

Analysis of Market Efficiency, Costs and Price Spread Sorghum in Bundelkhand region of Uttar Pradesh

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ABSTRACT

The economics of the supply chain and the limitations of sorghum in the Bundelkhand region were studied. The Banda district was intentionally chosen due to its larger area and higher productivity. The respondents were selected using a random sampling technique. Twenty market intermediaries and a sample of 120 respondents were chosen through in-person interviews. The research area's findings showed that Channel I had a higher producer's share in consumer rupees (96.21%), followed by Channel III (75.61%) and Channel II (70.15%). Channel I's marketing efficiency was 25.42, while Channel III's was 3.17 and Channel II's was 2.34. Due to direct acquisition of the commodity from the producer, Channel I is more efficient. According to the report, the main issues farmers had with selling sorghum were a lack of information about the market and its unavailability.

Comment [ps3]: Is it economics please check

Comment [ps4]: The paper used supply chain and marketing channel interchangeably. However, supply chain is a broader term and marketing channel seems to be appropriate. Please check

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Comment [ps6]: Under cultivation?

Comment [ps7]: Of sorghum crop?

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Key words: Price spread, supply chain, constraints, and marketing efficiency

INTRODUCTION

One of the major dryland crops that rural communities in arid and semi-arid regions of the world support is sorghum. Sorghum bicolor L. is the term given to sorghum in science. It is also known as the "King of Millets" and goes by the name "jowar" in India. It is an extremely productive agricultural plant that can be used for a number of purposes, such as cereals, fodder, and livestock feed. In the world's food production hierarchy, sorghum ranks fifth, behind cereals such as rice, maize, barley, and wheat. It is also used as an industrial raw material in many different industries in wealthy countries like the United States. Under suitable ecological and managerial conditions, it might successfully rival crops such as maize. 70% of the carbs, 3% of fat, and 10%–12% of protein are found in sorghum grain.

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India had a decrease in the overall cultivated area of sorghum crop from 6.17 million hectares in 2014–2015 to 4.24 million hectares in 2020–2021. Moreover, throughout the last five years, or 2015–2021, production has decreased from 5.45 million tonnes to 4.78 million tonnes. However, the production increased from 8.84 quintals per hectare to 11.28 quintals per hectare throughout the same period, albeit with minor volatility.

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OBJECTIVES

- To look into the Sorghum Supply Chain and determine pricing spread, marketing cost, and marketing efficiency.
- To examine the constraints faced by sorghum growers faced in marketing their product.

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Material and Methods

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The Banda district in Uttar Pradesh's Bundelkhand region was purposefully chosen based on higher area and production; two blocks, Baberu and Naraini, were chosen since they had the largest areas under sorghum agriculture, and four villages were chosen. Only eight

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villages were included in this study, and fifteen respondents were chosen from each village to provide a sample of 120 farmers. Data from 20 market intermediaries was also gathered in order to examine the marketing channels.

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Marketing Cost

The price associated with transporting commodities from producers to consumers. The expenses incurred from the time the crop is harvested until it is in the hands of the final consumer typically make up the marketing cost. It covers the costs of handling, loading, unloading, storing, weighing, labour, market, and other expenses in addition to transportation and other costs.

Comment [ps25]: There different market intermediaries Commission agents, Wholesaler, Retailers. Please mention when did you classify intermediaries, pre or post data collection? please mention no. of intermediaries under each category either here (if pre classification) or in results section (if post classification)

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$$C = C_{mf} + C_{m1} + C_{m2} + C_{m3} + \dots + C_{mi}$$

Where,

C = Entire cost of marketing Sorghum

C_{mf} = Cost paid by the producer from the time the product leaves the farm till it gets sells

C_{mi} = Cost incurred by the ith middlemen in the process of buying and selling of product

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Marketing efficiency

Marketing efficiency (Acharya's Method)

$$ME = NP_F / MC + MM$$

Where,

NP_F = Net price received by respondents

MC = Marketing cost

MM = Total market margin.

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Comment [ps30]: Please check what is ME from original source. Is it Marketing efficiency or Modified measures of index of marketing efficiency

Comment [ps31]: Farmer or producer? The term respondents include market intermediaries also Please check

Market margin

This is the total profit that different market intermediaries make on a particular product after subtracting the expenses they incur in processing it.

Price Spread

It is the discrepancy between the net price that the buyer pays and the producer gets paid for producing the same amount of goods. It is made up of marketing margins and costs.

$$\text{Price Spread} = T_c + T_m$$

Where,

T_c = Total marketing cost

T_m = Total market margin

Producer's Share: It shows the percentage share of producer in the price paid by the consumer.

$$P_s = P_f / P_c * 100$$

Where,

P_s = Producer's share in consumer's rupee

P_f = Price of the produce received by a farmer

P_c = Price of the produce paid by the final consumer

Comment [ps32]: Difference?

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Supply Chains

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The organisation of all the people, businesses, assets, processes, and technological advancements involved in the creation and marketing of a product is known as a supply chain.

In the research area, three supply networks were discovered. The marketing supply chains listed below were examined.

- i. Supply Chain I: Producer-Consumer
- ii. Supply Chain II: Producer -----Commission agents ----- Wholesaler ----- Retailer----- Consumer
- iii. Supply Chain III: Producer ----- Retailer----- Consumer

Constraints

The issues that growers encountered when marketing sorghum were gathered. Following a conversation with the respondents who were asked to rate the restrictions, Garret's Ranking Technique was utilised to determine the constraints.

For converting rank into per cent Garrett's formula was given:

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

Where,

Rij = Rank given for ith factor by jth individual

Nj = Number of factors ranked by jth individual

RESULTS AND DISCUSSION

In Banda district, the study was done on the economics and marketing aspects of Sorghum and identified three supply chains. Among three different Supply Chains, Channel III handled large quantity of produce 41 per cent of 49 farmers followed by Channel I (32 per cent) 39 farmers the channel I involved direct sale of sorghum in the village, and Channel II (27 Per cent) 32 farmers respectively. A lack of knowledge or awareness of the market pricing may be the reason why the majority of farmers and producers decide to sell their produce through Channel III.

Table 1. Distribution of Farmers/ Producers adopting different Supply Chains

Supply Chains	Farmer's Category				Total
	Marginal	Small	Medium	Large	
Channel I	18(34.61)	15(42.85)	4(16)	2(25)	39(32)
Channel II	13(25)	7(20)	8(32)	4(50)	32(26.66)
Channel III	21(40.38)	13(37.14)	13(52)	2(25)	49(40.83)
Total	52	35	25	8	120

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Comment [ps47]: Farmers and producers are same

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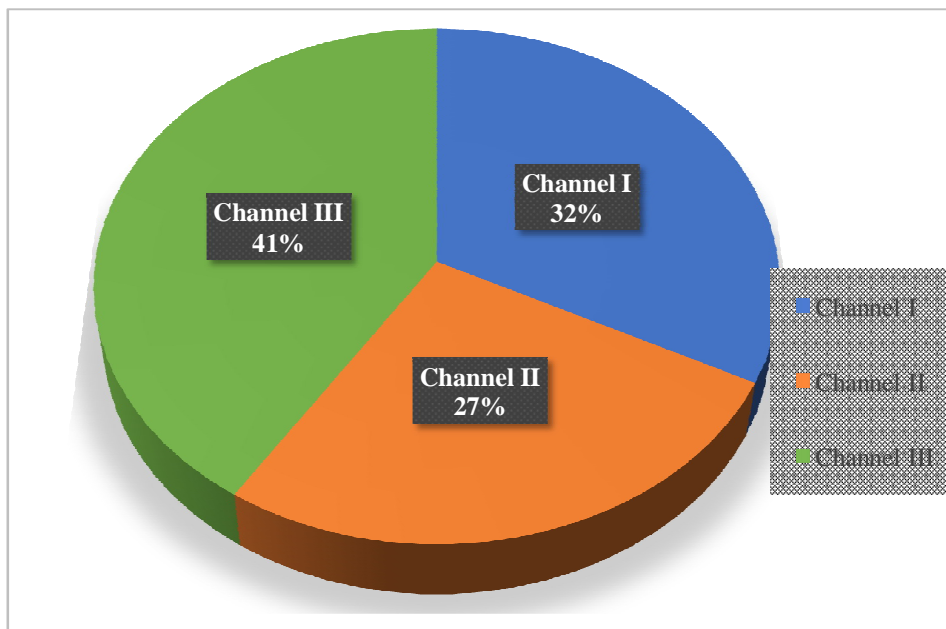


Fig 1. Sale of Sorghum through different Channels

Table 2: Price spread, marketing cost, marketing margin, and marketing efficiency of Channel I

S.No.	Particulars	Farmer's Category				
		Marginal	Small	Medium	Large	All farms
1.	Consumer's Price	3500	3500	3500	3500	3500
2.	Total Marketing Cost	132.4	132.4	133	132	132.45
3.	Total Marketing Margin	0	0	0	0	0
4.	Net price received by the farmer	3367.3	3367.6	3367	3368	3367.47
5.	Producer's share in Consumer's price (per cent)	96.20	96.21	96.2	96.22	96.21
6.	Price Spread	132.4	132.4	133	132	132.45
7.	Marketing efficiency (Acharya's method)	25.43	25.43	25.31	25.51	25.42

Table 2 showed the producer's portion of the consumer rupee, the farmer's net price, the price spread, and the marketing effectiveness of sorghum in the research area. With a net price received by farmers of Rs. 3367.47/q, a price spread of Rs. 132.45/q, and a producer's share of the consumer price of 96.21 percent, Channel I had an overall marketing efficiency of

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25.42. In the case of marginal 25.43, small 25.43, medium 25.31, and large 25.51, the marketing cost was low and the marketing margin sustained by an intermediary in the channel, making it much more efficient than another channel. (Ravekar and others, 2015). had additionally made a contribution to the producer-consumer rupee share, which was largest in channel I.

Comment [ps62]: Unit of measurement?

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Table 3: Marketing cost, Marketing margin, Marketing efficiency, and Price Spread of Channel II (Rs./q)

S.NO	Supply chain II Particulars	Farmer's category				All farm
		Marginal	Small	Medium	Large	
1.	Consumer's Price	4500	4800	5000	5000	4825
2.	Total Marketing Cost	524	613	554	739.25	607.25
3.	Total Marketing Margin	708.21	848	940.27	895.5	847.99
4.	Net price received by the farmer	3188	3334.3	3527.01	3488	3384.32
5.	Producer's share in Consumer's price (per cent)	70.84	69.46	70.54	69.76	70.15
6.	Price Spread	1232.21	1461	1494.27	1634.75	1455.55
7.	Marketing efficiency(Acharya's method)	2.58	2.82	2.36	2.13	2.47

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Table 3 showed the price spread, producer's share of the consumer rupee, farmer's net price, and the marketing effectiveness of sorghum in the research area. It was noted that Channel II was less efficient than other channels, that the number of market intermediaries had increased, and that the channel's marketing margin and cost were the greatest. The overall marketing efficiency in the cases of marginal farmers (2.58), small farmers (2.82), medium farmers (2.36), and large farmers (2.13), is 2.47. The net price obtained by farmers is Rs. 3384.32/q, the price spread is Rs. 1455.55/q, and the producer's share of the consumer's price is 70.15 percent. This study is in partnership with Hile, et al. (2013), who found that the channel I (producer, commission agent, wholesaler, retailer, and customer) had the highest marketing margins for rabi sorghum.

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Table 4: Marketing cost, Marketing margin, Marketing Efficiency, and Price Spread of Channel III (Rs./q)

Supply Chain III		Farmer's Category				
S.NO	Particulars	Marginal	Small	Medium	Large	All farm
1.	Consumer's price	4500	4600	4800	4800	4675
2.	Total Marketing Cost	445.72	428	431	403.5	427.05
3.	Total Marketing Margin	780.81	634	681	681	694.20
4.	Net price received by the farmer	3273.47	3538	3688	3685.5	3546.24
5.	Producer's share in Consumer's Price (per cent)	72.74	76.91	76.83	76.78	75.81
6.	Price Spread	1226.53	1062	1112	1084.5	1121.25
7.	Marketing efficiency (Acharya's method)	2.66	3.33	3.31	3.39	3.17

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Table 4 revealed the producer's share in consumer rupee, Net price received by farmer, price spread and marketing efficiency of Sorghum in channel III on the study area. In Channel III, it was observed that the marketing efficiency of marginal farmers (2.66), Small(3.33), Medium(3.31), and Large(3.39). Overall marketing efficiency is 3.17, price spread is Rs. 1121.25/q, Net price received by the farmer is Rs.3546.24/q, and Producer's share in Consumer's price is 75.81 per cent. Similar work related to present investigation was done by (Kumar *et al.*, 2022). Sidhu *et al.*(2011) also estimated channel wise marketing efficiency of green peas which is comparable to the present study. A few observations on pricing spread, market margin, and marketing costs in various Fig marketing channels were made by Bhosale *et al.* (2011). In Punjab, Singh *et al.* (2018) provided some information on the pricing distribution and marketing trends of green fodder. Additionally, Mounika *et al.* (2020)

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provided some statistics on the price spread, market margin, and marketing costs associated with sorghum in various distribution channels.

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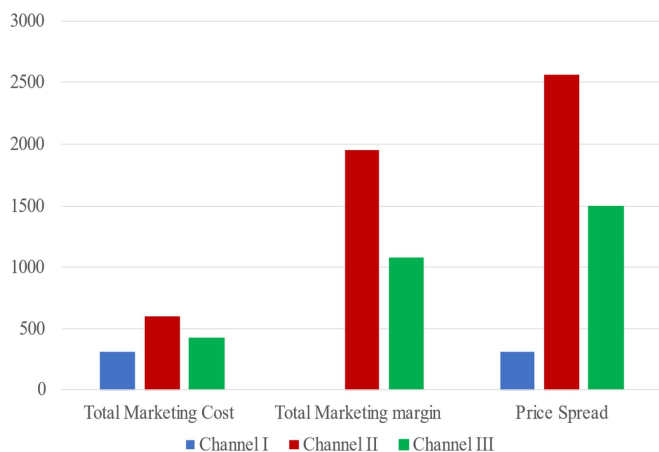


Fig 2 : Marketing cost, Marketing margin and Price Spread of Sorghum under three Supply chains

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Constraints in marketing of sorghum

Table 5 Constraints handled by farmer in marketing of Sorghum

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Constraints	Mean score	Rank
Price Fluctuations	29.3	VIII
Malpractice in weighing	32.37	VI
Market Places are far away	70.38	II
A small quantity of Marketable surplus	30.22	VII
Non-availability of Market-related information	72.40	I
Limited buyer's in Market	63.75	III
Poor transport facility	51.84	IV
High Cost of Transportation	48.7	V

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The findings presented in Table 5 illustrate the diverse obstacles encountered by the sorghum cultivators within the research region. According to the study, the main obstacles farmers in the study area face when marketing sorghum are the lack of market-related information (rank I, mean score: 72.40), market locations that are far away (rank II: 70.38), few buyers in the market (rank III: 63.75), poor transport facilities (rank IV: 51.84), high transportation costs (rank V: 48.7), weighing errors (rank VII: 32.37), and price fluctuations (rank VIII: 29.3). The respondents expressed dissatisfaction at the lack of information relevant to the market. The majority of farmers are unable to obtain market information. The reason for this was the involvement of middlemen. Research akin to the current study was conducted on strawberries by Sharma *et al.* (2022) and bananas by Mungalpara *et al.* (2017). The main issue with pearl millet marketing was lack of transportation facilities, which was followed by high transportation costs (Tandel *et al.*, 2018). When finger millet was studied for marketing channels and marketing effectiveness in the Kolar area of Karnataka, price fluctuations (56%) and a lack of market intelligence (45%) were found to be the main issues. (Venkatamana *et al.*, 2015).

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Comment [ps81]: Intermediaries or producer/farmers?

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Comment [ps83]: Tandel *et al.*, 2018 study pertains to finger millet not pearl millet

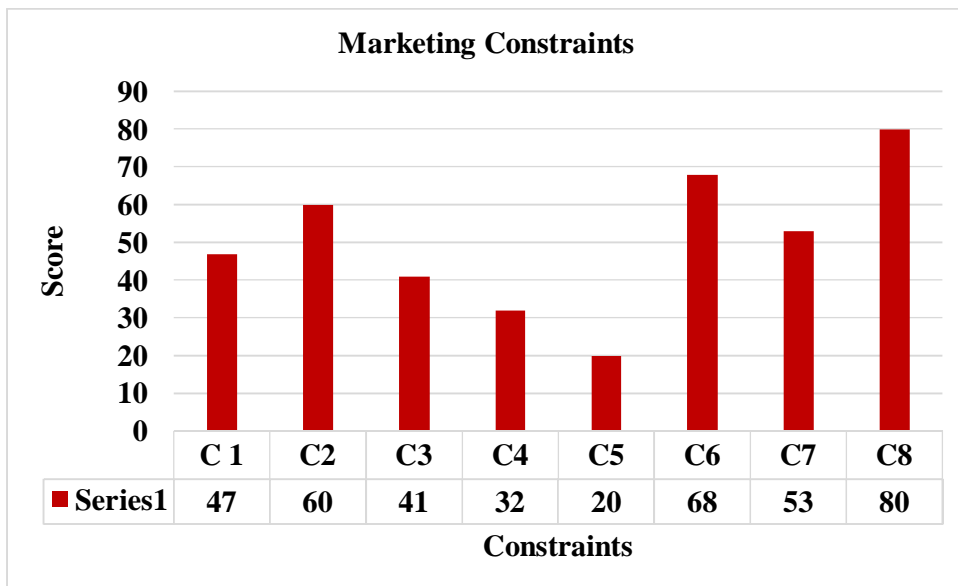


Fig 3: Constraints in marketing of Sorghum

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CONCLUSIONS

The present investigation was intended to represent the image of Sorghum growers in Banda district of U.P Bundelkhand region. The previous discussion on various aspects of study led to draw the following conclusions.

The study revealed that, there are three Supply chain identified, Out of the three supply chain, Channel I (Producer---Consumer), is more efficient than Channel III (Producer-- -- Retailer--- Consumer), and Channel II (Producer--- Commission agent--- Wholesaler--- Retailer---Consumer).

In respect of market efficiency, Channel I producer's share in the consumer's rupee was 96.21 per cent , the total marketing margin was zero because there is no middleman involvement, the total marketing cost was Rs.132.52/q, Price Spread was Rs.132.52/q, the Net price received by the farmer was Rs.3367.47 and marketing efficiency was 25.42. The marketing efficiency decreased by increase in number of intermediaries. In Channel II producer's share in the consumer's rupee was 70.15 per cent , the total marketing margin was Rs. 847.99, the total marketing cost was Rs. 607.56, Price Spread was Rs.1455.55, the Net price received by the farmer was Rs.3384.32/q, and marketing efficiency was 2.47.

The producer's share of the consumer's rupee in Channel III was 75.81 percent; the total marketing cost was 427.05; the price spread was Rs. 1121.25; the net price obtained by the farmer was Rs. 2872.94; and the marketing efficiency was 3.17.

Out of the eight restrictions, the lack of market-related knowledge rank I (with a Garrett score of 72.40) and market locations being far distant rank II (with a Garrett score of 70.38) posed the biggest challenges to farmers selling sorghum. Low number of buyers in the market rank III (Gartner score: 63.75), inadequate transportation infrastructure rank IV (Gartner score: 51.84), and high transportation costs rank V (Gartner score: 48.7) Poor transport facility rank VII (with a Garrett score of 51.84), Price fluctuation rank VIII (with a Garrett score of 29.3), and malpractice in weighing rank VI (with a Garrett score of 32.37).

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