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Financial performance and crop-wise profitability of Yashwant Hi-Tech seedling nursery in Nagpur

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Abstract

The present study was conducted during the production year 2025–26 to work out the cost of establishment of the nursery unit and to analyze the profitability of major crops cultivated under polyhouse conditions at Yashwant Hi-Tech Nursery, Mauda, Nagpur. The study followed a case study approach based on primary information collected through personal interviews, field observations and nursery records. Tabular and percentage analysis, depreciation analysis, crop-wise cost allocation, gross return, net return and Benefit-Cost ratio were used for economic evaluation.

The total initial establishment cost of the one-acre nursery unit, equivalent to 4047 m², was ₹3280000. The annual fixed cost was ₹573100 and the annual variable cost was ₹4372500, resulting in a total annual production cost of ₹4945600. The nursery sold 2700000 seedlings and generated gross returns of ₹6230000, resulting in an overall net profit of ₹1284678 and an overall B:C ratio of 1.26. Bottle Gourd recorded the highest B:C ratio of 2.05, followed by Capsicum at 1.91, while Chilli generated the highest absolute net profit. The study concludes that the nursery was economically viable at the overall enterprise level, although profitability can be improved by emphasizing high-return crops and reviewing low-return crop lines.

Keywords: Nursery economics, establishment cost, polyhouse, seedling production, profitability, benefit-cost ratio, Nagpur

Introduction

Protected cultivation has emerged as an important component of modern horticulture because it provides a controlled production environment and supports the production of high-value crops and quality planting material. Polyhouse and hi-tech nursery systems use protected structures, irrigation and fertigation facilities, specialized growing media and mechanized operations to improve seedling uniformity, survival and marketability.

The establishment of a commercial nursery requires substantial investment in land development, protected structures, irrigation, electricity, machinery, storage and fertigation facilities. Therefore, accurate estimation of establishment and recurring production costs is necessary for investment planning, pricing and assessment of enterprise viability.

Yashwant Hi-Tech Nursery at Mauda represents a commercial nursery enterprise producing vegetable and flower seedlings. The present paper focuses on estimating the cost of establishment of the nursery unit and analyzing the profitability of major crops cultivated under polyhouse conditions.

Objectives of the Study

1. To work out the cost of establishment of the nursery unit.
2. To analyze the profitability of major crops cultivated under polyhouse conditions.

Methodology

Area of Study

The present study was conducted at Yashwant Hi-Tech Nursery, Mauda, Dist. Nagpur, near the Gopal Snacks Company, Bhandara Road, Nagpur – 441104.

Period of Study

The data was collected for the financial year 2025–2026.

Source of Data

Primary Data

The primary data for the nursery study was collected exclusively from the selected unit, Yashwant Hi-Tech Nursery, Mauda, during the financial year 2025–26. Information was obtained through specially designed schedules and personal interviews with the nursery owner, supervisors and workers. The data covered establishment and maintenance costs, yield and revenue details.

Analytical Tools

The selection of statistical and analytical tools was based on the study's objectives and the type of data collected. The methods used for analysis in this study are explained below.

Cost and Returns of Yashwant Hi-Tech Nursery, Mauda

Cost of establishment

Capital investment is the acquisition of physical assets by a unit for use in furthering its long-term business goals and objectives.

Fixed Cost

Fixed costs in the nursery include expenses such as constructing the nursery and polyhouse structures with GI pipes, polyethylene sheets and shade nets, installing irrigation and climate control systems, land preparation, and depreciation of equipment.

Variable Cost

Variable costs consist of inputs like seeds or saplings, fertilizers, pesticides, labour wages, electricity for irrigation and climate control, packaging, and transportation.

Total Cost

The total cost is calculated by adding together the fixed costs and the variable costs.

$$TC = \text{Fixed Cost} + \text{Variable Cost}$$

Gross Return

Gross return is defined as the total rate of return on an investment before the deduction of any expenses.

$$GR = \text{Price} \times \text{Quantity}$$

Net Return

Net return refers to return after deducting all expenses from the gross return generated by the investment.

$$\text{Net Return} = \text{Gross Return} - \text{Total Cost}$$

Benefit-Cost Ratio

The benefit-cost ratio compares the benefit generated with the cost and investment of the project.

$$B:C \text{ Ratio} = \text{Gross Return} / \text{Total Cost}$$

Results and Discussion

Cost of establishment of nursery

The results presented in Table 1 reveal that the total initial establishment cost of Yashwant Hi-Tech Nursery was ₹3280000 for an area of one acre (4047 m²), which worked out to approximately ₹810.48 per m². Machinery and equipment accounted for the highest share of the total establishment cost (24.39%), followed by the polyhouse structure (21.34%), land development (18.29%) and shade-net house (15.24%). Together, these components constituted a major proportion of the total capital investment, indicating the capital-intensive nature of establishing a hi-tech nursery. The remaining investment was incurred on irrigation, electricity connection, office and storage facilities, water-source development and fertigation. The results indicate that a considerable amount of capital is invested before regular production begins. Therefore, efficient utilization of nursery infrastructure and optimum production capacity are essential for recovering the establishment investment and improving long-term economic performance.

The total initial establishment cost of the nursery was ₹3280000. Machinery and equipment accounted for the highest share, followed by the polyhouse structure, land development and shade-net house. The establishment cost works out to approximately ₹810.48 per m².

Table 1: Cost of Establishment of Nursery

Sr. No.	Particulars	Investment (₹)	Share (%)
1	Land Development	600000	18.29
2	Polyhouse Structure	700000	21.34
3	Shade Net House	500000	15.24
4	Irrigation System	200000	6.1
5	Electricity Connection	200000	6.1
6	Machinery and Equipment	800000	24.39
7	Office / Storage Building	120000	3.66
8	Water Source Development	100000	3.05
9	Fertigation Unit	60000	1.83
	Total	3280000	100.0

Profitability of major crops cultivated under polyhouse conditions

Annual fixed cost

The results presented in Table 2 show that the total annual fixed cost of the nursery was ₹573100. Interest on fixed capital was the largest component, amounting to ₹393600, followed by depreciation on machinery and equipment at ₹80000. Depreciation on the polyhouse structure, shade-net house, irrigation and fertigation unit, and office or storage building constituted the remaining fixed-cost components. The predominance of interest on fixed capital indicates that the large initial investment continues to influence the annual economics of the nursery. Hence, higher utilization of the existing facilities and increased production of profitable seedlings can help spread the fixed cost over a larger volume of output and improve overall profitability. The annual fixed cost was ₹573100. Interest on fixed capital formed the largest component of annual fixed cost, followed by depreciation on machinery and equipment.

Table 2: Annual Fixed Cost

Sr. No.	Particulars	Capital Value (₹)	Rate	Annual Cost (₹)
1	Depreciation on Office / Storage Building	150000	5%	7500
2	Depreciation on Polyhouse Structure	700000	5%	35000
3	Depreciation on Shade Net House	520000	5%	26000
4	Depreciation on Machinery and Equipment	800000	10%	80000
5	Depreciation on Irrigation System & Fertigation Unit	310000	10%	31000
6	Interest on Fixed Capital	3280000	12%	393600
	Total Annual Fixed Cost	3280000		573100

Total Annual Variable Cost

The results presented in Table 3 indicate that the total annual variable cost of the nursery was ₹4372500. Seed cost was the largest expenditure, accounting for ₹2551500 or 58.36 per cent of the total variable cost. Labour wages ranked second at ₹550000 (12.58%), followed by interest on working capital at ₹397500 (9.09%). Cocopeat and trays were also important recurring cost components.

The remaining expenses on fertilizers, micronutrients, pesticides and fungicides, plant growth regulators, electricity, packaging, transportation, repair and maintenance. The results clearly show that seed procurement is the most important area for cost management. Therefore, efficient input planning and procurement can play a major role in reducing the overall variable cost of the nursery. The total annual variable cost was ₹4372500.

Table 3: Total Annual Variable Cost

Sr. No.	Particulars	Amount (₹)	Share (%)
1	Seed cost	2551500	58.36
2	Cocopeat cost	250000	5.72
3	Trays purchased	200000	4.57
4	Fertilizer cost	100000	2.29
5	Micronutrient cost	30000	0.69
6	Pesticide/Fungicide cost	40000	0.91
7	Plant growth regulators	15000	0.34
8	Labour wages	550000	12.58
9	Electricity charges	65000	1.49
10	Packaging materials	50000	1.14
11	Transportation cost	45000	1.03
12	Repair & maintenance	40000	0.91
13	Miscellaneous expenses	38500	0.88
	Sub-Total Working Capital	3975000	90.91
14	Interest on Working Capital	397500	9.09
	Total Annual Variable Cost	4372500	100.0

Crop-wise cost allocation

The results presented in Table 4 show the crop-wise allocation of fixed and variable costs on the basis of the number of seedlings sold. A total of 2700000 seedlings were sold during the study period. Chilli accounted for the highest share of total seedling sales (18.52%), followed by Tomato (14.81%). Cabbage and Cauliflower each accounted for 11.11 per cent, while Brinjal accounted for 9.26 per cent. Accordingly, these crops received comparatively higher allocations of fixed and variable costs.

Crops with smaller sales volumes, such as Watermelon and Bottle Gourd, received lower absolute cost allocations. The total fixed cost of ₹573100 and variable cost of ₹4372500 were distributed among the twelve crops according to their respective share in seedling sales. This allocation provides a clear basis for estimating crop-wise total cost, net returns and B:C ratios.

Table 4: Crop-wise Allocation of Fixed and Variable Costs

Sr. No.	Crop	Seedlings Sold	Fixed Cost (₹)	Variable Cost (₹)	Share (%)
1	Chilli	500000	106130	809722	18.52
2	Tomato	400000	84904	647222	14.81
3	Cabbage	300000	63678	485833	11.11
4	Brinjal	250000	53065	404861	9.26
5	Marigold	200000	42452	323889	7.41
6	Bitter Gourd	160000	33961	259111	5.93
7	Capsicum	200000	42452	323889	7.41
8	Cauliflower	300000	63678	485833	11.11
9	Cucumber	100000	21226	161944	3.7
10	Watermelon	50000	10613	80972	1.85
11	Bottle Gourd	40000	8490	64778	1.48
12	Onion	200000	42452	324167	7.41
	Total	2700000	573100	4372500	100.0

Gross Returns

The nursery sold a total of 2700000 seedlings. Gross returns were determined from crop-wise sales volume and realized selling price, while profitability was estimated after allocating fixed and variable costs according to the number of seedlings sold.

The results presented in Table 5 show that the nursery generated total gross returns of ₹6230000 from the sale of 2700000 seedlings. Chilli generated the highest gross return of ₹1250000 due to its highest sales volume of 500000 seedlings. Tomato ranked second with gross returns of ₹1000000, followed by Capsicum with ₹700000. Chilli generated the highest gross return of ₹1250000 because of its large sales volume, followed by Tomato at ₹1000000 and Capsicum at ₹700000.

Table 5: Gross Returns of Seedlings

Sr. No.	Crop	Seedlings Sold	Selling Price / Seedling (₹)	Gross Returns (₹)
1	Chilli	500000	2.5	1250000
2	Tomato	400000	2.5	1000000
3	Cabbage	300000	1.75	525000
4	Brinjal	250000	2.0	500000
5	Marigold	200000	2.5	500000
6	Bitter Gourd	160000	3.0	480000
7	Capsicum	200000	3.5	700000
8	Cauliflower	300000	1.75	525000
9	Cucumber	100000	2.5	250000
10	Watermelon	50000	3.0	150000
11	Bottle Gourd	40000	3.75	150000
12	Onion	200000	1.5	300000
	Total	2700000		6230000

Profitability of major crops

The results presented in Table 6 reveal considerable variation in crop-wise profitability. The overall nursery

enterprise generated a net profit of ₹1284678. Chilli recorded the highest net profit of ₹334148, closely followed by Capsicum with ₹333659, while Tomato generated a net profit of ₹267874. Bitter Gourd and Marigold also recorded favourable net returns of ₹186928 and ₹133659, respectively. Among the other crops, Bottle Gourd,

Cucumber, Watermelon and Brinjal generated positive returns. In contrast, Onion recorded the highest loss of ₹166619. The results indicate that profitability varied considerably among crops; therefore, greater emphasis should be given to profitable crops while reviewing the cost and pricing strategy of loss-making crops.

Table 6: Profitability of Each Crop

Sr. No.	Crop	Seedlings Sold	Income (₹)	Total Cost (₹)	Net Profit / Loss (₹)	Profit Share (%)
1	Chilli	500000	1250000	915852	334148	22.27
2	Tomato	400000	1000000	732126	267874	17.85
3	Brinjal	250000	500000	457926	42074	2.8
4	Marigold	200000	500000	366341	133659	8.91
5	Bitter Gourd	160000	480000	293072	186928	12.46
6	Capsicum	200000	700000	366341	333659	22.24
7	Cucumber	100000	250000	183170	66830	4.45
8	Watermelon	50000	150000	91585	58415	3.89
9	Bottle Gourd	40000	150000	73268	76732	5.11
10	Onion	200000	200000	366619	-166619	Loss
11	Cabbage	300000	525000	549511	-24511	Loss
12	Cauliflower	300000	525000	549511	-24511	Loss
	Overall Total	2700000	6230000	4945600	1284678	

Benefit-Cost Ratio

The results presented in Table 7 show that the overall B:C ratio of the nursery was 1.26, indicating that the enterprise was economically viable during the study period. Bottle Gourd recorded the highest B:C ratio of 2.05, followed by Capsicum at 1.91. Bitter Gourd and Watermelon each recorded a B:C ratio of 1.64, indicating comparatively efficient returns over the costs incurred.

Tomato recorded a B:C ratio of 1.37, while Chilli, Marigold and Cucumber each recorded 1.36. Brinjal was only marginally profitable with a ratio of 1.09. Onion recorded the lowest B:C ratio of 0.55, while Cabbage and Cauliflower each recorded 0.96, indicating that their returns were insufficient to fully cover the allocated costs. Thus, Bottle Gourd, Capsicum and Bitter Gourd emerged as the most economically efficient crops, whereas Onion, Cabbage and Cauliflower require improvement in price realization, cost management or crop planning.

Table 7: Benefit-Cost Ratio per Crop

Sr. No.	Crop	Income (₹)	Total Cost (₹)	B:C Ratio
1	Chilli	1250000	915852	1.36
2	Tomato	1000000	732126	1.37
3	Brinjal	500000	457926	1.09
4	Marigold	500000	366341	1.36
5	Bitter Gourd	480000	293072	1.64
6	Capsicum	700000	366341	1.91
7	Cucumber	250000	183170	1.36
8	Watermelon	150000	91585	1.64
9	Bottle Gourd	150000	73268	2.05
10	Onion	200000	366619	0.55
11	Cabbage	525000	549511	0.96
12	Cauliflower	525000	549511	0.96
	Overall	6230000	4945600	1.26

Conclusion

The nursery required an initial establishment investment of ₹3280000 for one acre (4047 m²), indicating the capital-intensive nature of hi-tech nursery establishment. The annual fixed cost was ₹573100 and the annual variable cost was ₹4372500, resulting in a total annual production cost of ₹4945600. The nursery sold 2700000 seedlings and

generated gross returns of ₹6230000, producing an overall net profit of ₹1284678 and a B:C ratio of 1.26. Chilli generated the highest absolute net profit, while Bottle Gourd recorded the highest B:C ratio of 2.05, followed by Capsicum at 1.91. Onion, Cabbage and Cauliflower showed B:C ratios below unity and require review of selling price, production cost or crop planning.

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