

An economic appraisal of commercial horticultural nurseries in central Tamil Nadu

Abstract

Horticultural nurseries serve as a fundamental source of high-quality planting materials, which are indispensable for promoting sustainable agricultural practices and fostering economic growth. Considering these, the nurseries from small level to big enterprise it is being established. In this context, an effort has been taken to assess the worthiness of establishing the nurseries in the city front particularly in Tiruchirappalli city. On undertaking preliminary investigation, the Department of Horticulture and Plantation Crops has formed its own retail unit in the town near Thiruvanaikaval to meet the requirements of the consumers focusing from inputs, small implements, indoor plants, outdoor plants and Coconut saplings. Though they operate with different varieties, few are gaining importance in sales and revenue generation. Such plants and their contribution to gross income are discussed in detail. However, being the Government maintained nursery, it could generate the output – input ratio only to the level of 1.20. This indicates that the nursery is run not for profit earning but for providing service to the city dwellers of Tiruchirappalli City. Though there were certain constraints to the consumers, few strategic actions are immediately needed to facilitate and facelift the nursery which will attract the consumers further.

Keywords: horticultural nursery, agribusiness, indoor plants, outdoor plants and revenue generation from nursery

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Introduction

Horticultural nurseries play a crucial role in enhancing food security, fostering rural employment, and stimulating economic growth. Many fruit trees are perennial and can remain fruitful for decades, rendering nurseries an essential resource for orchard establishment and replanting initiatives.¹ In addition to fruit crops, nurseries address the growing need for ornamental, medicinal, and landscape plants, which are extensively utilised in urban landscaping, public parks, and residential gardens.² The demand for superior-quality seedlings and grafts has increased due to the growing emphasis on high-yielding, disease-resistant, and climate-adaptive plant varieties.³ The selection of mother plants plays a crucial role in ensuring genetic purity and productivity, as they serve as the primary source for propagation.⁴

The nursery sector has become a highly profitable agribusiness, requiring less land use, minimal investment, and providing quicker returns compared to conventional agriculture.⁵ However, one of the key issues is that good planting materials are not readily available to farmers, making the nursery sector vital for the development of high-quality planting materials, not only for vegetable and fruit production but also for indoor and outdoor plants for recreational purposes. Thus, a study has been initiated to address the significance of nurseries for consumers and evaluate their economic operations within the government sector.

Methodology

In Tamil Nadu, Tiruchirappalli district has Commercial Horticultural Nurseries both in the Government side and in the Private side are capable of keeping many indoor, outdoor, fruit plants and Auspicious plants for sale in the nursery. On examining and availing the discussion with the owners of nursery by the researchers, developed an interest to learn the prospects and constraints that are associated with the ornamental and commercial nurseries to a larger extent. This is visible both in respect of Government side and the private

agricultural entrepreneurs considerably and hence the Tiruchirappalli District was selected purposively for the study.

Sampling design

The study is focusing on addressing the problems in connection with developing of nurseries and sale of seedlings in the study environment. For that purpose, the study area was selected as Tiruchirappalli District as it encompasses few agricultural entrepreneurs both in the Government side and in the private side whom are interestingly run the nurseries as part of their farming and hence the list of agricultural entrepreneurs available in the District was collected from the records of Department of Agriculture and Farmers' Welfare and from the records of Department of Horticulture and Plantation Crops in the first Stage. In the second stage, the list of number of blocks and villages available in Tiruchirappalli District was enlisted and the blocks in which the higher number of nurseries available were collected from the records of respective departments. In the third stage, Thiruvanaikaval block in which the nurseries that are existing both in the Government side and in the private side and hence the Government Nursery was purposively selected and interviewed for the study as the private nurseries are very hesitant to disclose the information on quality, source of materials and the investment made and hence data collected from government nursery was appropriately analyzed using the tools of analysis. To identify the constraints, the consumers whom are visiting the nursery on day-to-day basis were interviewed to the tune of 40 consumers and their views are noted for analyzing the constraints. The consumer preferences were indirectly identified and documented in the sale of plants from different divisions.

Data collection

For this study, both primary data and secondary data were used. Primary data was generated through a well-structured interview schedule designed for the farm level survey and the same was pretested in the field appropriately and modified accordingly. The method of data collection was done by personal interview. Data on general

characteristics of agricultural entrepreneurs like age, education, nursery experience, size of the nursery, seedlings grown in the nursery, awareness and adoption of inputs, knowledge on application of inputs and farmers’ preferences on raising seedlings as their main crop, economics of growing of seedlings and the returns realized from the seedlings, growing and selling practices. Secondary data like area under crops, number of nurseries, population in rural and urban areas whom are able to consume the saplings for their home and office as interior and exterior beautification, literacy level, number of workers etc., were gathered from the records of Department of Agriculture and Farmers’ Welfare, Tiruchirappalli and are suitably analyzed using percentage analysis.

The fixed cost is the cost which incurred on the fixed assets. The fixed cost includes amortized cost of establishment, rental value of land, cost of tools and implements including shade net and interest on capital.

Variable cost is the cost which is incurred at the various level of production of nursery saplings under shade net house. The variable cost includes cost of protrays, seeds, coir pith, fertilizers, plant protection chemicals, irrigation and labour charges.

Amortized cost of tools and equipment made in one year to be included under fixed cost component. Amortization of cost was done under 12 percent which reflects bank lending rate. Amortization of investment was calculated using the following formula:

$$I = \frac{TAi}{Li}$$

Where,

- I = Amortized cost of tools and equipment
- TAi = Total investment made on the incurred asset
- Li = Life of the asset used in nursery

The output – Input ratio was calculated using the following,

$$R = \frac{GI}{TC}$$

Where,

- R = Output – Input ratio
- GI = Gross income generated in Rupees
- TC = Total cost incurred in Rupees

Output - Input ratio indicates an overall income generation by the entrepreneur for a rupee of investment made in the horticultural nursery.

Study period

The reference year for the study was the agricultural year 2024 and the collection of data from the sample nursery was taken up during the months of June to August 2024 and hence the data related to the year 2024.

Results and discussion

The results are discussed under the following sub heads. They are,

- General characteristic features of commercial horticultural nursery
- Infrastructural needs of commercial nursery
- Sources of purchase of nursery saplings and inputs for the commercial nursery

- Income generation from the commercial nursery
- Costs incurred and returns realized from commercial nursery
- Constraints in production and sale of commercial nursery plants

1. General characteristic features of commercial horticultural nursery

As discussed earlier, the nursery in Tiruchirappalli city was manned by Department of Horticulture and Plantation Crops on the Government side and few nurseries are also located in the city and are operated and manned by the private sector people and are running it as an Agribusiness venture in a fit in manner. Here, the researchers’ interest is how the commercial nursery is being maintained under Government side is an important answer to find out and hence the General Characteristics of the Government Nursery located in Thiruvanaikaval is furnished in Table 1.

Table 1 General characteristic features of the case firm

Sl. No	Particulars of the firm	Name / units
01	Name of the firm	Government horticulture nursery
02	Location	Thiruvanaikaval, Tiruchirappalli district
03	Year of establishment	2021
04	Area spread in square feet	4360 square feet
05	Form of the business	Government, department of horticulture and plantation crops, Tiruchirappalli district
06	Number of years in business	04
07	Number of women labours employed	03
08	Number of men labourers employed	02
09	Number of supervisors	01
10	Number of divisions	10

(Source: Field survey)

Table 1 outlined that the name of the nursery is Government Horticulture Nursery located in Thiruvanaikaval of Tiruchirappalli City in a sprawling area of 4360 square feet which was established during the year 2021. Considering the demand among the nursery saplings in the private and hence it was also established to supply the saplings at an affordable cost to the consumers of Tiruchirappalli city. The nursery had an experience of four years and is employing three women labourers, two men labourers and one supervisor who are also caring the propagation works and in addition to this, he is listening to the sale of tools and equipment, ornamental plants and Coconut nursery saplings to the consumers on demand.

2. Infrastructural needs of commercial nursery

Any nursery established which commands certain basic infrastructures for its smooth performance to generate business. In this respect, the details of essential infrastructures that require during the initial periods of establishment of nursery are analyzed and the results are outlined in Table 2.

Table 2 revealed that the initial investment for establishing the commercial nursery in an area of 4360 sq. Feet is arrived at INR. 6.67 lakhs. Of which, the major share goes to the erection of Temporary shed with metallic cooling sheet which is accounted for 52.45 per cent to the total investment cost followed by the investment on Poly House which is needed in 750 sq. feet able to consume a cost of INR. 1.12 lakhs which is accounted for 16.86 per cent to the total

investment. Office room cum storage space consumed a cost of INR. 50000 which is accounted for 7.49 per cent to the total cost. Moving space in the nursery and parking facility space which is respectively accounted for 5.69 per cent and 4.50 per cent to the total investment cost. However, one should be cautioned with working on the annual cost of investment based on the nature of infrastructure and its life. These details are analyzed and the results are presented in Table 3 for its usage in real terms.

Table 2 Capital investment on essential infrastructures for commercial nursery

Sl. No	Details of infrastructures	Area in sq. Feet	Amount in INR	Percentage to total investment
01	Fencing for protection	4360	14857.00	02.23
02	Poly house	750	112500.00	16.86
03	Shade net	600	54000.00	08.08
04	Temporary shed	1000	350000.00	52.45
05	Office room cum storage space	160	50000.00	07.49
06	Irrigation structures	200	18000.00	02.70
07	Moving space and pathways	1200	38000.00	05.69
08	Parking space with pavement bloc	450	30000.00	04.50
Total space in sq. Feet		4360	667357.00	100.00

(Source: Field survey)

Table 3 has given a clear picture on the amount to be considered per annum for arriving the cost and return realized from the commercial nursery. The total annual cost on essential infrastructures is arrived at INR. 75436. Among which the shade net and Temporary Shed alone has consumed a share of 47 per cent to the total annual cost followed by Poly House with metallic sheet is accounted for around 15 per cent to the total annual investment cost. The cost on shade net alone is capable of consuming a cost of 24 per cent to the total annual cost. Office room and storage space is able to absorb 13.26 per cent to the total annual cost. From that one could understand that the agricultural entrepreneurs should invest considerably to run the business comfortably on various infrastructures. Besides the above, it is also important to purchase certain tools and equipments which are essentially required in doing various activities in the nursery. These are analyzed and the results are presented in Table 4.

Table 3 Annual cost on essential infrastructures

Sl. No	Details of infrastructures	Amount spent in INR	Life of the asset in years	Annual cost in INR
01	Fencing for protection	14857.00	10	1485.70 (01.96)
02	Poly house	112500.00	10	11250.00 (14.91)
03	Shade net	54000.00	03	18000.00 (23.86)
04	Temporary shed	350000.00	20	17500.00 (23.20)
05	Office room cum storage space	50000.00	05	10000.00 (13.26)
06	Irrigation structures	18000.00	05	3600.00 (04.79)
07	Moving space and pathways	38000.00	05	7600.00 (10.07)
08	Parking space with pavement bloc	30000.00	05	6000.00 (07.95)
Total		667357.00	07.25	75435.70(100.00)

(Source: Field survey, figures in parentheses indicate percentage of the total)

Table 4 Details of investment made on tools and equipments for commercial nursery

Sl. No	Particulars of tools	Quantity purchased in numbers	Unit cost in INR	Total cost in INR
01	Spade	02	260.00	520 (06.71)
02	Hand hoe	06	180.00	186 (02.40)
03	Rose can	04	280.00	1120 (14.56)
04	Iron pan	06	100.00	600 (07.75)
05	Secateurs	02	450.00	900 (11.62)
06	Crow bar	02	550.00	1100 (14.20)
07	Weeding fork	06	125.00	750 (09.68)
08	Garden trowel	06	110.00	660 (08.52)
09	Pruning secateurs	02	520.00	1040 (13.43)
10	Pressure sprayer	03	290.00	870 (11.23)
Total		39	286.50	7746 (100.00)

(Source: Field survey, figures in parentheses indicate percentage of the total)

Table 4 outlined that the details of principal tools and equipments which are in need of fulfilling certain activities in the nursery on day to day basis. There are ten tools and equipments which are essentially needed. Among these ten, Rose Can, Pruning Secateurs, Secateurs and Crow bar are found to be essential items which are alone able to consume 53.81 per cent of expenditure on the investment on tools and equipments. Here also it is important to work out the annual cost which is to be incurred for the tools and equipments and hence these details are analyzed and the results are presented in Table 5.

Table 5 Annual cost on tools and equipment's used in the commercial nursery

Sl. No	Particulars of tools	Total cost in INR	Life of the asset	Total annual cost in INR
01	Spade	520	03	173.33 (06.28)
02	Hand hoe	186	03	62.00 (02.25)
03	Rose can	1120	03	373.33 (13.53)
04	Iron pan	600	03	200.00 (07.25)
05	Secateurs	900	02	450.00 (16.32)
06	Crow bar	1100	05	220.00 (07.97)
07	Weeding fork	750	03	250.00 (09.06)
08	Garden trowel	660	03	220.00 (07.97)
09	Pruning secateurs	1040	02	520.00 (18.85)
10	Pressure sprayer	870	03	290.00 (10.52)
Total				2758.66 (100.00)

(Source: Field survey, figures in parentheses indicate percentage of the total)

Table 5 outlined the details of annual cost on tools and equipments which are normally used in the commercial nursery. Among the tools, pruning secateurs alone consumed 18.85 per cent cost followed by Secateurs and Rose Can. The average annual cost spent on tools and equipments is arrived at INR. 2759. While summing up the annual cost on essential infrastructures and the annual cost on Tools and Equipments, it is arrived at INR. 78194 which are to be included in the cost analysis.

3. Sources of purchase of nursery saplings and inputs for the commercial nursery

It is important to assess the sources of procurement of nursery saplings and inputs and its cost details. Any purchase should be so

effective if it is capable of generating higher return, quality plants, and lesser price per unit of the produce so that the loyalty in business could be ensured. In this respect, the sources of purchase of saplings and inputs are analyzed and the results are presented in Table 6.

Table 6 Sources of purchase of nursery saplings and inputs

Sl. No	Name of the plants / inputs	Sources of procurement	Quantity procured in (Number of pieces)	Quantity sold in (Number of pieces)
01	Indoor plants	Bangalore	200	106
02	Outdoor plants	Bangalore	500	375
03	Coconut nursery	Hosur	500	392
04	Fruit plants	Bangalore	500	474
05	Medicinal plants	Pudukkottai	300	226
06	Forest plants	Pudukkottai, cuddalore	1000	752
07	Vaastu plants	Bangalore	300	195
08	Flower plants	Bangalore, hosur	300	230
09	Nursery plant inputs	Karur	1000	818
Total			4600 (100.00)	3568
Plants in inventory			1032 (22.44)	3568 (77.56)

(Source: Field survey, figures in parentheses indicate percentage of the total)

Table 6 revealed that the sources of purchase of Saplings are from Bangalore for indoor, outdoor plants and fruit plants. Most of the plants drawn from Bangalore were found to be hybrid varieties or Graft developed seedlings. This is quite popular in fruit plants. The medicinal and forest plants are drawn from Pudukkottai town where mass production of saplings are taking place and few of the nurseries are depending Pudukkottai as their destination to procure certain variety of seedlings. Auspicious plants and flower plants are drawn from Bangalore where these are famous and hence the nurseries prefer Bangalore as their destination for procurement and the Nursery Plants Inputs are being procured from Karur town where a wholesale shop is located and it became the lucrative centre for such inputs. Around 4600 plants are being procured from these destinations in a month. Out of which around 3568 plants are sold out and the remaining 1032 are kept as stock in the inventory to meet sudden needs.

4. Income generation from the commercial nursery

We have seen the income generated from the commercial nursery which contain nine sub divisions which are able to operate variety of plants in the nursery. The principal divisions in operation with the nursery are furnished as follows.

- Indoor plants division
- Outdoor plants division
- Coconut nursery unit
- Fruit plants unit
- Medicinal plants unit
- Forest nursery plants
- Auspicious plants unit
- Flower plants division and

- Plant inputs division

Though each division has its own unique characteristics, the income contributions of different divisions are carefully analyzed without omissions of any important units and the results are outlined in Table 7.

Table 7 Revenue generated from different divisions of nursery

Sl. No	Name of the divisions / inputs	Quantity sold per month (Number of pieces)	Price per unit	Average quantity in transaction / month
01	Indoor plants	106	238.00	29450.00 (08.26)
02	Outdoor plants	375	225.00	67390.00 (18.91)
03	Coconut nursery	392	243.00	93200.00 (26.15)
04	Fruit plants	474	141.25	48170.00 (13.52)
05	Medicinal plants	226	66.00	13200.00 (03.70)
06	Forest plants	752	41.00	27580.00 (07.74)
07	Vaastu plants	195	181.42	28360.00 (07.96)
08	Flower plants	230	73.00	17530.00 (04.92)
09	Nursery plant inputs	818	37.00	31515.00 (08.84)
Total / mean		3568	138.41	356395.00 (100.00)

(Source: Field survey, figures in parentheses indicate percentage of the total)

Table 7 revealed that the nine divisions of different plants and inputs could sell out 3568 items at the average price per unit of INR. 138.41 and able to harvest are gross revenue of INR. 356395 in a month time. Among the divisions, Coconut nursery is able to contribute the gross income of INR. 93200 which is accounted for 26 per cent to the gross income generated from the nursery followed by outdoor plants are able to contribute a gross income of INR. 67390 which is accounted for around 19 per cent to the gross income generated from the nursery.

The revenue generation in the third category are fruit plants which are able to generate a gross income of INR. 48170 which is accounted for 13.52 per cent to the total. All other divisions are contributing to a lesser extent. Though these are contributing in a lesser level, its importance in revenue generation cannot be ignored. Because these are customer oriented and hence the nursery owner is fulfilling A to Z products in the nursery to meet the requirements of the consumers. Because of that the consumers are regular in attending the nursery for their various requirements.

5. Costs involved in running the commercial nursery

The costs involved in the establishment and maintenance of commercial nursery are broadly divided into the Fixed Cost and the Variable Costs. The Fixed Costs are involved in establishing the infrastructure facilities like shed, buildings, shade net, poly house etc and hence the annual fixed costs were worked out after assessing the life of the assets and the variable costs included are purchase of nursery saplings and inputs for running the nursery. Both these costs are summed up provides the total cost in the maintenance of nursery. The life of the assets are obtained based on the opinion of the owner of the nursery in calculating the annual fixed costs which is used as fixed costs for estimation of total costs.

Table 8 revealed the details of costs involved in procuring nursery saplings which are included under variable costs. The cost involved per month is arrived at 1.65 lakhs. On an average, the cost involved per annum is arrived at 16.50 lakhs considering the potential months for business is only 10 months. The annual fixed cost involved is

found to be INR. 75436 for essential infrastructure, which was explained in Table 3, and the annual fixed cost involved under the head tools and equipments is arrived at INR. 2759 as explained in Table 5. On Summing up the annual fixed cost, the total annual fixed cost is arrived at INR. 78195. These will be taken to work out the net return generated from the nursery.

Table 8 Costs involved in purchase of nursery saplings

Sl. No	Name of the plants / inputs	Quantity procured in number of pieces	Procurement cost per unit	Total cost of procurement in INR
01	Indoor plants	200	80.00	16000.00
02	Outdoor plants	500	70.00	35000.00
03	Coconut nursery	500	60.00	30000.00
04	Fruit plants	500	50.00	25000.00
05	Medicinal plants	300	20.00	6000.00
06	Forest plants	1000	15.00	15000.00
07	Vaastu plants	300	80.00	24000.00
08	Flower plants	300	20.00	6000.00
09	Nursery plant inputs	1000	22.00	22000.00
Total quantity purchased		4600	46.33	179000.00
Total quantity sold		3568	46.33	165305.44

(Source: Field survey)

Table 9 revealed the details of costs incurred and the return realized from the commercial nursery in a month's time. The total cost arrived at INR 2.96 lakhs and the gross revenue earned is arrived at INR. 3.56 lakhs. The Gross return earned is closer to our results an income generation is reported by Poonam⁶ and Patil et al.⁷ The net income generated per month is arrived at INR. 59819 and the output – input ratio was worked out to be 1.20. It indicated that for a rupee of investment, the commercial nursery in the Government side could earn only a net return of INR. 0.20 from sale of saplings and the nursery inputs. It indicated that the nursery run by the Government sector is not for profit but for service to provide to the city dwelling population.⁸⁻¹³

Table 9 Costs involved in establishment and maintenance of commercial nursery

Sl. No	Details of inputs	Rupees per month	Cost per annum	Percentage to total cost
01	Nursery renewal fees	200.00	2000.00	00.07
02	Poly bags	1834.00	18340.00	00.62
03	Trays	5417.00	54170.00	01.83
04	Labour charges for women	23400.00	234000.00	07.89
05	Wages to men labour	26000.00	260000.00	08.77
06	Wages to supervisor	30000.00	300000.00	10.12
07	Telephone charges	600.00	6000.00	00.20
08	Electricity charges	3000.00	30000.00	01.01
09	Transportation cost	30000.00	150000.00	10.12
10	Advertisement cost	700.00	7000.00	00.24
11	Stationary cost	1000.00	10000.00	00.34
12	Repair and maintenance	300.00	3000.00	00.10
13	Miscellaneous charges	1000.00	10000.00	00.34
14	Procurement of seedlings	165305.00	1653050.00	55.74
Total variable cost / month		288756.00	2887560.00	97.36
Annual fixed cost in rs		7820.00	78195.00	02.64

Total cost	296576.00	2965755.00	100.00
Gross income generated in rs.	356395.00	3563950.00	
Net income generated in rs	59819.00	598195.00	
Output – input ratio	01.20	01.20	

(Source: Field survey)

6. Constraints in production and sale of commercial nursery plants

Being the Government manned nursery under the control of Department of Horticulture and Plantation Crops, there are no constraints on the nursery unit. But the consumers whom are visiting the nursery are reporting few of the constraints. These details are analyzed and the results are presented in Table 10.

Table 10 Constraints in production and sale of commercial nursery plants

Sl. No	Constraints	Number of consumers reporting the problem	Percentage
01	Poor parking facility	12	30.00
02	Lack of visibility from the main road	06	15.00
03	Approach road is inaccessible	09	22.50
04	Pest and disease care is poor	03	07.50
05	Lack of supply of saplings desired	07	17.50
06	Shortage of vegetable seeds	03	07.50
Total responses		40	100.00

(Source Field survey, figures in parentheses indicate percentage of the total)

Table 10 revealed the details of constraints faced by the consumers whom are visiting the nursery for their various needs. Around 30 per cent of the consumers had reported that the parking facility is so poor for their vehicles and hence the parking facility may be enhanced or improved in the nursery. Another important constraint is the approach road is inaccessible to the vehicles operated by the consumers which are accounted for 22.50 per cent to the total. Another important issue is Lack of visibility of approach road from the main road due to some road side shops occupied the platform has created the nuisance and hence the above constraints may be redressed to facilitate the visit of the consumers. Besides, lack of supply of desired saplings was reported by 17.50 per cent of the consumers whom are visiting the nursery.

Conclusions and policy implications

The study highlights the significance of commercial nurseries in the horticulture sector. While government-run nurseries in Tiruchirappalli serve to various consumer needs through nine subdivisions, they often incur higher operational costs than revenue generation. Though they meet the goal of a government unit, a margin of profit can also be considered for financial sustainability. A key challenge is poor accessibility, as the nursery is located six feet below the surface road, making entry difficult for consumers. Elevating the site to match the road level would improve convenience, allowing vehicles to access the nursery with ease. Additionally, redesigning the parking space and approach road would enhance the nursery's appearance and attract more visitors. Establishing a relaxation zone within the nursery could further improve the consumer experience. Another major issue is the

unavailability of desired saplings for consumers, necessitating bulk procurement and consistent stock maintenance to meet demand. Expanding plant varieties and extending the space for parking would also contribute to a better consumer experience. Addressing these issues through policy interventions and training programs for agricultural entrepreneurs can enhance the nursery's profitability and sustainability, ultimately contributing to horticultural development and economic growth.

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Conflicts of interest

The authors declare no conflict of interest exists.

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