

Marketing analysis of bitter gourd (*Momordica charantia* L.) in Sultanpur district of Uttar Pradesh: A study on marketing channels, efficiency and constraints

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Abstract

This paper presents a study conducted in the Sultanpur district of Uttar Pradesh, focusing on the marketing of bitter gourd in the selected area. The research employed a multistage stratified purposive cum random sampling technique to select the district, block, villages, and respondents. From the population, 100 growers were randomly chosen, comprising 66 marginal, 23 small, and 11 medium farmers during the period of 2021-2022, using the proportionate allocation technique. Primary data were collected through face-to-face interviews using a survey schedule. Three distinct marketing channels for bitter gourd were identified: Channel-I (producer to consumer), Channel-II (producer to retailer to consumer) and Channel-III (producer to wholesaler to retailer to consumer). The study revealed that Channel-I exhibited the highest marketing efficiency (29.15), followed by Channel-II (5.47) and Channel-III showed the lowest efficiency (2.96). Notably, different groups of farms predominantly sold bitter gourd through Channel-III. The research also shed light on the challenges faced by bitter gourd growers, including issues related to perishability, price fluctuations, and inadequate storage facilities. The paper emphasizes the significance of policymakers and stakeholders addressing these challenges and developing effective strategies and interventions to support the bitter gourd farming community.

Key words: Bitter gourd, garrett ranking technique, marketing efficiency, marketing pattern, price spread, producer's share

Introduction

Agriculture and allied sector have long been the backbone of the Indian economy. Its GDP contribution has fallen from 54.19 percent in 1950-51 to 20.2 percent in 2020-21. (NSO 2021; Mishra *et al.*, 2023a). Globalization, natural resource depletion, climate change, rapid industrialization, population growth, and changing consumer behaviour are all contributing factors. (Kumar *et al.*, 2023). Agriculture and related industries are going through a period of transition all over the world. Indian agriculture must now reorganize by expanding its scope beyond primary agriculture. As a result, there is a need to reform the farming sector, invest heavily in infrastructure development, improve access to formal credit, and implement agriculture policies that are realistic.

The demand for vegetables in developing countries has increased due to population growth and economic development (Arsanti *et al.*, 2007). India is known as the Fruits and Vegetable Basket because it is the world's second largest producer of fruits and vegetables after China (Chari and Madhav Raghavan, 2012; Sudarshan *et al.*, 2013; Nabi and Bagalkoti, 2017). The importance of this sector has increased in recent decades, contributing a larger share to the Gross Value Addition of agriculture and allied sectors. With the changing agricultural landscape, it is evident that the horticulture sector is crucial to the economies of various countries (Schenau *et al.*, 2022; Agrawal *et al.*, 2016). Horticulture has emerged as one of the primary drivers of growth because it is more productive than agriculture (food grains mainly). Horticulture production in India has skyrocketed in recent years. Annual production increased by

4.8% over the last ten years, while horticulture area increased by 2.6%. (Kumar and Singh, 2020; Jiji, 2020). Aside from ensuring the nation's nutritional security, it also generates new jobs, diversifies farm activities, supplies raw materials to various food processing industries, and boosts farm profitability through increased productivity and foreign exchange earnings (Mishra *et al.*, 2023b).

Vegetables are high in fibre, carbohydrates, minerals, and vitamins, including fat-soluble vitamins like vitamin A and D as well as water-soluble vitamins like vitamin B and C. (Settaluri *et al.*, 2012). Despite containing less than 3% protein, the proteins have a high biological value. Vegetables also have medicinal properties. Carrot, cucumber, bitter gourd, cabbage, lettuce, and spinach juices are a few examples. (Adhiguru *et al.*, 2004; Sharma *et al.*, 2010; Wavdhane *et al.*, 2016). The bitter gourd, also known as karela (*Momordica charantia* L., Cucurbitaceae), is widely cultivated throughout the world, particularly in tropical and subtropical regions (Çiçek, 2022; Halder *et al.*, 2018; Singla *et al.*, 2023). It is widely planted throughout India, occupying approximately 0.08 million hectares and yielding 0.82 million tonnes (Mishra *et al.*, 2023a; Halder *et al.*, 2018). Bitter gourd gets its name from the Latin word "momordica," which means "to bite," because of its seed's grooved edges, which appear to have been chewed. It is a popular summer vegetable crop grown for its immature tuberculate fruits with a distinct bitter flavour (Mishra, 2022). The fruit is high in iron, calcium, phosphorus, and vitamin B. The current study attempts to calculate marketing costs, marketing margins, price spread, and identify marketing channels and constraints in the bitter gourd marketing.

Material and methods

The study was based on primary data which collected from Sultanpur district of Uttar Pradesh. In which the Amhat Mandi serving as major market for disposal of bitter gourd in the study area, was selected for studying the nature and magnitude of marketing costs and margins in the marketing of bitter gourd. A multistage stratified purposive cum random sampling technique was applied for the selection of district, block, villages and respondents. Total 100 respondents (*i.e.* 66 marginal, 23 small and 11 medium) were selected randomly through proportionate allocation to the population during September to December 2022. The main market functionaries engaged in the marketing of Amhat village traders, wholesalers/commission agents and retailers. Therefore, a list of all market functionaries involved in the marketing channels have been prepared and then a sample of 10 per cent of all the market functionaries have been randomly selected for the study of marketing aspects. Model price was used for the study.

Marketable surplus: It is the quantity of produce left after meeting out the requirements of the producer for family consumption, paid as wages, used for seed purpose etc (Seth *et al.*, 2018; Mishra *et al.*, 2023b). The marketable surplus was measured through following formula:

$$MS = P - \{C + W + S\}$$

Where,

MS = Marketable Surplus

P = Total Production

C = Family Consumption

W = Quantity use for wage

S = Quantity kept for seed

Marketed surplus: Marketed surplus is that quantity of the produce which the producer farmer actually sell in the market, irrespective of his requirements for family consumption, farm needs and other payments. The marketed surplus may be more, less or equal to the marketable surplus:

Marketed surplus < or = or > Marketable surplus

Marketing cost: Marketing cost was worked out using the following formula:

$$\text{Marketing cost} = T_c = C_p + \sum_{i=1}^n M_{ci}$$

Where,

T_c = Total cost of marketing

C_p = Cost incurred by the producer in marketing of his produce

M_{ci} = Marketing costs incurred by middle men or traders

Marketing margin: Khanal and Dhakal. (2020) and Mishra *et al.* (2023b) were used to analyse the market margin. This is the difference between the total payment (cost + purchase price) and receipts (sale price) at the middlemen (i^{th} agency). The formula was,

Absolute margin of i^{th} middlemen (A_{mi}): A_{mi} was calculated using following relationship:

$$A_{mi} = P_{Ri} (P_{pi} + C_{mi})$$

Percentage margin of i^{th} middleman (P_{mi}): P_{mi} was calculated using following equation:

$$P_{mi} = \frac{P_{Ri} (P_{pi} + C_{mi})}{P_{Ri}} \times 100$$

Where,

P_{Ri} = Total value of receipts per unit (sale price)

P_{pi} = Purchase value of produce per unit (purchase price)

C_{mi} = Cost incurred on marketing per unit.

Marketing efficiency: Marketing efficiency was measured through following shepherd's formula:

The ratio of the total value of goods marketed to the marketing cost was efficiency and vice versa. used to measure the efficiency. The higher the ratio, the higher efficiency and vice versa were suggested by Harriss (1979).

$$\text{Marketing efficiency (ME)} = \frac{V}{I} - 1$$

Where,

V = Value of goods sold (consumer's price)

I = Total marketing costs (MC)

Higher the ratio, the higher efficiency and vice-versa.

Marketing channels: In the study area, different channels were prevalent for the marketing of bitter gourd. The following channels were practiced by the farmers:

Channel-I: Producer → Consumer;

Channel-II: Producer → Retailer → Consumer; and

Channel-III: Producer → Wholesaler → Retailer → Consumer.

Producer's share in consumers rupees: It is the price received by the farmer expressed as a percentage of the retail price (*i.e.* the price paid by the consumer) (Singh *et al.*, 2018; Khanal and Dhakal, 2020; Mishra *et al.*, 2023b). If P_r is the retail price, the producer's share in the consumer's rupees (P_o) may be expressed as follows:

$$P_o = \frac{P_p}{P_r} \times 100$$

Where,

P_o = The producer's share in the consumers rupee

P_p = The producer's price for their produce

P_r = The price paid by the consumers or sale price of the retailers

Garrett's ranking technique : To achieve this goal, the Garrett Ranking Technique was used to identify the most significant constraints that influence marketing of bitter gourd (Mishra *et al.*, 2023a). Initially, the farmers' ranks were converted to percentage positions using the following formula:

$$\text{Percent Position} = \frac{100 (R_j - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for i^{th} preference by j^{th} farmer

N_j = Number of preferences ranked by j^{th} farmer

The percent position of each rank was translated to scores using the Garrett table. Individual respondent scores were added together and divided by the total number of respondents whose scores were combined for each constraint. As a result, the mean score for each limitation was sorted by arranging them in descending order (Wavdhane *et al.*, 2016; Grumet *et al.*, 2021; Singh *et al.*, 2022).

Result and discussion

Nature and extent of the marketable and marketed surplus of bitter gourd: Data presented in Table 1 reveal the surplus trend based on different farm sizes. Bigger farms show increased bitter gourd surplus. Family consumption on marginal, small, and medium-size farms was 0.42, 0.59, and 0.83 quintals, respectively. In contrast, the marketable surplus was 10.09, 28.35, and 72.92 quintals, with an average of 21.20 quintals. Larger farms yield more surplus for the market after meeting family needs. This is valuable for policymakers and farmers to optimize bitter gourd cultivation and enhance market potential.

Table 1. Nature and extent of marketable and marketed surplus of bitter gourd by farm size (q)

S. No.	Particulars	Size group of farms			Overall Average
		Marginal	Small	Medium	
A.	Total production	10.51 (100.00)	28.94 (100.00)	73.75 (100.00)	21.70 (100.00)
1.	Family consumption	0.42 (4.00)	0.59 (2.04)	0.83 (1.13)	0.50 (2.32)
2.	Marketable surplus	10.09 (96.00)	28.35 (97.96)	72.92 (98.87)	21.20 (97.68)
3.	Marketed surplus	10.09 (96.00)	28.35 (97.96)	72.92 (98.87)	21.20 (97.68)

(Figures in parentheses indicate percentage)

Disposal pattern of bitter gourd through different channels of distribution:

The study examines the production and disposal patterns of bitter gourd on marginal, small, and medium farms. The yields for each farm category are as follows: marginal farms produce 10.51 quintals, small farms produce 28.94 quintals, and medium farms produce 73.75 quintals (Fig. 1).

Bitter gourd disposal categorized into three channels: producer → consumer, producer → retailer → consumer, and producer → wholesaler → retailer → consumer (Fig. 1). Channel-III had the highest sales (73.70 quintals), followed by channel-II (29.07 quintals), and channel-I (10.43 quintals).

Within each farm category, maximum sales from marginal farms through channel-III (6.19 quintals), channel-II (3.04 quintals), and channel-I (1.28 quintals). Small farms: channel-III (20.96 q), channel-II (5.22 q), channel-I (2.76 q). Medium farms: channel-III (46.55 q), channel-II (20.81 q), channel-I (6.39 q).

Channel-III was the dominant distribution channel across all farm sizes, making it valuable for farmers and stakeholders to make informed marketing decisions. Further discussions on the factors influencing channel choice and its impact on production and profit are essential for understanding market dynamics.

Price spread, marketing costs, marketing margin and market efficiency of bitter gourd:

Price spread is the gap between consumer's payment and producer's net earnings for a comparable quantity of farm produce during a specific reference period. Marketing margins indicate the difference between what is paid and received by a marketing agency. Marketing costs encompass middlemen's profits, producer-paid marketing charges, wholesaler charges, and retailer charges in the marketing process of said produce.

Channel – I (Producer → Consumer): The price spread (marketing cost + market margin) of bitter gourd in the study area was as follows: ₹50.92, ₹52.48, and ₹54.80 per quintal on

Table 2. Disposal pattern of bitter gourd through different channels on different size group of farms (q)

S. No.	Size group of farms	Channel-I	Channel-II	Channel-III	Total Quantity
1.	Marginal	1.28 (12.27)	3.04 (10.46)	6.19 (8.40)	10.51 (9.28)
2.	Small	2.76 (26.46)	5.22 (17.96)	20.96 (28.44)	28.94 (25.57)
3.	Medium	6.39 (61.27)	20.81 (71.59)	46.55 (63.16)	73.75 (65.15)
	Total	10.43 (100.00)	29.07 (100.00)	73.70 (100.00)	113.20 (100.00)

(Figures in parentheses indicate percentage)

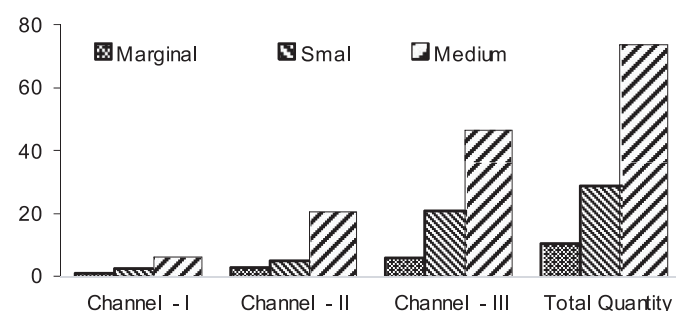


Fig. 1. Disposal pattern of bitter gourd through different channels on different size group of farms (q)

marginal, small, and medium farms, respectively. These figures accounted for 3.25, 3.39 and 3.55% of the consumer's price. The average marketing cost incurred by the producer was ₹51.71 per quintal, representing 3.32% of the consumer's price. This cost included transportation, labor charges, and losses during the sale. The producer's share in the consumer's rupee was 96.68%, the highest among the four channels.

Channel – II (Producer → Retailer → Consumer): Table 2 shows the sale of bitter gourd from producer to consumer. The average share of the consumer's rupee that the producer received was 84.56%, which was lower than in Channel-I due to the involvement of a middleman, the retailer. The marketing expenses and retailer's margins were 2.96 and 8.82%, respectively. The per quintal prices received by marginal, small, and medium farms were ₹1429.00, ₹1411.00, and ₹1405.00, respectively, while the producer's share in the consumer's rupee was 84.70%, 84.35%, and 84.10%, respectively. Moreover, the price spread was ₹258.10, ₹261.79, and ₹265.67 per quintal on marginal, small, and medium farms, respectively, accounting for 15.30%, 15.65%, and 15.90% of the consumer's price. The average price spread was ₹259.78 per quintal, accounting for 15.44% of the consumer's price.

Channel – III (Producer → Wholesaler → Retailer → Consumer): Channel-III had bitter gourd marketing. Producer's share in the consumer's rupee was 74.75%, lower than Channel – I and II due to two middlemen (wholesaler and retailer). Wholesalers and retailers incurred 1.43% and 4.11% marketing costs, respectively. Marginal, small, and medium farms received ₹1344.00, ₹1326.00, and ₹1320.00 per quintal, with the producer's share in consumers' rupee being 75.03%, 74.42%, and 73.74% correspondingly. Price spread on marginal, small, and medium farms was ₹447.22, ₹455.88, and ₹470.08 per quintal, accounting for 24.97%, 25.58%, and 26.26% of the

Table 3. Price spread for bitter gourd marketing in Channel-I (Producer → Consumer) (₹/q)

S. No.	Particulars	Size group of farms			Overall average
		Marginal	Small	Medium	
1.	Net price received by the producer	1514.00 (96.75)	1496.00 (96.61)	1490.00 (96.45)	1507.22 (96.68)
2.	Cost incurred by the producer				
(i)	Transportation	8.26 (0.53)	8.43 (0.54)	8.79 (0.57)	8.36 (0.54)
(ii)	Cost of bags	6.73 (0.43)	6.98 (0.45)	7.25 (0.47)	6.84 (0.44)
(iii)	Weighing charge	9.28 (0.59)	9.51 (0.61)	10.01 (0.65)	9.41 (0.60)
(iv)	Loading and unloading	5.56 (0.36)	5.84 (0.38)	6.12 (0.40)	5.69 (0.36)
(v)	Losses	10.85 (0.69)	11.23 (0.73)	11.56 (0.75)	11.02 (0.71)
(vi)	Other	10.24 (0.65)	10.49 (0.68)	11.07 (0.72)	10.39 (0.67)
(vii)	Total cost incurred by the producer	50.92 (3.25)	52.48 (3.39)	54.80 (3.55)	51.71 (3.32)
3.	Producer sale price / consumer purchase price	1564.92 (100.00)	1548.48 (100.00)	1544.80 (100.00)	1558.93 (100.00)
4.	Price spread	50.92 (3.25)	52.48 (3.39)	54.80 (3.55)	51.71 (3.32)

Table 4. Price spread for bitter gourd marketing in Channel – II (Producer → Retailer → Consumer) (₹/q)

S. No.	Particulars	Size group of farms			Overall average
		Marginal	Small	Medium	
1.	Net price received by the producer	1429.00 (84.70)	1411.00 (84.35)	1405.00 (84.10)	1422.22 (84.56)
2.	Cost incurred by the producer				
(i)	Transportation cost	17.51 (1.04)	17.95 (1.07)	18.32 (1.10)	17.70 (1.05)
(ii)	Cost of bags	6.68 (0.40)	6.72 (0.40)	6.83 (0.41)	6.71 (0.40)
(iii)	Weighing charge	9.81 (0.58)	9.89 (0.59)	9.96 (0.60)	9.84 (0.59)
(iv)	Loading and unloading	5.87 (0.35)	5.93 (0.35)	6.34 (0.38)	5.94 (0.35)
(v)	Losses	10.56 (0.63)	10.78 (0.64)	10.95 (0.66)	10.65 (0.63)
(vi)	Other	10.74 (0.64)	10.82 (0.65)	10.99 (0.66)	10.79 (0.64)
(vii)	Total cost incurred by the producer	61.17 (3.63)	62.09 (3.71)	63.39 (3.79)	61.63 (3.66)
	Producer sale price / Retailer purchase price	1490.17 (88.33)	1473.09 (88.06)	1468.39 (87.89)	1483.85 (88.22)
3.	Cost incurred by the retailer				
(i)	Transportation	14.63 (0.87)	14.84 (0.89)	15.10 (0.90)	14.73 (0.88)
(ii)	Grading	4.81 (0.29)	4.95 (0.30)	5.16 (0.31)	4.88 (0.29)
(iii)	Loading and unloading	5.58 (0.33)	5.72 (0.34)	5.96 (0.36)	5.65 (0.34)
(iv)	Market fee	10.69 (0.63)	10.82 (0.65)	10.93 (0.65)	10.75 (0.64)
(v)	Losses	5.48 (0.32)	5.78 (0.35)	6.25 (0.37)	5.63 (0.33)
(vi)	Other charges	7.92 (0.47)	8.31 (0.50)	8.67 (0.52)	8.09 (0.48)
	Total cost incurred by the retailer	49.11 (2.91)	50.42 (3.01)	52.07 (3.12)	49.74 (2.96)
4.	Retailer net margin	147.82 (8.76)	149.28 (8.92)	150.21 (8.99)	148.42 (8.82)
5.	Retailer sale price / consumer purchase price	1687.10 (100.00)	1672.79 (100.00)	1670.67 (100.00)	1682.00 (100.00)
6.	Price spread	258.10 (15.30)	261.79 (15.65)	265.67 (15.90)	259.78 (15.44)

Table 5. Price spread for bitter gourd in Channel – III (Producer → Wholesaler → Retailer → Consumer) (₹/q)

S. No.	Particulars	Size group of farms			Overall average
		Marginal	Small	Medium	
1.	Net price received by the producer	1344.00 (75.03)	1326.00 (74.42)	1320.00 (73.74)	1337.22 (74.75)
2.	Cost incurred by the producer				
(i)	Transportation cost	37.50 (2.09)	37.69 (2.12)	37.92 (2.12)	37.59 (2.10)
(ii)	Cost of bags	6.61 (0.37)	6.78 (0.38)	6.96 (0.39)	6.69 (0.37)
(iii)	Weighing charge	8.78 (0.49)	8.93 (0.50)	9.52 (0.53)	8.90 (0.50)
(iv)	Loading and unloading	5.84 (0.33)	5.98 (0.34)	6.29 (0.35)	5.92 (0.33)
(v)	Losses	9.23 (0.52)	9.37 (0.53)	9.84 (0.55)	9.33 (0.52)
(vi)	Other	11.20 (0.63)	11.53 (0.65)	12.05 (0.67)	11.37 (0.64)
(vii)	Total cost incurred by the producer	79.16 (4.42)	80.28 (4.51)	82.58 (4.61)	79.79 (4.46)
(viii)	Producer sale price/ wholesaler purchase price	1423.16 (79.45)	1406.28 (78.92)	1402.58 (78.35)	1417.01 (79.21)
3.	Cost incurred by the wholesaler				
(i)	Grading	4.68 (0.26)	4.82 (0.27)	4.98 (0.28)	4.75 (0.27)
(ii)	Market fee	7.35 (0.41)	7.78 (0.44)	8.21 (0.46)	7.54 (0.42)
(iii)	Loading and unloading	5.61 (0.31)	5.89 (0.33)	6.05 (0.34)	5.72 (0.32)
(iv)	Weighing charge	8.27 (0.46)	8.56 (0.48)	8.94 (0.50)	8.41 (0.47)
(v)	Total cost incurred by wholesaler	25.15 (1.40)	26.17 (1.47)	26.99 (1.51)	25.59 (1.43)
(vi)	Wholesaler margin	124.89 (6.97)	126.27 (7.09)	129.68 (7.24)	125.73 (7.03)
(vii)	Wholesaler's sale price/ retailer purchase price	1573.20 (87.83)	1558.72 (87.48)	1559.25 (87.11)	1568.34 (87.67)
4.	Cost incurred by the retailer				
(i)	Transportation	22.69 (1.27)	23.92 (1.34)	26.29 (1.47)	23.37 (1.31)
(ii)	Loading and unloading	5.21 (0.29)	5.73 (0.32)	6.36 (0.36)	5.46 (0.30)
(iii)	Grading	4.92 (0.27)	5.13 (0.29)	5.45 (0.30)	5.03 (0.28)
(iv)	Weighing charge	7.52 (0.42)	7.77 (0.44)	7.91 (0.44)	7.62 (0.43)
(v)	Rent of shop / rehire	11.20 (0.63)	11.36 (0.64)	11.59 (0.65)	11.28 (0.63)
(vi)	Losses	10.95 (0.61)	11.12 (0.62)	11.43 (0.64)	11.04 (0.62)
(vii)	Other charge	9.58 (0.53)	9.74 (0.55)	10.99 (0.61)	9.77 (0.55)
(viii)	Total cost incurred by retailer	72.07 (4.02)	74.77 (4.20)	80.02 (4.47)	73.57 (4.11)
(ix)	Retailer margin	145.95 (8.15)	148.39 (8.23)	150.81 (8.42)	147.05 (8.22)
(x)	Retailer sale price/ consumer purchase price	1791.22 (100.00)	1781.88 (100.00)	1790.08 (100.00)	1788.95 (100.00)
5.	Price spread	447.22 (24.97)	455.88 (25.58)	470.08 (26.26)	451.73 (25.25)

consumer's price. The average price spread was ₹451.73 per quintal, accounting for 25.25%.

Inter-channel comparison as a whole for bitter gourd: In this study, we analysed bitter gourd marketing, focusing on inter-channel comparisons of average marketing costs, margins, and price spreads. The results, shown in Table 6, indicate that marketing costs increased with more intermediaries in both channel-II and channel-III. Gross marketing margins varied significantly across channels, with channel-III having the highest margin at 25.25% and the lowest margin of 3.32% in channel-I. These findings shed light on bitter gourd marketing dynamics and emphasize the intermediaries' role in influencing costs and margins in different marketing channels. The paper discusses the implications of these results and potential strategies for optimizing bitter gourd marketing efficiency.

Table 6. Inter-channel comparison as a whole for bitter gourd (₹/q)

S. No.	Particulars	Channel-I	Channel-II	Channel-III
1.	Price received by the producer	1507.22 (96.68)	1422.22 (84.56)	1337.22 (74.75)
2.	Cost incurred by the producer			
(i)	Total cost incurred by the producer	51.71 (3.32)	6163 (3.66)	79.79 (4.46)
(ii)	Producer sale price/ consumer purchase price	1558.93 (100.00)	1483.85 (88.22)	1417.01 (79.21)
3.	Cost incurred by the retailer			
(i)	Total cost incurred by the retailer		48.74 (2.96)	
(ii)	Retailer net margin		148.42 (8.82)	
(iii)	Retailer sale price / consumer purchase price		1682.00 (100.00)	
4.	Total cost incurred by the wholesaler			
(i)	Total cost incurred by the wholesaler			25.59 (1.43)
(ii)	Wholesaler margin			125.73 (7.03)
(iii)	Wholesaler's sale price/ retailer purchase price			1568.34 (87.67)
5.	Total cost incurred by the retailer			
(i)	Total cost incurred by the retailer			73.57 (4.11)
(ii)	Retailer margin			147.05 (8.22)
(ii)	Retailer sale price/ consumer purchase price			1788.95 (100.00)
6.	Price spread	51.71 (3.32)	259.78 (15.44)	451.73 (25.25)

(Figures in parentheses indicate the percentage to total of consumer's price each size of samples).

Marketing efficiency of bitter gourd: The marketing efficiency of bitter gourd under different marketing channels has been presented in Table 7.

Table 7. Marketing efficiency of bitter gourd in different channels

Channel	Value of bitter gourd sold (₹/q) (consumer's price)	Gross marketing margin (₹/q) (Cost + margin)	Marketing Efficiency
I	1558.93	51.71	29.15
II	1682.00	259.78	5.47
III	1788.95	451.73	2.96

Table 7 indicates that channel-I was found more efficient as compared to channel-II and channel-III because no middlemen were existing and produce was sold directly to the consumers which resulted in less marketing cost in channel-I as compared to other channels.

Producer's share in consumer's rupee, marketing costs and middlemen margins of bitter gourd under different channels: The paper explores bitter gourd marketing dynamics, focusing on consumer rupee distribution among producers, marketing costs, and middlemen margins in various channels. Fig. 2 displays the analysis. In channel-I, producer's share was highest at 96.68%. Channel-II and channel-III had significant but lower shares at 84.56% and 74.75%, respectively. Channel-III had the highest marketing cost at ₹178.95 per quintal, followed by ₹111.36 in channel-II and ₹51.71 in channel-I. Middlemen margins were ₹148.42 per quintal in channel-II and ₹272.78 per quintal in channel-III. These insights aid discussions and policy implications in the bitter gourd industry.

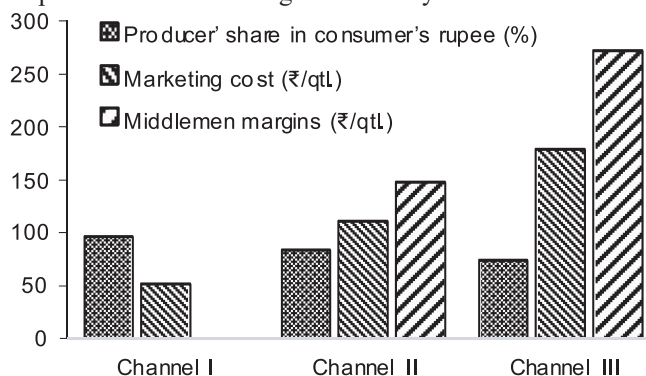


Fig. 2. Producer's share in consumer's rupee, marketing costs, and middlemen margins in different channels

Constraints faced by the farmers during the bitter gourd marketing: The use of the Garrett Ranking Technique aided in the process of prioritizing and ranking various factors, thereby determining their significance within a given context. The research looked at the marketing challenges that bitter gourd farmers face. The primary limitation, as indicated by an average garrett score of 56.79, is perishability, which results in losses after harvest. Price fluctuations, which were ranked 2nd with an average score of 54.59, have a significant impact on farmer income. The insufficient availability of storage facilities is the third highest ranked issue, with an average score of 53.56, highlighting the need for improved preservation techniques. Inefficient transportation is the 4th ranked factor contributing to delays and losses, with a score of 53.39. Middlemen exploitation was ranked fifth with a score of 53.25, while a lack of market information was ranked sixth with a score of 52.36. Limited market demand ranked 7th (average score: 51.88), and weighing errors ranked 8th (average score: 51.85), affecting marketing efforts. Other constraints include marketing infrastructure (51.79), financial constraints (51.62), lack of processing facilities (50.30), packaging issues (49.71), grading problem (48.31), government regulations and policies (47.93), and produce bulkiness (47.63). Surprisingly, government subsidies (average score: 46.51) and quality standards (average score: 45.98) ranked lower. Unavailability of preservative chemicals ranked 18th (average score: 45.44), and lack of farmer cooperatives ranked 19th (average score: 44.93), affecting distribution. Export restrictions ranked lowest (average score: 42.18), not perceived as a significant problem by farmers.

Table 8. Constraints / Problems on different size group of farms in the study area

S. No.	Particulars	Percent position	Garrett value	Total	Average score	Rank
i.	Financial constraints	2.50	88	5162	51.62	10 th
ii.	Quality standards and certifications	7.50	78	4598	45.98	17 th
iii.	Packaging issues	12.50	73	4971	49.71	12 th
iv.	Lack of farmer cooperatives	17.50	68	4493	44.93	19 th
v.	Export restrictions	22.50	65	4218	42.18	20 th
vi.	Weighing errors	27.50	62	5185	51.85	8 th
vii.	Government subsidies favouring other crops	32.50	58	4651	46.51	16 th
viii.	Limited market demand	37.50	56	5188	51.88	7 th
ix.	Middlemen exploitation	42.50	54	5325	53.25	5 th
x.	Unavailability of preservative chemicals	47.50	51	4544	45.44	18 th
xi.	Lack of processing facilities	52.50	49	5030	50.3	11 th
xii.	Problem of bulkiness of produce	57.50	46	4763	47.63	15 th
xiii.	Perishability problem	62.50	44	5679	56.79	1 st
xiv.	Government regulations and policies	67.50	41	4793	47.93	14 th
xv.	Lack of storage facilities	72.50	38	5356	53.56	3 rd
xvi.	Grading problem	77.50	35	4831	48.31	13 th
xvii.	Marketing infrastructure	82.50	32	5179	51.79	9 th
xviii.	Lack of market information and prices	87.50	27	5236	52.36	6 th
xix.	Inefficient transportation	92.50	22	5339	53.39	4 th
xx.	Wide fluctuations in prices	97.50	13	5459	54.59	2 nd

In summary, the study revealed that larger bitter gourd farms contribute significantly to marketable surplus, emphasizing the need for optimized cultivation. Channel-III dominates distribution across all farm sizes, guiding stakeholders in strategic decision-making. The analysis of price spread, costs, and margins underscores the impact of intermediaries on market dynamics. Channel-I proved most efficient, advocating for direct producer-to-consumer transactions. Constraints faced by farmers, such as perishability and price fluctuations, highlight areas for targeted interventions. Overall, this research provides valuable insights for policymakers, farmers, and stakeholders to enhance bitter gourd marketing efficiency and navigate market complexities effectively.

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