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Composition, cost, returns and profitability of nursery enterprises in Ratnagiri district of Maharashtra state

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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 Konkan region of Maharashtra, by selecting 30 sample nurseries from Ratnagiri district. The research aimed to analyse the cost returns, profitability, and overall viability of nursery enterprise. The data was collected through personal interviews using structured schedules for the reference year 2023-24. The study on 30 nurseries in Ratnagiri district (2023-24) revealed that nursery enterprises are highly profitable. On average, each nursery prepared 81,079 grafts/seedlings, of which 58,167 were sold, generating an income of Rs 82.90 lakh. Coconut, Mango and Cashew were the dominant crops, contributing over 90% of total income. Coconut gave the highest income (Rs 42.83 lakh), while Mango and Cashew provided balanced returns. Total cost per farm was Rs 25.44 lakh, resulting in a net profit of Rs 57.46 lakh. Profitability indicators were favourable: overall BCR = 1.44. Black pepper (1.99) and Nutmeg (1.88) showed the highest efficiency, while Coconut had the highest net returns despite a lower BCR (1.31). The break-even point was 7,863 grafts, much lower than actual sales, confirming strong economic viability. Coconut, Mango and Cashew are the most profitable crops, while Nutmeg, Black Pepper and Ornamental plants offer good efficiency for small-scale nurseries. Nursery enterprises in Konkan prove to be a low-capital, high-return activity with significant potential for income generation.

Keywords: Nursery enterprise, cost analysis, profitability, benefit-cost ratio, break-even point, horticulture, grafts, seedling production

Introduction

A nursery is a specialized facility where young fruit or vegetable seedlings are nurtured under controlled conditions until they are mature enough for transplantation. The core objective of efficient nursery management is to supply healthy, high-quality planting material that supports both orchard development and replantation programs. This component of horticulture is particularly appealing due to its minimal land requirement and the potential for rapid economic returns, making it a vital contributor to sustainable agricultural development.

India's diverse climate ensures the availability of all varieties of fresh fruits and vegetables. It ranks second in fruits and vegetable production in the world, after China. As per National Horticulture Database (1st Advance Estimates) published by National Horticulture Board 2023-24, India produced11.21 million metric tonnes of fruits and 209.39 million metric tonnes of vegetables. The area under cultivation of fruits stood at 7.15 million hectares while vegetables**.**

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Maharashtra is one of the leading states in horticultural production due to its diverse agro-climatic zones and strong institutional support. The Konkan region, particularly Ratnagiri district, is famous for its production of high-value horticultural crops like mango (Alphonso), cashew, coconut and areca nut. Given the demand for quality grafts and seedlings, nursery enterprises have flourished in this district, creating economic opportunities for farmers and entrepreneurs.

Materials and Methods

Selection of Districts

From the south Konkan region, Ratnagiri district were selected purposively for investigation

Selection of Tehsils
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 from selected district. Dapoli, Ratnagiri and Lanja tehsils were selected.

Selection of Nursery
Total sample of 30 nurseries were selected on proportionate number of nurseries in selected tehsils in district.

Collection of Data
Data was collected from selected nursery owners by personal interviews with the help of specially designed schedule.

Analysis of data
To achieve specific objectives of the study, the collected data was analysed to draw conclusion.

Tabular Analysis
The data is arranged in suitable tables and simple statistical tools such as average, percentage, ratios, standard cost concepts were used for analysis.

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

To estimate cost, returns and profitability of nursery business
For all types of seedlings direct and indirect costs were estimated separately in each group of nurseries.

Items of direct cost
- Cost of plant material (seed, rootstock, seedling)
- Cost of scion
- Cost of containers and potting media
- Cost of fertilizer, FYM, manure
- Cost of irrigation charges6. Cost of Nutrient agrochemicals (Growth promoter and plant protection chemicals)
- Miscellaneous cost
- Supervision charges
- Annual Maintenance cost of mother orchard

Items of 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. Rental value of Land/ Land rent
5. Amortization cost

Results and Discussion
Per farm Composition of nursery enterprises
Information regarding per farm composition of the nursery enterprise in study area is given in table 1.
The table 1 indicates that the total grafts prepared in study area was 81,079 out of which majority 26,522 (32.71%) were mango grafts, followed by Coconut 20,486 (25.27) and Cashew nut 17,038 (21.01%). The per farm number of seedlings prepared were arecanut 6,144, black pepper 5,510, nutmeg 3,075 and ornamental plants 2,303. The survival percentage was observed, maximum in coconut (84%) and ornamental (84%) followed by nutmeg (73%), arecanut (73%), cashew (73%), mango (68%), black pepper (64%). It was also revealed that among grafts of fruits crops survival percentage is less in mango, as compared to other crops. The total number of saleable grafts were 59,865 out of which maximum grafts of mango i.e.18,000 (30.06%) followed by coconut 17140 (28.63), cashew grafts 12500 (20.88%), arecanut 4500 (7.51%), black pepper 3500 (5.84%), nutmeg 2250 (3.75%) and ornamental 1975 (3.29%). In case of total number of grafts sold maximum 29.60 per cent (17,222) of mango which received Rs. 18,00,000. In case of coconut total number of seedlings sold were 17,140 (28.63%) and income received was Rs. 42,83,794. cashew was also found to be major component of nursery. The total number of grafts sold were 12,000 (20.63%) and income earn was Rs. 10,80,000.

Table 1: Per Farm Composition of Nursery Enterprise in Ratnagiri district

Name of Crop	Area (Mother Plant)	Number of Grafts Prepared / Seedlings Prepared / Purchased	No. of Saleable Grafts / Seedlings	No. of Grafts / Seedlings Sold	Survival Percentage	Income (₹)
Mango	0.66 (29.4)	26522 (32.71)	18000 (30.06)	17222 (29.60)	68	1800000 (21.72)
Cashew	0.61 (27.12)	17038 (21.01)	12500 (20.88)	12000 (20.63)	73	1080000 (13.02)
Coconut	0.78 (34.66)	20486 (25.27)	17140 (28.63)	17135 (29.45)	84	4283794 (51.68)
Areca nut	0.09 (4.00)	6144 (7.58)	4500 (7.51)	4150 (7.13)	73	394250 (4.76)
Black pepper	0.05 (2.23)	5510 (6.79)	3500 (5.84)	3200 (5.50)	64	224000 (2.75)
Nutmeg	0.04 (1.78)	3075 (3.79)	2250 (3.75)	2485 (4.27)	73	310135 (3.74)
Ornamental*	0.02 (0.9)	2303 (2.84)	1975 (3.29)	1975 (3.39)	84	197500 (2.38)
Total	2.25 (100)	81079 (100)	59865 (100)	58167 (100)		8289679 (100)

*Ornamental cuttings/ seedlings were purchased from other nurseries.

The total number of seedlings sold in case of arecanut 4150 and income received was Rs. 3,94,250 (4.76%). The black pepper graft sold in study area about 3200 (5.50%) and income received was Rs. 2,24,000. The nutmeg and ornamental grafts sold were 2485 and 1975 respectively. It was also revealed that per farm total income received from nursery enterprise in study year was Rs. 82,89,679 out of which maximum Rs 42,83,794 (51.68%) income received by coconut followed by mango Rs 18,00,000 (21.72%), cashew Rs 10,80,000 (13.02%), arecanut Rs 3,94,250 (4.76%), nutmeg Rs 3,10,135 (3.74%), black pepper Rs 2,24,000(2.75%), ornamental Rs 1,97,500 (2.38%) respectively. It was also revealed that coconut, mango, cashew, arecanut are major component of nursery accounted

more than 90 per cent income. It was concluded that nursery enterprises is one of the major enterprise where relatively required less capital investment and the per farm income is higher. Another important attribute of this enterprises is the existing farm resources such land, irrigation and different inputs can be used more efficiently and provide higher income to the farmers in study area. The farmer do not need to invest much in capital like machinery, building and such business conducted are in rural area so that farmers in the study area should be aware of the benefits of this nursery enterprise, which also supports the climate of konkan region and is very much suitable in hardening of grafts and overall nursery operation.

Per Farm Cost and Returns of Nursery Enterprise

The table 2 presents detailed information on the cost and returns for different nursery crops. The total expenditure for producing grafts and seedlings was Rs. 25,44,075. Coconut had the highest share in total cost at Rs. 10,06,241 (39.55%), followed by Mango at Rs. 7,19,499 (28.28%) and Cashew at Rs. 3,89,667 (15.31%). The least expenditure was observed for Nutmeg (Rs. 58,417), making up only 2.29% of the total In terms of gross returns, Coconut again led with Rs. 42,83,794 (51.67%), followed by Mango (Rs. 18,00,000 or 21.71%) and Cashew (Rs. 10,80,000 or 13.02%). Ornamental crops, Nutmeg, and Black pepper contributed relatively less to total gross returns.

Table 2: Per farm cost and returns of nursery enterprise.

Sr. no	Name of Crop	Total Cost	Gross Returns	Net Profit	Per Graft/seedling Total Cost	Sale Price per Graft/seedling	Net Profit Per Graft/seedling
1	Mango	719499 (28.28)	1800000 (21.71)	1080501 (18.80)	42	100	58
2	Cashew	389667 (15.31)	1080000 (13.02)	690333 (12.01)	32	90	58
3	Coconut	1006241 (39.55)	4283794 (51.67)	3277552 (57.04)	59	250	191
4	Areca nut	196152 (7.71)	394250 (4.75)	198098 (3.45)	47	80	33
5	Black pepper	104736 (4.11)	224000 (2.70)	119264 (2.07)	33	70	37
6	Nutmeg	58417 (2.29)	310135 (3.74)	251719 (4.38)	24	100	76
8	Ornamental	69362 (2.72)	197500 (2.38)	128138 (2.23)	35	100	65
	Total	2544075 (100.00)	8289679 (100.00)	5745604 (100.00)			

(Figures in parentheses indicate percentages to total)

When looking at net profit, Coconut remained the top-performing crop with Rs. 32,77,553 (57.04%), showing its high profitability. Mango and Cashew also performed well with net profits of Rs. 10,80,501 (18.80%) and Rs. 6,90,333 (12.01%) respectively. Among the spices, Black Pepper and Nutmeg gave net profits of Rs. 1,19,264 and Rs. 2,51,719 respectively. Analyzing per unit economics, Coconut had the highest net profit per graft at Rs. 191, though it also had a relatively high cost of Rs. 59 per graft. Mango and Cashew both offered a per graft profit of Rs. 58, but with lower costs Rs. 42 and Rs. 32 respectively indicating better returns for their cost. Nutmeg and Ornamental plants also showed good performance with net profits of Rs. 76 and Rs. 65 per graft, respectively. Arecanut, despite its lower cost (Rs. 47), yielded only Rs. 33 per unit.

Coconut emerged as the most profitable crop with the highest gross and net returns. Mango and Cashew also showed consistent returns with moderate costs. For high returns per rupee spent, Nutmeg and ornamental crops performed efficiently. These findings help in deciding the most suitable nursery crops depending on investment capacity, return expectations, and the scale of operation. Similar results were observed by Tevari et.al (2023) studied the costs and returns of nursery enterprises in Koppal district of Karnataka.

Per farm profitability of nursery enterprises:

The analysis of per farm profitability of nursery enterprises is given in the table 5.15. It is seen from the table that reveals a wide range of economic outcomes across fruit, spice and ornamental nursery enterprises. The total investment incurred across all categories was Rs. 25,44,075, with variable costs making up the larger portion (Rs. 19,15,082) compared to fixed costs (Rs. 6,28,993). Among all nursery enterprises, Coconut demanded the highest total cost at Rs. 10,06,241, followed by Mango at Rs. 7,19,499. On the lower end, Nutmeg and Black Pepper required relatively less investment, with total costs of Rs. 58,417 and Rs. 1,04,736 respectively. In terms of gross returns, Coconut generated the highest income of Rs. 42,83,794, followed by Mango Rs. 18,00,000 and Cashew Rs. 10,80,000. Despite its high cost, Coconut led all crops in overall revenue generation.

Table 3: Per farm Profitability of nursery enterprise

Sr.no.	Particulars	Fruits				Spices		Ornamental	Overall
		Mango	Cashew	Coconut	Areca nut	Black Pepper	Nutmeg		
1	**Cost**								
	a) Variable cost	535256	259048	789613	138810	87723	47108	57525	1915082
	b) Fixed cost	184243	130619	216628	57342	17013	11308	11838	628993
	Total Cost	719499	389667	1006241	196152	104736	58417	69362	2544075
2	**Gross returns**	1800000	1080000	4283794	394250	224000	310135	197500	8289679
3	**Net returns at**								
	a) Variable cost	1264744	820952	3494180	255440	136277	263027	139976	6374597
	b) Total cost	1080501	690333	3277552	198098	119264	251719	128138	5745604
4	**Benefit- cost Ratio**	1.67	1.56	1.31	1.99	1.88	1.23	1.54	1.44

However, Mango recorded the highest net returns over variable cost at Rs. 12,64,744, with a net return of Rs.

10,80,501 over total cost, demonstrating a strong balance between cost and profitability. Cashew also showed a healthy return of Rs. 6,90,333, indicating its potential as a profitable nursery enterprise with moderate investment. Among spices, Nutmeg and Black Pepper were noteworthy for their strong returns with relatively low inputs. Nutmeg earned a net return of Rs. 2,63,027 over variable cost and Rs. 2,51,719 over total cost. Similarly, Black Pepper achieved a net profit of Rs. 2,55,440 above variable cost and Rs. 1,19,264 above total cost. These results suggest that spice nursery enterprise, particularly Nutmeg and Black Pepper, offer high profitability even with minimal capital requirements. ornamental nursery enterprise, though contributing lower gross returns (Rs. 1,97,500), still provided a reasonable net return of Rs. 1,28,138, with a low cost base of Rs. 69,362, making them viable for small-scale or niche nursery operations. The Benefit-Cost Ratio (BCR) is a useful indicator of economic efficiency. Black Pepper had the highest BCR at 1.99, followed closely by Nutmeg (1.88) and Mango (1.67) confirming their strong profitability per rupee spent. Though Coconut generated the highest gross income, its BCR was only 1.31, due to its high input cost. Ornamental crops also recorded a decent BCR of 1.54, while Cashew (1.56) reflected good efficiency in capital utilization. The overall BCR for all nursery enterprises combined was 1.44, indicating that nursery farming is economically beneficial and offers profitable returns on investment. The findings indicate that Mango, Cashew and Coconut are suitable for large-scale nursery businesses due to their consistent returns and market demand. However, nursery enterprises like Nutmeg and Black Pepper prove to be more efficient in terms of return on investment, making them highly suitable for farmers with limited resources or for small-scale nursery ventures. Ornamental nursery enterprises also hold economic potential, especially for urban or peri-urban markets. Overall, this analysis highlights the profitability and sustainability of nursery enterprises. The information regarding cost-return dynamics and benefit cost ratio helpful, nursery owners so that they can make better crop choices based on available capital, land size and profit expectations. Similar results were observed by Mhatre (2011) studied the economic evaluation of private horticulture nurseries in Ratnagiri district.

Break- even point

Break-even point analysis helps to determine the minimum number of units that must be sold to cover all fixed and variable costs. It is a crucial indicator of the financial health and sustainability of a nursery business.

Table 4: Break- even point analysis

Sr.no	Particulars	Number/Price
1	Fixed cost	628993
2	Variable cost	1915082
3	Total Grafts sold	58167
4	Gross returns	8289679
5	Selling price per graft	113
6	Variable cost per graft	33
7	Break even point	7863

The information regarding break- even point of nursery enterprise is given in table 4. As shown in Table 4, the fixed cost of the nursery farm was Rs. 6,28,993, and the variable cost was Rs. 19,15,082. During the study period, the nursery sold a total of 58,167 grafts, generating a gross return was Rs. 82,89,679. By dividing the gross return by the total number of grafts sold, the selling price per graft was found to be Rs. 113, while the variable cost per graft was Rs. 33. Thus, the break-even quantity was calculated to be 7863 grafts. This means that the nursery must sell at least 7863 grafts to cover its total costs. Any sales beyond this quantity contribute to the profit of the enterprise. Since the actual number of grafts sold was 58,167, which is significantly higher than the break-even level, it indicates that the nursery enterprise was operating well within a profitable zone. This emphasizes the economic viability and potential for income generation from nursery activities when managed efficiently.

Conclusion

1. Nursery enterprises in Ratnagiri district are highly profitable, with an overall BCR of 1.44 and an average net return of Rs57.46 lakh per farm.
2. Coconut is the most profitable crop, contributing 51.68% of total income, followed by Mango and Cashew as other major sources of returns.
3. Nutmeg, Black Pepper and Ornamental plants recorded higher efficiency with better per graft returns and BCRs, despite their smaller scale.
4. With a break-even point of 7,863 grafts against 58,167 actually sold, nursery activities in Konkan are confirmed as financially sustainable and market-driven.
5.Per graft profitability was maximum in Coconut (Rs191), highlighting its economic edge compared to other crops like Arecanut (Rs33).
6. The nursery sector plays a significant role in employment generation, both family and hired labor, thereby contributing to rural livelihood security

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