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An economic analysis of nursery enterprise in Sindhudurg districts of Konkan region

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ABSTRACT

Nursery enterprise plays a vital role in supporting horticulture, agriculture, landscaping, and forestry by providing quality planting material. The study was conducted in the South Konkan region of Maharashtra by selecting 30 sample nurseries from Sindhudurg district. The research aimed to analyse the cost, returns, profitability, and overall viability of nursery enterprises. The data was collected through personal interviews using structured schedules for the reference year 2023–24. The analysis revealed that per-farm capital investment was ₹329.20 lakh, with land comprising the largest share (94.59%). The major components of nursery enterprise were Mango (34.18%), Cashew (21.42%), and Arecanut (18.87%) based on mother orchard area. The per-farm cost of nursery production was ₹23,31,318, while gross returns stood at ₹54,79,996, resulting in a net profit of ₹31,48,677. The benefit-cost ratio varied among nursery crops, with Golden *Plumeria* recording the highest B ratio (2.79), followed by Cashew (2.47) and Rose (2.25). Mango generated the highest net profit of ₹14,48,350. The study concluded that nursery enterprises are economically viable and profitable, offering significant opportunities for income generation and employment in the Konkan region.

Keywords: Nursery enterprise, Profitability, Konkan region, Benefit-cost ratio, Capital investment, Graft production, Planting material

Introduction

Nursery management is the cultivation, care, and maintenance of young plants, such as trees, flowers, shrubs, and vegetables, in a nursery. Nursery management is a vital part of horticulture and agriculture, and is important for growing healthy plants, trees, and crops. Nurseries can be retail, wholesale, or private. Retail nurseries sell to the general public, wholesale nurseries sell to other nurseries and commercial gardeners, and private nurseries supply institutions or private estates. Nursery is a place where planting material, such as grafting, seedlings, saplings, cuttings, etc., are raised, propagated and multiplied under favourable conditions for transplanting in prepared beds. The availability of quality and true to-type planting material is the prerequisite of successful and remunerative horticultural crop production. Nursery management plays a critical role in the horticulture and landscaping sectors, serving as the backbone for quality plant propagation and supply. A nursery business, whether focused on ornamental plants, fruit samplings, vegetable seedlings, or forest species, contributes significantly to agricultural development, environmental sustainability, and rural employment generation.

The Konkan region has made significant headway in horticultural production due to availability of production technologies and new crop varieties. The area under mango and cashew, which are foreign exchange earning crops has been increased by 8-9 times during the last two decades. Nursery management holds considerable economic importance in Sindhudurg district, where agriculture is the mainstay of the local economy. The productivity and profitability of the agricultural sector are closely linked to the quality of planting inputs supplied by nurseries.

Data source and methodology

From the south Konkan region, Sindhudurg district was selected purposively for investigation the information regarding the list of nurseries, number of nurseries in each tehsil were obtained from District Superintendent Agricultural Officer. On the basis of number of nurseries in each tehsil, three tehsils having maximum number of nurseries were selected purposively district. Namely kudal, vengurla, and kankvali from Sindhudurg district. Total 30 sample nurseries were selected on proportionate number basis from district. Data was collected from selected nursery owners by personal interviews with the help of specially designed schedule. Simple statistical tools such as average, percentage, ratios, standard cost concepts, Benefit cost ratio etc. were used for analysis.

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Objective

To estimate Cost, returns and profitability of nursery business.

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For all types of plant materials variable/direct and fixed/indirect costs were estimated separately in each group of nurseries.

Items of variable/direct cost

1. Cost of plant materials (seed, rootstock, seedling)
2. Cost of scion
3. Cost of containers and potting media
4. Cost of fertilizer, FYM, manure
5. Cost of irrigation charges
6. Cost of Nutrient agrochemicals (Growth promoter and plant protection chemicals)
7. Miscellaneous cost
8. Annual Maintenance cost of mother orchard

Items of fixed/indirect cost

1. Interest on working capital
2. Interest on fixed capital
3. Depreciation on protected structure, godown, machinery, irrigation structure, hand tools and implements
4. Land rent : The rental value of land is usually considered as 1/6 of gross produces minus land revenue which estimating economics of crop, however in nursery enterprise it was found to be unsuitable due to overestimation of land rent. The nursery area occupies mother planation as well as hardening, storage, shed etc. therefore a prevailing rent for other agriculture crops in study was used for calculating per farm rental of land.
5. Supervision charges
6. Land revenue
7. Amortization cost of Mother orchard

In this present investigation, gross return and net return were be calculated separately for different types of nursery. For each group, gross income was calculated from receipt of sale of nursery plant material. Whereas net return for each group of nurseries was calculated by deducting the total cost from the gross return.

Reference period

The information and data for present study is pertained to year 2023-24

Results and Discussion

1. Capital investment in nursery enterprise

Capital investment are crucial as they reflect the financial status of farmer. These asset encompass investment in land, building, livestock, equipment and machinery, shed and irrigation structure. Table 1 provide details on the per farm capital investment in nursery enterprises. Table that per farm of total capital investment was Rs 329.60 lakh. Out of which maximum investment Rs. 306 lakh (94.59%) was under land. Followed by Rs. 13.40 (3.12 %) was under building and Rs. 2.89 Lakh (0.67%) under irrigation structure such as Bore well, Well, Drip, Sprinkler, Pond, Pump House ,etc. It was also observed that 1.23 percent

(5.28 lakh) was invested in shed such as Polyhouse, Shed Net, Potting Shed, etc. It was concluded that land was major component of capital investment and overall capital investment of moderate level. Unlike other agriculture enterprises such as processing units (Cashew processing units, Mango processing units, Poultry business or dairy enterprises). The capital investment in nursery enterprises relatively less and due to number of farmer engaged in nursery enterprises.

(Rupees in Lakhs)

Table 1. Capital investment in nursery enterprises:

Sr.no.	Particulars	N = 30
1	Land	306.00 (94.59)
2	Building (Residential +Byre + Store+ Farm house+ Godown)	13.40 (3.12)
3	Livestock	1.60 (0.37)
4	Implements, machinery& Hand tools	0.46 (0.10)
5	Irrigation structure(Bore well, Well, Drip, Sprinkler, Pond, Pump House)	2.89 (0.67)
6	Shed(Polyhouse, Shed Net, Potting Shed)	5.28 (1.23)
	Total	329.20 (100.00)

(Figures in parentheses indicate percentage to total)

Composition of nursery enterprise in study area

Information regarding per farm composition of nursery enterprise in study area is given table no. 2. It was observed from table that among various components of nursery business as regards to area under mother plants was found that mango 0.67 ha (34.18%), Cashew 0.42 ha (21.42%), Arecanut 0.37 ha (18.87%) were found to be major component of nursery in study area. It will also revealed that total grafts prepared in study area 78257 out of which 28095 (35.90%) were mango grafts, followed by Cashew nut 19631 (24.08%), Areca nut 14074 (17.98%). There number of grafts were prepared coconut, kokum, black pepper, nutmeg, hibiscus, rose, golden plumeria were 5006, 4372, 3284, 2040, 100, 756, 1000 respectively. It was observed that out of total grafts prepared in nursery enterprises more than one third is 28095 (35.90%) grafts of mango followed by cashew 19631 (25.08%), arecanut 14074 (17.98%), coconut 5006 (6.39%), kokum 4372 (3.58%), black pepper 3284 (4.19%), nut meg 2040 (2.60%), hibiscus 1000 (1.27%), plumeria 1000 (1.27%), rose 756 (0.96%) prepared by the nursery owner respectively.

(Figures in parentheses indicates percentage to total)

Regarding the survival percentage, it was observedd that, maximum survival in hibiscus (88.97%) followed by nut meg (88.24%), arecanut (87.33), rose (86.62%), coconut (85.63%), plumeria (81.29%), black pepper (79.18%), kokum (73.06), mango (67.96%). It was also revealed that among number of fruits crops grafts survival percentage is less in mango and kokum as compared to other crops. The total no of saleable grafts were 59817 out of which maximum grafts sale was mango i.e. 19095 (31.89%) followed by cashew grafts 14631 (24.43%), arecanut 122290 (20.52%) , coconut 4487 (7.49%), kokum 3194 (5.33%), black pepper 2600 (4.34%), nutmeg 1800 (3.00%), plumeria 813 (1.35%), hibiscus 800 (1.40%), rose 730 (1.21%) were number of grafts available for sale in study area. In case of total number of grafts sold maximum 31.83 percentage (18095) mango grafts sold and received Rs. 2099020. In case of cashew total number of grafts 13631 (24.00%) and income received Rs. 1090480. Arecanut was also found to be major component of nursery. The total number of plants sold were 12223 (4.52%) and income earn was Rs. 733360 . the total number of grafts sold in case of coconut was 4091 and income received Rs. 617674 (14.19%). The black pepper graft sold in study area was 2914 (5.13%) and income received was Rs. 233310. The hibiscus, rose, golden plumeria grafts sold were 800, 730, 756 respectively.

Table 2. Per farm composition of nursery enterprises in study area:

Sr.no.	Name of crop	Area in ha. (Mother orchard)	No of Grafts prepared	No. of salabel grafts	No. of grafts sold	Survival percentage	Total Income (Rs.)
1	Mango	0.67 (34.18)	28095 (35.90)	19095 (31.89)	18095 (31.83)	67.96	2099020 (40.63)
2	Cashew	0.42 (21.42)	19631 (25.08)	14631 (24.43)	13631 (24.00)	74.53	1090480 (21.10)
3	Coconut	0.33 (16.83)	5006 (6.39)	4487 (7.49)	4091 (7.20)	85.63	617674 (11.95)
4	Areacnut	0.37 (18.87)	14074 (17.98)	12290 (20.52)	12223 (21.32)	87.33	733360 (14.19)
5	Kokum	0.06 (3.06)	4372 (3.58)	3194 (5.33)	2914 (5.13)	73.06	233120 (4.51)
6	Black pepper	0.05 (2.55)	3284 (4.19)	2600 (4.34)	2500 (4.40)	79.18	175000 (3.38)
7	Nut meg	0.03 (1.53)	2040 (2.60)	1800 (3.00)	1700 (2.99)	88.24	136000 (2.63)
8	Rose	0.01 (0.51)	756 (0.96)	730 (1.21)	730 (1.28)	86.62	36500 (0.70)
9	Hibiscus	0.01 (0.51)	1000 (1.27)	800 (1.33)	800 (1.40)	88.97	45000 (0.87)
10	<i>Plumeria</i>	0.01 (0.51)	1000 (1.27)	813 (1.35)	756 (1.33)	81.29	41024 (0.79)
	Total	1.96 (100.00)	78257 (100.00)	59817 (100.00)	56783 (100.00)		5166154 (100.00)

It was also revealed that per farm total income received in study year was Rs. 5166154 out of which maximum (40.63%) income received by mango followed by cashew (21.10%), areacanut (14.19%), coconut (11.95%), kokum (4.51%), black pepper (2.63%), nutmeg (2.60%), hibiscus (0.87%), golden plumeria (0.79%), rose (0.70%). It was also revealed that mango, cashew, areacanut major component of nursery accounted more than 90 percent income. It was concluded that nursery enterprises one of the substainial where relatively less capital investment required and the per farm income is higher.

Another important attribute of this enterprises is the existing farm resources such land, irrigation, water can be used more efficiently and provide higher income to the farmers in study area. The farmer they do not need to invest much in capital like machinery and building such as business conducted in rural area. It is observed that farmers in study area they should aware benefits of these enterprises which also supported with climate of konkan region which is very much suitable for hardening of grafts and overall nursery operation .

Per farm cost and returns of nursery enterprise

Information regarding Per farm cost and returns from nursery enterprises is given table 3. The total cost per farm incurred for the preparation of grafts and seedlings amounted to Rs. 23,31,318. Among the crops, Mango accounted for the highest cost share of the total cost at Rs. 7,23,094 (31.01%), followed by Cashew Rs. 6,49,349 (27.85%), Coconut Rs. 4,00,148 (17.16%) respectively. On the lower end, Hibiscus (0.57%), Rose (0.86%), and *Plumeria* (1.12%) had the least cost contributions in total cost of nursery. The gross returns from all crops summed up to Rs. 54,79,996, with mango again leading the chart at Rs. 21,71,400 (39.62%), showing strong market demand followed by Cashew Rs. 10,90,480 (19.89%) and Coconut Rs. 8,18,111 (14.92%). Flower crops like Rose and Hibiscus had much smaller gross returns of Rs. 36,500 (0.66%) and Rs. 45,000 (0.82%) respectively. The net profit across all crops was Rs. 31,48,677, with Mango delivering the highest net profit of Rs. 14,48,306 (45.99%). This was followed by Areacanut at Rs. 4,64,786 (14.78%), Cashew at Rs.4,41,131 (14.01%), and Coconut at Rs. 4,17,964 (13.27%). Other

profitable crops include Kokum Rs. 1,21,679 (3.86%), Black Pepper Rs. 1,05,966 (3.36%), and Nutmeg Rs. 86,266 (2.73%). The flower crops (Hibiscus, Rose, and *Plumeria*) showed low total profits, contributing between 0.46 per cent to 1.00 per cent of total per profit of nursery, Mango had a total cost of Rs.40 and a profit of Rs.60 per graft, making the profitable at scale. In spices nursery, the Nutmeg, Kokum, and Black Pepper showed high per unit profits of Rs. 51, Rs. 42, and Rs. 42 respectively, indicating excellent efficiency and suitability for limited resource cultivation. Areacanut also proved efficient with a low cost of Rs.21 and a profit of Rs. 38 per seedling. In contrast, flowers like *Plumeria*, Rose, and Hibiscus, though low-cost (Rs.14–22 per unit), offered limited per-unit profits of Rs.27–35. Coconut had the highest cost per seedlings at Rs.97 but still yielded Rs.53 profit per unit.

(Figures on parentheses indicate percentage to total)

In summary, Mango is the best option for large-scale, high-volume returns. However, crops like Nutmeg, Kokum, and Black Pepper offer superior returns per rupee invested, making them ideal for high- efficiency or small-scale production. Flower crops, although low-cost, have limited profitability. These insights can guide crop selection based on available resources, scale of operation, and target profitability. Similar results were observed by Mhatre (2011) [1] studied the economic evaluation of private horticulture nurseries in Ratnagiri District.

Per farm profitability of nursery enterprises

Information regarding Per farm Profitability of nursery enterprises is given table 4. The table clearly indicates profitable outcomes across fruits, spices, and flower nursery. Among fruits, mango grafts showed the highest net returns at total cost level, amounting to Rs. 14,48,350, followed by cashew grafts (Rs.4,40,981) and coconut (Rs.4,17,980). Cashew again stood out with the highest net profit, while crops like areacanut and black pepper also yielded more returns. Per nursery farm Among flowers, hibiscus and golden plumeria generated net profits of Rs.31,726 and Rs. 24,036 respectively, whereas rose earned Rs13,951. In terms of the benefit-cost ratio (BCR), rose recorded the highest at 2.62, indicating

its excellent profitability relative to the investment. Cashew grafts also showed a very strong BCR of 2.47, making it the most economi-

cally efficient nursery enterprises.

Table 3. Per farm cost & returns of nursery enterprise:

Sr no	Name of crop	Total Cost	Gross Returns	Net Profit	Per Graft/ seedling	Total Cost	Average Sale Price per Graft/ seedling	Net Profit Per Graft/ seedling
1	Mango	723094 (31.01)	2171400 (39.62)	1448306 (45.99)	40		100	60
2	Cashew	649349 (27.85)	1090480 (19.89)	441131 (14.01)	47		80	32
3	Coconut	400148 (17.16)	818111 (14.92)	417964 (13.27)	97		151	53
4	Areaca nut	268574 (11.52)	733360 (13.38)	464786 (14.78)	21		60	38
5	Kokum	111441 (4.78)	233120 (4.25)	121679 (3.86)	38		80	42
6	Black pepper	69034 (2.96)	175000 (3.19)	105966 (3.36)	27		70	42
7	Nutmeg	49734 (2.13)	136000 (2.48)	86266 (2.73)	29		80	51
8	Hibiscus	13438 (0.57)	45000 (0.82)	31562 (1.00)	14		50	35
9	Plumeria	26317 (1.12)	41024 (0.74)	14708 (0.46)	22		50	27
10	Rose	20255 (0.86)	36500 (0.66)	16242 (0.51)	18		50	31
	Total	2331318 (100.00)	5479996 (100.00)	3148677 (100.00)				

Coconut (1.96), kokum (1.92), and black pepper (1.65) also had positive B:C ratios, reflecting sound profitability. As nursery enterprises among flowers, golden plumeria (1.71) and hibiscus (1.42) showed modest but viable returns. Overall, this analysis highlights that all the horticultural crops studied—whether fruits, spices, or flowers—offered profitable returns, confirming their economic viability. The high benefit-cost ratios and strong net returns emphasize the potential of these crops nursery enterprises for income generation and employment opportunities in the nursery and horticulture sector. Among fruits, Mangos nursery enterprise showed the highest net returns at total cost level with Rs. 14,48,350, followed by Cashew (Rs.4,40,981) and Coconut (Rs.4,17,980). Arecanut also showed promising net re-

turns of Rs. 4,64,830. In the spices nursery enterprises, Black Pepper and Nutmeg grafts yielded net profits of Rs. 1,05,913 and Rs. 86,266 respectively, while Kokum earned Rs. 1,21,679. In terms of flowers, Hibiscus, Golden *Plumeria*, and Rose nursery enterprise generated net profits of Rs. 31,726, Rs. 14,708, and Rs. 16,245 respectively. When evaluating net returns over variable costs, all nursery showed substantial margins. Mango grafts led with Rs. 16,28,152, while Cashew and Coconut followed with Rs. 6,73,655 and Rs. 5,03,451 respectively. The flower nursery, despite lower total costs and returns, also provided positive margins—Golden *Plumeria* Rs.20,226, Rose Rs.21,022, and Hibiscus Rs.35,320—highlighting their potential in small-scale or ornamental nurseries. In terms of Benefit-Cost Ratio

Table 4. Per farm Profitability of nursery enterprise: (Value in Rupees)

Sr.no.	Particulars	Fruits					Spices		Flowers			Total
		Mango	Cashew	Coconut	Arecanut	Kokum	Black Pepper	Nutmeg	Hibiscus	Golden plumeria	Rose	
1	Cost											
	a) Variable cost	543248	416825	314660	213303	75912	57683	41449	9680	20798	15478	1709035
	b) Fixed cost	179802	232674	85471	55227	35529	11404	8284	3594	5519	4777	622283
	Total Cost	723050	649499	400131	268530	111441	69087	49734	13274	26317	20255	2331318
2	Gross returns	2171400	1090480	818111	733360	233120	175000	136000	45000	41024	36500	5479996
3	Net returns at											
	a) Variable cost	1628152	673655	503451	520057	157208	117317	94551	35320	20226	21022	3770960
	b) Total cost	1448350	440981	417980	464830	121679	105913	86266	31726	14708	16245	3148677

(continued on next page)

Sr.no.	Particulars	Fruits					Spices		Flowers			Total
		Mango	Cashew	Coconut	Areca nut	Kokum	Black Pepper	Nutmeg	Hibiscus	Golden plume- ria	Rose	
4	Benefit- cost Ratio	1.50	2.47	1.96	1.58	1.92	1.65	1.58	1.42	2.79	2.25	1.74

(BCR), Golden *Plumeria* stood out with the highest B:C ratio of 2.79, indicating excellent economic efficiency relative to investment in nursery enterprises. Cashew also performed strongly with a BCR of 2.47, the highest among fruits and spices. Other notable grafts B:C ratios included Rose (2.25), Coconut (1.96), Kokum (1.92), and Black Pepper (1.65), all reflecting sound profitability.

Even crops with moderate BCRs, like Areca nut (1.58) and Nutmeg (1.58), nursery enterprises offered viable economic returns. Overall, this analysis highlights the profitable and economically sustainable nature of all the crops nursery enterprise under study. High net profits and favourable BCR across fruit, spice, and flower nursery enterprises underscore the diverse opportunities in horticulture— not only for large-scale commercial nursery business but also for small nurseries aiming for high efficiency and niche markets. These results emphasize the potential of these nursery enterprises to generate income and employment, especially in rural and peri-urban regions. These results are in the line with the studies from Larinde *et al.* (2014) [2] conducted study to understand the economic contribution of small scale nursery industry in Port Harcourt, Rivers State of Nigeria and Sudha (2003) studied the economics of nursery management in Bangalor.

Conclusion

The study clearly demonstrates that nursery enterprises are economically viable and have strong potential for income generation and rural employment. The per-farm capital investment was about ₹329.20 lakh, of which land constituted the major share (94.59%), indicating that nursery production is largely land-oriented and requires comparatively limited investment in machinery and other infrastructure. The nursery enterprises produced 78,257 grafts, with mango, cashew and areca nut being the major components in terms of production and market contribution. Mango generated the highest income of ₹21.71 lakh, followed by cashew (₹10.90 lakh) and coconut (₹8.18 lakh). Overall, the nursery enterprise generated gross returns of ₹54.80 lakh and net returns of ₹31.49 lakh per farm, confirming its high profitability. Among individual crops, mango was the most important crop for large-scale returns, whereas cashew, golden plumeria, rose, coconut and kokum demonstrated attractive benefit-cost performance. *Golden plumeria* recorded the highest B:C ratio (2.79), followed by rose (2.25) and cashew (2.47). Thus, nursery enterprises provide an effective means of efficiently utilizing land, water and existing farm resources, while generating substantial income with relatively lower infrastructure requirements.

Policy implications

- Considering to the demand for good grafts of different fruits crops, spices plantation crops, and ornamental crops the proper training regarding grafting skills and maintenance of graft should be given to nursery entrepreneur to reduces mortality as grafts.
- The financial institution should provide a loan for nursery enterprise at lower rates as loan procedure should be easy.

21-24.

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