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Marketing channel structure and farmer profitability in vegetable marketing: Evidence from Raipur city, Chhattisgarh

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Abstract

A large part of what Indian consumers pay for vegetables never reaches the farmer who grew them, and evidence on how this gap is distributed within secondary cities of central India remains limited. The study examines (i) the marketing channels through which major vegetables move from farm to consumer in Raipur city, Chhattisgarh (ii) the marketing cost, margin, price spread, and efficiency associated with each channel, based on primary data collected from 50 vegetable-growing farmers of the peri-urban belt surrounding Raipur city during the 2025-26 Rabi season using a structured, pre-tested interview schedule. The data were analysed using percentage analysis and the standard price spread, marketing margin, farmer's share and Shepherd's marketing efficiency framework, applied to tomato as the reference commodity. Three channels were identified: Channel I (Farmer → Consumer), Channel II (Farmer → Mandi → Retailer → Consumer), and Channel III (Farmer → Wholesaler → Mandi → Retailer → Consumer). Channel II was used by 72.00 per cent of farmers and Channel III by 56.00 per cent, while only 20.00 per cent sold through Channel I, even though Channel I returned the highest farmer's share in the consumer's rupee (95.38%) and the highest marketing efficiency score (20.67), against 40.46 per cent and 0.68 for Channel II and 37.29 per cent and 0.59 for Channel III. Post-harvest losses averaged 9.10 per cent of production across the sample. The study recommends strengthening farmer producer organisations, improving village-level post-harvest handling infrastructure and piloting direct-marketing arrangements to help farmers access the more remunerative channel. The results provide useful primary evidence on vegetable marketing channel performance in Raipur city, Chhattisgarh, a region under-represented in the marketing efficiency literature.

Keywords: Vegetable marketing channels, price spread, marketing efficiency, farmer's share in consumer's rupee, post-harvest losses, Raipur, Chhattisgarh

1. Introduction

Vegetables are among the largest single contributors to farm income and rural employment in India. India ranks second in the world in vegetable production after China, with output of approximately 191.77 million tonnes a year, close to 14 per cent of global production (Patel, 2021). Very little of this scale advantage, however, is reflected in what an individual farmer earns from a kilogram of tomato or brinjal sold. Between the field and the urban kitchen sits a chain of village merchants, wholesalers, commission agents and retailers and each link in that chain adds a cost and retains a margin, so that the price an urban consumer eventually pays often bears little relationship to the price the grower received.

How this gap gets distributed depends on the structure of the marketing channel used. A channel with fewer intermediary stages returns a larger share of the final price to the farmer and moves perishable produce to market faster; a channel with more stages does the opposite. Gandhi and Namboodiri (2004) ^[3], studying the Ahmedabad and Chennai wholesale

markets, found that farmers retained only 41.1 to 69.3 per cent of the consumer's rupee through conventional intermediary chains, rising to 85–95.4 per cent wherever a direct marketing arrangement existed instead. Comparable evidence has emerged from Andhra Pradesh (Reddy *et al.*, 2010) ^[7] and from Ethiopia (Aliyi *et al.*, 2021) ^[2], suggesting that this pattern is not specific to one region but a fairly general feature of intermediary-heavy vegetable trade.

In India, policy attention to this problem has grown through initiatives such as the National Agriculture Market (e-NAM) platform and the Central Sector Scheme for the promotion of Farmer Producer Organisations (FPOs), both aimed at shortening the distance between farmers and end markets. Yet secondary cities such as Raipur, which differ from the metropolitan markets that dominate the existing literature in market infrastructure, farmer organisation, and consumer purchasing behaviour, remain almost entirely unstudied in this respect. Shaikh *et al.* (2023) ^[8], examined tomato price spread in the Abhanpur block of Raipur district alone and

found a direct channel between farmer and consumer to be the most efficient, but their analysis was confined to a single crop in a single block, leaving open how the broader set of vegetables grown around Raipur and the full range of channels through which they are sold, compare on cost, margin, and efficiency.

The present study addresses this gap by examining the marketing channels currently used by vegetable farmers in Raipur city and district, and the profitability each channel delivers. The objective of the study was as follows:

1. To examine the present distribution channel and profitability of major vegetables in Raipur city, Chhattisgarh.

2. Materials and Methods

2.1 Study area

The study was conducted in Raipur city, the administrative capital of Chhattisgarh, and the peri-urban belt that supplies it with vegetables, extending roughly 40 to 50 km around the city. Raipur district falls within Agro-climatic Zone VI (the Chhattisgarh Plain Zone) and its dry Rabi season, October to March, is when most vegetable cultivation in this belt takes place. Secondary data compiled for the district place total vegetable cultivation at approximately 23,728 hectares, yielding 335,635 tonnes a year, a district productivity of 14.15 tonnes per hectare. Brinjal occupies the largest cultivated area share (25.47 per cent), ahead of okra (11.31 per cent) and tomato (11.29 per cent), though Raipur district contributes the largest share of the state's tomato area (14.77 per cent) of any single crop, making tomato the district's leading vegetable by state-level importance even though it is not the largest by district area.

2.2 Sampling procedure and justification

A multi-stage stratified random sampling procedure was adopted to select the farmer respondents. The study covered the peri-urban vegetable-growing belt extending approximately 40-50 km around Raipur city. Farmer respondents were selected from major vegetable-producing villages located within this belt, including Kumhari, Dhaneli, Chandkhuri, Amleshwar, Arang, Funda, Raveli, Bhansoj, and other nearby villages supplying vegetables to Raipur city. Villages were identified in consultation with Agricultural Extension Officers and the District Horticulture Department, and a random sample of villages was drawn from this list. Within the selected villages, farm households were stratified by landholding size before being drawn through proportionate random sampling within each stratum. This produced a final sample of 50 farmer's actively growing and marketing vegetables during the 2024-25 reference year. This stratified approach was adopted specifically to ensure that farmers of different landholding sizes, who tend to use different marketing channels, were proportionately represented, rather than to maximise sample size alone. Alongside the farmer sample, wholesalers and retailers trading in Raipur's main vegetable markets were selected purposively, based on trading volume and their position in the channels identified, to supply the cost and price data needed to reconstruct each channel beyond the farm gate.

2.3 Data collection instrument

Data were collected using a structured interview schedule

designed specifically for farmer respondents and pre-tested on a pilot sample of 10 farmers before finalisation. The schedule covered landholding and cropping pattern, the channels used to sell produce, the price received at each stage of sale, the marketing costs incurred and post-harvest losses. A separate, shorter schedule was administered to wholesalers and retailers to obtain their purchase price, selling price, marketing cost, and margin at their respective stage of the channel.

2.4 Data collection and ethical considerations

Farmers, wholesalers, and retailers were interviewed in person by trained enumerators at their farms or business premises, between November 2025 and February 2026, covering the main Rabi vegetable marketing season in the study area. Participation in the survey was voluntary, and respondents were informed of the purpose of the study before the interview began. Information collected from individual respondents was used solely for the purposes of this academic study and was not linked to any respondent by name in the analysis or reporting of results.

2.5 Statistical tools and technique

Percentage analysis was used to describe landholding categories, cropping pattern, channel usage, and post-harvest loss across the sample:

Percentage (%) = (Number of respondents in category / Total respondents) × 100

The economic performance of Channel I, Channel II, and Channel III was assessed for tomato, the crop occupying the largest cultivated area among the sample farmers, using the standard marketing-cost, margin, and efficiency framework:

Marketing margin: $Ami = PRi - (PPi + Cmi)$

Price spread: $Pc - Pf$

Farmer's share in the consumer's rupee: $PS = (Pf / Pc) \times 100$

Marketing efficiency (Shepherd, 1946): $ME = (V / I) - 1$

Where PRi , PPi , and Cmi are the selling price, purchase price, and marketing cost of the i -th intermediary; Pc and Pf are the consumer price and the net price received by the farmer; and V and I are the consumer price and total marketing cost within the channel (Acharya and Agarwal, 2015; Mishra *et al.*, 2014) ^[1, 5]. A higher ME value indicates a more efficient channel. Data were coded and processed in Microsoft Excel.

3. Results

3.1 Landholding size and cropping pattern of sample farmers

Table 1 presents the distribution of the 50 sample farmers according to landholding category.

Large landholders formed the biggest single group at 48.00 per cent, followed by medium landholders (24.00 per cent), small landholders (16.00 per cent), and semi-medium landholders (12.00 per cent). This skew reflects who engages in commercial vegetable cultivation in this belt: farmers with access to irrigation, transport, and capital, a group that tends

to hold larger landholdings. Smallholders remain on the margins of this trade, constrained by limited marketable surplus and weaker bargaining power, a pattern also documented by Bhunia and Singh (2025) among Indian vegetable growers more widely.

Table 1: Distribution of Farmers by Landholding Size (n = 50)

Landholding Category	No. of Farmers	Percentage (%)
Small (<1.01 ha)	8	16.00
Semi-Medium (1.01–2.02 ha)	6	12.00
Medium (2.02–10.12 ha)	12	24.00
Large (>10.12 ha)	24	48.00
Total	50	100.00

Source: Primary Data. (2025-26)

Table 2 presents the area under the major vegetable crops grown by the sample farmers.

Tomato was the dominant crop, covering 33.64 per cent of the total cultivated vegetable area, followed by cucumber (20.58%), bitter gourd (13.37%) and brinjal (12.51%); together these four crops accounted for close to 80 per cent of the cropped area. This is consistent with Shaikh *et al.*'s (2023) ^[8] description of Raipur as Chhattisgarh's leading tomato-producing district and is the basis on which tomato was selected as the reference commodity for the price spread and efficiency analysis reported in Section 3.3

Table 2: Area under Major Vegetable Crops Grown by Selected Farmers (n = 50)

Crop	Area (ha)	Percentage to Total
Tomato	225.63	33.64
Cucumber	137.99	20.58
Bitter Gourd	89.65	13.37
Brinjal	83.89	12.51
Cabbage/Cauliflower	72.03	10.74
Chilli	46.54	6.94
Okra	12.12	1.81
Leafy Vegetables	2.83	0.42
Total	670.68	100.00

Source: Primary Data. (2025-26)

3.2 Marketing channel structure

Three channels were found in use for moving vegetables from the study area's farms to Raipur's consumers. In Channel I, the farmer sells directly to the consumer, with no intermediary involved. In Channel II, produce passes from the farmer through the regulated mandi and then a retailer before reaching the consumer. In Channel III, a private wholesaler or commission agent buys from the farmer and sells on to a retailer, bypassing the regulated mandi at the point of first sale.

Channel II was used by 72.00 per cent of sample farmers, more than any other route and Channel III by 56.00 per cent. Only 20.00 per cent sold through Channel I, and those who did were mostly small and semi-medium farmers located within 8–15 km of Raipur city, close enough to manage door to door sale or roadside vending on their own. As the profitability results in Section 3.3 show, this usage pattern runs opposite to what a purely economic decision would predict, since Channel I pays farmers considerably better than either alternative. Bhunia and Singh (2025) reported a similar disconnect among West Bengal farmers, where channel

choice tracked market infrastructure and price satisfaction more closely than awareness of which channel actually paid more.

Table 3: Distribution of Farmers by Marketing Channel Used (n = 50,)

Marketing Channel	No. of Farmers	Percentage to Total
Channel II	36	72.00
Channel III	28	56.00
Channel I	10	20.00

Source: Primary Data. (2025-26)

3.3 Marketing cost, margin, price spread and efficiency

Table 4 presents the complete price spread and marketing margin analysis for tomato across the three channels.

The farmer's own marketing cost was highest under Channel II (₹344/qt), driven mainly by mandi fees and commission (₹133), transport (₹125) and loading, unloading and packaging (₹86). Under Channel I the cost was ₹150, covering only transport and packaging, since no commission is paid when selling directly to the consumer. Channel III carried the lowest farmer-level cost, ₹50, entirely for labour, since the trader collects the produce at the farm gate and absorbs the transport cost further down the chain.

At the intermediary stage, the Channel III trader's cost of ₹923/qt, combined with the ₹1,784 paid to the farmer, brought his total cost to ₹2,707; a 30 per cent margin set his selling price to the retailer at ₹3,519, a profit of ₹812/qt. The Channel II retailer bought at the mandi price of ₹1,659, spent ₹245 on marketing, and sold at ₹3,250, a net margin of ₹1,346 (41.42% of the consumer price). The Channel III retailer paid ₹3,519 to the trader, spent ₹356 on marketing, and sold at ₹4,650, earning ₹775 (16.67% of the consumer price), a smaller share of a higher price because so much had already been extracted upstream by the trader. This concentration of the largest single margin at the retail stage of Channel II matches the findings of Shaikh *et al.* (2023) ^[8] for Raipur and Mishra *et al.* (2014) ^[5] for Varanasi, both of whom reported that retailers, rather than wholesalers or commission agents, captured the largest margin once produce passed through a mandi-linked channel.

The absolute price spread widened sharply with channel length: ₹150/qt under Channel I, ₹1,935 under Channel II, and ₹2,916 under Channel III. Despite incurring the lowest marketing cost of the three, the Channel III farmer received a net price of only ₹1,734, well below the ₹3,100 received under Channel I, because the trader sets the farm-gate price to protect his own margin rather than in proportion to the eventual consumer price. Farmer's share in the consumer's rupee followed the same pattern: 95.38 per cent under Channel I against 40.46 per cent under Channel II and 37.29 per cent under Channel III, a gap consistent with Gandhi and Namboodiri (2004) ^[3], who reported 85–95.4 per cent under direct marketing against 41.1–69.3 per cent under conventional channels, and with Shaikh *et al.* (2023) ^[8], whose Raipur-specific figures of 92.33 per cent for their comparable direct channel against 60.07 and 51.34 per cent for their two intermediary-linked channels follow the same ranking, though at somewhat higher absolute levels than recorded here.

Marketing efficiency, computed using Shepherd's (1946) formula, scored 20.67 for Channel I against 0.68 for Channel

II and 0.59 for Channel III, more than thirty times higher for Channel I than for either alternative. Mishra *et al.* (2014) ^[5] reported a comparable pattern in Varanasi, where an organised channel's uniform marketing cost of Rs.100 per quintal, against Rs.227–327 in the unorganised channel,

translated into a clear efficiency advantage. Together, price spread, farmer's share, and marketing efficiency point to the same conclusion: Channel I is, by a wide margin, the most efficient and remunerative option available to farmers in this study area, yet it is the one used by only one farmer in five.

Table 4: Price Spread, Marketing Cost and Marketing Margin for Tomato by Channel (₹/Quintal)

Parameter	Channel I	Channel II	Channel III
Gross price received by farmer	3,250	1,659	1,784
Total producer marketing cost	150	344	50
Net price received by farmer	3,100	1,315	1,734
Wholesaler total marketing cost	-	-	923
Wholesaler profit margin	-	-	812
Wholesaler selling price to retailer	-	-	3,519
Total retailer marketing cost	-	245	356
Retailer net margin / profit	-	1,346	775
Consumer price	3,250	3,250	4,650
Total marketing cost (MC)	150	589	1,329
Total marketing margin (MM)	0	1,346	1,587
Absolute price spread (MC + MM)	150	1,935	2,916
Farmer's share in consumer's rupee (%)	95.38	40.46	37.29
Marketing efficiency (ME)	20.67	0.68	0.59

Source: Primary Data (2025-26)

3.4 Post-harvest losses

Post-harvest loss averaged 9.10 per cent of production across the sample. Nearly three in four farmers (74.00%) reported losses in the 5-10 per cent range, and a further 8.00 per cent reported losses above 20 per cent; no farmer reported losses below 5 per cent, indicating that some degree of loss is close to unavoidable under current conditions in this belt. This figure is markedly lower than the 25-30 per cent Sihariya *et al.* (2013) ^[9] reported for traditional multi-intermediary chains in India generally, or the 30–40 per cent Patel (2021) found in Gujarat, which may partly reflect the comparatively short 40–50 km distance between farm and market in the Raipur belt. Even so, the universality of the loss, together with Aliyi *et al.*'s (2021) ^[2] finding that 78.1 per cent of Ethiopian smallholder vegetable growers named inadequate storage as a major constraint, points to post-harvest handling as a second lever, alongside channel choice, through which farmer income in this study area could be improved.

Table 5: Distribution of Farmers by Post-Harvest Loss of Vegetables (n = 50)

Post-Harvest Loss (%)	No. of Farmers	Percentage to Total
5-10	37	74.00
10-20	9	18.00
Above 20	4	8.00
Total	50	100.00

Source: Primary Data. (2025-26)

4. Summary

The findings are broadly consistent with the wider literature on vegetable marketing channels while adding new, locally grounded evidence for a tier-II central Indian city. As in Gandhi and Namboodiri (2004) ^[3], Mishra *et al.* (2014) ^[5], and Aliyi *et al.* (2021) ^[2], the channel with the fewest intermediary stages delivered the highest farmer's share and marketing efficiency by a wide margin, confirming that channel length, more than production efficiency alone, is a first-order determinant of what vegetable cultivation pays in this study area. The comparison with Shaikh *et al.* (2023) ^[8],

the only other Raipur-specific study, shows the same ranking of channels, Channel I well ahead of the two intermediary-linked channels, though the present study extends their single-crop, single-block analysis across a wider peri-urban sampling frame and a fuller breakdown of marketing costs at each stage.

Despite Channel I's clear economic advantage, only one farmer in five in the sample used it, a gap explained less by farmer preference than by the transport, consumer-access, and transaction-cost barriers that individual smallholders face in reaching consumers directly, a pattern also reported by Bhunia and Singh in West Bengal. Post-harvest loss, averaging 9.10 per cent of production and reported by every farmer in the sample to some degree, compounds this loss of value at the farm level, though at a lower rate than reported in less well-connected production belts elsewhere in India (Sihariya *et al.*, 2013) ^[9].

5. Limitations

The study is subject to certain limitations. Its cross-sectional design captures marketing cost, margin, and price data at a single point in the 2025–26 Rabi season, and does not capture how these figures might vary across other seasons or years. The geographic scope is limited to the peri-urban vegetable growing belt surrounding Raipur city and the findings may not directly apply to other districts of Chhattisgarh or to vegetable markets with different infrastructure and regulatory conditions. Farmers' recall of marketing costs and prices received may carry some memory bias, which was partly addressed through cross-verification during the interview itself. Finally, the study draws on wholesalers' and retailers' cost and price data only to reconstruct the marketing chain beyond the farm gate, and does not cover their own perspectives on the constraints or incentives shaping their participation in each channel.

6. Conclusion

This study examined the marketing channel structure and profitability of major vegetables among 50 farmers in Raipur

city and district, Chhattisgarh. Three channels were found in use, and their performance differed sharply: Channel I returned a farmer's share of 95.38 per cent and a marketing efficiency score of 20.67, against 40.46 per cent and 0.68 for Channel II and 37.29 per cent and 0.59 for Channel III. Yet Channel I was used by only 20.00 per cent of farmers, while the two markedly less remunerative channels together accounted for the great majority of sales, and post-harvest losses averaged 9.10 per cent of production. Taken together, these findings indicate that channel choice, more than production practice alone, is a major determinant of farmer income in this study area, and that the barriers keeping most farmers out of the most remunerative channel are practical and addressable rather than intrinsic. Strengthening farmer producer organisations in the sampled blocks, investing in basic post-harvest handling infrastructure, and piloting direct-marketing arrangements in the peri-urban belt closest to Raipur city would together offer a realistic route to higher farmer income without requiring a fundamental change in what or how these farmers grow. The findings provide useful primary evidence for farmer producer organisations, agribusiness entrepreneurs, and policymakers seeking to strengthen vegetable marketing in Raipur and comparable secondary cities of central India.

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