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RESEARCH PAPER

Economic Analysis and Market Dynamics of Jowar Cultivation in Adilabad District of Telangana

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ABSTRACT

This study analyzes the cost of cultivation, profitability, and marketing efficiency of Jowar in Adilabad district, Telangana, during the Rabi season 2023-2024. A random sampling technique was used to select 100 respondents, including 80 farmers, 10 traders, 3 processors, 3 wholesalers, and 4 retailers. The total cost of cultivation of jowar was ₹ 55,607 per hectare, with operational costs (85.24%) being the major expense. Jowar cultivation proved profitable, yielding a net return of ₹ 15,870 per hectare and a return per rupee spent of 1.29. The study also examined marketing channels, revealing that direct sales to consumers (Channel-I) ensured the highest producer share (98.19%) and marketing efficiency (54.33%), whereas longer supply chains (Channels II-IV) significantly reduced farmers' profits. The findings highlight the need for cost reduction and market reforms, including the introduction of Fair Remunerative Price (FRP), Farmer Producer Organizations (FPOs), financial support, value addition, and improved market linkages. These strategies can enhance Jowar production, profitability, and sustainability, ensuring better income for farmers and improved market accessibility for consumers.

HIGHLIGHTS

- Farmers earn a net return of ₹ 15,870 per hectare with a return per rupee spent of 1.29, indicating economic viability.
- Channel-I (direct sale to consumers) gives farmers the highest share of the consumer's rupee (98.19%) and the best marketing efficiency (54.33%).
- High labor and mechanization costs (62.37% of total expenses) highlight the need for Fair Remunerative Price (FRP), Farmer Producer Organizations (FPOs), and improved market access to enhance farmer profits.

Keywords: Economic Analysis, Market Dynamics, Jowar, Cultivation, Adilabad

Jowar (*Sorghum bicolor*), a resilient and nutritionally rich millet crop, holds significant importance in the agricultural landscape of Telangana, particularly in the northern districts like Adilabad. Despite its historical importance as a staple food crop and its remarkable adaptability to diverse agro-climatic conditions, jowar cultivation faces numerous challenges related to production costs, market access, and economic viability in contemporary agricultural systems (Vasantha *et al.* 2021; Charankumar *et al.* 2024). Labor and mechanization constitute major cost components in jowar cultivation, as highlighted by Charankumar *et al.* (2024), who found these factors significantly affect the overall cost structure and profitability. The crop's potential for sustainable farming practices and nutritional security remains largely underexploited due to

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inadequate market infrastructure, limited value addition, and insufficient policy support (Rodriguez Izaba *et al.* 2023).

The agricultural economy of Adilabad district, characterized by its semi-arid climate and predominantly rain-fed farming systems, presents a unique context for understanding the economic dimensions of jowar cultivation. Dinesh *et al.* (2019) analyzed growth patterns and instability in jowar cultivation in neighboring regions, noting considerable fluctuations in production and area under cultivation. Verma *et al.* (2018) investigated income from jowar across different farm size groups, finding that profitability varies significantly based on landholding size and cultivation practices. Despite these valuable insights, a comprehensive analysis focusing specifically on jowar in Telangana's northern zone remains limited.

The marketing efficiency of agricultural commodities significantly impacts farmers' income and profitability, as demonstrated by Monika *et al.* (2022) who found that direct marketing channels yield higher returns for producers. Similarly, Sehgal and Kumar (2022) observed that reducing intermediaries in the supply chain substantially increases the producer's share in the consumer's rupee. These findings suggest potential benefits from optimizing marketing channels for jowar farmers in Adilabad district.

MATERIALS AND METHODS

Purposive sampling technique was adopted for selection of district that is having highest area under jowar for the past five years. Accordingly, Adilabad district of the Northern Telangana Zone (NTZ) was selected for the *Rabi* season (Table 1) for data collection in 2023-24 *Rabi* season.

Table 2 reflects that Area and production have shown statistically significant and very high growth rates of 47.11 and 80.99 per cent respectively. However, productivity showed a growth rate of 1.79 but it is statistically non-significant. The results suggest the need to focus on yield-enhancing interventions like high yielding jowar varieties or hybrids, improving irrigation facilities, better management practices and extension support.

From Table 3 it was seen that similar procedure as adopted for selection of district was adopted for selection of two *mandals* and four villages from Adilabad district. A random sampling technique was used to select 20 farmers from each village making a sample of 80 for the farmers. The sample also included 10 traders, 3 processors, 3 wholesalers, and 4 retailers, ensuring a comprehensive representation of the Jowar value chain. The study employs tabular analysis, cost concepts, Marketing margins, Producer share in consumers rupee and marketing efficiency to derive conclusions.

RESULTS AND DISCUSSION

Table 4 shows that the total cost of cultivation for Jowar was ₹ 55,607 per hectare, with operational costs accounting for the majority (85.24%) and fixed costs contributing 14.76%. Among the operational costs, human labour had the highest share (₹ 22,961; 41.29%), followed by machine labour (₹ 11,719; 21.08%). Fertilizers (₹ 4,938; 8.88%), plant protection chemicals (₹ 2,612; 4.7%), and seeds (₹ 2,488; 4.48%) also added to expenses. Bullock labour (₹ 1,632; 2.94%), miscellaneous costs (₹ 725;

Table 1: District wise - Year wise Jowar area in NTZ during *Rabi* from 2016-17 to 2021-22 (in ha)

Year	Adilabad	Kamareddy	Asifabad	Nirmal	Nizamabad	Mancherial	Jagtial	R.Sircilla	Peddapalli	Karimnagar
2016 2017	2618	3249	3855	2480	260	390	705	—	—	—
2017 -2018	2946	3371	2839	2651	167	387	242	—	—	—
2018 - 2019	3234	3244	2318	2293	186	232	98	—	—	—
2019 - 2020	6580	6852	2030	2382	117	183	40	9	12	
2020 - 2021	13832	8278	2590	3137	723	414	229	5	—	6
2021 - 2022	13392	9802	4130	3213	734	260	310	166	40	22
% change	411.54	201.69	7.13	29.56	182.31	-33.33	-56.03	—	—	—
Average	7100	5799	2960	2692	364	311	270	60	26	14
Rank	1	2	3	4	5	6	7	8	9	10

Source: *https://data.desagri.gov.in/website/crops-apy-report-web.*

Table 2: Trends in area, production and productivity of Jowar in Adilabad district

Year	Area (Hectare)	Production (Tonnes)	Productivity (Tonne/Hectare)
2016 - 2017	2618	2270	0.87
2017 - 2018	2946	3738	1.27
2018 - 2019	3234	4110	1.27
2019 - 2020	6580	14950	2.27
2020 - 2021	13832	37696	2.73
2021 - 2022	13392	23972	1.79
CAGR	47.11***	80.99**	15.62^{NS}
R-Square	0.9	0.81	0.45
Intercept	29.13	9.96	-0.01
t-value	6.02	3.59	1.56

Source: *https://data.desagri.gov.in/website/crops-apy-report-web.*

Table 3: Sampling procedure

Particulars	District	Mandal	Village	Sample (No.)
Farmers	Adilabad	Talamadugu	Kajjarla	20
			Kuchalapur	20
		Utnur	Narsapur	20
			Yenda	20
		Total		80
Traders				10
Processors				3
Wholesalers				3
Retailers				4
Total sample		Grand total		100

Table 4: Cost of cultivation of Jowar farmers: (n=80)

Sl. No.	Cost component	Costs (₹ ha^{-1})
I	**Operational Costs**	
1	Human Labour	22961(41.29)
2	Bullock Labour	1632 (2.94)
3	Machine Labour	11719 (21.08)
4	Seed	2488 (4.48)
5	Fertilizers	4938 (8.88)
6	Plant Protection Chemicals	2612 (4.7)
7	Miscellaneous	725 (1.3)
8	Interest On Working Capital	322 (0.58)
	Total Operational Costs	47401 (85.24)
II	**Fixed Costs**	
1	Rental Value Of Owned Land	6845 (12.31)
2	Depreciation	905 (1.63)
3	Interest On Fixed Capital	454 (0.82)
	Total Fixed Costs	8205 (14.76)
III	**Total Cost**	**55607 (100)**

1.3%), and interest on working capital (₹ 322; 0.58%) were relatively lower. Among the fixed costs, rental value of owned land was the largest fixed cost (₹ 6,845; 12.31%). Depreciation (₹ 905; 1.63%) and interest on fixed capital (₹ 454; 0.82%) contributed minimally. The findings indicate that labour and mechanization are the most significant cost factors, highlighting the need for cost-effective strategies in Jowar cultivation (Charankumar *et al.* 2024; Dinesh *et al.* 2019; Vasantha *et al.* 2021).

Table 5: Profitability of Jowar cultivation by sample farmers: (n=80)

Sl. No.	Particulars	Details
1	Total Cost of Cultivation (₹ Ha^{-1})	55607
2	Yield (Kg Ha^{-1})	2439
3	Gross Returns (₹ Ha^{-1})	71477
4	Net Returns (₹ Ha^{-1})	15870
5	Returns Per Rupee Spent	1.29

Table 5 shows that the analysis of Jowar cultivation profitability among the sample farmers reveals a positive net return, indicating economic viability. Total cost of cultivation was ₹ 55,607 per hectare. Average yield was 2,439 kg per hectare. Gross returns amounted to ₹ 71,477 per hectare. Net returns, after deducting costs, were ₹ 15,870 per hectare. Returns per rupee spent stood at 1.29, indicating that farmers earned ₹ 1.29 for every ₹ 1 invested. These results suggest that Jowar cultivation is profitable, but strategies to reduce costs and enhance productivity could further improve farmers' income (Verma *et al.* 2018).

Fig. 1 shows that the marketing channels of sorghum in Adilabad involve multiple pathways connecting producers to consumers. The first channel (Channel-I) allows producers to sell directly to consumers. In the second channel (Channel-II), producers sell sorghum to APMC, which then to retailers and to consumers. The third channel (Channel-III) involves producers selling to CCD (NGO) who sell to consumers. Lastly, in the fourth channel (Channel-IV), producers sell their sorghum to village merchants, who then pass it on to wholesalers, followed by retailers, followed by consumers. These marketing channels depict the various routes sorghum takes before it reaches the end consumer in Adilabad.

Table 6 shows that the marketing margins, producer share in the consumer's rupee, and marketing efficiency of sorghum vary across different channels in Adilabad. In Channel-I, the producer sells directly to the consumer at ₹ 5220.01, retaining 98.19% of the consumer's price, making this the most efficient channel (54.33% efficiency). In Channel-II, the producer receives ₹ 2869.17, with a 62.02% share, while the consumer pays ₹ 4626.17. The marketing efficiency here drops to 1.63% due to added intermediary costs. For Channel-III, the producer's net price is ₹ 2836.17, but the consumer pays ₹ 5289.13, reducing the producer's share to 53.62%, with an efficiency of 1.16%. Channel-IV involves multiple intermediaries, leading to the highest consumer price (₹ 5595.95) while the producer gets only ₹ 2836.17, resulting in the lowest producer share (50.68%) and marketing efficiency (1.01%). Overall, direct selling (Channel-I) provides the highest returns to the producer (Monika *et al.* 2022), while longer supply chains (Channels II, III,

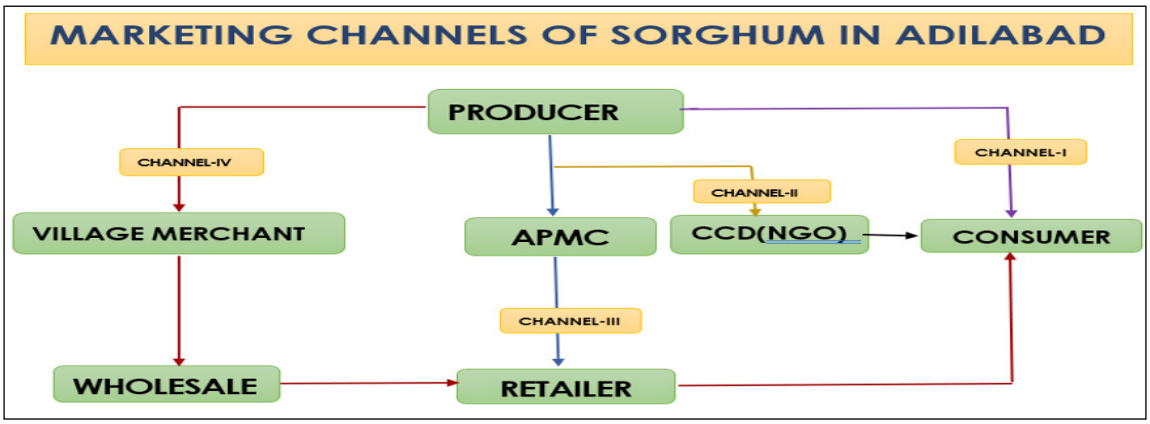
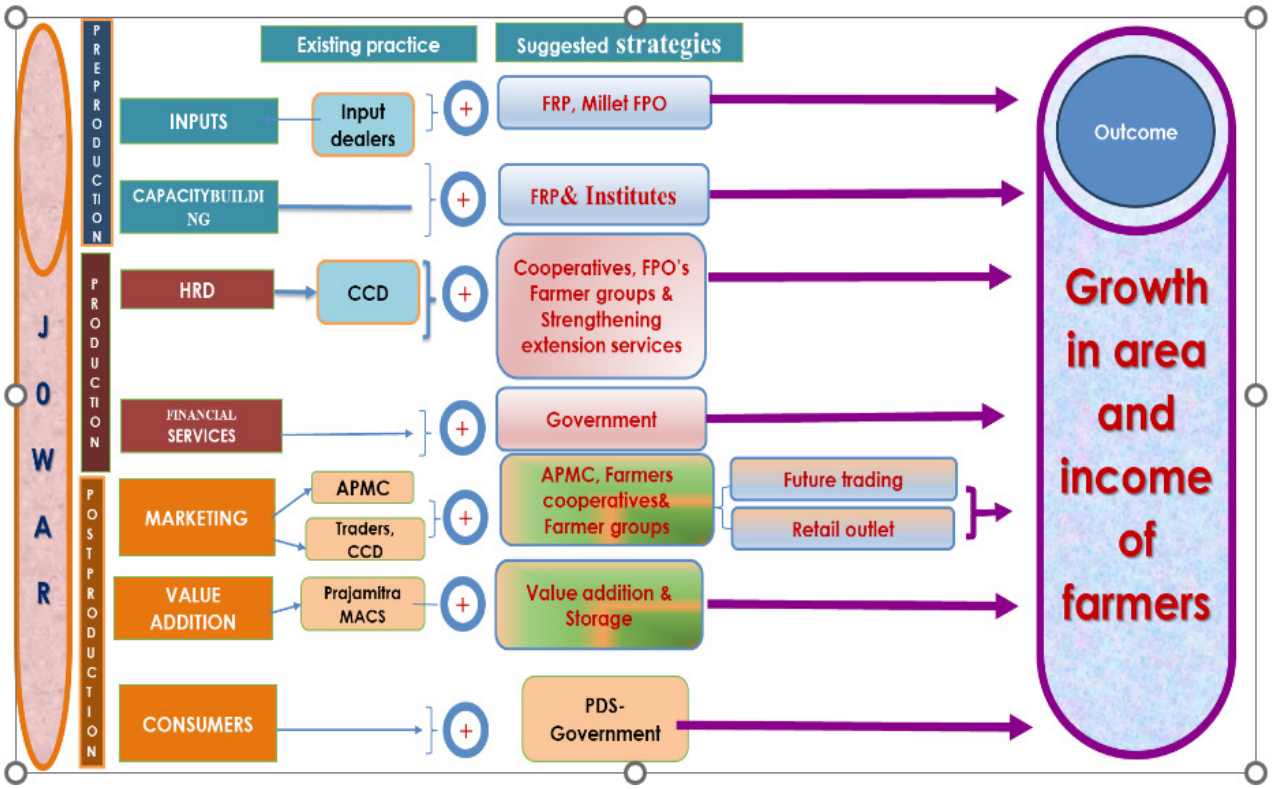


Fig. 1: Marketing channels of Sorghum in Adilabad

Table 6: Marketing margins, Producer share in consumers rupee and marketing efficiency of sorghum in different channels (n=80)

Sl. No.	Particulars	Channel-I	Channel-II	Channel-III	Channel-IV
1	Producer sale price	5220.01	2963.51	2930.51	2930.51
2	Cost incurred by the producer	94.34	94.34	94.34	94.34
3	Net price received by the producer	5125.66	2869.17	2836.17	2836.17
4	Sale price of producer to village merchant/ commission agent/APMC	5220.01	2963.51	2930.51	2930.51
5	Cost incurred by the village merchant/trader/ APMC	—	711.94	708.73	708.73
6	Margin of village merchant or commission agent/APMC	—	950.72	550.72	550.72
7	Sale price of commission agent to wholesaler	—	4626.17	4189.96	4189.96
8	Cost incurred by the wholesaler	—	—	—	59.8
9	Margin of wholesaler	—	—	—	306.82
10	Sale price of wholesaler to retailer	—	—	680.92	680.92
12	Margin of retailer	—	—	418.25	418.25
13	Sale price of retailer to consumer	—	—	5289.13	5595.95
14	Sale price to consumer	5220.01	4626.17	5289.13	5595.95
15	Price spread	94.34	1757	2452.96	2759.78
16	Consumer paid price	5220.01	4626.17	5289.13	5595.95
17	Producer share in consumer rupee	98.19	62.02	53.62	50.68
18	Marketing Efficiency (%)	54.33	1.63	1.16	1.01



CCD = Centre for Collective Development, APMC = Agricultural Produce Market, MACS = Mutually Aided Cooperative Society, FRP = Farmer Retail Partnership, FPO = Farmer Producer Organization, PDS = Public Distribution System.

Fig. 2: Strategies for promotion of Jowar

and IV) reduce their profit due to additional costs and intermediaries (Sehgal *et al.* 2022).

Fig. 2 presents a comparative analysis of existing and suggested improvements in the Jowar (production and marketing system to drive growth in the area. In preproduction stage, input supply is from dealers, but the suggestion is to introduce Farmer Retail Partnership (FRP) and Farmer Producer Organizations (FPOs) for better farmer benefits. Enhancing capacity through FRP and linkage with institutes like State Agricultural Universities and Indian Institute of Millets in collaboration with Ag. Dept. may be helpful for improving the productivity levels of jowar. In production stage, transitioning from traditional methods to Cooperatives and FPOs is suggested (Anand *et al.* 2025). Shifting from the current system to increased government financial support to jowar cultivars is recommended. In post production stage, moving from traditional markets or middlemen to APMCs, farmer cooperatives, farmer groups and future retail opportunities is proposed. Emphasis on value addition to increase product demand and profitability (Rodriguez Izaba *et al.* 2023) is needed. Expanding consumer access through Public Distribution Systems (PDS) and targeted government initiatives is essential for strengthening the jowar supply chain. These improvements aim to enhance growth in the Jowar sector, benefiting both farmers and consumers.

CONCLUSION

The findings indicate that Jowar cultivation in Adilabad is profitable, with a net return of ₹ 15,870 per hectare and a return per rupee spent of 1.29. Labor and mechanization constitute major cost components, highlighting the need for cost-effective production strategies. Direct farmer-to-consumer sales (Channel-I) emerged as the most profitable marketing channel, with a producer share of 98.19% and the highest marketing efficiency (54.33%). However, longer supply chains reduced farmer profits due to intermediary costs. To enhance Jowar cultivation and marketing efficiency, the study suggests the implementation of Fair Remunerative Price (FRP), cooperative farming models, government financial support, and improved value addition practices. Strengthening market linkages through Farmer Producer Organizations (FPOs) and Public Distribution Systems (PDS) can further improve price realization for farmers. These measures will ensure sustainable income growth for jowar farmers while making jowar more accessible and affordable for consumers.

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