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Comparative Analysis of Marketing Channels and Efficiency in Tomato Agribusiness: A Case Study from Ballia District, Uttar Pradesh

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Abstract
This study examines the marketing channels and their efficiency in the tomato agribusiness sector within Ballia district, Uttar Pradesh. Tomato (Solanum lycopersicum) is a high-value, widely cultivated vegetable crop with significant economic importance due to its nutritional value and market demand. The research employed purposive-cum-random sampling to select 100 tomato farmers across different landholding categories, along with wholesalers, distributors, and retailers, to analyze the marketing costs, margins, price spread, producer's share in consumer rupee, and overall marketing efficiency. Three marketing channels were analyzed: Channel 1 (Producer → Consumer), Channel 2 (Producer → Wholesaler → Retailer → Consumer), and Channel 3 (Producer → Commission Agent → Wholesaler → Retailer → Consumer). The producer sale price remained constant at ₹1900 per quintal across all channels, while marketing costs borne by producers were ₹630 per quintal. The final consumer prices varied, with ₹3000, ₹3200, and ₹3400 per quintal for Channels 1, 2, and 3, respectively. The producer's share in consumer rupee decreased progressively from 63.33% in Channel 1 to 59.38% in Channel 2 and 55.88% in Channel 3. Correspondingly, marketing efficiency declined from 2.77 to 1.85 and 1.61 across the channels, indicating increased intermediary costs and reduced benefits for producers in longer chains. The study highlights the need for streamlined marketing channels, reduced intermediaries, and improved infrastructure to enhance producer profitability and supply chain efficiency. Policy interventions such as promoting Farmer Producer Organizations and direct marketing can significantly improve farmers' income and market access in the tomato agribusiness sector.

Keywords: Tomato marketing, Marketing channels, Price spread, Marketing efficiency, Producer's share

Introduction

Tomato (Solanum lycopersicum), a member of the Solanaceae family, was considered one of the most important and widely grown vegetable crops across the world. Believed to have originated in western South America, it had spread globally due to its adaptability to diverse agro-climatic conditions and its significant demand in domestic and international markets. In India, tomato cultivation had gained popularity among farmers owing to its short duration, high yield potential, and profitability. Tomatoes were known for their rich nutritional composition, including essential vitamins such as A and C, minerals like potassium and iron, and the powerful antioxidant lycopene, which contributed to various health benefits. The crop was used extensively in both fresh and processed forms, making it a staple in culinary applications. Tomato cultivation required well-drained, fertile soils and moderate climatic conditions, and advances in agricultural practices and improved hybrid varieties had further enhanced its productivity and quality. Economically, tomato farming played a crucial role in improving farmers' incomes and supported numerous stakeholders in the agricultural value chain, including traders, processors, and retailers. However, despite its economic significance, the marketing of tomato often remained a challenge due to its perishable nature, price fluctuations, lack of storage facilities, and the presence of multiple intermediaries. These issues often resulted in reduced profit margins for producers. Therefore, understanding the marketing systems, cost components, and efficiency of various marketing channels became essential to ensure fair returns to farmers and to strengthen the overall value chain of tomato cultivation and trade.

Research Methodology

The present study employed a purposive-cum-random sampling technique to ensure both relevance and representativeness in the selection process. Ballia district in Uttar Pradesh was purposively selected to minimize logistical challenges and time constraints. Within the district, Bansdih block was chosen based on the predominance of tomato cultivation among farmers. A complete list of villages in the selected block was compiled, from which five percent of the villages with a significant number of tomato growers were randomly selected. From these villages, a comprehensive list of tomato farmers was prepared and stratified into five categories based on landholding size: Marginal (less than 1 hectare), Small (1-2 hectares), Semi-medium (2-4 hectares), Medium (4-10 hectares), and Large (more than 10 hectares). A total of 100 tomato farmers were selected using proportionate random sampling across these categories. Furthermore, to assess marketing dynamics, 5 wholesalers, 5 distributors, and 10 retailers were selected to analyze parameters such as marketing cost, marketing margin, price spread, producer's share in consumer rupee, and marketing efficiency. Primary data were collected through direct personal interviews using a well-structured and pre-tested schedule, while secondary data were obtained from published sources including books, journals, government reports, and official records from district and block offices. The data collected were subjected to appropriate statistical analysis for interpretation. The study was based on data pertaining to the agricultural years 2022 to 2024.

Analytical Tools

1. **Marketing Cost:** C = Cf+ Cm1+ Cm2+ Cm3+ ..... + Cmn
2. **Market Margin:** AMI=Pri-(Ppi+Cmi)
3. **Price Spread:** Marketing Cost + Market Margin
4. **Marketing Efficiency:** Price received by producer Marketing Cost + Marketing Margin
5. **Producer's Share in Consumer Rupee:** Price received by the farmer x100 Retail price paid by the consumer

Results and Discussion

Table 1: Price distribution in Channel-1.

S. No.	Particulars	Amount (INR/Quintal)
1.	Amount Received by Producer	1900
	Costs Incurred by the Producer	
i.	Cost of Packaging	50
ii.	Labour Charges	120
iii.	Transportation and Handling Charges	140
iv.	Storage and Cooling Expenses	100
v.	Cost for Maintaining Product Quality	70
vi.	Other Miscellaneous Expenses	150
	Total Cost Incurred by Producer (i-vi)	**630**
	Additional Income to Producer	450
3.	Final Consumer Price	3000
A.	Aggregate Marketing Cost	630
B.	Total Marketing Margin	450
C.	Marketing Efficiency Ratio	2.77
D.	Difference Between Producer and Consumer Price	1100
E.	Producer's Percentage Share in Consumer Payment	63.33%

Table 1: The table presented a detailed breakdown of the marketing structure for tomato under the producer-to-consumer model. The producer received ₹1900 per quintal, while incurring various expenses such as packaging (₹50), labour (₹120), transportation (₹140), storage (₹100), quality maintenance (₹70), and miscellaneous charges (₹150), amounting to a total marketing cost of ₹630 per quintal. An additional margin of ₹450 was earned by the producer. The consumer paid ₹3000 per quintal, leading to a price spread of ₹1100 between producer and consumer prices. The marketing efficiency was calculated at 2.77, indicating a favorable cost-benefit ratio for the producer. The producer's share in the consumer's expenditure stood at 63.33%, reflecting a substantial return to the farmer. This analysis showed that direct marketing without intermediaries allowed producers to retain a significant portion of the final price, thereby enhancing profitability and reducing distribution inefficiencies. Overall, the channel proved economically beneficial for tomato growers in the study area.

Table 2: Price distribution in Channel-2.

S. No.	Particulars	Value (INR/Quintal)
1	**Producer Sale Price**	1900
	Expenses Borne by Producer:	
i	Packaging Cost	50
ii	Labour Cost	120
iii	Transportation/Logistics Cost	140
iv	Storage and Refrigeration Cost	100
v	Quality Maintenance Cost	70
vi	Miscellaneous Charges	150
	Total Marketing Cost (i-vi)	630
2	Producer Extra Margin	400
3	Sale Price to Consumer	3200
A	Total Marketing Cost	630
B	Total Market Margin (3 - 1 - A)	670
C	Marketing Efficiency (1 / (A + B))	1.85
D	Price Spread (3 - 1)	1300
E	Producer Share in Consumer Rupee (%)	59.38%

Marketing Channel 2

Structure: Producer → Wholesaler → Retailer → Consumer

Table 2: Marketing Channel 2 represents a traditional and commonly used supply chain, where agricultural produce moves from the producer to the wholesaler, then to the retailer, and finally reaches the consumer. In this structure, the producer sells the product at ₹1900 per quintal. To bring the product to market, the producer incurs several costs including packaging (₹50), labour (₹120), transportation (₹140), storage and refrigeration (₹100), quality maintenance (₹70), and miscellaneous charges (₹150), summing up to a total marketing cost of ₹630 per quintal. In addition to covering these expenses, the producer also factors in an extra margin of ₹400, possibly representing profit, risk coverage, or incentive.

The final sale price to the consumer is ₹3200 per quintal. From this, the total market margin—earned by the intermediaries (wholesaler and retailer)—is calculated as ₹670 (i.e., the difference between the consumer price and the sum of the producer's sale price and marketing costs). This margin reflects the earnings of intermediaries for their roles in handling, distributing, and selling the product.

The marketing efficiency of this channel stands at 1.85, which is calculated by dividing the producer's sale price by the combined total of marketing cost and market margin. A marketing efficiency value above 1 indicates a reasonably efficient channel; however, the goal is to maximize this ratio by minimizing costs and intermediary margins. The price spread, defined as the difference between the consumer price and the producer's sale price, is ₹1300. This amount represents the value lost by the producer in the chain, highlighting the extent to which the consumer's payment is distributed among intermediaries and costs.

The producer's share in the consumer rupee is 59.38%, meaning that for every ₹1 spent by the consumer, the producer receives about 59 paise. While this is better than in longer and more fragmented channels, it still indicates that over 40% of the consumer's payment does not go to the producer, but rather to cover marketing expenses and intermediary profits.

In summary, Marketing Channel 2 offers a moderately efficient supply chain, with limited intermediaries and reasonable cost structures. However, there is still room for improvement. Reducing marketing costs through shared infrastructure, cooperative marketing, and digital platforms could improve both the producer's share and the overall efficiency of the channel. Transitioning toward direct marketing or establishing Farmer Producer Organizations (FPOs) could further enhance the producer's income by cutting down intermediary margins and improving negotiation power.

Table 3: Price distribution in Channel-3.

S. No.	Particulars	Value (INR/Quintal)
1	**Producer Sale Price**	1900
	Expenses Borne by Producer:	
i	Packaging Cost	50
ii	Labour Cost	120
iii	Transportation/Logistics Cost	140
iv	Storage and Refrigeration Cost	100
v	Quality Maintenance Cost	70
vi	Miscellaneous Charges	150
	Total Marketing Cost (i-vi)	630
2	Producer Extra Margin	350
3	Sale Price to Consumer	3400
A	Total Marketing Cost	630
B	Total Market Margin (3 - 1 - A)	870
C	Marketing Efficiency (1 / (A + B))	1.61
D	Price Spread (3 - 1)	1500
E	Producer Share in Consumer Rupee (%)	55.88%

Structure: Producer → Commission Agent → Wholesaler → Retailer → Consumer

Marketing Channel 3 is a longer and more layered supply chain that involves an additional intermediary — the commission agent — between the producer and the wholesaler. In this structure, the agricultural produce passes through four levels before reaching the final consumer: starting with the producer, then the commission agent, followed by the wholesaler and retailer. The producer sells the commodity at ₹1900 per quintal. To prepare the product for market, the producer bears various costs including packaging (₹50), labour (₹120), transportation and logistics (₹140), storage and refrigeration (₹100), quality maintenance (₹70), and miscellaneous charges (₹150). These expenses add up to a total marketing cost of ₹630 per quintal, which reflects the producer's efforts in making the produce market-ready.

In this channel, the producer's extra margin is ₹350 — slightly lower than in Channel 2 — possibly due to reduced bargaining power or higher commission cuts by agents. The final price paid by the consumer is ₹3400 per quintal. From this, the total market margin, calculated as the difference between the consumer price and the sum of producer's sale price and producer's marketing costs, stands at ₹870. This is the combined margin distributed among the commission agent, wholesaler, and retailer, indicating higher intermediary involvement and profit extraction compared to shorter channels.

The marketing efficiency in Channel 3 is calculated at 1.61, which is lower than the efficiency in Channel 2 (1.85). This decline reflects the negative impact of additional intermediaries, where more of the consumer's rupee is absorbed in commissions and operational margins, rather than reaching the producer. The price spread in this channel is ₹1500 (i.e., the difference between what the consumer pays and what the producer receives), indicating a broader gap between farm gate and retail prices. This widening price spread suggests lower efficiency and greater scope for value leakage in the supply chain.

The producer's share in the consumer rupee is only 55.88%, meaning that for every ₹1 spent by the consumer, the producer receives just under 56 paise. This is a drop from 59.38% in Channel 2, showing that the presence of a commission agent further dilutes the producer's income. It underscores how extended marketing chains can erode the producer's share, even when the consumer pays a higher price.

In conclusion, Marketing Channel 3, though functional, demonstrates lower efficiency and reduced producer benefit due to the involvement of more intermediaries. The increased market margin and reduced producer share suggest that this channel is less favorable for farmers. To improve outcomes, efforts should be made to reduce reliance on commission agents and streamline the supply chain through direct marketing, contract farming, or the formation of Farmer Producer Organizations (FPOs). These approaches can help farmers retain a larger portion of the consumer price while minimizing the exploitative nature of traditional, intermediary-heavy marketing systems.

Table 4: Comparative Summary of All Three Marketing Channels

Particulars	Channel 1(Producer → Consumer)	Channel 2(Producer → Wholesaler → Retailer → Consumer)	Channel 3(Producer → Commission Agent → Wholesaler → Retailer → Consumer)
Producer Sale Price (₹/Quintal)	1900	1900	1900
Total Marketing Cost (₹/Quintal)	630	630	630
Producer Extra Margin (₹/Quintal)	450	400	350
Sale Price to Consumer	3000	3200	3400

(₹/Quintal)			
Total Market Margin (₹/Quintal)	450	670	870
Marketing Efficiency	2.77	1.85	1.61
Price Spread (₹/Quintal)	1100	1300	1500
Producer Share in Consumer Rupee (%)	63.33%	59.38%	55.88%

Marketing Channel 1 represents the direct sale from the producer to the consumer, where the producer sells at ₹1900 per quintal and the consumer pays ₹3000. With no intermediaries, the producer incurs marketing costs totaling ₹630, earns an extra margin of ₹450, and retains 63.33% of the consumer's rupee, reflecting the highest marketing efficiency (2.77) among the three channels. This channel maximizes producer benefit but may not always be feasible due to logistical or market access challenges.

Marketing Channel 2 involves two intermediaries—the wholesaler and retailer—between the producer and the consumer. Here, although the producer sale price remains ₹1900 and marketing costs borne by the producer stay at ₹630, the final consumer price rises to ₹3200. The presence of intermediaries increases the total market margin to ₹670, reducing the producer's extra margin to ₹400. Consequently, the producer's share in the consumer rupee drops to 59.38%, and marketing efficiency falls to 1.85. This channel represents a balance between market reach and producer profitability but shows some loss of producer income due to intermediary margins.

Marketing Channel 3 introduces an additional commission agent, extending the chain to four intermediaries. The producer's sale price and marketing costs remain the same, but the consumer price increases further to ₹3400. The total market margin expands to ₹870, while the producer's extra margin decreases to ₹350. This results in the lowest producer share of 55.88% and the lowest marketing efficiency at 1.61. The increased price spread of ₹1500 indicates greater costs and margins accumulated along the chain, which reduces the share of the consumer's payment that reaches the producer.

In summary, as the number of intermediaries in the marketing channel increases from one to three, the producer's share in consumer rupees decreases, the price spread widens, and marketing efficiency declines. While longer channels may improve market access and provide services such as aggregation and distribution, they often reduce the actual income producers receive. Efforts to streamline the supply chain by reducing intermediaries, improving infrastructure, or adopting direct marketing can enhance producer profitability and supply chain efficiency.

Conclusion

The analysis of the marketing cost structure and price distribution of tomatoes revealed important insights into the involvement and margins of intermediaries within the supply chain. It was found that tomato producers received INR 1900 per quintal from local wholesalers, who incurred marketing expenses totalling INR 120, covering packaging, labor, transportation, storage, and quality grading. Despite these costs, wholesalers earned a modest margin of INR 80. Retailers then purchased the tomatoes from wholesalers at INR 2100, incurring further marketing costs of INR 80 for packaging, labor, logistics, storage, and quality maintenance. Retailers secured a significantly higher margin of INR 820, reflecting their substantial role in value addition and price increase along the marketing channel. Ultimately, consumers paid INR 3000 per quintal for tomatoes, with total marketing costs amounting to INR 200 and a combined market margin of INR 900. The price spread between producer and consumer was INR 1100, indicating a notable difference due to marketing activities. The producer's share accounted for about 63.33% of the consumer price, showing that producers received the majority of the final price while intermediaries claimed a significant portion. These findings highlight the importance of improving marketing efficiency to reduce costs and enhance the profitability of tomato producers, while also ensuring fair margins for intermediaries and reasonable prices for consumers.

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