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Economic evaluation of green chilli marketing and constraints in Nandurbar district of Maharashtra

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Abstract
The present study was undertaken to examine the marketing performance and major marketing constraints associated with green chilli cultivation in Nandurbar district of Maharashtra. Primary data were collected from 90 selected green chilli growers during Kharif 2025. The marketing system was evaluated in terms of marketed quantity, marketing channels, marketing cost, marketing margin, price spread, producer's share in the consumer's rupee and marketing efficiency. The study revealed the presence of different marketing channels through which green chilli was moved from producers to final consumers. Three major marketing channels were identified, namely (Producer–Consumer), (Producer–Villagetrader–Wholesaler–Retailer–Consumer) and (Producer–Wholesaler–Retailer–Consumer). The overall quantity of green chilli marketed was 184.29 quintals per hectare, of which Channel-III accounted for the largest share of 38.32 per cent, followed by Channel-II (38.21%) and Channel-I (23.47%). The analysis revealed substantial differences in marketing performance among the channels. Channel-I recorded the lowest price spread of ₹71.64 per quintal and the highest producer's share in the consumer's rupee at 97.88 per cent. In contrast, Channel-II registered the highest price spread of ₹1,080.00 per quintal and the lowest producer's share of 74.17 per cent, mainly due to the involvement of village traders, wholesalers and retailers. Channel-III recorded a price spread of ₹746.66 per quintal with a producer's share of 81.12 per cent. The marketing efficiency was highest in Channel-I (47.20), followed by Channel-III (5.30) and Channel-II (3.87), indicating the relative advantage of shorter marketing channels with fewer intermediaries.
The major constraints in marketing were assessed using Garrett's ranking technique. Lack of market information and intelligence emerged as the most important constraint, obtaining a score of 66.11 per cent, followed by high transportation charges (59.60%), middlemen malpractices (50.21%), inadequate storage facilities (39.60%) and high price fluctuation (33.50%). The findings indicate that improving farmers' access to timely market information, strengthening transportation and storage facilities, reducing exploitative intermediary practices and encouraging direct marketing or organized marketing arrangements could improve price realization and marketing efficiency for green chilli growers.

Keywords: Green chilli, Marketing cost, Price spread, Producer's share, Marketing efficiency, Marketing constraints

Introduction
Vegetable cultivation occupies an important position in the agricultural economy because of its contribution to farm income, employment generation and household nutrition. Vegetables are comparatively high-value crops and can provide farmers with better returns per unit of land than many conventional field crops. Among the important vegetable crops, green chilli (*Capsicum annuum* L.) has considerable economic significance owing to its widespread consumption, multiple uses and relatively high market value. It is cultivated under both tropical and subtropical agro-climatic conditions and has become an important component of diversified vegetable production systems. Green chilli is one of the widely consumed spice and vegetable crops in India. It is valued for its characteristic pungency, flavour and colour and is used extensively in fresh culinary preparations, pickles, sauces, chutneys and other processed food products. The crop also possesses considerable nutritional importance as it supplies vitamin C, carotenoids and other essential nutrients. In addition to its domestic consumption, chilli has considerable potential in processing and value-added activities, including pharmaceutical and food industries. The crop therefore contributes not only to

agricultural income but also to employment and commercial activities associated with harvesting, grading, transportation, processing and marketing. India is one of the major producers of chilli in the world, and the crop is cultivated across several states under diverse production environments. Rajasthan is also an important chilli-growing state, where green chilli cultivation is concentrated in districts having favourable soil and climatic conditions. Jaipur district is among the important vegetable-producing regions of the state, and green chilli is cultivated by farmers as a commercial crop. The crop provides an opportunity to generate relatively higher returns; however, profitability depends not only on production performance but also on the efficiency of the marketing system. Since green chilli is highly perishable, timely harvesting, handling, transportation, storage and disposal through suitable marketing channels are particularly important.

Methodology

The sampling procedure adopted for the study was a purposive methods. Nandurbar district was selected purposively as it is one of the leading green chilli-producing districts of Maharashtra. Nandurbar and Shahada tehsils were selected purposively based on the area under green chilli cultivation and favourable agro-climatic conditions. Three villages from each tehsil, namely Kanalde, Khondamali and Vikharan from Nandurbar, and Prakasha, Vaijali and Dhamberkheda from Shahada, were selected purposively. A total of 90 farmers were selected randomly and classified into small, medium and large farm-size groups, with 30 farmers in each category. Primary data were collected from the selected farmers through a well-structured and pre-tested interview schedule for the agricultural year Kharif-2025. The data on Marketing costs and constraints were collected through personal interviews. Marketing cost, marketing margin, price spread and marketing efficiency were estimated for different marketing channels. Garrett's ranking technique was employed to identify and rank the major constraints faced by green chilli growers.

Analysis of Data

Marketing Cost

The total marketing cost was calculated as:

$$C = C_f + C_{m1} + C_{m2} + C_{m3} \ldots\ldots\ldots + C_{mn}$$

Where,

C = Total marketing cost.

C_f = Cost paid by the producer from the time of produce leaves the farm till he sells It.

C_{mi}= Cost incurred by ith middleman in the process of buying and selling the Produce.

Marketing Margin

The absolute value of the marketing margin was calculated as:

$$MT = \sum (S_i - P_i)/Q_i$$

Where,

MT = Total marketing margin.

S_i = Sell value of a product paid by i^{th} firm.

P_i = Purchase value of a product paid by i^{th} firm.

Q_i = Quantity of product handled by ith firm

Price Spread

Price spread: Consumer's price – price received by farmer

Where,

C_p = Consumer's price

P_f = Price received by farmer

Marketing Efficiency (ME)

The marketing efficiency was calculated by using the modified method as suggested by Acharya and Agarwal (1999).

$$MMP = RP/(MC + MM) - 1$$

Where,

MME = Modified measure of marketing efficiency.

RP = Net price received by farmer.

MC = Total marketing cost.

MM = Net marketing margin.

Constraints Faced in Marketing of Green Chilli:

The Garrett ranking technique is used to assess the constraints faced by farmers in Green chilli marketing

$$\text{Per cent position} = 100(Rij - 0.5) / Nj$$

Where,

R_{ij} = Rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

Results and Discussion

Marketing Channels

The study identified three major marketing channels through which the sample farmers marketed their green chilli. These channels were: Producer–Consumer (P–C), Producer–Village Trader–Wholesaler–Retailer–Consumer (P–VT–W–R–C) Producer–Wholesaler–Retailer–Consumer (P–W–R–C).

At the overall level, the total production of green chilli was 186.53 q/ha. Out of the total production, 0.43 q/ha was retained for home consumption, 0.60 q/ha was distributed as gratis to relatives and others, and 1.22 q/ha was utilized as wages in kind. Thus, the total quantity disposed through these farm and family uses was 2.24 q/ha, accounting for 1.20 per cent of the total production. The major proportion of the produce was available for sale in the market. At the overall level, the marketable quantity was 184.29 q/ha, which constituted 98.80 per cent of the total production. Similar trend reported by Naresh Kumar and Bhag Chandra Jain (2018) [6].

Table 1: Channel wise Marketed Quantity of Green Chilli (Per hectare)

Sr. No	Channels	Small	Medium	Large	Overall
1.	Channel-I	72.24 (39.83)	39.78 (21.64)	17.76 (9.46)	43.26 (23.47)
2.	Channel-II	65.12 (35.90)	94.54 (51.43)	51.58 (27.48)	70.41 (38.21)
3.	Channel-III	44.02 (24.27)	49.49 (26.92)	118.34 (63.05)	70.62 (38.32)
Total		181.38 (100.00)	183.81 (100.00)	187.68 (100.00)	184.29 (100.00)

(Figures in parentheses indicates the percentage to the respective total marketed quantity)

At the overall level, an average of 184.29 quintals of green chilli per hectare was marketed. Among the three marketing channels, Channel-III accounted for the highest marketed quantity of 70.62 quintals, followed closely by Channel-II with 70.41 quintals, while Channel-I accounted for 43.26 quintals. Their respective shares were 38.32, 38.21 and 23.47 per cent of the total marketed quantity. Among small farms, the total marketed quantity was 181.38 quintals per hectare. Of this, 72.24 quintals were marketed through Channel-I, followed by 65.12 quintals through Channel-II and 44.02 quintals through Channel-III, accounting for 39.83, 35.90 and 24.27 per cent, respectively. In the medium farm size group, the total marketed quantity was 183.81 quintals per hectare. The highest quantity, 94.54 quintals, was marketed through Channel-II, followed by 49.49 quintals through Channel-III and 39.78 quintals through Channel-I. These constituted 51.43, 26.92 and 21.64 per cent, respectively. Similarly, large farmers marketed 187.68 quintals per hectare. Among the different channels, Channel-III accounted for the highest quantity of 118.34 quintals, followed by Channel-II with 51.58 quintals and Channel-I with 17.76 quintals. Their respective shares were 63.05, 27.48 and 9.46 per cent. Overall, the results indicated that Channel-III was the most important marketing channel at the overall level, followed very closely by Channel-II. Small farmers mainly preferred Channel-I, whereas medium farmers predominantly used Channel-II and large farmers relied more on Channel-III. The variation in channel preference across farm-size groups indicated differences in farmers' access to markets and intermediaries.

Marketing cost

Table 2: Channel wise Marketing Cost of Green Chilli. (₹/qtl)

Sr. No.	Particulars	Channel I	Channel II	Channel III
1. Producer				
	Packaging charges	20.55 (28.68)	20.58 (44.66)	20.89 (28.30)
	Sorting and filling charges	15.22 (21.24)	15.40 (33.42)	15.32 (20.75)
	Transportation charges	22.30 (31.12)	0.00 (0.00)	27.59 (37.38)
	Weighing charges	3.57 (4.98)	0.00 (0.00)	0.00 (0.00)
	Loading and unloading charges	10.00 (13.95)	10.10 (21.91)	10.00 (13.55)
	Market fee	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	Marketing cost	71.64 (100.00)	46.08 (100.00)	73.80 (100.00)
2. Village trader				
	Packaging charges	(0.00) (0.00)	0.00 (0.00)	0.00 (0.00)
	Sorting and filling charges	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	Transport charges	0.00 (0.00)	28.73 (27.32)	0.00 (0.00)
	Weighing charges	0.00 (0.00)	3.28 (3.11)	0.00 (0.00)
	Loading and unloading	0.00 (0.00)	10.20 (9.69)	0.00 (0.00)
	Market fee	0.00 (0.00)	62.95 (59.86)	0.00 (0.00)
	Marketing cost	0.00 (100.00)	105.16 (100.00)	0.00 (100.00)
3. Wholesaler				
	Packaging charges	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	Sorting and filling charges	0.00	0.00	0.00

		(0.00)	(0.00)	(0.00)
	Transportation charges	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	Weighing charges	0.00 (0.00)	4.12 (4.78)	4.78 (5.77)
	Loading and unloading charges	0.00 (0.00)	12.45 (14.47)	12.40 (14.97)
	Market fee	0.00 (0.00)	69.46 (80.73)	65.64 (79.03)
	Marketing cost	0.00 (100.00)	86.03 (100.00)	82.82 (100.00)
4. Retailers				
	Packaging charges	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
	Sorting and filling charges	0.00 (0.00)	0.00 (0.00)	9.68 (8.90)
	Transportation charges	0.00 (0.00)	22.07 (19.51)	12.82 (11.79)
	Weighing charges	0.00 (0.00)	4.78 (4.22)	4.15 (3.81)
	Loading and unloading charges	0.00 (0.00)	10.20 (9.01)	10.12 (9.31)
	Market fee	0.00 (0.00)	76.05 (67.24)	71.89 (66.16)
	Marketing cost	0.00 (100.00)	113.10 (100.00)	108.66 (100.00)

(Figures in parentheses indicates the percentage to the respective total)

The results revealed that the marketing cost varied considerably across the channels depending upon the number of intermediaries involved and the marketing functions performed at each stage. In Channel-I (Producer–Consumer), the producer alone performed all the marketing activities and incurred a total marketing cost of ₹71.64 per quintal. Among the various cost components, transportation charges ₹22.30/qtl constituted the highest share, followed by packaging charges ₹20.55/qtl, sorting and filling charges ₹15.22/qtl, loading and unloading charges, ₹10.00/qtl and weighing charges ₹3.57/qtl. No market fee was incurred in this channel. In Channel-II (Producer–Village Trader–Wholesaler–Retailer–Consumer), marketing costs were incurred at three different stages of the marketing system. At the producer level, the total marketing cost was ₹46.08 per quintal, mainly comprising packaging, sorting, loading and unloading expenses. The village trader incurred an additional marketing cost of ₹105.16 per quintal, while the wholesaler and retailer incurred ₹86.03 and ₹113.10 per quintal, respectively. The comparatively higher marketing cost in Channel-II attributed to the involvement of multiple market intermediaries. In Channel-III (Producer–Wholesaler–Retailer–Consumer), the producer incurred a marketing cost of ₹73.80 per quintal, which was slightly higher than that in Channel-I. The wholesaler and retailer incurred marketing costs of ₹82.82 and ₹108.66 per quintal, respectively. The relatively higher marketing cost at the producer level in Channel-III was mainly due to increased expenditure on transportation and packaging required for supplying produce directly to wholesale markets. Likewise, wholesalers and retailers incurred additional expenses on market fees, loading and unloading, weighing and transportation before the produce reached the final consumers. Similar result were reported by Deore *et al* (2015) [3] and Thomas *et al* (2015) [10].

Table 3: Per Quintal Channel-Wise Marketing Cost, Market Margin Price Spread and Marketing efficiency of Green Chilli (₹/ qtl)

Sr. No.	Particulars	Channel I	Channel II	Channel III
1	Gross Price Received By Farmer	3381.05 (100.00)	3147.68 (75.27)	3282.08 (82.99)
a	Marketing Cost	71.64 (2.12)	46.08 (1.10)	73.80 (1.87)
b	Net Price realized	3309.41 (97.88)	3101.60 (74.17)	3208.28 (81.12)
2	Village Trader			
a	Price Paid	0.00 (0.00)	3147.68 (75.27)	0.00 (0.00)
b	Marketing Cost	0.00 (0.00)	105.16 (2.51)	0.00 (0.00)
c	Marketing Margin	0.00 (0.00)	220.34 (5.27)	0.00 (0.00)
d	Price received	0.00 (0.00)	3473.18 (83.06)	0.00 (0.00)
3	Wholesaler			
a	Price Paid	0.00 (0.00)	3473.18 (83.06)	3282.08 (82.99)
b	Marketing Cost	0.00	86.03	82.82

		(0.00)	(2.06)	(2.09)
c	Marketing Margin	0.00 (0.00)	243.12 (5.81)	229.75 (5.81)
d	Price received	0.00 (0.00)	3802.34 (90.93)	3594.65 (90.89)
4	Retailer			
a	Price Paid	0.00 (0.00)	3802.34 (90.93)	3594.65 (90.89)
b	Marketing Cost	0.00 (0.00)	113.10 (2.70)	108.66 (2.75)
c	Marketing Margin	0.00 (0.00)	266.16 (6.37)	251.63 (6.35)
d	Price received	0.00 (0.00)	4181.60 (100.00)	3954.94 (100.00)
5	Consumer			
a	Price Paid By Consumer	3381.05 (100.00)	4181.60 (100.00)	3954.94 (100.00)
	Price Spread	71.64	1080.00	746.66
	Marketing Cost (Mc)	71.64	350.37	265.28
	Marketing Margin (Mm)	0.00	729.62	481.37
	MC + MM	71.64	1080.00	746.66
	Marketing Efficiency	47.20	3.87	5.30
	Producer share in consumer rupee (%)	97.88	74.17	81.12

(Figures in parentheses indicates the percentage to the respective total)

The results presented in Table no 3 indicated that, In Channel-I the gross price received by the producer was ₹3,381.05 per quintal. After deducting the marketing cost of ₹71.64 per quintal, the producer realized a net price of ₹3,309.41 per quintal. Since the produce was sold directly to consumers, there was no intermediary involved and hence no marketing margin was observed. Consequently, the price spread was limited to ₹71.64 per quintal. The producer's share in the consumer's rupee was 97.88 per cent, indicating that the producer retained almost the entire value paid by the consumer. In Channel-II the gross price received by the producer was ₹3,147.68 per quintal, from which a marketing cost of ₹46.08 per quintal was deducted, resulting in a net price realization of ₹3,101.60 per quintal. The village trader purchased the produce at ₹3,147.68 per quintal and earned a marketing margin of ₹220.34 per quintal after accounting for the marketing cost of ₹105.16. The wholesaler earned a marketing margin of ₹243.12 per quintal, while the retailer earned ₹266.16 per quintal. The final price paid by the consumer was ₹4,181.60 per quintal. Thus, the total price spread amounted to ₹1,080.00 per quintal, comprising marketing cost of ₹350.37 and marketing margin of ₹729.62 per quintal. The producer's share in the consumer's rupee was 74.17 per cent. In Channel-III the producer received a gross price of ₹3,282.08 per quintal and incurred a marketing cost of ₹73.80 per quintal, resulting in a net price realization of ₹3,208.28 per quintal. The wholesaler incurred a marketing cost of ₹82.82 per quintal and earned a marketing margin of ₹229.75 per quintal. Similarly, the retailer incurred a marketing cost of ₹108.66 per quintal and earned a marketing margin of ₹251.63 per quintal. The consumer paid ₹3,954.94 per quintal for the produce. The total price spread was ₹746.66 per quintal, consisting of ₹265.28 marketing cost and ₹481.37 marketing margin. The producer's share in the consumer's rupee was 81.12 per cent.

Among the three marketing channels, Channel-II recorded the highest price spread of ₹1,080.00 per quintal, followed by Channel-III with ₹746.66 per quintal, whereas Channel-I recorded the lowest price spread of only ₹71.64 per quintal. The higher price spread in Channel-II was mainly due to the involvement of three intermediaries, namely village trader, wholesaler and retailer, who added their respective marketing costs and margins at successive stages of the marketing chain. The highest marketing efficiency (47.20) was observed in Channel I, indicating the most efficient marketing system among the channels studied, this was mainly due to the absence of middlemen and comparatively lower marketing costs in this channel. Channel III recorded a marketing efficiency of 5.30, which was higher than Channel II (3.87), indicating relatively better efficiency. The highest producer's share in the consumer's rupee was observed in Channel-I (97.88%), followed by Channel-III (81.12%) and Channel-II (74.17%). This indicates that direct marketing enabled farmers to retain a larger proportion of the final consumer price, whereas the producer's share declined with greater involvement of intermediaries. The results therefore suggest that shorter marketing channels are relatively more beneficial to producers in terms of price realization. Similar study was conducted by Kaur and Singh (2019) [5], Patil *et al.* (2017) [7] and Kala *et al.* (2020) [4].

Table 4: Constraints in Marketing of Green Chilli

Sr. No	Constraints	Garrett Score							
		I	II	III	IV	V	Total	%	Rank
1.	Lack of market information and intelligence	4200	1200	350	80	120	5950	66.11	**I**
2.	High Transportation Charges	1800	2760	500	160	144	5364	59.60	**II**
3.	Middleman Malpractices followed in market	525	1080	2050	720	144	4519	50.21	**III**
4.	lack of storage facility	00	240	1100	1720	504	3564	39.60	**IV**
5.	High price fluctuation	75	240	500	1000	1200	3015	33.50	**V**

(Figures in parentheses indicate the percentage to the total)

The marketing constraints faced by green chilli growers were ranked using Garrett's ranking technique based on their mean scores. Lack of market information and intelligence ranked first (66.11%), indicating difficulty in obtaining timely information on market conditions and prices. High transportation charges ranked second (59.60%), which increased the cost of marketing and reduced farmers' returns. Middlemen malpractices ranked third (50.21%), followed by lack of storage facilities (39.60%) and high price fluctuations (33.50%). Overall, inadequate market information, high transportation costs and middlemen-related malpractices were the major marketing constraints faced by green chilli growers. Similar findings reported by Sai *et al.* (2022) [8], Dangore *et al* (2015) [1], Daundkar *et al* (2017) [2] and Shreedev (2014) [9].

Conclusion

It was observed that green chilli growers marketed their produce through three major channels, namely Channel-I (Producer–Consumer), Channel-II (Producer–Village Trader–Wholesaler–Retailer–Consumer) and Channel-III (Producer–Wholesaler–Retailer–Consumer). Overall, 184.29 q/ha of green chilli was marketed, with Channel-III accounting for the highest share (38.32%), followed closely by Channel-II (38.21%). The marketing cost was comparatively lower in Channel-II at the producer level (₹46.08/q), while the total marketing cost including intermediaries was highest in Channel-II (₹350.37/q). Channel-I recorded the lowest price spread of ₹71.64/q and the highest producer's share in consumer's rupee (97.88%). Channel-II registered the highest price spread of ₹1,080/q and the lowest producer's share (74.17%), whereas Channel-III recorded a price spread of ₹746.66/q with a producer's share of 81.12%. Marketing efficiency was highest in Channel-I (47.20), followed by Channel-III (5.30) and Channel-II (3.87), indicating the advantage of shorter marketing channels. The major constraints faced by growers were lack of market information and intelligence (66.11%), high transportation charges (59.60%) and middlemen malpractices (50.21%). Hence, strengthening market information services, improving transportation and storage facilities, reducing intermediary exploitation and promoting direct marketing would help improve price realization and marketing efficiency of green chilli growers.

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