Woven Bags, Fish Meal, Fish Oil, Mango Butter, Mustard Oil, Elemi Oil, Belts, Ebony Balusters, Veneers, Tyre Retreading Materials, Kaolin, Empty Cartons, Paper Cones, Conveyor Belt, Fragrance For Potpourri, Precured Tread Rubber, Beds, Wheat Flour, Sesame Oil, Beech Wood, Murukku, Cane Candle Chairs, Tamarind, Flavoures, Food Colour, Cocoa Beans, Butter, Latex Pincore, Latex Tubing, Sweets, Shoes, Blood Bag, Brandy, Liquors, Whisky, Banana,

Candle Sticks, Cheese Powder, Paper Bags, Atta, Palappam, Kothu Porotta, Samosa/Sherded Coconut, Leather Garments, Cosmetics & Toiletries, Soap Crumb Rubber. Reclaimed Rubber, Peanut Candy, Masala Dosa, Washerbiscuits, Cupels, Paper, Rubber Products, Blanket, Rubber Mouldes Goods, Frozen Parotta and Tissue Papers. High volume export was Miscellaneous items during 2018-19 (525906615 Kgs), followed by coir products (242427007 Kgs). Tea comprises 78101143 Kgs (3rd position). Spices was exported 70774628 Kgs, while Cashew was exported 32375012 Kgs only (Fig.1).

Cashew Export

The analysis of export details of cashew from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that 99 exporting companies were engaged in the cashew export. The total quantity of cashew kernels exported through the listed companies is 32375012 kgs. The maximum share of the exports was carried out by Western India Cashew CO. exports 4830673 kgs (14.92%) exported through different ports, followed by St.Mary's Cashew Facviary exports with quantity of 4013536 kgs (12.4%). Tasty Nut Industries exports stands in the 3rd position with 2211022 Kgs (6.82 %) of export. The lowest quantity exported was 12474 kg (0.038 %) by the company Chethana Cashew Corporation.

Coffee export Via Cochin

The analysis of export details of coffee from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that approximately 39 exporting companies were engaged in the coffee export. Total coffee exported via various ports from Cochin was 36, 470051 Kgs through 37 companies during 2019-2020.

Coir Product Others Export

The analysis of export details of Coir Product Others from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that approximately 48 exporting companies were engaged in the Coir Product Others. The total quantity of Coir Product Others exported through the listed companies is 129226563 kgs. The maximum share of the exports was carried out by Remmy Substrates India P.LTD with a quantity of 35483533 kgs exported through different ports. Remmy Substrates India P.LTD exported about 27.46% of the total Coir Product Others exported from Kerala, followed by Harish Coconut Products with quantity of 30219865 kgs (25.38%). Satyam Coir Products stands

IIIrd position with 13264070 kgs (10.26%) exported. The lowest quantity exported was 16000 kg (0.012%) by the company Duinkop Enterprises P.LTD.

The Coir Product Others from Kerala is exported to every part of the world channeled through various ports.

Coir Products Export

The analysis of export details of Coir Products from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that 113200444 Kgs via 204 exporting companies were engaged in the Coir Products.

The total quantity of Coir Geo Fabrics exported was 8446852 Kgs by 43 companies. Coir Log exported was 31954 Kgs by 3 companies. Coir Mats exported was 102540984 Kgs by 119 companies.

Coir Yarn Export

The analysis of export details of Coir Yarn from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that approximately 19 exporting companies were engaged in the Coir Yarn export. The total quantity of Coir Yarn exported through the listed companies was 1087242 kgs.

The maximum share of the exports was carried out by Kerafibertex International P.LTD with quantity of with a quantity of 458775 kgs

Cotton Goods Export

The analysis of export details of Cotton Goods from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that 1092 exporting companies were engaged in the Cotton Goods export. The total quantity of Cotton Goods exported through the listed companies was 47114859 Kgs. KITEX GARMENTS LTD. stands top in the export of cotton goods with 57,67816 Kgs (12.24%)

Cotton Yarn Export

The analysis of export details of Cotton Yarn from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that many exporting companies were engaged in the export. The total quantity of Cotton Yarn exported through the listed companies was

16085499 kgs through 29 ports from Cochin port. The maximum share of the exports was carried out by K.P.R. Mill LTD. i.e., 4245762 Kgs (26.39%) exported

Jute Products Export

The analysis of export details of Jute Products from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that approximately 100 exporting companies were engaged in the Jute Products which includes Jute matting, floor covering, mats, rugs and carpets. The total quantity of Jute Products exported through the listed companies was 7878272 kgs. The maximum share of the exports was carried out by N.C. John & Sons LTD with a quantity 2145977 kgs exported through different ports. N.C. John & Sons LTD exported about 27.23% of the total Jute Products exported from Kerala, followed by Travancore Mats & Matting CO. with quantity of 1828663 kgs (23,21%). Palm Fibre(India)P.LTD stands in the 3rd position with 1357055 Kgs (17.2%) exported.

Oleoresin Export

The analysis of export details of Oleoresin from Kerala during the period from 1st April 2019 to 31st March 2020 revealed a total quantity of 9574982 Kga exported through many companies.

Oleoresins of Spices accounted an amount of 8714286 Kgs, Oleoresin Pepper was 271117 Kgs, Oleoresin Paprika 157472 Kgs and Garcinia Extract 104794 Kgs. The lowest amount was represented by Oleoresin Mustard 6 Kgs. The details of product with the quantity engaged in the Oleoresin export was given in the table 7.30.

Spices Export

The analysis of export details of cashew from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that 204 exporting companies were engaged in the Spices export. The maximum share of each of the export was displayed below.

Cardamom

Total quantity exported was 533309 Kgs. Samex India P.Ltd exported 323668 Kgs (60.65) via the ports such as Bahrain, Bander Abbas, Jebel Ali, Kuwait, Sohar followed by Pace

Ventures 95851 kgs (17.9 %) Jebel Ali, Shuwaikh, Sohar. The lowest quantity exported was 4000 kg (0.75 %) by the company Sampat & Co.

Chillies

Total quantity of Chillies exported was 17,78299 Kgs. AB Mauri India P.Ltd. exported 454230 Kgs (25.5) via the ports such as Felixstowe, Houston, Long Beach, New Orleans, New York, Norfolk, Pusan, Savannah followed by AVT McCormick Ingredients Ltd 412199 kgs (23.17 %) Baltimore, Cape Town, Felixstowe, Fos Surmer, Goteborg, Haifa, Jefferson, Melbourne, New York, Oakland, Port Kelang, Pusan, Rotterdam. The lowest quantity exported was 11013 kg (0.62 %) by the company Topper Exports via Hamad port.

Ginger

Total quantity of Ginger exported was 741370 Kgs. AVT McCormick Ingredients Ltd. exported 331433 Kgs (44.7) via the ports such as Baltimore, Bangkok, Felixstowe, Manila, New York, Port Kelang, Rotterdam followed by Indian Commercial Company 115192 kgs (15.5 %) Casablanca, Jebel Ali, Tanger. The lowest quantity exported was 8000kg (1.08 %) by the company Biowin Agro Research via Fos Surmer port.

Pepper

Total quantity of Pepper exported was 8505826 Kgs. Indian Products Ltd. exported 2256633 Kgs (26.53) via the ports such as Auckland, Baltimore, Calgary, Charleston, Felixstowe, Gdynia, Gioia Tauro, Goteborg, Halifax,, Livorno, Long Beach, New York, Qingdao, Rotterdam, Savannah, Sydney, Toronto, Trieste, Warrington, Wellingborough, Wotton-Under-Edge followed by AB Mauri India P.Ltd 1938883 kgs (22.8 %) Chicago, Felixstowe, Grand Prairie, Houston, Long Beach, Long Beach, Los Angeles,, Louisville,, Minneapolis, Montreal, New Orleans, New Orleans, New York, Norfolk,, Savannah, Sydney. The lowest quantity exported was 200 kg (0.002 %) by the company Jeevagram via Barcelona port.

Turmeric

Total quantity of Turmeric exported was 2485609 Kgs. Avt McCormick Ingredients Ltd. exported 780789 Kgs (31.41) via the ports such as Abidjan, Antwerp, Baltimore, El Iskandaria, Felixstowe, Fos Surmer, Gdynia, Haifa, Livorno, New York, ,Pleasant Prairie,

Ravenna, Springfield, Tokyo followed by Akay Spices P.Ltd. 498500 kgs (20.05 %) Charleston, Hamburg, Helsingborg, Los Angeles, New York,Surabaya. The lowest quantity exported was 9000 kg (0.36 %) by the company General Commodities Ltd. via Genoa port.

Value added products

Total quantity of Value added products exported was 70774628 Kgs. Eastern Condiments P.Ltd

Ingredients Ltd. exported Chilli powder, Coriander powder, Curry powder, Spices, Spices powder 9692391 Kgs (13.6) 9727, 48451, 9611776, 7921 and 14516 Kgs respectively

Tea Export

The analysis of export details of Tea from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that 102 exporting companies were engaged in the Tea export. The total quantity of Tea exported through the listed companies is 78101143 kgs.

Miscellaneous Export

The analysis of export details of miscellaneous products from Kerala during the period from 1st April 2019 to 31st March 2020 revealed that many exporting companies were engaged in the export. Grand total included in this category was 525906615 Kgs.

8.1 FOREST BIORESOURCES

As a part of the study a detailed analysis of trends in collection of NWFP by primary collectors and marketing through various agencies as SC/ST federation, Vanasree and TRIFED was done. As a supplementary source of income, NWFP is important to the tribal people of Kerala and Kerala Forest department has put in place a collection and marketing mechanism through Vanasree including procurement; semi processing, packing, branding, labelling and marketing.

Existing marketing network starting right from the primary collectors (Girijan co-operative society), SC/ST Federation and their selling network involved different agencies as Ayurvedic manufacturing units/ companies as Oushadhi, Ayurdhara, and others, TRIFED etc. It is also observed that the forest department is maintaining the data related to forest bioresources and the team of RKI project collected division wise data, collection and sales of NWFP through Federation and marketing through Vanasree.

The existing collection and marketing network of NWFP and value-added products through Vanasree, TRIFED etc. need to be reviewed thoroughly and strengthened to ensure a functioning network in a more effective manner so that the stakeholders involved in the process should get benefit sharing as envisaged in Biological Diversity Act 2002 and Guidelines of Access and Benefit Sharing.

Considering resources such as wild honey (Big, honey small and other classifications of the honey made by the tribes like poottu then, thodu then, ngdial then etc.) and other products traded in large quantities, an in-depth study on supply and value chain of the forest bioresources and the possibility of developing value added products has to be framed out to strengthen the marketing network.

Training and capacity building program shall be extended exclusively to the tribal communities who are currently engaged in collection of NWFP and other bioresources to introduce good collection, processing, storage, and selling practices and value addition of forest bioresources especially on medicinal and aromatic plants, food plants with a view to improve their livelihood. Developing entrepreneur capacity building program of the target groups and marketing the raw materials and value added products without intermediary to ensure maximum profits will ensure better returns to the tribal community.

Location specific policy shall be framed in terms of conservation, cultivation of medicinal and aromatic plants in suitable forest areas or fringe areas.

Medicinal plants identified as threatened due to over extraction, unauthorized collection has to be restricted and regulated through implementing/ declaring of species level conservation sites of the medicinal plants through the in situ and ex situ conservation.

8.2 AYURVEDA INDUSTRIES

Extensive consultations were held with Ayurveda industry representatives and the major issue flagged was the non-availability of quality raw materials and the price rise of raw materials effecting the profitability. The necessity of a common facility center, centralized lab facility for quality check, centralized collection center of bioresources at least one center/ district were suggested. Lack of quality raw materials including honey, jaggery, oil etc is also one of the major issues flagged. Most of the raw material are accessed form traders and they do not have any registration or license or mechanism for quality checking. Frequently raw materials are maintained in different grades with different price which effects quality of the finished products.

Sustained supply of raw materials is a challenge to the Ayurveda industry as more than 75% of medicinal plants are sourced from forest area and 75% these are harvested in destructive ways. Lack of scientific validation/ standardization of raw materials (adulterant, substitute) is an issue. It was suggested that prioritized species for cultivation shall be identified, startups should be encouraged in this sector and a minimum support price to major commercially important medicinal plants shall be fixed. Unscientific /unauthorized collection and over extraction of medicinal plants shall be restricted and regulated. An improvement of the standard of entire value and supply chain is needed.

8.3. ANGADIKADA (RAW MATERIAL SHOPS) -MEDICINAL PLANTS FRESH AND DRY

According to the studies carried out based on Angadikada it is strongly recommended that appropriate policy decision shall be taken to register all Angadikada large- whole sale and retail, medium and small scale currently functioning in the state. Policy decision shall also be taken to issue license to all Angadi kada in Kerala under the LSGs

Based on the present study that the hygienic condition of raw material shops and storage places are not up to the mark policy decision shall be taken to issue appropriate

directions to the department of AYUSH, Drug Controller of Ayurveda to provide necessary guideline, regulations, restriction for improving the present condition.

At present there is no expiry date for the raw drugs, this is to be studied scientifically (shelf life of each items) and there should be a guide line for fixing an expiry date for each raw drugs. It is desirable to design a policy for introducing "Smart Angadi kada" under the startup programme so that the materials can have greater acceptability during export.

Introduce necessary register/develop a data base for maintaining the records including quantity and price of buying and selling of the raw materials, Value added products and source of materials collected (Local/ state/ outside the state/outside the country)

Innovation by the Ayurvedic drug manufacturers for the development of diverse scientifically validated products including Ayurvedic/ herbal/ nutraceutical/ cosmeceutical / vriksha ayurvedic products based on the raw materials available in the different geographic zone of Kerala is needed.

Establishment of cooperation between Ministry of Ayurveda and related agencies (Directorate of General of foreign trade (DGFT), Business information system (BIS) Export inspection council (EIC) and Ministry of Small and Medium Enterprises (MSME) and institutions at National and International level to develop appropriate policy is necessary.

8.4. AGRICULTURE AND HORTICULTURE SECTOR

As part of the project extensive consultations were held with farmers and FPOs and some of the major recommendations include :

Fixing base price for commercially important crops, Increasing the storage capacity through godowns, cold storage facilities etc, Survey to identify farmer-preferred species and focused research program on such species; Improved practices for nursery and plantations (optimum spacing, fertilizing, enrichment planting, and other methods of restoring natural forest cover, fire control techniques, etc.) and the preparation of technical manuals; Improved agro-forestry/land use planning, Wood technology practices to promote rational utilization of plantation products ; Demonstration plots using improved seeds, mixed cropping, inter-cropping of shorter rotation trees etc were some of the suggestions.

Promoting development of value added products from tea, coffee, cocoa, areca nut, rubber, coconut etc. at each district through a consortium of small scale plantation crop farmers, promoting small scale industries connected with bioresources of spices, dye, medicinal plants, promoting farm tourism, promoting GI crops like Navara rice which is nutraceutical and develop value added products via small scale industries that will provide additional income to farmers has also been suggested.

Registration of all the plant nurseries via BMC of the panchyat, promoting indigenous species especially high volume and high priced wild species than exotic species, promoting nurseries of Lotus and other ornamental plants which is high priced with minimal investments, promoting society level tissue culture biotech labs for producing economically important high priced ornamental and medicinal species like Orchids, Anthurium, Croton etc. has been stressed.

Model nurseries especially at high altitude areas like Wayanad, Idukki districts to promote wild edible cultivated plant species used by tribal population such as Leafy greens (107 species), Tuber and roots (46), Fruits and seeds (105 species) will promote employment opportunities to tribal people.

Agro and Fruit Processing Companies, Fruit/Horti farms at Wayandu and Idukki like at Nelliampathy can be promoted.

8.5. BIODIVERSITY CUM KNOWLEDGE PORTAL

The present project has attempted to document the traded bioresources which has to be updated regularly. Due to constraints in time and funds a comprehensive Biodiversity knowledge portal could not be developed. KSBB shall maintain a Biodiversity knowledge portal incorporating new species discoveries, updating tradable bioresources data bank, soft copy of related thesis, publications etc.

8.6. SPECIES SUGGESTED FOR CULTIVATION

Raw drugs are widely being exported from Kerala and a list of some important species with export potential that can be grown in Kerala is given below.

Table 8.1 Medicinal Plants recommended for cultivation in Kerala

Sl.No.	Botanical Name	Sanskrit Name	Local Name	No. of Ayurvedic formulations (approx.) in which the plant is used
1.	<i>Acorus calamus</i>	Vacha	Vayambu	85
2.	<i>Adhatoda beddomei</i>	Vasa	Adalodakom	60
3.	<i>Aegle marmelos</i>	Bilva	Koovalum	120
4.	<i>Aloe vera</i>	Kumari	Kattar vazha	15
5.	<i>Alpinia galanga</i>	Rasna	Chittaratha	150
6.	<i>Andrographis paniculata</i>	Bhunimba	Kiriyathu	50
7.	<i>Aristolochia indica</i>	Iswari	Garudakodi	20
8.	<i>Asparagus racemosus</i>	Sathavari	Sathavari	85
9.	<i>Azadirachta indica</i>	Nimba	Vepu	100
10.	<i>Baliospermum montanum</i>	Danti	Nagadanti	27
11.	<i>Bacopa monniera</i>	Brahmi	Brahmi	50
12.	<i>Boerhaavia diffusa</i>	Punarnava	Thavizhama	80
13.	<i>Cassia fistula</i>	Aragwada	Kanikonna	50
14.	<i>Celastrus paniculata</i>	Jyotishmati	Kattadinayakam	15
15.	<i>Centella asiatica</i>	Mandooka parni	Kudangal	20
16.	<i>Coleus amboinicus</i>	Himasagara	Njavara	25
17.	<i>Coscinium fenestratum</i>	Harichandana	Maramannhal	80
18.	<i>Cyclea peltata</i>	Pata	Pata	60
19.	<i>Cyperus rotundus</i>	Musta	Muthanga	70
20.	<i>Desmodium gangeticum</i>	Saliparni	Orila	60
21.	<i>Eclipta alba</i>	Bringaraja	Kaithonni	40
22.	<i>Embelia ribes</i>	Vidanga	Vizhal	60
23.	<i>Embllica officinalis</i>	Aamalaki	Nelli	180
24.	<i>Evolvulus alsinoides</i>	Vishnukranthi	Vishnukranthi	40
25.	<i>Gloriosa superba</i>	Langali	Menthonni	6
26.	<i>Gmelina arborea</i>	Kasmari	Kumbil	70
27.	<i>Hemidesmus indicus</i>	Sariba	Naruneendi	70
28.	<i>Holarrhena antidysenterica</i>	Kutaja	Kutakappala	40
29.	<i>Holoptelea integrifolia</i>	Chrivillwa	Avil	30
30.	<i>Holostemma adakodien</i>	Jeevanthi	Adapathian	30
31.	<i>Indigofera tinctoria</i>	Neeli	Neela amari	5
32.	<i>Ipomoea mauritiana</i>	Kshiravidari	Palmudukku	15
33.	<i>Kaempferia galanga</i>	Sati	Kacholam	25

34.	<i>Moringa oleifera</i>	Sigru	Muringa	55
35.	<i>Murraya koenigii</i>	Kaidaryam	Karivepu	25
36.	<i>Myristica fragrans</i>	Jathiphal	Jathi	40
37.	<i>Ocimum sanctum</i>	Tulsi	Tulsi	60
38.	<i>Operculina turperhum</i>	Trivrit	Thrikolppakonna	40
39.	<i>Oroxylum indicum</i>	Syonaka	Palakapayyani	70
40.	<i>Phyllanthus fraternus</i>	Bhumiamalaki	Keezha Nelli	20
41.	<i>Piper longum</i>	Pippali	Thippali	240
42.	<i>Plumbago zeylanica</i>	Chitrak	Koduveli	120
43.	<i>Pongamia pinnata</i>	Karanja	Pongu	70
44.	<i>Psoralea corylifolia</i>	Bakuchi	Karkokil	25
45.	<i>Punica granatum</i>	Dadima	Mathalam	35
46.	<i>Ricinus communis</i>	Eranda	Avanakku	70
47.	<i>Rubia cordifolia</i>	Manjista	Manjatti	40
48.	<i>Salacia reticulata</i>	Ekanayakomus	Ponkarandi	10
49.	<i>Santalum album</i>	Chandana	Chandanam	40
50.	<i>Saraca indica</i>	Asoka	Asokam	16
51.	<i>Semecarpus anacardium</i>	Bhallataka	Cheru	22
52.	<i>Sesbania grandiflora</i>	Agasthi	Agathi	20
53.	<i>Sida rhombifolia</i>	Bala	Kurunthotti	180
54.	<i>Solanum indicum</i>	Brihati	Chunda	45
55.	<i>Strychnos potatorum</i>	Kathaka	Thettamparal	25
56.	<i>Strobilanthes neilgherrensis</i>	Sahachara	karimkurinji	60
57.	<i>Terminalia bellerica</i>	Vibhitaka	Thanni	160
58.	<i>Terminalia chebula</i>	Hareetaki	Kadukka	150
59.	<i>Tinospora cordifolia</i>	Guduchi	Chttamruthu	260
60.	<i>Tribulus terrestris</i>	Gokshura	Njerinnil	120
61.	<i>Trichosanthes cucumerina</i>	Tikthaphala	Kattu padavalam	55
62.	<i>Vetiveria zizanioides</i>	Useera	Ramacham	60
63.	<i>Vitex negundo</i>	Nirgundi	Karinochi	50
64.	<i>Woodfordia fruticosa</i>	Dhataki	Thathiri	30

Source: Handout published 'Resource Augmentation, sustainable harvesting and value addition to medicinal plants resources through (BMC), KSBB publication 2015

Table 8.2 Plants with export potential

Sl.No	Local name	Scientific name
1.	Asokam	<i>Saraca asoca</i>
2.	Koovalam	<i>Aegle marmelos</i>
3.	Palakappayani	<i>Oroxylum indicum</i>
4.	Kumizh	<i>Gmelina arborea</i>
5.	Kanikkonna	<i>Cassia fistula</i>
6.	Nellikka	<i>Phyllanthus emblica</i>
7.	Neelayamari	<i>Indigofera tinctoria</i>
8.	Iruveli	<i>Plectranthus vettiveroides</i>
9.	Adapathiyan	<i>Holostema ada-kodien</i>
10.	Kattupadavalam	<i>Trichosanthes lobata</i>
11.	Nannari	<i>Hemidesmus indicus</i>
12.	Naikkuranam	<i>Mucuna pruriens</i>
13.	Kattarvazha	<i>Aloe vera</i>
14.	Kacholam	<i>Kaempferia galangal</i>
15.	Brahmi	<i>Bacopa monnieri</i>
16.	Kachooram/Manja koova	<i>Curcuma zedoaria</i>
17.	Sathavari	<i>Asparagus racemosus</i>
18.	Aratha	<i>Alpinia galanga</i>
19.	Paalmuthakku	<i>Ipomoea mauritiana</i>
20.	Vellakkunni	<i>Abrus precatorius</i>
21.	Nagadanthi	<i>Baliospermum montanum</i>
22.	Trikolpakonna	<i>Operculina turpetum</i>
23.	Chittaadalodakam	<i>Justicia beddomei</i>
24.	Vayambu	<i>Acorus calamus</i>
25.	Pooppal	<i>Lichen sp.</i>
26.	Chandhanam	<i>Santalum album</i>
27.	Raktha chandanam	<i>Pterocarpus santalinus</i>
28.	Maramanjil	<i>Coscinium fenestratum-</i>
29.	Pathimugham/Chappangam	<i>Caesalpinia sappan</i>
30.	Elam	<i>Elettaria cardamomum</i>
31.	Grampoo	<i>Syzygium aromaticum</i>
32.	Kurumulaku	<i>Piper nigrum</i>

In the tradable bioresource survey, 29 species found outside forest have been prioritized with good economic value and commercially utilized in the industries, nurseries for

ornamental, wood, essential oils etc. The list has been compiled with inputs from JNTBGRI, KFRI and other research institutes of Kerala.

Table 8.3 Species with commercial potential

Sl. No	Binomial	Common name	Use
1	<i>Nelumbo nucifera</i>	Sacred Lotus, Thamara, Chenthamara, Venthamera	Flower & Tuber
2	<i>Ocimum americanum</i>	Common basil, Kattuthulasi	Oil
3	<i>Cymbopogon citratus</i>	Lemongrass, Thyilapullu, Vasanappullu	Oil
4	<i>Cymbopogon martini</i>	Palmarosa, Sambarapullu	Oil
5	<i>Chrysopogon zizanioides</i>	Vetiver, Ramacham	Oil
6	<i>Cymbopogon flexuosus</i>	Ginger grass, Inchipullu	Oil
7	<i>Pogostemon cablin</i>	Pacholi	Oil
8	<i>Mentha piperita</i>	Pepper mint	Oil
9	<i>Pelargonium hirsutum</i>	Geranium	Oil
10	<i>Ocimum basilicum</i>	Basil, Kattuthrithavu, Tirunetru	Oil
11	<i>Tribulus terrestris</i>	Njerinjil, Mulluringi, puncture vine	Medicinal
12	<i>Sida cardifolia</i>	Country Mallow, Anakurunthoti, Kattooram, Kurunthotti, Vellooram, Velluppan	Medicinal
13	<i>Gmelina arborea</i>	Kumbil, White Teak, Coomb Teak	Medicinal
14	<i>Pterocarpus marsupium</i>	Karavenga, Venga	wood
15	<i>Monarda fistulosa</i> L.	Bergamot	wood
16	<i>Gravelia robusta</i>	Silky oak	wood
17	<i>Terminalia elliptica</i>	Black murdah, Indian laurel, Matthi, Karimaruthu	wood
18	<i>Xylia xylocarpa</i>	Burma Iron-wood, Irumullu, Kadamaram, Pangal	wood
19	<i>Pterocarpus indicus</i>	Red Sandalwood	wood
20.	<i>Dipterocarpus indicus</i>	Vella-ayani, Karanjili	wood
21	<i>Nauclea diderrichii</i>	Bilinga, badi	wood
22	<i>Peltogyne purpurea</i>	Violet wood, Amaranth, purple heart	wood
23	<i>Terminalia alata</i>	taukkyan wood	wood
24	<i>Lagerstroemia lanceolata</i>	Nandi tree, venthekku	wood
25	<i>Albizia lebbeck</i>	Indian siris, Womans tongue, Nenmenivaka, Kattuvaka, Vaka	wood
26	<i>Albizia odoratissima</i>	Ceylon rosewood, Mellivaka, Nellivaga, Pulivaka	wood
27	<i>Terminalia tomentosa</i>	Crocodile bark tree, black murdah	wood

28	<i>Terminalia paniculata</i>	Flowering murdah, Maruthu, Manjamaruthu, Theempaav	wood
29	<i>Bridelia retusa</i>	Spinous Kino Tree, Mulkaini, mulluvenga	Bark and root

7. Species of conservation concern

Based on the study conducted under RKI Project (primary and secondary data) the following species of medicinal plants are recommended for conservation, regulation and restrictions

Table 8.4 Threatened medicinal plants

Sl. No	Botanical Name	Common Name	Conservation	Restrictions Regulation	Rescue Recovery reintroduction Rehabilitation	In-situ	Ex-situ	Remarks
1	<i>Acorus calamus</i>	Vayambu	✓	✓		✓	✓	Collected in high volume
2.	<i>Adenahondala</i>	Kannadaku	✓		✓	✓	✓	Un authorised collection by Tribal healers
3.	<i>Adathodabeddomei</i>	Cheriya Adalotakoam			✓	✓	✓	Over extraction by the industry and folk dealers
5.	<i>Aeglemarmelos</i>		✓		✓	✓	✓	Collected in high volume cultivation
6.	<i>Amorpho</i>	Kattu chena	✓		✓	✓		Un

	<i>phallus core. paeoniifolius</i>							authorised collection by Tribal/Folk dealers
7.	<i>Aristolochia tagala</i>	Valiya arayan	✓	✓		✓	✓	Un authorised collection by Tribal/Folk healers
8.	<i>Baliospermum montanum</i>	Nagadanthi		✓		✓	✓	Over extraction by the industry
9.	<i>Canarium strictum</i>	Karutha kunthiri kkom	✓	✓		✓		Declare of species level conservation site
10.	<i>Celastrus paniculatus</i>	Cheru punna	✓	✓		✓		over extraction by industries
11.	<i>Chonemorpha fragrans</i>	Perumkurumba	✓	✓		✓		over extraction by industries
12.	<i>Cocinium fenestratum</i>	Maramanjala	✓	✓		✓	✓	over extraction by industries Declare species level conservation site
13.	<i>Decalepis arayalpathra</i>	Amrithapala	✓	✓	✓	✓		Un authorised

								collection by Tribal/Folk dealers, Declare species level conservation site
14	<i>Decalepis hamiltonii</i>	Mahannikizhangu	✓	✓	✓	✓		Un authorised collection by Tribal/Folk dealers, Declare species level conservation site
15	<i>Dysoxylum malabaricum</i>	Vellakil	✓		✓	✓		Un authorised collection by tribes
16	<i>Embelia tsjerian-cottam</i>	Vizhalari	✓		✓	✓		Un authorised collection by Tribal/Folk dealers
17	<i>Hydnocarpus alpinia</i>	Kattu marotti	✓		✓	✓		Over extraction by industries
18	<i>Madhuca longifolia</i>	Ilippa	✓	✓		✓	✓	Over extraction by industries
19	<i>Myristica malabarica</i>	Pasupasi	✓	✓		✓	✓	Over extraction

							by industries
20.	<i>Nervilie aragoana</i>	Orilathamara	✓	✓	✓	✓	Un authorised collection by Tribal/Folk dealers
21.	<i>Nilgirianthus ciliatus</i>	Karimkuringi	✓	✓		✓	Collected in high volume
22.	<i>Oroxylum indicum</i>	Palaka payyani	✓	✓		✓	Collected in high volume
23.	<i>Pterocarpus santalinus</i>	Rekthachandanam	✓	✓	✓	✓	Exported
24.	<i>Salacia obolonga</i>	Ponkorandi	✓	✓	✓	✓	Un authorised collection by Tribal/Folk healers
25.	<i>Smylax zeylanica</i>	Karee lanchi	✓	✓		✓	Un authorised collection by Tribal/Folk dealers
26.	<i>Trichopus zeylanicus</i>	Arogya pacha	✓	✓	✓	✓	Un authorised collection by Tribal/Folk dealers, Declare species level conservation site

27	<i>Utteria salicifolia</i>	Mahali	✓	✓	✓	✓	Un authorised collection by Tribal/Folk dealers and for industries, Declare species level conservation site
28	<i>Pterospermum rubigenosum</i>	Elluri patta, Indianal	✓	✓		✓	Un authorised collection by Tribal/Folk dealers' cultivation Declare species level conservation site
29	<i>Ranvolfia serpentina</i>	Sarpaganda	✓	✓		✓	Collected in high volume
30	<i>Mappia foetida</i>	Peenari	✓	✓		✓	Collected in high volume, Declare species level conservation site

Table 8.5 State list of species suggested to be restricted for commercial utilization

No	Groups	Species		Distribution	Commercial utilization		Threat status
		Common name	Scientific name		Parts used	Approx Qty traded/ year	
1.	Medicinal plants	Kolavu, Shurali	<i>Kingiodendron pinnatum</i> (Roxb. ex DC.) Harms	S.W.Ghats	Resin used for rheumatism	Overexploiting	Endangered
		Attuvanchi	<i>Ochreinauclea missionis</i> (Wall. ex G. Don) Ridsdale	Endemic to Western Ghats	Bark used for skin troubles, rheumatism and constipation	Habitat destruction	Vulnerable
		Brahmi	<i>Bacopa monnieri</i> (L.) Pennell		Improve intellect, used for epilepsy. Leaves used as diuretic	Habitat destruction	Least Concern
		Chittadalodakam, Cheriya adalodakam	<i>Adhatoda beddomei</i> C.B. Clarke	Endemic to India	Leaf juice used in haemoptysis and menorrhagia	Over exploitation	Endangered
		Adakodian	<i>Holostemma annular e</i> (Roxb.) Schum.	India, Sri Lanka, Nepal, Myanmar	Roots used in diabetes, cough, gonorrhoea and stomach-ache	--	
		Eswaramulla, Valiyaarayan, Garudakodi	<i>Aristolochia tagala</i> Cham.	India, Nepal, Myanmar	Carminative tonic and emmenagogue	Habitat destruction	
		Kudakapala	<i>Holarrhena pubescens</i>	India, China, Myanmar	Stem bark decoction used	--	Least Concern

		(Buch.-Ham.) Wall. ex G. Don		for psoriasis Antimalarial and antibacterial		
	Analivegam	<i>Alstonia venenata</i> R.Br.	Endemic to India	Fruits used in insanity, epilepsy and mental disorders		
		<i>Salacia malabarica</i> Gamble	Endemic to Western Ghats		Over exploitation	Endangered
	Chittelam	<i>Heracleum candolleianum</i> (Wight & Arn.) Gamble	Endemic to India	Fruits used in stomach troubles	Over exploitation	
	Kallurvanchi	<i>Rotul aaquatica</i> Lour.	West tropical Africa, Tropical Asia	root		Endangered
	Mahalikizhangu	<i>Utleria salicifolia</i> Bedd. ex Hook.f.	Endemic to Southern Western Ghats	root		Endangered
	Kattukurumulaku	<i>Piper barberi</i> Gamble	Southern Western Ghats	root		Endangered
	Arogyappacha	<i>Trichopuszeylani</i> <i>cus ssp.</i> <i>travancoricus</i> (Bedd.) Burkill ex Narayanan	South West India to Peninsular Malaya			Vulnerable

		Maramanjil, Manjavalli	<i>Coscinium fenestratum</i> (Gaertner) Colebr.	S. India to W. Malesia	Stem		Endangered
		Peenari Pulippacha	<i>Nothapodytes nimmoniana</i> (Graham) Mabb.	Indo- Malesia and China		In 2006–2008, the reported trade in the volumes has exceeded 1000 tons	
		Athithippali, Kannukuttimad, Nilamchakka	<i>Balanophora fungosa</i>	Indo- Malesia and Australia		Collected from forests/ Not quantified and published	
		Asparagus	<i>Asparagus fysonii</i> Macbr	Western Ghats		Collected from forests/ Not quantified and published	
		Koori	<i>Cynometra travancorica</i> Bedd.	Western Ghats		Collected from forests/ Not quantified and published	
		White Cedar	<i>Dysoxylum malabaricum</i>	Western Ghats		Collected from forests/ Not quantified and published	Endangered
2.	NTFP	Wild Nutmeg	<i>Myristica malabarica</i> Lam.	S.W.Ghats	Seed, and mace (aril) nutmeg adulterant	Overexploiting	Vulnerable

	Akil	<i>Dysoxylum malabaricum</i> Bedd. ex Hiern	W.Ghats	Timber, AromaticBark used for wound healing	Overexploiting	Endemic
	Malaviriam	<i>Pterospermum reticulatum</i> Wight & Arn.	S. W.Ghats	Ornamental	Overexploiting	Rare, Vulnerable
	Moottippazham	<i>Baccaurea courtallensis</i> (Wight) Muell.- Arg.	S.W. Ghats	Fruit edible		Endemic
	Kuttichooral	<i>Calamus brandisii</i> Becc.ex. Becc. & Hook.f.	S.W.Ghats	Stem		Endangered Indeterminate
	Arichooral, Vallichooral	<i>Calamus travancoricus</i> Bedd.ex. Becc. &Hook.f.	S.W.Ghats	Stem		Near threatened
	OttamanVattayila	<i>Calamus vattayila</i> Renuka	S.W.Ghats	Stem		Endangered
	Kudappana	<i>Corypha umbraculifera</i> L.	Southern India	Stem pith		Least Concern
	Black Dammar, KaruthaKunthirikk am	<i>Canarium strictum</i> Roxb.	India, Se. Asia	Resin	

		Kilitheenipanji, Jothishmathi	<i>Celastrus paniculatus</i> Willd.	India, Sri Lanka, Myanmar, Malesia	Bark an abortifacient Seeds tonic and aphrodisiac, seed oil as nerve stimulant	Habitat destruction	
		Vizhal, Thiruvettikalli	<i>Embelia ribes</i> Burm.f.	India, Sri Lanka, Myanmar, Malesia	Fruits used as stomachic, tonic, astringent and antihelmintic against tapeworms	Over exploitation	
		Ooravu, Kulamavu	<i>Persea macrantha</i> (Nees) Kosterm.	India, Sri Lanka	Bark used in asthma, consumption and rheumatism Leaves applied to ulcers	Destructive destruction	
		Vellapayin, Thellipayin	<i>Vateria indica</i> L.	Endemic to India	Resin used for chronic bronchitis and throat troubles Bark is alexipharmac		Critically Endangered
		Amruthapala	<i>Janakia arayalpathra</i> J. Joseph & V. Chandras.	Endemic to Western Ghats		Over exploitation	Critically Endangered
			<i>Ochlandra wightii</i> (Munro) C.E.C.Fisch.	Forests of Thiruvananthapuram,	Culms		

				Kollam			
			<i>Ochlandra setigera</i> Gamble	Forests of North Kerala	Culms		
			<i>Pseudoxytenanthera bourdillonii</i> (Gamble) H.B. Naithani	Pathanamthitta, Idukky, Ernakulam, Palakkad	Culms		
			<i>Schizostachyum beddomei</i> C.E.C. Fisch. R.B. Majumdar	Forests of Kerala	Culms		
		Hill Turmeric Kattumanjal	<i>Curcuma pseudomontana</i>	Peninsular India	Rhizome	Collected from forests/ Not quantified and published	Vulnerable
		Wild Cinnamon	<i>Cinnamomum sulphuratum</i>	Western Ghats	Bark	Collected from forests/ Not quantified and published	Vulnerable
		Kaatukaruva	<i>Cinnamomum gamblei</i>	Western Ghats	Bark	Collected from forests/ Not quantified and published	Endangered
3.	Timber	Raktha chandanam	<i>Pterocarpus santalinus</i> L.f.	Peninsular india	Timber used for dye	Overexploiting	Endemic
		Thodappei, Chenkuringi	<i>Gluta travancorica</i> Bedd.	Endemic to Western Ghats	Used for gunstock and construction		Lower Risk/Near Threatened
		Achamaram	<i>Hardwickia</i>	Endemic to	Used for house		

			<i>binate</i> Roxb.	India	construction		
		Karu, Karimaram	<i>Diospyros ebenum</i> J. Koenig	India, Sri Lanka, Myanmar	Used for house construction		Data Deficient
		Malamanjadi	<i>Ormosia travancorica</i> Bedd.	Endemic to India	Used for house construction		
		Venkotta, Vembala	<i>Lophopetalum wightianum</i> Arn.	India, Myanmar, Malesia	Used for house construction		Lower Risk/Least Concern
		Bhoothamkolli, Pulivayala	<i>Poeciloneuron indicum</i> Bedd.	Endemic to Western Ghata	Used for house construction		
4.	Ornamental plants as orchids etc. from wild	Arisaema	<i>Arisaema agasthyanum</i> Sivad. & C.S.Kumar	Endemic to the Southern Western Ghats.	Wild ornamental plant		Critically Endangered
		Wild Begonia	<i>Begonia arnottiana</i> (Wight) A.DC.	Endemic to the Southern Western Ghats	Wild ornamental plant		Critically Endangered
		Didymocarpus	<i>Henckelia macrostachya</i> (E.Barnes) A. Weber & B. L. Burtt	Endemic to the Southern Western Ghats.	Wild ornamental plant		Critically Endangered

		Kanjavu	<i>Memecylon subramanii</i> A.N.Henry	Endemic to the Southern Western Ghats.	Wild ornamental plant		Critically Endangered
		Pothos	<i>Pothos keralensis</i> Pandur. & V.J. Nair	Endemic to the Southern Western Ghats.	Wild ornamental plant		Endangered
		Sonerila	<i>Sonerila nemakadensis</i> C.E.C.Fischer	Endemic to the Southern Western Ghats	Wild ornamental plant		Endangered
			<i>Vernonia multibracteata</i> Gamble	Endemic to the Southern Western Ghats.	Wild ornamental plant		Endangered
		Kattukamuku, Kanthal	<i>Bentinckia condapanna</i> Berry ex Roxb.	Endemic to Western Ghats	Wild ornamental	Destructive destruction	Rare

			<i>Thunbergia mysorens</i> (Wight) T. Anders.	Endemic to India	Wild ornamental		
			<i>Phyllanthus gageanus</i> (Gamble) M. Mohanan	Endemic to Western Ghats	Wild ornamental		Rare
		Elimaram	<i>Memecylon gracile</i> Bedd.	Endemic to India	Wild ornamental		
			<i>Impatiens platyadena</i> C.E.C. Fischer	Endemic to Western Ghats	Wild ornamental	Over exploitation	Indeterminate
			<i>Exacum courtallense</i> Arn.	Endemic to Western Ghats	Wild ornamental		Indeterminate
		Keerikizhangu, Sulli	<i>Anaphyllum wightii</i> Schott	Endemic to Western Ghats	Wild ornamental	Over exploitation	Vulnerable
			<i>Ardisia sonchifolia</i> Mez	Endemic to Western Ghats	Wild ornamental		Endangered
			<i>Brachycorythis lantha</i> (Wight) Summerh.	Endemic to India	Wild ornamental		
			<i>Begonia albococcinea</i> Hook.	Endemic to India	Wild ornamental	Over exploitation	

			<i>Euonymus paniculatus</i> Wight ex G. Lawson	Endemic to Western Ghats	Wild ornamental		Endangered
			<i>Tabernae montanagamblei</i> Subr. & A.N. Henry	Endemic to India	Wild ornamental		Lower Risk/Conservation Dependent
			<i>Phlogacanthusgrandis</i> Bedd.	Endemic to Western Ghats	Wild ornamental		
			<i>Ipsea malabarica</i> (Rchb.f) Hook.f.				Rare
			<i>Papiopedilum druryi</i> Stein				Critically endangered
			<i>Phaius luridus</i> Thwaites				Endangered
		Drury's Paphiopedilum	<i>Paphiopedilum druryi</i>	Western Ghats	Plant	Not quantified and published	Critically Endangered
			<i>Vanda thwaitesii</i> Hook.f.				Rare
			<i>Vanda wightii</i> Rchb.f.				Rare
5.	Minor products as tubers, mushrooms, resins etc	Arayambu	<i>Pseudoxytenanthera bourdillonii</i>	Rare distribution in Vazhachal, Nilambur	Limited trade for curtain industry	Rare	No

		Erancol, Solid bamboo	<i>Munrochloa ritchiei</i>	Nilambur Forest Division	Extracted without restriction and sent to neighbouring states	Rare And endangered bamboo species	There was a ban but it was lifted
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Table 8.6 Plants of commercial and conservation interest

1.	<i>Cyclea peltata</i>	
2.	<i>Sida alnifolia</i>	
3.	<i>Aegle marmelos</i>	
4.	<i>Premna serratifolia</i>	
5.	<i>Babiospermum solanifolium</i>	Regulation required
6.	<i>Gmelina arborea</i>	
7.	<i>Sterospermum colais</i>	
8.	<i>Desmodium velutinum</i>	
9.	<i>Solanum virginianum</i>	
10.	<i>Solanum violaceum</i>	
11.	<i>Tribulus terrestris</i>	
12.	<i>Aristolochia indica</i>	
13.	<i>Trichopus zeylanica</i>	Regulation required
14.	<i>Leptadenia reticulata</i>	Regulation required
15.	<i>Ipomoea mauritiana</i>	
16.	<i>Asparagus racemosus</i>	Regulation required
17.	<i>Asparagus gonocladus Baker</i>	
18.	<i>Justicia adathoda</i>	
19.	<i>Indigofera tinctoria</i>	
20.	<i>Eclipta prostrata</i>	
21.	<i>Acorus calamus</i>	
22.	<i>Ipomoea obscura</i>	
23.	<i>Curculigo orchioides</i>	
24.	<i>Hemidesmus indicus</i>	
25.	<i>Decalepis nervosa</i>	Regulation required
26.	<i>Plectranthus hadiensis</i>	
27.	<i>Strychnos potatorum</i>	
28.	<i>Salacia chinensis</i>	
29.	<i>Rauvolfia tetraphylla</i>	
30.	<i>Chrysopogon vetiveroides</i>	
31.	<i>Plumbago zeylanica</i>	
32.	<i>Ficus racemos</i>	
33.	<i>Ficus microcarps</i>	

34.	<i>Ficus religiosa</i>	
35.	<i>Ficus benghalensis</i>	
36.	<i>Trichosanthes cucumerina</i>	
37.	<i>Terminalia chebula</i>	
38.	<i>Terminalia bellerica</i>	
39.	<i>Phyllanthus emblica</i>	
40.	<i>Phyllanthus amarus</i>	
41.	<i>Euphorbia thymifolia</i>	
42.	<i>Kaempferia galanga</i>	
43.	<i>Alpinia galanga</i>	
44.	<i>Alpinia calcarata</i>	
45.	<i>Jasminum grandiflorum</i>	
46.	<i>Heracleum candolleianum</i>	Regulation required
47.	<i>Centella asiatica</i>	
48.	<i>Scoparia dulcis</i>	
49.	<i>Rotula aquatica</i>	
50.	<i>Bacopa monnieri</i>	
51.	<i>wrightia tinctoria</i>	
52.	<i>Holarrhena pubescens</i>	
53.	<i>Vernonia cinerea</i>	
54.	<i>Costus speciosus</i>	
55.	<i>Hedychium spicatum</i>	Regulation required
56.	<i>Artocarpus hirsutus</i>	
57.	<i>Terminalia arjuna</i>	
58.	<i>Woodfordia fruticosa</i>	
59.	<i>Piper longum</i>	
60.	<i>Tinospora cordifolia</i>	
61.	<i>Erythrina stricta</i>	
62.	<i>Cassia fistula</i>	
63.	<i>Azadirachta indica</i>	
64.	<i>Cyperus rotundus</i>	
65.	<i>Berberis tinctoria</i>	Regulation required
66.	<i>Withania somnifera</i>	

67.	<i>Pueraria tuberosa</i>	Regulation required
68.	<i>Evolvulus alsinoides</i>	
69.	<i>Merremia tridentata</i>	
70.	<i>sphaeranthus indicus</i>	
71.	<i>Cinnamomum verum</i>	
72.	<i>Hygrophila schulli</i>	
73.	<i>Ricinus communis</i>	
74.	<i>Rothea serrata</i>	
75.	<i>Callicarpa tomentosa</i>	
76.	<i>Piper mullesua</i>	
77.	<i>symplocos cochinchinensis</i>	
78.	<i>Chonemorpha fragrans</i>	
79.	<i>Canarium strictum</i>	
80.	<i>Elaeocarpus sphaericus</i>	
81.	<i>Holoptelea integrifolia</i>	
82.	<i>Ferula asafoetida</i>	
83.	<i>Oldenlandia corymbosa</i>	
84.	<i>Achyranthus aspera</i>	
85.	<i>Tragia involucrata</i>	
86.	<i>Mucuna pruriens</i>	
87.	<i>Citrus medica</i>	
88.	<i>Citrullus colocynthis</i>	
89.	<i>Momordica dioica</i>	
90.	<i>Crateva magna</i>	
91.	<i>Sida cordifolia</i>	
92.	<i>Stychnos nuxvomica</i>	
93.	<i>Leucas aspera</i>	
94.	<i>Vitex negundo</i>	
95.	<i>Aloe vera</i>	
96.	<i>Ichnocarpus frutescens</i>	
97.	<i>Cryptolepis buchanani</i>	
98.	<i>Cissampelos pavier</i>	
99.	<i>Kaempferia rotunda</i>	
100.	<i>Elettaria cardamomum</i>	

101.	<i>Butea monosperma</i>	
102.	<i>Ceropegia juncea</i>	
103.	<i>Sarcostemma acidum</i>	
104.	<i>Prosopis cineraria</i>	
105.	<i>Syzigium cumini</i>	
106.	<i>Clitoria ternatea</i>	
107.	<i>Janakia arayalpathra</i>	Regulation required
108.	<i>Vateria macrocarpa</i>	
109.	<i>Actiniopteris radiata</i>	
110.	<i>Pellionia heyneana</i>	Regulation required
111.	<i>Atuna indica</i>	
112.	<i>Atuna travancorica</i>	
113.	<i>Myristica beddomei</i>	
114.	<i>Pterospermum rubiginosum</i>	Regulation required
115.	<i>Humboldtia unijuga</i>	Regulation required

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