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Assessment of marketing costs, margins, and efficiency in sweet corn marketing in Sonipat, Haryana

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Abstract

The study was conducted in Sonipat district of Haryana to identify prevailing marketing channels, and analyze marketing costs, margins, price spread, and marketing efficiency in sweet corn. Primary data for the agricultural year 2024-25 were collected from 80 farmers, wholesalers, retailers, millers, and *masakhores* using a multi-stage purposive sampling technique. Five marketing channels, including three *mandi*-based and two non-*mandi*-based routes, were identified. Results indicated that marginal farmers devoted the highest proportion of their operational area (88.11%) to sweet corn cultivation, while large farmers allocated only 44.37%. Marketing cost was highest in Channel I (₹2,200/quintal) and lowest in Channel IV (₹1,000/quintal). The producer's share in the consumer's price ranged from 37.76 per cent in Channel I to 61.26 per cent in Channel IV. Marketing efficiency analysis showed that shorter channels, particularly Channel IV and Channel V, recorded higher efficiency scores under Shepherd's (3.15 and 3.67, respectively) and Acharya's (1.58 and 1.29, respectively) methods. The findings suggest that reducing the number of intermediaries and improving direct market access can significantly enhance producer returns and marketing efficiency in sweet corn marketing.

Keywords: Sweet corn, marketing cost and margins, marketing channels, price spread, marketing efficiency

Introduction

Maize (*Zea mays* L.) is one of the most important cereal crops globally, ranking third in production after rice and wheat, and is valued for its wide adaptability under diverse agro-climatic conditions (Dass *et al*., 2012) [2]. Maize is also known as the "Queen of Cereals" due to its higher productivity potential compared to other members of the *Gramineae* family, it was first domesticated in Southern Mexico about 10,000 years ago and has since become a staple food crop in many parts of the world (Jaisridhar *et al*., 2014) [5]. In India, during 2023-24 maize occupies about 11.24 million hectares, with an annual production of 37.67 million tonnes and an average productivity of 3.35 tonnes per hectare (GoI, 2024). In Haryana, maize is grown during the kharif season. During the 2024-25 kharif season, maize occupied an area of 4.31 thousand hectares with 16.01 thousand MT of production (GoH, 2025). In Haryana, Panchkula (3,440 ha and 11,450 MT), Sonipat (450 ha and 1,500 MT), Karnal (210 ha and 700 MT) and Panipat (170 ha and 470 MT) are the major maize producing districts (DES, 2023).

Sweet corn (*Zea mays saccharata*), a naturally occurring mutant type of maize, has gained significant importance in recent years due to its high sugar content (25-30 per cent) and low starch content, making it a preferred choice for fresh consumption and processing. Sweet corn is harvested at the milky stage when the grain moisture is around 70 per cent, it offers tender kernels with high palatability, appealing flavour, and enhanced nutritional value. India's growing economy, coupled with changing dietary patterns and increasing health consciousness, has created a robust domestic market for sweet corn, especially in urban areas where the demand for roasted and boiled cobs is on the rise. It is consumed fresh - boiled, roasted, or in culinary preparations - and is also processed into canned, frozen, and dehydrated products. In addition, it serves as raw material for manufacturing starch syrups, dextrose, dextrin, and other industrial products, while the crop residue is a valuable source of quality fodder for livestock (Dwivedi *et al*., 2021) [4].

Despite its potential, sweet corn cultivation faces several challenges, including high costs of seed and fertilizers, labour shortages during peak operations, inadequate market infrastructure, high transportation costs, and price fluctuations (Chahal & Kataria, 2010; Dwivedi *et al*., 2021) [1, 4]. Marketing inefficiencies - such as high intermediary margins and limited access to remunerative markets, further reduce producers' share in the consumer's rupee. Understanding the cost structure, profitability, and marketing efficiency is therefore essential for strengthening

the value chain and enhancing farmers' income.

In this context, the present study was undertaken to assess the economic viability of sweet corn marketing and examine its marketing patterns, costs, margins, and price spread across different marketing channels. Sonipat, being a leading district in area as well as production of maize in Haryana and its very close proximity to the NCR (National Capital Region) was chosen for the study. The findings of the study provide useful insights for policy formulation, resource allocation, and development of market linkages to promote sustainable sweet corn production and marketing.

Materials and Methods

A multi-stage purposive sampling technique was adopted to identify the final sampling units for the study. Primary data for the agricultural year 2024-25 were collected through a survey method, using personal interviews conducted with the help of a pre-tested, structured schedule. Four villages - Manoli, Dahisra, Toki, and Pubsra, were selected purposively, and from each village, 20 farmers were chosen at random, resulting in a total sample of 80 farmers. Based on the cumulative frequency distribution method, these farmers were categorised into four groups: marginal, small, medium, and large, according to their operational holding size. To capture marketing-related information, data were also collected from wholesalers and retailers operating in Azadpur Mandi, Delhi, a key market for sweet corn in the study area.

Different concepts used in the study are discussed below in brief:

A. **Marketing cost:** Marketing cost comprises all expenses incurred in moving sweet corn from the farm to the final consumer, including transportation, storage, market fees, packaging, and related charges. These costs were estimated at each stage of the marketing chain and subsequently aggregated to obtain the total marketing cost. The results were also expressed in percentage terms to facilitate comparison across different stages and channels. The marketing cost is given by:

$$C = C_F + C_{M1} + C_{M2} + C_{M3} \ldots C_{Mn}$$

Where,
C = Total cost of marketing
C_F = Cost paid by the producer from the time produce leave the farm till sale
C_{Mi} = Cost incurred by the ith middlemen at each stage of marketing i = 1, 2, 3…n

B. **Marketing margins:** The general expression for estimating the margin for intermediaries is;

$$Margin = Sale\ price - Price\ paid - Cost\ of\ marketing - Loss\ in\ value$$

C. **Marketing Efficiency:** Marketing efficiency is calculated by the following three methods (Acharya & Agarwal, 2021):

D. **Conventional method**

$$Marketing\ efficiency = \frac{Value\ Added}{Total\ Marketing\ Cost} x100$$

- **Shepherd's method**

$$Marketing\ efficiency = \frac{Consumer's\ price}{Total\ Marketing\ Cost} x100$$

- **Acharya's method**

$$Marketing\ efficiency = \frac{Price\ Recieved\ by\ farmer}{Total\ Marketing\ Cost + Margins} x100$$

Results and Discussion

This section presents the key findings on the socio-economic profile of sweet corn growers, marketing channels, costs, margins, price spread, and marketing efficiency. The results are discussed with relevant literature to highlight variations across channels and their implications for producer returns and market performance.

General Characteristics of Sweet Corn Growers

The socio-economic scenario of the sampled sweet corn growers is presented in table 1. The family composition data indicates that adult males formed the largest share across all farm categories, constituting 44.99 per cent of the total sample. Their proportion was highest among small farmers (47.52%) and lowest among medium farmers (43.41%). Adult females accounted for 34.35 per cent of the total sample, with marginal farmers reporting the highest proportion (38.23%). Children formed 21.06 per cent of the overall household members, with their share being highest in large farm households (24.64%) and lowest among marginal farmers (16.17%). This pattern suggests that larger farms tend to have slightly higher dependency ratios due to a greater proportion of children in the household.

The majority of respondents across all categories had education up to the intermediate level (25.00%), followed closely by graduates (21.25%). Primary and secondary education levels accounted for 16.25 and 17.50 per cent of the total sample, respectively, while matriculates formed 15.00 per cent. Illiteracy was relatively low at 5.00 per cent, observed only among marginal, small, and medium farmers. This indicates a generally moderate to high educational attainment among sweet corn growers, which can positively influence adoption of improved production and marketing practices.

The age distribution of respondents revealed that the farming population is predominantly middle-aged, with 52.50 per cent falling in the 35-50 years category. Older farmers (>50 years) constituted 36.00 per cent of the sample, while young farmers (<35 years) were the least represented at 11.25 per cent. This suggests that sweet corn cultivation is largely managed by experienced farmers, with limited participation from younger age groups.

In terms of operational holding size, medium farmers accounted for the largest share of the sample (36.25%), followed by large (25.00%), small (23.75%), and marginal farmers (15.00%). The average landholding size increased substantially across categories - from 1.85 acres in marginal farms to 29.70 acres among large farms. Interestingly, the proportion of land under sweet corn cultivation was highest among marginal farmers (88.11%) and smallest among large farmers (44.37%), indicating that smaller farms tend to allocate a larger share of their operational area to sweet corn, possibly due to its higher profitability and quicker returns. Overall, sweet corn accounted for 49.64 per cent of the total operational area across all farm sizes.

Table 1: Socio-economic structure of the sweet corn growers in Sonipat district

Categories	Marginal	Small	Medium	Large	Overall
Family Composition					
Adult Males Frequency	31(45.58)	48(47.52)	79(43.41)	62(44.92)	220(44.99)
Adult Females Frequency	26(38.23)	34(33.66)	64(35.16)	49(35.5)	168(34.35)
Children Frequency	11(16.17)	19(18.81)	39(21.42)	34(24.64)	103(21.06)
Total	68(100)	101(100)	182(100)	138(100)	489(100)
Educational Status					
Illiterates	1(8.33)	2(2.50)	1(3.44)	0(0.00)	4(5.00)
Primary	5(41.66)	3(15.79)	3(10.34)	2(10.00)	13(16.25)
Secondary	1(8.33)	4(21.05)	5(13.79)	4(20.00)	14(17.5)
Matriculates	1(8.33)	2(10.53)	6(24.14)	3(15.00)	12(15.00)
Intermediates	3(25.00)	3(15.80)	8(27.59)	6(30.00)	20(25.00)
Graduates	1(8.33)	5(26.32)	6(20.68)	5(25.00)	17(21.25)
Total	12(100)	19(100)	29(100)	20(100)	80(100)
Age distribution					
Young (<35)	2(18.18)	2(9.52)	3(10.34)	2(10.52)	9(11.25)
Adult (35-50)	6(54.54)	11(52.38)	15(51.72)	10(52.63)	42(52.50)
Old (>50)	3(27.27)	8(38.09)	11(37.93)	7(36.84)	29(36.00)
Total	11(100)	21(100)	29(100)	19(100)	80(100)
Operational size of holding of farmers					
Frequency	12(15.00)	19(23.75)	29(36.25)	20(25.00)	80(100)
Average land holding (in acres)	1.85	5.03	14.62	29.7	14.2
Average sweet corn acreage (in acres)	1.63	3.92	7.12	13.18	7.05
Percentage Acreage under sweet corn	88.11	77.93	48.7	44.37	49.64

*Figures in parentheses show percentages

These findings are consistent with earlier studies which reported that small and marginal farmers often allocate a larger share of their operational land to high-value crops to enhance income returns. The predominance of middle-aged farmers is also in line with findings by Singh *et al*. (2019) [10], who noted that experience plays a significant role in decision-making for perishable crop marketing. Higher literacy levels observed in the present study could positively influence the adoption of improved cultivation and marketing practices, as also indicated in the findings of Kundu *et al*. (2020) [7], where education was positively correlated with adoption of recommended practices.

Marketing Pattern of Sweet Corn
The study found that, sweet corn in Sonipat district is marketed through five distinct channels, each differing in structure and the sequence of intermediaries involved. The first channel follows a processing route, where produce moves from the producer to a miller or processor, then to a company, followed by distributors, and finally to consumers. The second channel operates within the mandi system, starting from the producer and passing through a commission agent, wholesaler, and retailer before reaching the consumer. The third channel also begins with a commission agent in the *mandi*, after which the produce is sold to *masakhores* (bulk buyers) and then to hawkers, who sell directly to consumers. The fourth channel is similar but shorter, with *masakhores* selling directly to consumers, bypassing the hawker stage. The fifth and shortest channel involves direct sale from the producer to a retailer, who then sells to consumers. Of these, three channels (the second, third, and fourth) are *mandi*-based, while the first and fifth operate outside the *mandi* through processors or direct retailers who maintain collection outlets near the villages. The five channels are as below:

- Channel I: Producer → Miller/Processor → Company → Distributors → Consumers
- Channel II: Producer →Commission agents → Wholesalers → Retailers → Consumers
- Channel III: Producers → Commission agents → *Masakhores* → Hawkers → Consumers
- Channel IV: Producers → Commission agents → *Masakhores* → Consumer
- Channel V: Producers → Direct Retailer → Consumers

Marketing Cost and Margins of Intermediaries in Sweet Corn Marketing
The marketing cost and margins incurred by different intermediaries through each through channel is shown in table 2. The analysis of marketing costs, margins, and price realization across the five marketing channels of sweet corn in Sonipat district reveals substantial variation in efficiency and producer returns depending on the number and type of intermediaries involved. In Channel I, where the farmer sold directly to a miller, the net price received by the producer was the highest at ₹2,500/quintal, with minimal producer-incurred expenses of ₹110/quintal, mainly for transportation and loading. The miller purchased the produce at ₹2,510/quintal and bore significant processing-related expenses of ₹1,790/quintal, which included ₹830/quintal for electricity, labour, and cleaning, and ₹960/quintal for canning boxes. Despite the high operational cost, the miller secured a margin of ₹350/quintal and sold the processed product to a company at ₹4,650/quintal. This channel clearly benefited the producer by avoiding multiple intermediary margins and also demonstrated the role of value addition in increasing the final price.
Channel II involved a longer supply chain where the producer sold through commission agents to wholesalers and subsequently to retailers. Here, the net price received by the producer was the lowest at ₹1,810/quintal, with producer expenses rising to ₹290/quintal due to additional costs such

as packing charges, commission fees, and transportation. The wholesaler purchased the produce at ₹2,100/quintal, incurred ₹300/quintal in marketing expenses that included market fees, transportation, loading, and repacking, and earned the highest intermediary margin in the study at ₹540/quintal. The lower producer share in this channel can be attributed to the cumulative effect of multiple intermediary margins and higher marketing costs.

In Channel III, the produce moved from the producer through commission agents to *masakhores* and then to hawkers before reaching consumers. The producer's net price was ₹1,930/quintal, with marketing expenses of ₹300/quintal. The *masakhores* purchased at ₹2,230/quintal, spent ₹700/quintal mainly on market fees, packing, loading, and labour, and earned a margin of ₹220/quintal. Although the producer's price was marginally higher than in Channel II, the presence of multiple small-scale traders meant that marketing costs remained high, and the margins retained by intermediaries limited the gains to farmers.

Channel IV followed a similar structure to Channel III, with the produce moving through commission agents to *masakhores* but sold directly to consumers without hawkers. The producer's net price and expenses were identical to Channel III at ₹1,930/quintal and ₹300/quintal respectively, with *masakhores* again incurring ₹700/quintal in expenses and retaining a ₹220/quintal margin. The similarity in costs and margins indicates that the removal of hawkers from the chain did not significantly alter the producer's returns, but it may have slightly improved consumer access to fresher produce.

Channel V, involving direct sales from producers to retailers with collection outlets near villages, was the second most profitable for farmers, yielding a net price of ₹2,400/quintal with only ₹110/quintal in expenses, primarily for transportation and loading. The direct retailer purchased at ₹2,510/quintal, incurred ₹1,050/quintal in costs including electricity, rent, and other operational charges, and retained the highest retail-level margin at ₹700/quintal. This channel demonstrated that reducing the number of intermediaries substantially improved the producer's share in the consumer's rupee while allowing retailers to maintain a profitable margin.

Table 2: Marketing cost and margins of intermediaries in marketing of sweet corn in Sonipat

Particulars	Channel I	Channel II	Channel III	Channel IV	Channel V
Net price received by the producer	2,500	1,810	1,930	1,930	2,400
Expenses incurred by the producer	110	290	300	300	110
Transportation	60	60	90	90	60
Loading charges	50	50	50	50	50
Packing charges	-	50	50	50	-
Commission	-	100	110	110	-
Purchase price of Miller	2,510	-	-	-	-
Purchase price of Wholesaler	-	2,100	-	-	-
Purchase price of *Masakhores*	-	-	2,230	2,230	-
Purchase price of Direct retailer	-	-	-	-	2,510
Expenses incurred by Miller	1,790	-	-	-	-
Expenses incurred by Wholesaler	-	300	-	-	-
Expenses incurred by *Masakhores*	-	-	700	700	-
Expenses incurred by Direct Retailer	-	-	-	-	1,050
Electricity, labor, cleaning, etc. (Miller)	830	-	-	-	-
Canning boxes (Miller)	960	-	-	-	-
Market fee (Wholesaler)	-	45	-	-	-
Market fee (*Masakhores*)	-	-	50	50	-
Transportation (All)	-	105	50	50	200
Loading/unloading (All)	-	50	50	50	-
Labour/repacking (All)	-	150	350	350	350
Packing (*Masakhores*)	-	-	100	100	100
Electricity, Rent and other charges (Direct retailer)	-	-	-	-	100
Wastage (All)	-	100	100	100	300
Storage (Miller)	-	-	-	-	-
Margin of Miller	350	-	-	-	-
Margin of Wholesaler	-	540	-	-	-
Margin of *Masakhores*	-	-	220	220	-
Margin of Direct retailer	-	-	-	-	700
Selling price (Miller to company)	4,650	-	-	-	-
Expenses by Company	300	-	-	-	-
Transport	130	-	-	-	-
Loading unloading	100	-	-	-	-
Storage	70	-	-	-	-
Purchase price of retailer	-	2,920	-	-	-
Purchase price of Hawkers	-	-	3,150	-	-
Expenses incurred by retailer	-	980	-	-	-
Transportation	-	100	-	-	-
Labour	-	400	-	-	-
Packing	-	100	-	-	-

The higher costs in *mandi*-based channels are attributed to multiple handling stages and statutory market charges, a trend also reported by Kumar *et al*. (2021) in their study on vegetable marketing. The low marketing costs in direct marketing channels (Channel V) and processor-linked channels (Channel I) align with the observations of Sihmar *et al*. (2018) [9], who noted that shortening the supply chain reduces costs and enhances farmer margins. Additionally, the substantial margins retained by processors in Channel I highlight the value addition potential in sweet corn, as also emphasized by Dhaka *et al*. (2017) [3], who found processing to significantly enhance profitability but reduce the producer's share in the consumer price due to high operational expenses.

Price Spread and Marketing Efficiency in Marketing of Sweet Corn Through Different Channels
Table 3 shows the price spread for sweet corn marketing in Sonipat district, revealing significant differences in efficiency among the five identified channels. In Channel I, the consumer price is the highest at ₹6,620/quintal, with a price spread of ₹4,120/quintal and the lowest producer's share in the consumer's rupee (37.76%). While the net price received by the producer (₹2,500/quintal) is relatively high, substantial marketing costs (₹2,200/quintal) and margins retained by intermediaries (₹1,920/quintal) reduce the overall efficiency of this channel. Channel II shows a consumer price of ₹4700/quintal and a price spread of ₹3,040/quintal, with the producer's share at 38.51%. The producer's net price is lower at ₹1,810/quintal, and marketing costs stand at ₹1,570/quintal. This indicates that although the marketing cost is lower than in Channel I, the producer's earnings are comparatively smaller due to the involvement of multiple intermediaries sharing the margins.

Table 3: Price spread in marketing of sweet corn through different channels in Sonipat district (₹/qtl)

Particulars	Channel-I	Channel-II	Channel-III	Channel-IV	Channel-V
Producer net price	2,500	1,810	1,930	1,930	2,400
Marketing margin	1,920	1,470	1,100	220	700
Marketing cost	2,200	1,570	1,670	1,000	1,160
Consumer's price	6,620	4,700	4,700	3,150	4,260
Price spread	4,120	3,040	2,770	1,220	1,860
Producers' share in consumer Rupee	37.76	38.51	41.06	61.26	56.33

In Channel III, the producer's net price improves slightly to ₹1,930/quintal, but marketing costs are higher (₹1,670/quintal), and the price spread (₹2,770/quintal) is close to that of Channel II. The producer's share in the consumer's rupee is slightly better at 41.06%, reflecting a marginal improvement in efficiency despite the added

hawker stage. Channel IV is the most efficient *mandi*-based channel, with a producer's share of 61.26% and the lowest price spread among *mandi* routes (₹1,220/quintal). Here, the net price to the producer (₹1,930/quintal) is the same as in Channel III, but the shorter chain reduces marketing costs to ₹1,000/quintal and intermediary margins to ₹220/quintal, leading to better returns for farmers. Channel V is one of the highly efficient among all channels, with a producer's share of 56.33% and a net price of ₹2,400/quintal. Marketing costs (₹1,160/quintal) are moderate, and the price spread (₹1,860/quintal) remains substantially lower than in the longer chains. This direct route bypasses *mandi* intermediaries, enabling farmers to capture a larger share of the consumer price while maintaining reasonable marketing costs.

These results reaffirm the general marketing principle that shorter supply chains result in higher producer shares and lower price spreads (Dwivedi *et al*., 2021) [4]. The efficiency of Channel IV reflects the benefit of eliminating redundant intermediary stages, a finding consistent with Malik *et al*. (2016) [8] in their analysis of vegetable marketing in Haryana. Conversely, the low efficiency of Channel I, despite its high consumer price, is primarily due to heavy processing and distribution costs, which is similar to the observations of Kumar and Singh (2018) [6], who noted that value addition often benefits downstream actors more than producers unless farmers are directly linked to processing units.

Marketing efficiencies of the five channels when evaluated using Conventional, Shepherd's, and Acharya's methods is represented in table 4. Based on the Conventional Method, efficiency values ranged from 1.22 (Channel IV) to 1.93 (Channel II), indicating that *mandi*-based Channel II performed marginally better than other routes, while Channel IV was the least efficient under this approach. In contrast, the Shepherd's Method showed higher efficiency values across all channels, with the maximum observed in Channel V (3.67), the direct retailer route, followed by Channel IV (3.15) and Channel II (2.99). This highlights that shorter supply chains and reduced intermediary involvement contribute significantly to marketing efficiency. Channel III (2.81) had the lowest efficiency under Shepherd's Method, reflecting higher costs relative to the value of goods transacted.

Acharya's Method, which incorporates the producer's share in the consumer's price, revealed a distinctly different ranking. Channel IV (1.58) recorded the highest efficiency, followed by Channel V (1.29), whereas Channels I (0.61) and II (0.56) both had the lowest value. This reinforces the finding that channels with fewer intermediaries, lower marketing costs, and higher producer shares tend to perform better on efficiency measures that factor in producer welfare.

Table 4: Marketing efficiency of different marketing channels in sweet corn marketing in Sonipat district

Particulars	Channel-I	Channel-II	Channel-III	Channel-IV	Channel-V
Conventional Method	1.87	1.93	1.65	1.22	1.60
Shepherd's Method	3.01	2.99	2.81	3.15	3.67
Acharya's method	0.61	0.56	0.70	1.58	1.29

The overall pattern indicates that while *mandi*-based channels (II and III) may show competitive efficiency under conventional cost-benefit approaches, direct marketing and shorter channels (IV and V) are more efficient from the

perspective of both price realization and equitable distribution of marketing margins. These results are in line with the findings of Dwivedi *et al*. (2021) [4] and Sihmar *et al*. (2018) [9], who reported that reducing the length of

marketing channels improves efficiency and enhances producers' returns. Similar observations were made by Malik *et al*. (2016) in vegetable marketing studies, where direct sales channels consistently outperformed longer chains in terms of Acharya's efficiency index.

Conclusion

Sweet corn marketing in Sonipat district functions through a mix of *mandi*-based and direct-sale channels, each with distinct cost structures, margins, and efficiency levels. The analysis revealed that shorter channels involving fewer intermediaries provided higher producer shares and better marketing efficiency. *Mandi*-based channels, while offering broader market access, incurred higher marketing costs due to commission charges, transportation, packing, and handling expenses, reducing the net price received by producers. Notably, Channel IV achieved the highest producer's share (61.26%) and the greatest efficiency under Acharya's method (1.58), while Channel V recorded the highest Shepherd's efficiency (3.67). The predominance of middle-aged and relatively educated farmers indicates readiness to adopt improved marketing strategies. Policy measures promoting direct marketing infrastructure, strengthening farmer - retailer linkages, and fostering farmer producer organizations (FPOs) can reduce dependency on commission agents, improve marketing efficiency, and ensure a more equitable distribution of consumer expenditure in the sweet corn value chain.

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