



Marketing Channels of Pomegranate in Pune Division of Maharashtra, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Pomegranate, scientifically named *Punica granatum L.*, is prized globally, particularly in tropical and subtropical regions like India, Iran, and Spain. Pomegranate cultivation has surged in India, notably in Maharashtra, Gujarat, and Karnataka, with India emerging as a top global producer. In 2020-21, India expanded pomegranate cultivation to 2.88 lakh hectares, yielding 32.70 lakh tonnes. Maharashtra led with 54.89% of national production and 59.38% of cultivated area, underscoring its key role despite slightly lower productivity than the national average. The objectives of the study were to identify different marketing channels of pomegranate, to estimate the price spread and marketing efficiency of identified marketing channels and to identify problems faced by stakeholders. The primary data was collected from 60 Pomegranate farmers and from 30 intermediaries. The study identified four different pomegranate marketing channels. Channel-1 (Producer → Pre-harvest contractor → Wholesaler-cum-commission agent → Retailer → Consumer),

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Channel-2 (Producer →Wholesaler-cum-commission agent→ retailer → consumer), Channel-3 (Producer →Collection Center (CC) → Distribution Center (DC) → Consumer), Channel-4 (Producer →Village trader →Wholesaler-cum-commission agent →Retailer → Consumer). Channel-3 providing producers with 69.78% of the consumer price and demonstrating highest efficiency (2.31) for its Acharya-Agarwal marketing efficiency method was used. Pomegranate producers face challenges including high transportation costs, storage issues, price volatility, and market information deficits. Production problems include pest infestations, high input costs, and labor shortages. Intermediaries grapple with quality variation, labor scarcity, and price fluctuations. Strategic interventions in infrastructure, logistics, and market intelligence are crucial for sustainable profitability.

Keywords: Marketing channel; cost; margin; efficiency; price spread; constraints.

1. INTRODUCTION

The agricultural industry in India holds significant importance, providing livelihoods for a large portion of the population, with approximately 60% of Indians relying on agriculture for their income. Despite this, the sector's contribution to GDP has gradually declined over the years, currently standing at 17%. This decline is attributed not only to changes in the agricultural sector but also to the rapid expansion of the industrial and service sectors [1].

India's diverse climate enables year-round cultivation of a wide variety of fruits and vegetables. India holds the 1st position in terms of both areas under cultivation and total pomegranate production [2]. Fruit farming has gained prominence due to its profitability and contribution to overall health and well-being. The adaptability of fruit crops like pomegranates to different climatic conditions has made them a lucrative option for farmers, especially in regions with arid and semi-arid climates [3].

Pomegranate cultivation has seen significant growth in India, particularly in states like Maharashtra, Gujarat, Karnataka, and Andhra Pradesh. Maharashtra leads in pomegranate production, contributing nearly 55% of the country's total output. The fruit's resistance to harsh environmental conditions and its economic viability have made it a preferred choice for farmers in the region. In the 2020–21 agricultural year, pomegranate farming in India reached significant proportions, covering approximately 2.88 lakh hectares of land and yielding 32.70 lakh tonnes of fruit nationwide [4,5].

Maharashtra emerged as a leading pomegranate-growing state, contributing substantially to India's output with 1.71 lakh hectares under cultivation and a yield of 17.95

lakh tonnes. Despite slightly lower productivity than the national average at 10.50 tonnes per hectare, Maharashtra's sheer volume underscores its pivotal role in India's pomegranate industry [6].

Pomegranates aren't just economically valuable; they're also prized for their medicinal properties. Used in traditional medicine for ages, modern research highlights their potential in fighting diseases like heart disease and cancer. Rich in essential nutrients, they're a healthy addition to any diet [7]. Moreover, pomegranates are versatile industrially, with their extracts extending shelf life and providing health benefits. Pomegranate seed oil is gaining popularity in skincare due to its protective and nourishing properties [8].

Efficient marketing plays a crucial role in the success of pomegranate cultivation. However, challenges such as the dominance of commission agents and middlemen in the marketing process, supply chain inefficiencies, and high consumer costs hinder the sector's growth. To address these challenges, collaboration among stakeholders, including producers, government agencies, private industries, and research institutions, is essential. By fostering collaboration, sharing best practices, and driving collective action, stakeholders can overcome common challenges and improve market efficiency and competitiveness.

The study was conducted with the following objectives:

1. To identify different marketing channels for Pomegranate
2. To estimate the price spread and marketing efficiency of identified channels
3. To identify Problems faced by different stakeholders

2. METHODOLOGY

2.1 Research Methodology

A total of 90 stakeholders were sampled from the Pune division for the study. This included 60 farmers from Pune, Satara, Sangli, Solapur, and Kolhapur districts, which are major pomegranate-producing areas, selling their produce at the Pune APMC market. Additionally, 30 intermediaries, such as 8 wholesalers-cum-commission agents, 8 retailers, 6 pre-harvest contractors, 4 traders and 4 private companies were selected from the Pune APMC market to gather information on marketing costs and margins for different pomegranate marketing channels. Primary data was collected through physical visits surveys and interviews with the sampled respondents.

2.2 Analytical Tools

Objective 2: To estimate the price spread and marketing efficiency of identified marketing channels.

Marketing Cost: This encompasses the overall expenses accrued by farmers and intermediaries involved in the marketing channel. It is estimated by considering various factors and using the following formula:

$$C = CF + CM_1 + CM_2 + CM_3 + \dots + CM_n$$

Where,

C = Total cost of marketing
 CF = Cost borne by the producer from the time produce leaves the farm till it is sold,
 CM₁,..., CM_n = Cost incurred by different market intermediaries

Marketing Margin:

$$A_{mi} = P_s - (P_p + M_{ci})$$

Where,

A_{mi} = Absolute marketing margin of the ith market intermediaries
 P_s = Selling price of the ith market intermediaries
 P_p = Purchase price of the ith market intermediaries
 M_{ci} = Marketing cost incurred by the ith market intermediaries

Price Spread:

$$\text{Price spread (P}_{sd}) = P_c - P_f$$

Where,

P_{sd} = Price Spread
 P_c = Price paid by the consumer
 P_f = Price received by the farmers for equivalent quantity of the produce

Marketing Efficiency: The evaluation of marketing efficiency in various channels in the study area was conducted using Acharya's approach [9].

$$\text{Marketing Efficiency} = \frac{P_f}{M_c + M_m}$$

were,

P_f = Net price received by the farmer
 M_c = Total marketing cost
 M_m = Total marketing margin

Objective 3. To identify problems faced by different stakeholders

The Garrett Ranking Technique (1969) was used for to find out the most significant factor influence to the respondent [10]

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the ith variable by jth respondents
 N_j = Number of variables ranked by jth respondents

3. RESULTS AND DISCUSSION

3.1 Marketing Channels

To study the marketing aspects of pomegranate, need to study various factors related to marketing channels and costs involved in it. Marketing channels involve the pathways through which pomegranates move from producers to consumers, encompassing processes such as harvesting, sorting, grading, packaging, transportation, and selling. Understanding these channels helps identify the intermediaries involved, such as Pre-harvest contractor, commission agent, wholesalers,

retailers and their roles in the supply chain. Additionally, analyzing marketing costs involves assessing expenses incurred at each stage of the marketing process [11]. The results of the

study indicated that the sample respondents preferred to sell their produces mainly through four major channels represented in Table 1 [12].

Table 1. Marketing channels of pomegranate

Channel No.	Marketing channels
Channel-1	Producer → Pre-harvest contractor → Wholesaler-cum-commission agent→ Retailer → Consumer
Channel-2	Producer → Wholesaler-cum-commission agent→ retailer → consumer
Channel-3	Producer → Collection Center (CC) → Distribution Center (DC) → Consumer
Channel-4	Producer → Village trader → Wholesaler-cum-commission agent → Retailer → Consumer

3.2 Price Spread, Marketing Margin, Marketing Costs and Efficiency of Marketing Channels

Table 2. Marketing cost and marketing margin of pomegranate marketing channels- 1, 2 & 4 (₹/qt)

Sr. No.	Particulars	Channel-1	Channel-2	Channel-4
	Net price received by producer	10885	9768.62	10023.53
	Cost incurred by producer			
1	Loading/ Unloading Cost	-	83	-
2	Grading Sorting and Packaging Cost	-	73.50	74.05
3	Packaging material	-	59.50	25
4	Transportation cost	-	357.50	-
5	Weighing Charge	-	21.80	-
6	Wastage loss	-	158.40	102.35
7	Miscellaneous cost	-	37.68	10.07
	Total cost (1 to 7)	-	791.38	211.47
	Pre-harvest contractor's price	10885	-	-
	Cost incurred by Pre-harvest contractor			
1	Harvesting Cost	140	-	-
2	Grading Sorting and Packaging cost	76.67	-	-
3	Packaging material	18.33	-	-
4	Loading/ Unloading Cost	52.50	-	-
5	Weighing Charge	24.17	-	-
6	Transportation cost	366.67	-	-
7	Wastage loss	217.70	-	-
8	Miscellaneous cost	44.80	-	-
	Total cost (1 to 8)	940.82	-	-
	Marketing margin	761.95	-	-
	Village trader's price	-	-	10235
	Cost incurred by village traders			
1	Loading/ Unloading Cost	-	-	65.75
2	Weighing Charge	-	-	14.45
3	Transportation cost	-	-	375.96
4	Wastage loss	-	-	204.70
5	Miscellaneous cost	-	-	33.04
	Total cost (1 to 5)	-	-	693.90
	Wholesaler-cum-commission agent's price	12587.79	10560	11645.35
	Cost incurred by wholesaler-cum-commission agent			
1	Labour cost	86.87	86.87	86.87
2	Wastage loss	251.75	211.20	291.13

Sr. No.	Particulars	Channel-1	Channel-2	Channel-4
3	Miscellaneous cost	33.86	29.80	37.80
	Total cost (1 to 3)	372.48	327.87	415.80
	Wholesaler-cum-commission agents' margin	1258.77	1267.20	1397.44
	Selling price	14219.06	12155.08	13458.60
Cost incurred by Retailer				
	Purchase price	14219.06	12155.08	13458.6
1	Transportation cost	233.75	233.75	233.75
2	Loading/ Unloading Cost	73.12	73.12	73.12
3	Market Fee	142.19	121.55	134.59
4	Wastage loss	426.57	386.10	471.05
5	Miscellaneous cost	43.78	40.73	73.00
	Total cost (1 to 5)	919.41	855.24	985.50
	Retailers' margin	2132.86	1930.50	2018.79
	Selling price	17271.33	14940.83	16462.90
	Marketing cost	2232.71	1974.51	2306.68
	Marketing margin	4153.59	3197.70	4132.68
	Price spread (MC+MM)	6386.30	5172.21	6439.37

In marketing channel-1, as per the responses received from the respondents the producer receives ₹10885 per quintal, constituting 63.12% of the consumer price, with no production costs. The pre-harvest contractor adds ₹940.82 for various expenses, selling at ₹12587.79. The wholesaler-cum-commission agent's total cost is ₹372.48, with a margin of ₹1258.77, selling at ₹14219.06. The retailer's costs amount to ₹919.41, with a margin of ₹2132.86, selling at ₹17271.33. The marketing cost sums up to ₹2232.71, and the marketing margin totals ₹4153.59, making the price spread ₹6386.30.

In marketing channel-2, the producer receives ₹9768.62 per quintal (65.38% of consumer price) after bearing ₹791.38 in costs. The wholesaler buys at ₹10560, incurring ₹327.87 in expenses and adding a margin of ₹1267.2, selling at ₹12155.08. The retailer's costs amount to ₹855.25, with a margin of ₹1930.5, selling at ₹14940.83. Total price spread is ₹5172.21, with marketing cost at ₹1974.51 and margin at ₹3197.7.

In marketing channel-4, the producer's costs include grading, sorting, and packaging, totaling ₹211.47 per quintal. The village trader adds ₹693.90 for loading, transportation, and other expenses, selling at ₹11645.35. The wholesaler-cum-commission agent incurs ₹415.80, with a margin of ₹1397.44, selling at ₹13458.60. The retailer's costs amount to ₹985.50, with a margin of ₹2018.79, selling at ₹16462.90. Total price spread is ₹6439.37, with a marketing cost of ₹2306.68 and margin of ₹4132.68, reflecting

costs and profits across each stage of Channel-4 in pomegranate marketing.

The total costs incurred at each stage of marketing channel-3 are mentioned in Table 3. In marketing channel-3, the producer incurs costs totaling ₹399.21 per quintal for packing, transportation, and other expenses. The net price received by the producer is ₹12800.7, with a gross price of ₹13200. The pomegranates are then bought by the company's Collection Center (CC), incurring ₹1384.85 for labor, packaging, and transportation, selling at ₹14584.85. Next, the pomegranates move to the company's Distribution Center (DC) at ₹14584.85 per quintal, with additional costs of ₹843.21 for labor, transportation, and delivery. The DC adds a margin of ₹2860.46, selling at ₹18429.78. The total marketing cost from producer to consumer is ₹2627.12, with a margin of ₹2860.46. The total price spread amounts to ₹5487.58.

Table 4 Presented the comparative analysis of pomegranate marketing channels, reveals Channel-3 as the most efficient, with a marketing efficiency of 2.31 and a producer's share in consumer rupee of 69.78%, offering optimal returns. Channel-2 follows, balancing costs and margins well, providing a reasonable 65.38% share to producers. Channel-1, despite high margins, is less efficient at 1.70, with a producer's share of 63.02%. Channel-4 is the least efficient, offering only 60.89% of consumer's rupee to producers. This underscores the importance of minimizing costs and maximizing producer returns, with Channel-3 emerging as the best choice.

Table 3. Marketing cost and marketing margin of pomegranate marketing channel-3 (₹/q)

Sr. No.	Particulars	₹ / quintal
	Net price received	12800.79
Cost incurred by Producer		
1	Packing, Grading Sorting Cost	76.80
2	Loading/ Unloading Cost	52.50
3	Transportation cost	130.90
4	Wastage loss	120.00
5	Miscellaneous	19.01
	Total cost (1 to 5)	399.21
	Farmer's selling price to Company CC	13200
Cost incurred by Company CC		
1	Labour Cost	191.25
2	packaging Material	525.00
3	Transportation cost	380.00
4	Wastage loss	198.00
5	Miscellaneous	90.60
	Total cost (1 to 5)	1384.85
	Company CC selling price to Company DC	14584.85
Cost incurred by Company DC		
1	Labour Cost	63.75
2	Transportation cost	175.00
3	Wastage loss	29.31
4	Delivery charge	535.00
5	Miscellaneous	40.15
	Total Cost (1 to 5)	843.21
	Company's margin	2860.46
	Selling price	18429.78
	Total Marketing Cost	2627.12
	Total Marketing margin	2860.46
	Price spread (MC+MM)	5487.58

Table 4. Price spread, producer's share in consumer's rupee and marketing efficiency of identified marketing channels

Marketing channels	Price spread (₹)	Marketing cost (₹)	marketing margin (₹)	Producer's share in consumer rupee (%)	marketing efficiency
Channel-1	6386.30	2232.74	4153.59	63.02	1.70
Channel-2	5172.21	1974.51	3197.7	65.38	1.89
Channel-3	5487.58	2627.12	2860.46	69.78	2.31
Channel-4	6439.37	2306.68	4132.68	60.89	1.56

3.3 Problems Faced by Different Stakeholders

Table 5. Problems faced by producers in production of pomegranate

Problems	Mean Score	Rank
Pest and Disease infestation	74.5	I
High cost of inputs	72.3	II
Non availability of healthy plant material	65.4	III
Non availability of labour on time	54.8	IV
Unfavorable weather conditions	45.1	V
Lack of credit facilities	40.7	VI
Non availability of adequate water	32.6	VII
Lack of technical guidance	28.3	VIII

Pomegranate producers face critical challenges highlighted in Table 5. such as Pest and disease infestation tops, with diseases like oily spot and bacterial blight causing significant losses. High input costs rank second, burdening small-scale farmers. Non-availability of healthy plant material ranks third, impacting orchard productivity. Labour shortages come fourth, affecting crop management. Unfavorable weather conditions rank fifth, affecting yields. Lack of finance is the sixth, hindering investment. Water scarcity ranks seventh, critical in arid divisions. Lastly, the lack of technical guidance ranks eighth, affecting cultivation methods.

Table 6. shows that Pomegranate growers face significant marketing challenges, with high transportation costs as the most critical issue, followed by market price fluctuations and inadequate storage facilities. The absence of timely market information and low prices also pose considerable hurdles, impacting profitability and investment. Damage during transport and payment insecurity are additional concerns, albeit lesser ones.

Pre-harvest contractors in pomegranate marketing face several challenges illustrated in Table 7. Price fluctuation and labour unavailability tops the list. Lack of adequate storage facilities increase concerns, leading to potential spoilage and reduced shelf life. Loss during handling and transportation further escalates expenses. Moreover, High transportation costs add financial strain, while inadequate market information limits strategic

decision-making. Addressing these challenges demands a multi-faceted approach, including improved infrastructure, streamlined logistics, and enhanced market intelligence to ensure sustainable and profitable pomegranate marketing for pre-harvest contractors.

Wholesalers-cum-commission agents operating in the pomegranate marketing sector encounter several significant challenges listed in Table 8. Topping the list is quality variation, indicating inconsistencies in product quality. This is due to farmers generally selling their good quality produce to the pre-harvest contractors and private companies, while the remaining inferior quality produce is sold to the wholesaler-cum-commission agent in the APMC market. Price fluctuation follows closely, high labour costs pose a notable concern, impacting profit margins. Losses during handling underscore operational inefficiencies and potential wastage, adding to financial burdens. Additionally, the lack of sufficient storage facilities indicates logistical limitations, potentially leading to product spoilage and reduced market competitiveness.

Table 9. highlighted that retailers engaged in pomegranate marketing face a range of challenges that significantly impact their business operations and profitability. Main problem is price fluctuation, indicating the volatility in market prices. High transportation costs rank next, representing a considerable portion of operational expenses, which can potentially affect profit margins and overall cost-efficiency.

Table 6. Problems faced by producers in marketing of pomegranate

Problems	Mean Score	Ranking
High cost of transportation	81.6	I
Fluctuation in market price	75.3	II
Lack of storage facility	68.9	III
Lack of market information	53.2	IV
Low price	48.7	V
Damage of fruits during transport	30.2	VI
Payment insecurity	28.9	VII

Table 7. Problems faced by Pre-harvest contractor in pomegranate marketing

Problems	Mean score	Rank
Price fluctuation	70.33	I
Unavailability of labour on time	64.28	II
Lack of storage facility	56.77	III
Loss during handling and transportation	50.00	IV
High transportation cost	45.33	V
Quality variation	30.00	VI
Lack of market information	27.83	VII

Table 8. Problems faced by wholesalers-cum-commission agent in pomegranate marketing

Problems	Mean score	Rank
Quality Variation	58.50	I
Price fluctuation	56.50	II
High labour cost	48.77	III
Loss during handling	45.33	IV
Lack of storage facility	39.65	V

Table 9. Problems faced by retailers in pomegranate marketing

Problems	Mean score	Rank
Price fluctuation	63.75	I
High transportation cost	60.13	II
Quality variation	54.38	III
Loss during handling and transportation	53.75	IV

Table 10. Problems faced by private company in pomegranate marketing

Problems	Mean score	Rank
Competition from other private player	66.70	I
High Packaging material cost	61.10	II
High transportation cost	55.33	III
Price fluctuation	44.77	IV
High Labour cost	43.50	V
Quality variation	40.25	VI

Quality variation, highlighting inconsistencies in the products they receive, which can lead to customer dissatisfaction.

unpredictable. Additionally, high labour costs and quality variation compound operational challenges.

Table 10 illustrates Private companies involved in pomegranate marketing encounter challenges that impact their operations and profitability. These players are generally operational in metro cities so, there is a competition from other private players, signifying a saturated market where companies compete for market share and consumer attention, compelling firms to innovate and differentiate themselves to stay competitive. High packaging material costs and high transportation costs represent a substantial portion of operational expenditures, impacting overall cost-efficiency and competitiveness. Price fluctuation poses further challenges, making revenue forecasting and pricing strategies

Village traders engaged in pomegranate marketing confront several notable challenges presented in Table 11. Foremost among these is quality variation, highlighting inconsistencies in the products they handle. High transportation costs rank next, indicating significant expenses incurred in moving goods from the APMC market to the selling point, impacting profit margins. Price fluctuation follows, indicating volatility in market prices, making it challenging for traders to establish stable pricing strategies. Another problem are Losses during handling and transportation, lack of market information hindering informed decision-making and potentially leading to missed opportunities.

Table 11. Problems faced by village trader in pomegranate marketing

Problems	Mean score	Rank
Quality variation	65.55	I
High transportation cost	59.80	II
Price fluctuation	52.33	III
Loss during handling and transportation	45.50	IV
Lack of market information	40.71	V

4. CONCLUSION

In this study four pomegranate marketing channels, each with distinct players, costs, and efficiencies were found. Channel-1 (Producer → Pre-harvest Contractor → Wholesaler → Retailer → Consumer) minimizes producer costs, with producers earning 63.12% of the consumer price. Channel-2 (Producer → Wholesaler → Retailer → Consumer) sees producers taking on more post-harvest responsibilities, resulting in a 65.38% share of consumer's price. Channel-3 involves a private company with Collection and Distribution Centers, giving producers 69.78% of the consumer price, showing the highest efficiency with a ratio of 2.31. Channel-4 (Producer → Village Trader → Wholesaler → Retailer → Consumer) has producers retaining 60.89% of the consumer's price and is the least efficient with a ratio of 1.56.

Pomegranate producers face challenges in the marketing of pomegranate including high transportation costs, storage issues, price volatility, and market information deficits. Production problems include pest infestations, high input costs, and labor shortages. Intermediaries grapple with quality variation, labor scarcity, lack of storage facility and price fluctuations. Strategic interventions in infrastructure, logistics, and market intelligence are crucial for sustainable profitability. Addressing these issues through improved infrastructure, logistics, market intelligence, and cost management is crucial for enhancing sustainability and profitability in pomegranate marketing.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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