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Economic analysis of pomegranate cultivation in Maharashtra's Ahmednagar district

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Abstract

Pomegranate is a high value crop. India produces fine edible quality of pomegranates which are available almost throughout the year. Among Indian states, Maharashtra leads in pomegranate production, contributing approximately 70% to the national output. Pomegranates thrive in the drought-prone regions of Maharashtra, including districts such as Solapur, Ahmednagar, Pune, Sangali, Dhule, and parts of Osmanabad. The strategic allocation of resources towards plant protection measures and other operational expenses demonstrates a holistic approach to crop management. Meanwhile, the substantial commitments to working capital investment, interest payments, and depreciation underscore the capital-intensive nature of Pomegranate cultivation. The benefit-to-cost ratio of 1:1.63 suggests a favourable economic outlook, highlighting the profitability of engaging in pomegranate farming.

Keywords: Horticulture, pomegranate, production, benefit, cost and management

Introduction

Pomegranate is a popular fruit in tropical and subtropical regions worldwide. Pomegranate originates from Iran or Persia region. This crop has a history of some 5000 years there. The taxonomical name of Pomegranate is *Punica granatum*. Pomegranate a member of the *Punicaceae* family, Pomegranate cultivation is prominent in Maharashtra, Gujarat, Karnataka, Tamil Nadu, Uttar Pradesh, Haryana, and Andhra Pradesh. Notable varieties cultivated in India include Alandi, Dholka, Kabul, Kandhari, Muskat Red, Vellode, Ganesh, G-137, Jyoti, Mridula, Phule Arakta, and Bhagwa. Pomegranate trees are highly drought-resistant and can flourish in challenging conditions. They produce fruit three times a year, ensuring a reliable income for farmers. With their recognized health benefits and high levels of vitamins, potassium, and antioxidants, pomegranates are continually in demand. Maharashtra is a leading state in Pomegranate production within India. It is regarded as Fruit of Paradise due to its attractive arils, refreshing juice and fruit skin rich in medicinal properties.

Methodology

A random sampling design was used for selecting districts, tehsils, villages, and Pomegranate growers. In the first stage, Ahmednagar district was purposively chosen due to its abundance of pomegranate orchards. In the second stage, three tehsil as a ``Rahuri, Shrigonda and Sangamner were selected based on their extensive areas of pomegranate cultivation as a primary fruit crop. In the third stage, five village clusters from each selected tehsil were chosen based on the presence of Pomegranate orchards. In the fourth stage, a separate list of Pomegranate growers was compiled for each village cluster, and from these, Ten Pomegranate growers were randomly selected. Cross-sectional data were collected from 150 pomegranate growers during the 2021-2022 period. To analyze the data, various cost concepts such as Cost-A, Cost-B, and Cost-C were employed. Cost-A includes expenditures on hired labor, machinery, manure, fertilizers, plant protection, irrigation, land revenue, incidental expenses, interest on working capital, and asset depreciation. Cost-B comprises Cost-A plus the rental value of land, interest on fixed capital, and amortized establishment costs. Cost-C encompasses Cost-B along with the imputed value of family labor.

Results and Discussion

The cost evaluation for various items was conducted as follows:

A. Per hectare physical inputs used in pomegranate production

The significant number of days for both male (71.12 days) and

female (69.36 days) labor indicates the substantial workforce required for various tasks throughout the cultivation cycle. This suggests that labor-intensive activities are integral to pomegranate farming. The presence of bullock labor, albeit in a relatively small quantity (1.21 pairs), indicates the use of traditional farming practices involving animal traction.

Table 1: Per hectare physical inputs used in pomegranate production

Sr. No	Particulars	Unit	Quantity of inputs	
1	Hired human Labour	Male	Days	71.12
		Female	Days	69.36
2	Bullock labour	Pair Days	1.21	
3	Machinery	Hrs.	112.4	
4	Mannure	Tonne	15.67	
5	Fertilizer	N	Kg	36.47
		P	Kg	84.10
		K	Kg	51.02
6	Family Labour	Male	Days	38.24
		Female	Days	54.12

(Note: Human labor was charged at a rate of Rs. 380.14 per day for male workers and Rs. 230.64 per day for female workers and the cost for using a pair of bullocks was set at Rs. 1326.21 per day)

The substantial quantity of manure used (15.67 tonnes) underscores the importance of soil health and fertility management in pomegranate orchards. This indicates a focus on sustainable farming practices aimed at maintaining soil nutrition. The specific quantities of nitrogen (36.47 kg), phosphorus (84.10 kg), and potassium (51.02 kg) highlight the careful nutrient management necessary for optimal Pomegranate growth

and fruit development.

B. Per hectare cost of cultivation of Pomegranate Production

Allocation of costs provides valuable insights into the resource utilization and financial viability of pomegranate cultivation as shown in Table No 02.

Table 2: Per hectare cost of cultivation of Pomegranate Production

Sr. No.	Item of cost	Unit	Quantity	Rate per unit (Rs)	Cost in (Rs)	Share per cent	
1	Hired Human Labour	A) Male	Days	71.12	380.14	27035.55	5.60
		B) Female		69.36	230.64	15997.19	3.31
2	Bullock labour	Pair days	1.21	1326.21	1604.71	0.33	
3	Machine power	hrs	112.4	90.21	10139.60	1.28	
4	Manures	Tonne	12.36	2625.21	32447.59	6.72	
5	Fertilizer	N	Kg	36.47	63.54	2317.30	0.48
		P	Kg	84.1	80.12	6738.09	1.40
		K	kg	51.02	57.32	2924.46	0.61
6	Irrigation charges				14354.38	2.97	
7	Biofertilizers /micronutrients				18214.37	3.77	
8	Plant protection charges				32174.58	6.66	
9	Incidental Charges				1025.31	0.21	
10	Repairs on farm implements and machinery				3254.97	0.67	
11	Raw material				1257.92	0.26	
12	Weedicides				1024.78	0.21	
13	Working capital				170510.83	35.30	
14	Interest on working capital				28418.47	5.88	
15	Depreciation on farm implements and machinery				5473.21	1.13	
16	Land revenue and other ceases				160	0.03	
17	Cost-A				204562.51	42.36	
18	Rental value of land				131403	27.21	
19	Interest of fixed capital @ 10 percent per annum				20147.35	4.17	
20	Amortization cost				98754.54	20.45	
21	Cost-B				454867.40	94.18	
22	Family labour	Male	days	38.24	380.14	14536.553	3.01
		Female	days	54.12	250.64	13564.63	2.81
23	Cost-C				482968.59	100	
24	Output	Main produce	qtl	154.78	5100	789378	
25	Per quintal Cost				3120.32		
26	Benefit: Cost ratio				1: 1.63		

The breakdown of costs is as follows: The employment of male labor for 71.12 days at Rs. 380.14 per day yields a total expenditure of Rs. 27,035.55, constituting 5.60% of the total cost. Similarly, female labor, employed for 69.36 days at Rs. 230.64 per day, incurs an expenditure of Rs. 15,997.19, contributing 3.31% to the total cost. Bullock labor, engaged for 1.21 pair days at Rs. 1326.21 per day, amounts to Rs. 1,604.71, contributing 0.33% to the total cost. Machine power utilization for 112.4 hours at Rs. 90.21 per hour results in an expenditure of Rs. 10,139.60, constituting 1.28% of the total cost. Manures, fertilizers (Nitrogen, Phosphorus, Potassium), and irrigation charges collectively contribute to the cost structure. Notably, manures amounting to 12.36 tonnes at Rs. 2625.21 per tonne and fertilizers, including N, P, and K, incur varying costs, contributing significantly to the total expenditure. Nitrogen (N), Phosphorus (P), and Potassium (K) constitute significant portions of the expenses. Nitrogen, amounting to 36.47 kg at Rs. 63.54 per kg, incurs a cost of Rs. 2,317.30, contributing 0.48% to the total cost. Phosphorus, weighing 84.1 kg at Rs. 80.12 per kg, totals Rs. 6,738.09, contributing 1.40% to the total cost. Potassium, accounting for 51.02 kg at Rs. 57.32 per kg, sums up to Rs. 2,924.46, contributing 0.61% to the total cost. Irrigation charges amount to Rs. 14,354.38, contributing 2.97% to the total cost. Plant protection charges, totaling Rs. 32,174.58, contribute 6.66% to the total cost. Additional costs, including biofertilizers/micronutrients, repairs, raw material expenses, and weedicides, collectively contribute to the operational outlay. Incidental charges amount to Rs. 1,025.31, repairs sum up to Rs. 3,254.97, and raw material expenses and weedicides incur Rs. 1,257.92 and Rs. 1,024.78, respectively. Working capital investment amounts to Rs. 1,70,510.83, contributing 35.30% to the total cost. Interest on working capital and depreciation sum up to Rs. 28,418.47 and Rs. 5,473.21, respectively. Cost-A includes all direct costs, while Cost-B encompasses both direct and fixed costs, including rental value of land, interest on fixed capital, and amortization cost. The comprehensive Cost-C integrates all expenses, including imputed family labor, representing the entirety of the financial commitment. The expected output, main produce, amounts to 154.78.

Summary and Conclusion

The detailed analysis provides valuable insights into the resource utilization, cost structure, and economic viability of pomegranate cultivation, essential for sustainable agricultural practices and informed decision-making by farmers and stakeholders. Both male and female labor are extensively utilized, with 71.12 and 69.36 days worked, respectively. This highlights machinery underscores a blend of traditional and modern agricultural practices for efficient cultivation. Significant expenses are incurred on manures, fertilizers (Nitrogen, Phosphorus, Potassium), and irrigation, emphasizing the importance of soil health and nutrient management. The allocation of resources towards plant protection measures and other operational expenses further reflects the comprehensive approach to crop management. Working capital investment, interest payments, and depreciation constitute substantial financial commitments, indicating the capital-intensive nature of pomegranate cultivation. Per quintal cost is not explicitly provided, the benefit-to-cost ratio of 1:1.63 indicates a favorable economic return, affirming the profitability of the farming venture.

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