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Economics of production of apple ber in Dhule district of Maharashtra

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ABSTRACT

The present investigation was conducted in Dhule district of Maharashtra state to study the economics of production and marketing of apple ber (*Ziziphus mauritiana* L.). Based on the highest acreage under apple ber cultivation, two tahsils namely Dhule and Sindkheda were purposively selected. From each tahsil, three villages were selected randomly, and from each village, 15 sample cultivators were selected across three categories: small (upto 0.40 ha), medium (0.41 to 0.80 ha), and large (above 0.80 ha). Thus, the final sample comprised 90 apple ber growers. Primary data pertaining to the agricultural year 2024-25 were collected through personal interviews using specially designed schedules and analysed using simple tabular approach, functional analysis. The per hectare establishment cost of apple ber orchard was estimated at ₹1,57,776.66, with manure constituting the largest expenditure (18.49%), followed by hired male labour (13.69%) and machine labour (13.67%). The total cost of cultivation averaged ₹4,35,243.61 per hectare. Meanwhile, per hectare cost of production was highest (Rs 4,37,157.49) in large group followed by medium (Rs 4,21,751.15) and small group (Rs 4,46,822.21). While gross returns amounted to ₹8,98,487.82, yielding net returns of ₹4,63,244.20 with a benefit-cost ratio of 2.06. Apple Ber is a profitable crop with large farmers getting maximum profit. The estimation of financial indicators suggests that apple ber is proven to be economically viable.

Keywords: Cost of Cultivation, Apple Ber

Introduction

Apple Ber (*Ziziphus mauritiana* L.), also known as the Indian jujube, is an increasingly popular tropical fruit crop well-suited to arid and semi-arid regions. Rich in vitamin C, essential minerals, and antioxidants, it has high nutritional, medicinal, and post-harvest processing value. Originating from Thailand, popular commercial varieties like Kashmiri Red, Ball Sundari, and Thai Jujube are grown across states like Madhya Pradesh, Gujarat, Rajasthan, and Maharashtra. In India, Apple Ber is cultivated on approximately 52 thousand hectares, producing around 531 thousand MT. Madhya Pradesh leads national production with 122.50 thousand MT, while Maharashtra ranks seventh, producing 10.56 thousand MT from 1.12 thousand hectares with a productivity of 9.43 MT/ha.

Maharashtra plays a key role in crop diversification, with districts like Solapur, Dhule, and Beed being major production hubs. In Dhule district alone, Apple Ber is grown on 320 hectares, yielding 1,280 MT at a high productivity rate of 10.32 MT/ha. Farmers in the region cultivate high-yielding varieties such as Thai Jujube and Ball Sundari, generating impressive profits of lakhs of rupees per acre due to low operational costs and high market demand. Key apple ber-producing regions in the district include the Dhule and Sindkheda tahsils.

Materials and methods

Dhule district is one of the major apple ber growing districts of Maharashtra. The Dhule district was purposively selected for the study. Two tahsils, Dhule and Sindkheda, of Dhule district contribute a major part of the area under apple ber cultivation. Therefore, these two tahsils were selected for the study. Three villages from each tahsil were selected randomly on the basis of maximum area under apple ber. Thus, in all, 6 villages were selected from these tahsils. A total of 90 sample farmers were selected for the study.

Tools and analysis

Estimation of production cost and returns

The production cost and returns of apple ber production were estimated on the basis of per hectare. The standard cost concept were used and viz. cost 'A', cost 'B' and cost 'C' were worked out. The sample statistical tools viz. percentages and averages were used.

Results and discussion

Cost of cultivation of apple ber

The per hectare cost of cultivating apple ber for various farm size groups, as well as the overall average, is presented in Table 1.
(₹/ha)

Sr.No.	Items of Cost	Small			Medium			Large			Overall		
		I			II			III			Qty	Value	Per cent
		Qty	Value	Per cent	Qty	Value	Per cent	Qty	Value	Per cent			
1	Hired Human labour (Man days)												
	a) Male	87.84	35136.99	7.86	88.33	35330.14	8.38	87.42	34967.03	8.00	87.86	35144.72	8.07
	b) Female	81.68	20419.52	4.57	84.40	21100.48	5.00	80.11	20027.47	4.58	82.06	20515.82	4.71
2	Bullock power (pair days)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Machine	9.50	7602.74		10.90	8719.62		11.70	9361.32		10.70	8561.23	
3	Manures (q)	155.14	15513.70	3.47	157.89	15789.47	3.74	156.59	15659.34	3.58	156.54	15654.17	3.60
4	Fertilizers (kg)												
	Nitrogen	310.75	9263.61	2.07	312.24	9263.61	2.20	301.77	8850.88	2.02	308.25	9126.04	2.10
	Phosphorous	232.98	16921.30	3.79	243.08	16468.18	3.90	255.03	16179.63	3.70	243.70	16523.04	3.80
	Potassium	309.78	12487.03	2.79	320.53	13448.11	3.19	310.20	13589.98	3.11	313.50	13175.04	3.03
5	Irrigation Charges (₹)		13304.19	2.98		10508.88	2.49		11242.92	2.57		11685.33	2.68
6	Plant protection charges (₹)		102053.94	22.84		97863.25	23.20		97004.29	22.19		98973.83	22.74
7	Incidental charges (₹)		1318.49	0.30		1656.84	0.39		1588.85	0.36		1521.39	0.35
8	Repairs (₹)		965.75	0.22		1028.90	0.24		997.36	0.23		997.34	0.23
	Working capital (₹)		234987.27	50.89		231177.49	52.75		229469.09	50.35		231877.95	53.28
9	Int.on Working Capital @ 6 % (₹)		14099.24	3.16		13332.18	3.16		13768.15	3.15		13733.19	3.16
10	Depre. on farm implements		1871.58	0.42		1669.07	0.40		1465.00	0.34		1668.55	0.38
11	Land revenue and taxes		155.14	0.03		150.00	0.04		150.00	0.03		151.71	0.03
	Cost 'A'		251113.22	56.20		237354.25	56.28		244853.05	56.01		244440.17	56.16
12	Rental value of land		153385.10	34.33		145854.78	34.58		152129.40	34.80		150456.43	34.57
13	Int. on fixed capital @ 10 % (₹)		19402.23	4.34		15846.03	3.76		19611.65	4.49		18286.63	4.20
14	Amortization cost (₹)		11020.98	2.47		11428.14	2.71		11426.03	2.61		11291.72	2.59
	Cost 'B'		434921.53	97.34		410483.20	97.33		428020.13	97.91		424474.95	97.53
15	Family labour											0.00	
	a.Male	18.84	7534.25	1.69	17.22	6889.95	1.63	14.67	5868.13	1.34	16.91	6764.11	1.55
	b. Female	17.47	4366.44	0.98	17.51	4366.44	1.04	13.08	4377.99	1.00	16.02	4370.29	1.00
	Cost 'C'		446822.21	100.00		421751.15	100.00		437157.49	100.00		435243.61	100.00

(continued on next page)

Sr.No.	Items of Cost	Small		Medium		Large		Overall	
		I		II		III			
	Output (q) and income (₹)	220.21	905753.42	225.17	876028.71	227.53	913681.32	224.30	898487.82
	Per quintal cost		2029.11		1873.06		1921.34		1940.45

The cost of cultivation for apple ber orchards was evaluated using standard agricultural economic principles, broken down into Cost 'A', Cost 'B', and Cost 'C'. Across all surveyed farms, the average total maintenance cost per hectare (Cost 'C') came to ₹4,35,243.61. Operational expenditures covered under Cost 'A' averaged ₹2,44,440.17, which represented 56.16% of the total Cost 'C'. Among the operational inputs within Cost 'A', plant protection emerged as the single largest expenditure, standing at ₹98,973.83 per hectare and accounting for 22.74% of Cost 'C'. The second most significant expense was hired male labor at ₹35,144.72 per hectare (8.07% of Cost 'C'). Other notable input expenses included manures at ₹15,654.17 (3.60%), irrigation charges at ₹11,685.33 (2.68%), and potassium fertilizers at ₹13,175.04 (3.03%). Within Cost 'B', the rental value of land formed the primary fixed component at ₹1,50,456.43, representing 34.57% of Cost 'C', alongside the amortization cost of fixed capital at ₹11,291.72 (2.59% of Cost 'C').

For small-size farms (Group I), the total per-hectare cost of cultivation was calculated at ₹4,46,822.21, with Cost 'A' contributing ₹2,51,113.22 (56.20% of Cost 'C'). Plant protection remained the highest input cost for this group at ₹1,02,053.94 (22.84%), followed by hired male labour at ₹35,136.99 (7.86%). Under Cost 'B', the rental value of land accounted for 34.33% and amortization cost represented 2.47% of Cost 'C'. In the medium-size group (Group II), the per-hectare cultivation cost was the lowest among all categories at ₹4,21,751.15. The Cost 'A' component stood at ₹2,37,354.25, forming 56.28% of Cost 'C'. Plant protection charges were again the dominant operational cost item at ₹97,863.25 (23.20%), while hired male labour accounted for 8.38% of the total cost. The rental value of land and amortization cost under Cost 'B' contributed 34.58% and 2.71% to Cost 'C', respectively. For large-size farms (Group III), the cost of cultivation per hectare was estimated at ₹4,37,157.49. Cost 'A' for this category was ₹2,44,853.05, constituting 56.01% of total Cost 'C'.

Plant protection charges once again led input expenses at ₹97,004.29 (22.19%), while manure expenditure was recorded at ₹15,659.34 (3.58%). Under Cost 'B', the land rental value and amortization cost contributed 34.80% and 2.61% to Cost 'C', respectively.

Costs, returns, gross income and B:C ratio from apple ber cultivation

The average gross return per hectare from apple ber cultivation stood at ₹8,98,487.82. Across the different farm size categories, Group I (small farms) earned ₹9,05,753.42, Group II (medium farms) generated ₹8,76,028.71, while Group III (large farms) recorded the highest gross returns of ₹9,13,681.32 per hectare.

At the overall sample level, the per-hectare cost of cultivation was evaluated across three distinct components: Cost 'A', Cost 'B', and Cost 'C'. Cost 'A', which covers actual paid-out operational expenditures, averaged ₹2,44,440.17. Cost 'B', which incorporates interest on fixed capital, land amortization, and the rental value of land into Cost 'A', totaled ₹4,24,474.95. Cost 'C', which further includes the imputed value of family labor, amounted to ₹4,35,243.61 per hectare. Based on these estimates, growers realized a net profit per hectare of ₹6,54,047.64 over Cost 'A', ₹4,74,012.87 over Cost 'B', and ₹4,63,244.20 over Cost 'C'. The corresponding Benefit-Cost (B:C) ratios were evaluated at 3.68, 2.12, and 2.06, respectively, highlighting strong financial profitability across all cost parameters.

When examining individual farm size groups, Group I incurred a Cost 'C' of ₹4,46,822.21 and achieved a net return of ₹4,58,931.21, yielding a B:C ratio of 2.03. Group II reported a total cost of ₹4,21,751.15, earning a net profit of ₹4,54,277.56 with a B:C ratio of 2.08. Group III registered a Cost 'C' of ₹4,37,157.49 while realizing the highest net profit of ₹4,76,523.83 per hectare and a B:C ratio of 2.09. These empirical findings demonstrate that apple ber production is economically viable and offers substantial returns across all farm sizes.

Size Group						
Sr.No.	Particulars	Unit	Small	Medium	Large	Overall
1	Total cost					
	i) Cost 'A'	₹	251113.22	237354.25	244853.05	244440.17
	ii) Cost 'B'	₹	434921.53	410483.20	428020.13	424474.95
	iii) Cost 'C'	₹	446822.21	421751.15	437157.49	435243.61
2	Profit at					
	i) Cost 'A'	₹	654640.20	638674.46	668828.27	654047.64
	ii) Cost 'B'	₹	470831.90	465545.51	485661.19	474012.87
	iii) Cost 'C'	₹	458931.21	454277.56	476523.83	463244.20
3	Production	q	220.21	225.17	227.53	224.30
4	Gross income	₹	905753.42	876028.71	913681.32	898487.82
5	B:C ratio					
	i) Cost 'A'		3.61	3.69	3.73	3.68
	ii) Cost 'B'		2.08	2.13	2.13	2.12
	iii) Cost 'C'		2.03	2.08	2.09	2.06

At the overall level, the benefit-cost ratio at Cost 'C' was recorded at 2.06, clearly reflecting that apple ber cultivation is a financially re-

warding and economically viable fruit crop.

Conclusions

The total per hectare cost of production (Cost 'C') for Apple Ber was calculated to be ₹4,35,243.61, with Cost 'A' and Cost 'B' contributing 56.16% (₹2,44,440.17) and 97.53% (₹4,24,474.95), respectively. A major component of Cost 'A' was the cost of plant protection charges. The Benefit-Cost (B:C) ratio of 2.06 over total cost (more than unity) clearly demonstrated that Apple Ber cultivation is economically viable and profitable for farmers in the Dhule district.

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