

Nurseries: A promising approach to enhance alternative income security and wellbeing a Case Study from Cherthala, Alappuzha

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Abstract

Nurseries, where the plants are cultivated, propagated and traded have been documented as an important supplemental source contributing to income generation, economic security and livelihoods of people/communities. The present study used questionnaire and field survey to document the information on tradable bioresources from nurseries of Cherthala taluk of Alappuzha. Ten nurseries including nine private and one Government nursery were visited during the study. Government nursery showed 5250 tradable plants of different categories. Private nurseries import ornamental plants like Orchids and Anthurium from Thailand and other countries. Kerala Agricultural University, Mannuthy was the main supplier of seedlings to most of the nurseries. Some Hibiscus sps, Bougainvillea, Rose, Balsams, Croton, Moringa, Mango, Jackfruit and Guava were budded or multiplied by stem cuttings. Most of the plants were sold locally, but some nurseries traded plants to other states especially to Karnataka and Tamil Nadu.

Economic status analysis of last five years revealed an annual expenditure ranging from INR 2, 40,000 to 60, 00,000 and an annual turnover of INR 2, 50,000 to 67, 50,000. Ornamental plants were the fast-moving items followed by fruit plants and

medicinal plants. The ornamental plants mainly belonged to Orchidaceae, followed by Rubiaceae, Aroideae, Portulacaceae and Poaceae. Significant increase in ornamental plant business was observed during 2020-2021. This variation noticed in previous years may be due to flood in 2018 and Covid-19 pandemic in 2019-2020. Lack of adequate space, water scarcity, increased labour charges, cost of production, unavailability of rare species, diseases, inability to produce required quantity in specific time, higher investment cost, lack of knowledge in new technologies and crowding of new nurseries without any standard protocol were the major issues faced by nursery owners. The study recommends need of financial support from the government, training for new/advanced technologies in seedling production, stable policies for fixing prices, fixing quality standards, incentives for producing new varieties, guidance for controlling pest and disease and awareness for marketing strategies.

Keywords: Annual turnover, Covid-19, Ornamental plants, Plant nurseries, Tradable bioresources

Introduction

Nurseries are found in rural and urban areas in predominantly small-scale subsistence agri/

horti cultural systems. The beginning of modern agriculture can be dated back to subsistence production systems that began in small garden plots around the household. These gardens have persistently endured the test of time and continue to play an important role in providing food and income for the family. Western countries contributed extensive knowledge in species inventories, functions, structural characteristics, composition, socio-economic, and cultural relevance about nurseries. Nurseries highlight various aspects based on the context or emphasis and objectives of the research (Bohringer and Ayuk 2003).

Natural resources account for about 20% of total world trade and dominate the exports in many countries. Plant nurseries are centers where mainly the plants are propagated and traded. Nurseries have a major role in trading plant resources. Small-scale tree nurseries are said to be among the fastest growing small businesses nowadays (Botha *et al.*, 2005), some nurseries have achieved their objectives, and many are struggling to survive or are no longer in existence. Formal literature provide scanty information on factors influencing their long-term viability, benefits and costs to stakeholders and the lessons learned or their efficacy as a conservation tool (Bohringer *et al.* 2003). Few studies have been carried out to found out Covid-19 impact on agriculture and related sectors. But no research has been done on the impact of Covid-19 on plant nurseries in India, till date. There are a few studies reported on nursery business in other countries (Botha *et al.*, 2005). Considering these facts, the present study examines the present status of the nursery industries in Cherthala Taluk of Alappuzha district in the south Indian state Kerala.

Major objectives were to estimate the traded plants, to trace the chain involved in this trading process such as suppliers and customers, to estimate the annual turnover and also to provide a check list on nursery plants.

Study area

Alappuzha is a coastal district in Kerala, it covers an area of 1414 Km². Cherthala is a municipal town and taluk located in Alappuzha formerly known as Shertalai.

Method of study

Ten nurseries of Cherthala taluk were selected for the present study. Questionnaire and field survey was carried to collect information from the nurseries.

Questionnaire for collecting the data from Nurseries
General information
Name of the Agency
Address, Phone number, E mail
Name of the respondent
Date of establishment
Annual expenditure for running the establishment (2015-16)
Total Annual Turnover (2015-2016)
Annual Turnover of plants (2015-2016)
Annual expenditure for running the establishment (2016-17)
Total Annual Turnover (2016-2017)
Annual Turnover of plants (2016-2017)
Annual expenditure for running the establishment (2017-18)
Total Annual Turnover (2017-2018)
Annual Turnover of plants (2017-2018)
Annual expenditure for running the establishment (2018-19)
Total Annual Turnover (2018-2019)
Annual Turnover of plants (2018-2019)
Annual expenditure for running the establishment (2019-20)
Total Annual Turnover (2019-20)
Annual Turnover of plants (2019-20)
Annual expenditure for running the establishment (2020-21)
Total Annual Turnover (2020-21)
Annual Turnover of plants (2020-21)
Name & address of the suppliers of seeds/ planting materials (with in district/ state) If not
Are you getting materials from outside Kerala/ Country Details
Give details-
Are you supplying outside Kerala
Give details-
Criteria for fixing price
Is there price variation

Status of availability
Challenged faced
Suggestions for improvement
Other information if any
Species /item wise information 2020-2021
Local Name of Plant
Scientific name
Collection locality (Cultivated)
Quantity (Unit/kg) monthly
Collected from other sources details
Buying / self-making price/unit
Selling price/unit

Details of buyers (local/ companies/other nurseries etc)
Total Annual quantity and price of each plant species (2019-2020)
Total Annual Turnover (2019-2020)
Annual expenditure for running the establishment (2019-2020)

Results and Discussion

Ten nurseries were visited during the present study. Age of the respondents ranged between 35 to 50. Following were the major observations of the study. Out of ten nurseries selected, nine were private and one was a government nursery (Table 1). Government nursery showed maximum number of plants (about 5250) in different categories, like medicinal, ornamental, fruit yielding, vegetables and plantation/ cultivating crops (Table 2).

Table 1
Details of nurseries studied and suppliers of materials

Sl. No	Name of agency	Year of establishment	Govt/ Private/ Society	Major suppliers	Age of respondents
1	Nursery 1	2011	Private	Thailand, Own preparation	35
2	Nursery 2	2015	Private	Bhavana Gardens- Muhamma, Agricultural University, Mannuthy	42
3	Nursery 3	2015	Private	Agricultural University, Mannuthy	40
4	Nursery 4	2014	Private	Own preparation	38
5	Nursery 5		Private	Agricultural University, Mannuthy	45
6	Nursery 6	2015	Govt.	Palakkad, Mannuthy	40
7	Nursery 7	2014	Private	Own preparation	45
8	Nursery 8	2013	Private	Agricultural University, Mannuthy Own preparation	50
9	Nursery 9	2015	Private	Agricultural University, Mannuthy Own preparation	35
10	Nursery 10	2013	Private	Thailand, Banglore	38

Nursery 5 showed about 3250 plants followed by Nursery 1 and 9 (2200 plants). In the category of medicinal plants Lakshmitharu, Amla, *Aloe vera* and Neem were the most traded plants (Table 3). Similarly, Bamboo, Bird of paradise, Philodendron, Ferns, Pentas, Orchids, Portulaca, Anthurium,

Jasmin, Spider orchid, Rose and Ixora were traded more in the category of ornamental plants, while Guava, Mangosteen, Bilimbi, Tamarind, Pomegranate and Rambutan were in the category of fruit plants. Curry leaves, Mint, Moringa, Capsicum, Cauliflower and Brinjal are among the

vegetables, whereas Coconut, Pepper, Nutmeg, Areca nut, Cashew nut, Teak, Banana and Beetle vine placed in the plantation crop category (Table 3).

Table 2
Details of different categories, number of varieties and total number of plants in each nursery studied

Sl. No	Name of agency	Category of plant	No of varieties	Total number of plants
1	Nursery 1	Medicinal	10	250
		Ornamental	60	800
		Fruit yielding	15	350
		Vegetables	10	500
		Plantation/ cultivating crops	2	300
2	Nursery 2	Medicinal	15	300
		Ornamental	20	300
		Fruit yielding	10	200
		Vegetables	20	400
		Plantation/ cultivating crops	5	250
3	Nursery 3	Medicinal	5	100
		Ornamental	10	100
		Fruit yielding	10	200
		Vegetables	15	300
		Plantation/ cultivating crops	5	400
4	Nursery4	Medicinal	5	100
		Ornamental	15	450
		Fruit yielding	5	100
		Vegetables	10	250
		Plantation/ cultivating crops	3	250
5	Nursery 5	Medicinal	20	400
		Ornamental	25	750
		Fruit yielding	25	500
		Vegetables	20	600
		Plantation/ cultivating crops	10	1000
6	Nursery 6	Medicinal	15	600
		Ornamental	10	400
		Fruit yielding	25	1250
		Vegetables	20	1000
		Plantation/ cultivating crops	10	2000

7	Nursery 7	Medicinal	5	50
		Ornamental	20	400
		Fruit yielding	10	300
		Vegetables	10	250
		Plantation/ cultivating crops	3	300
8	Nursery 8	Medicinal	5	150
		Ornamental	5	200
		Fruit yielding	5	250
		Vegetables	10	250
		Plantation/ cultivating crops	3	300
9	Nursery 9	Medicinal	10	200
		Ornamental	20	600
		Fruit yielding	15	600
		Vegetables	10	300
		Plantation/ cultivating crops	5	500
10	Nursery 10	Medicinal	5	100
		Ornamental	15	500
		Fruit yielding	5	250
		Vegetables	5	500
		Plantation/ cultivating crops	3	600

Table 3
List of fast-moving plants from the studied nurseries

Sl. No	High volume traded plants	Category
1	Coconut	Plantation crop
2	Pepper	Plantation crop
3	Nutmeg	Plantation crop
4	Areca nut	Plantation crop
5	Lakshmitharu	Medicinal
6	Portulaca	Ornamental
7	Anthurium	Ornamental
8	Jasmine	Ornamental
9	Spider plant	Ornamental
10	Rose	Ornamental
11	Ixora	Ornamental
12	Orchids	Ornamental
13	Amla	Medicinal
14	Rambutan	Fruit yielding
15	Bird of paradise	Ornamental
16	Philodendron	Ornamental

17	Ferns	Ornamental
18	Pentas	Ornamental
19	Banana	Plantation crop
20	Aloe vera	Medicinal
21	Cashew nut	Plantation crop
22	Mangosteen	Fruit yielding
23	Bilimbi	Fruit yielding
24	Tamarind	Fruit yielding
25	Pomegranate	Fruit yielding
26	Curry leaves	Vegetable
27	Mint	Vegetable
28	Capsicum	Vegetable
29	Cauliflower	Vegetable
30	Brinjal	Vegetable
31	Neem	Medicinal
32	Bamboo	Ornamental
33	Guajava	Fruit yielding
34	Moringa	Vegetable
35	Teak	Plantation crop
36	Beetle vine	Plantation crop

The nurseries 1 and 10 were importing ornamental plants from Thailand and Malaysia (Table 4). The main plants imported were orchids, ferns, cactus and calathea. Kerala Agricultural University, Mannuthy was the main supplier of seedlings to most of the nurseries (Table 5). Some Hibiscus sps, Bougainvillea, Rose, Balsam, Croton, Moringa, Mango tree, Jackfruit and Guajava were budded or multiplied by stem cuttings. The seedlings of such plants were propagated in the nurseries itself (Table 6). Most of the plants were sold locally, but some nurseries traded the plants to other states especially to Karnataka and Tamil Nadu.

Table 4
List of plants imported from foreign country (Thailand)

Sl. no	Plants imported from foreign countries	Name of plants
1	Orchids	Dendrobium hybrids, Vanda Hybrids, Spathoglottis, Phalaenopsis, Cymbidium
2	Ferns	Zipper fern
3	Cactus	Many varieties
4	Calathea	Pink calathea
5	Syngonium	Pink
6	Others	Philodendron, Hoya

Table 5
List of plants procured from Agriculture University, Mannuthi in nurseries

Sl. no	Plants supplied from Agriculture University, Mannuthi
1	Pepper
2	Nutmeg
3	Coconut
4	Areca nut
5	Lakshmitharu
6	Cashew nut
7	Mangostene
8	Rambuttan
9	Banana
10	Amla
11	Tamarind
12	Pomegranate

Table 6
List of self-made species by budding/ stem cuttings

Sl. no	Self-Made Species By Budding/ Stem Cuttings
1	Hibiscus sps
2	Bougainvilla
3	Rose
4	Balsam
5	Croton
6	Moringa
7	Mango
8	Jackfruit
9	Guava

Economic status analysis of last five years revealed an annual expenditure ranging from INR 2,40,000 to 60,00,000 and annual turnover of INR 2,50,000 to 67,50,000 (Table 7). Ornamental plants were the fast-moving items followed by fruit plants and medicinal plants. The fast-moving ornamental plants mainly belonged to Orchidaceae, followed by Rubiaceae, Aroideae, Portulacaceae and Gramineae. Significant increase in ornamental plant business was observed during 2020-2021 (Table 8). This variation may be due to flood in 2018 and Covid-19 pandemic in 2020.

Major issues faced by nursery owners were lack of adequate space, scarcity of water, increasing labour charges, increasing cost of production, unavailability of rare species, diseases, inability to produce required quantity in specific time, higher investment cost, lack of knowledge in new technologies and crowding of new nurseries. Damage of plants by heavy rain fall, diseases, flood and Covid-19 pandemic decreased the market (Table 9). The major recommendations obtained from the study include financial support from the government, need of training in advanced and

new technologies in seedling production, stable policies for fixing prices, fixing quality standards, incentives for producing new varieties, guidance for controlling pest and disease and awareness on marketing strategies.

A nursery is a site, designed to produce seedlings under favorable conditions until they are ready for planting. Nurseries mainly aim to produce sufficient quantities of high quality seedlings to satisfy the needs of different kind of customers. The special plantation drives and environmental clearance by greening activity also increased the demand of seedlings. The main suppliers of tree seedlings are the departmental/government and industrial nurseries. They are producing seedlings and vegetative propagules to meet the demand and supply them to public for meeting raw material demand. Mostly the ornamental and vegetable seedlings are produced by farmers themselves, because of the market availability of improved seeds and requirement of minimum inputs to establish them. Since the price of ornamental seedlings mainly depends on the buyer's interest and the size of planting material, the small private nurseries mostly concentrate on the ornamental seedling production to get more profit (Ratha Krishnan *et al.*, 2014).

In India, increase in horticulture production is observed over the last few years. Significant progress has been made in the area expansion resulting in higher production. During 2017-18, the production of horticulture crops was 311.71 million tones from an area of 25.43 million hectares (Campbell *et al.*, 2020). The lockdown effect during 2020 has broken the synchronization of demand and supply. The chain of supply along with relationship with producers and workers also messed up in the field of plant nurseries. Plant purchasing data during pandemic period by Campbell *et al.*, (2020), revealed a drastic increase, especially in the field of online purchase.

Documentation of tradable bio-resources in a geographical area has multiple uses. It helps to understand the demand and supply scenario of each and every resource, its effective management and sustainable utilization. The local trade of bioresources gives an opportunity to raise income and provides a stepping stone to enter the cash

economy, especially in rural areas with limited options for wage labor (Meinhold and Darr, 2019). According to Chaudhury *et al.*, (2021), the selling of bio-resources has contributed between 5% and 75% to the total income to majority of the households in Assam. Adverse situations like COVID-19 pandemic, has challenged the food security of the urban and rural population alike. Socioeconomic conditions of rural communities govern local market economies. It was also observed that women were the primary collectors and vendors in the local markets. Young people are also engaged in the exploration and collection of bio-resources (Njwaxu and Shackleton, 2019).

In some states of India, bioresources such as non-timber forest products (NTFPs) contribute to 28% of household income on an average world-wide, which may even be at par or exceed agricultural income in certain households. Similar results were reported by Mipun *et al.* (2019) by detailed investigation of the contribution of NTFPs to healthcare and livelihood security among the Karbis. Assam and the northeastern states of India are unique in abundance of natural resources and socio-cultural diversity. Livelihoods of rural communities are transitioning from a need-based system which depended on natural resources and community labor, to commercial agricultural and non-agricultural system, to the organized sector. In order to diversify sources of income of rural communities and manage natural resources, the government is making endeavors toward strengthening traditional governance and community decision-making (Chawii, 2007).

In the present study major issues faced by nursery owners and their suggestions were listed out. Similar problems were also reported by Chakma *et al.* (2021). Following recommendations were also provided by Kakon Chakma *et al.*, (2021), Government and NGOs need to provide easy financial assist for the nursery business, which will attract the young entrepreneurs. This industry has great export potentiality. So, research is required for uplifting this sector. Government and NGO should provide funds for these researches. The Government should develop a suitable policy to use fallow, unfertile land for establishing nursery.

Table 7
Annual expenditure and turnover of nurseries studied

Sl. No	Name of Nursery		2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
1	Nursery1	Annual expenditure	50000	50000	50000	50000	20000	30000
		Annual turnover	70000	75000	85000	30000	40000	50000
2	Nursery2	Annual expenditure	25000	40000	50000	50000	25000	75000
		Annual turnover	40000	50000	80000	30000	35000	100000
3	Nursery3	Annual expenditure	50000	50000	40000	20000	30000	50000
		Annual turnover	30000	40000	50000	15000	40000	75000
4	Nursery4	Annual expenditure	60000	50000	50000	50000	20000	50000
		Annual turnover	35000	65000	60000	20000	30000	75000
5	Nursery5	Annual expenditure	500000	500000	500000	500000	400000	500000
		Annual turnover	750000	800000	750000	400000	550000	800000
6	Nursery6	Annual expenditure	1000000	1000000	1000000	1000000	1000000	1000000
		Annual turnover	1200000	1350000	1200000	750000	850000	1400000
7	Nursery7	Annual expenditure	500000	500000	500000	500000	400000	500000
		Annual turnover	750000	700000	700000	400000	350000	550000
8	Nursery8	Annual expenditure	40000	55000	50000	50000	25000	40000
		Annual turnover	35000	40000	45000	30000	30000	50000
9	Nursery9	Annual expenditure	30000	45000	40000	50000	30000	50000
		Annual turnover	35000	50000	45000	25000	25000	65000
10	Nursery10	Annual expenditure	500000	600000	750000	750000	500000	600000
		Annual turnover	800000	850000	900000	400000	650000	750000

Table 8
List of Category of Plants Traded Most from 2015-2021 in Studied Nurseries

Name of Nursery	Category of Plants Traded Most in Each Year					
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Nursery1	Vegetables	Fruit plants	Ornamentals	Vegetables	Ornamentals	Ornamentals
Nursery2	Medicinal plants, Ornamentals	Medicinal plants	Vegetables	Vegetables	Vegetables	Vegetables, Plantation crops
Nursery3	Ornamentals	Plantation crops	Plantation crops	Vegetables	Vegetables	Vegetables, Fruit plants
Nursery4	Plantation crops, Ornamentals	Plantation crops	Ornamentals	Plantation crops	Ornamentals	Ornamentals
Nursery 5	Plantation crops, Ornamentals	Fruit plants, Plantation crops	Vegetables Fruit plants, Plantation crops	Vegetables Fruit plants, Plantation crops	Vegetables Fruit plants, Plantation crops	Ornamentals, Fruit plants, Plantation crops
Nursery6	Vegetables Fruit plants, Plantation crops	Vegetables Plantation crops, Medicinal plants	Fruit plants, Plantation crops	Vegetables Fruit plants, Plantation crops	Vegetables Fruit plants, Plantation crops	Ornamentals Fruit plants, Plantation crops,
Nursery7	Ornamentals	Fruit plants, Vegetables	Ornamentals Vegetables	Fruit plants, Vegetables	Fruit plants, Vegetables	Ornamentals Fruit plants,
Nursery8	Plantation crops	Vegetables	Plantation crops Vegetables	Plantation crops	Plantation crops	Vegetables Plantation crops
Nursery 9	Vegetables	Vegetables	Fruit plants, Vegetables	Plantation crops Vegetables	Ornamentals Vegetables	Ornamentals Fruit plants
Nursery 10	Ornamentals Vegetables	Ornamentals Fruit plants,	Ornamentals	Fruit plants, Vegetables	Ornamentals	Ornamentals

Table 9
Major issues and recommendations observed during the study

Sl. No	Name of Nursery	Major issues faced	Recommendations for improvement of business
1	Nursery 1	Lack of adequate space, water scarcity, Increasing labour charges, increasing cost of production, unavailability of rare species	<ul style="list-style-type: none"> • Need Govt. support (Financial) • Need training of new/ advanced technologies in seedling production • Need stable policies for fixing prices • Fix quality standards • Incentives for producing new varieties • Need guidance for control pest and Disease • Awareness for marketing strategies
2	Nursery 2	Increasing labour charges, Diseases, Inability to produce required quantity in specific time	
3	Nursery 3	Higher Investment cost, Increasing labour charges, diseases, lack of knowledge in new technologies	
4	Nursery 4	Water scarcity, Increasing labour charges, Crowding of new nurseries is a threat	
5	Nursery 5	Damage of plants by heavy rain fall, diseases, water scarcity, increasing cost of production	
6	Nursery 6	Flood and Covid-19 pandemic decreased market, increasing cost of production	
7	Nursery 7	Lack of adequate space, water scarcity, Increasing labour charges	
8	Nursery 8	Flood and Covid-19 pandemic decreased market, lack of customers	
9	Nursery 9	Damage of plants by heavy rain fall,	
10	Nursery 10	Higher Investment cost, Lack of adequate space, Flood, increasing cost of production	

Conclusion

Green Industry complex includes input suppliers; production firms such as nursery, greenhouse, and sod growers; wholesale distribution firms, including importers, brokers, re-wholesalers, transporters; horticultural service firms providing landscape and urban forestry services such as design, installation, and maintenance; and retail operations, including independent garden centers, florists, home improvement centers, and mass merchandisers or other chain stores. Currently, plant nurseries act as a leading source of plant supply especially during the COVID-19 pandemic. Nurseries contribute to employment, biodiversity ex situ conservation and plant diversity. It is an alternative source of economy and security for the people. This nursery industry needs modernization. New technologies will enhance the potency of activity and will enable this green business to drive a front seat in the international market.

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