



Production and Marketing Practice of Maize in North Coastal Andhra Pradesh

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HIGHLIGHTS

- **Influence of Multiple Variables:** The study highlighted key factors influencing marketing behavior, reflecting a complex decision-making process.
- **Recommendations for Improvement:** Suggested targeted interventions like training and market access improvements to boost farmers' marketing capabilities and profitability.
- **Encouraging direct sales and reducing intermediary involvement** could also lead to better profits.

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ABSTRACT

The results of the research conducted during the 2023-24 period offer significant insights into the production and marketing practices of maize farmers in the Srikakulam and Vizianagaram districts of Andhra Pradesh. This distribution indicates that the majority of growers are moderately engaged in marketing activities, with a notable proportion demonstrating high engagement. The proportion of variability in the dependent variable that is explained by the independent variables was 0.775 suggesting that the 15 variables selected in the study account for a significant 77.5 per cent of the variability in the marketing behavior of these maize growers. This strong predictive value underscores the importance of the identified factors in influencing marketing practices. These insights can be instrumental in tailoring interventions and training programs to enhance the marketing skills of maize growers, ultimately contributing to better market integration and increased profitability.

INTRODUCTION

Agricultural practices have been an integral part of the ancient culture of every nation, contributing to its growth and progress over countless centuries (Wakchaure et al., 2023). Agriculture supports rural communities in developing nations, with small-scale farmers crucial for food security, income, jobs, and poverty reduction (Gumbi et al., 2023). Agricultural production is susceptible to various risks stemming from the natural, economic, and socio-political landscape (Girma et al., 2023). Agricultural market regulation in India started with the 1928 Royal Commission's recommendations, leading to the 1938 Model Bill. Post-independence, the APMR Act allowed states to form APMCs,

widely adopted in the 1960s (Saha et al., 2024). The utilization of e-NAM among farmers, commission agents, traders, and other stakeholders is on the rise as time progresses (Bhatia et al., 2022).

The United States has maintained its position as the foremost producer, with China following closely behind, accounting for approximately 38 per cent and 23 per cent of total production, respectively. In the fiscal year 2016-17, India contributed around 2 per cent, amounting to 26 million metric tons (Bansal & Singh 2020). By 2050, more than 60 per cent of research projects anticipate a decrease in total crop production of more than 10 per cent, resulting in a necessity for developing nations to raise their maize imports by 24 per cent annually, costing around US \$30 billion (Murdia et al., 2016). Maize ranks as the third most

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significant food grain in India, following wheat and rice. It is cultivated across the nation, with the primary production occurring in the states of Andhra Pradesh, Karnataka, Maharashtra, Bihar, and Madhya Pradesh (Parkash & Peshin, 2023). An additional significant point is that corn is relatively simple to cultivate (Darma et al., 2022). Rising prosperity, incomes, and urbanization increase the demand for animal products, boosting maize consumption, especially in Asia (Erenstein et al., 2022).

Marketing agricultural products boosts production, consumption, and economic growth. A strong system raises incomes, encourages technology investment, and enhances productivity, however, maize farmers face significant challenges (Rajalakshmi et al., 2020). Appropriate and viable extension approaches to cater the unique agro ecological and socio economic requirements of maize farmers are called upon (Nain et al., 2007). The remuneration that farmers obtain for their agricultural products is influenced by and consequently mirrors, the efficiency of the marketing channels employed (Venkannanvara et al., 2019). Information asymmetry and communication gaps may result in market failures, but they can be reduced and are not unavoidable (Geethalakshmi et al., 2024). Access to input and output markets is crucial for farm households to adopt modern technologies like fertilizers and hybrid seeds, which boost productivity and income (Sibande et al., 2017). Commercialization and market orientation are closely linked among smallholder farmers and are often used interchangeably (Nwafor 2020). Engaging in farmers' markets contributes to fostering sustainable rural development in developing countries (Li et al., 2023).

METHODOLOGY

The study, conducted in 2023-24, analyzed the marketing behavior of maize growers in Srikakulam and Vizianagaram districts of Andhra Pradesh from 180 randomly selected maize growers, with 90 from each district. Srikakulam ranks fourth in terms of area, while Vizianagaram holds the fifth position among the districts of Andhra Pradesh according to ANGARU maize outlook in 2021 report. Srikakulam district comprises 38 blocks, among which Hiramandalam, Jalumuru, and Narasanapeta were selected for this study due to their comparatively high maize production relative to the other blocks. Vizianagaram district has 34 blocks, with Bobbili, Pusapatirega, and Therlam selected. A total of 18-gram panchayats were chosen from both districts. In Srikakulam, the gram panchayats were Hiramandalam, Rugada, Akkarapalli, Sri Mukalingam, Komanapalli, Akkarada, Narasannapeta, Komarthy, and Karagam. In Vizianagaram, they were Paradhi, Alajanji, Chintada, Yerukonda, Alladipalem, Gumpam, Amity, Kagam, and Lingapuram. Ten maize respondents from each gram panchayat were selected, totaling 180 respondents. Data were analyzed using statistical tools such as frequency, percentage, mean, standard deviation, correlation, and regression, providing insights into the variables influencing maize production and marketing behaviors. The study used an ex-post-facto research design.

Marketing behavior was divided into three main categories: planning orientation, production orientation, and marketing orientation. In planning orientation, there were 8 close-ended questions; in production orientation, there were 7 close-ended

questions; and in marketing orientation, there were 6 close-ended questions. The survey designed to assess the item-wise marketing behavior of maize growers consists of seven targeted questions that necessitate a binary yes or no answer. Following the collection of responses, calculations are performed, and the data is analyzed to determine the percentage of responses. Subsequently, a mean score is assigned, which facilitates the ranking of the statements based on these scores. The degree of relationship between the two variables was determined by calculating Pearson's product-moment correlation coefficient using the provided formula. The data was analyzed using SPSS (Statistical Package for Social Science).

$$R = (n(\sum xy) - (\sum x)(\sum y)) / (\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]})$$

Where, R = Pearson Coefficient, n = number of the pairs of the stock, $\sum xy$ = sum of products of the paired stocks, $\sum x$ = sum of the x scores, $\sum y$ = sum of the y scores, $\sum x^2$ = sum of the squared x scores, $\sum y^2$ = sum of the squared y scores

Multiple regression analysis was used to determine the relationship between dependent and independent variables and assess the contribution of independent variables. Data were analyzed using SPSS, and the resulting multiple regression equation is presented below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + U$$

Where, Y = Dependent variable, β_0 = Intercept, X_1 to X_n = Independent variables, β_1 to β_n = Partial regression coefficient

RESULTS

The marketing practices of maize farmers encompass the strategic planning of production and sales schedules, enhancing yield and quality, remaining updated on market trends, and selecting appropriate packaging, transportation methods, sales venues, and pricing strategies.

Planning, production and marketing orientation

Effective planning is critical in agriculture, echoing the words of Late Pandit Jawaharlal Nehru: "Everything else can wait... but not agriculture."

According to the survey data on planning orientation in Table 1, implementing farm production strategies is key to enhancing crop yield, a top priority for maize growers. Most farmers believe that adopting specific technical strategies can significantly boost their yield. Planning orientation indicates that prioritizing crop selection for different lands each year ranks second in planning. Planning the crop to cultivate before the farming season begins reduces stress and helps organize inputs. Assessing the number of seeds, fertilizers, and pesticides needed before cultivation ranked third in planning priority. Proper calculation of inputs reduces stress and ensures better preparation. Choosing the crops to grow must be decided in advance to avoid confusion, with this issue ranked fourth in planning orientation. Considering cultivation expenses is vital, as many respondents ranked this fifth, helping alleviate financial concerns. Respondents' responses on production orientation highlights timely crop planting as the top factor for high yield, optimizing crop performance, and reducing risks. Among seven key factors, this approach is crucial for farm success. Applying the

Table 1. Distribution of respondents according to their different orientation regarding maize crop

S.No.	Statements	Mean	Rank
Planning orientation			
1	It is possible to increase the yield through farm production plans	2.71	I
2	Every year one should think about the crops to be cultivated in each type of land	2.70	II
3	The number of seeds, fertilizers, pesticides, and agricultural inputs needed for raising a crop should be assessed before cultivation	2.66	III
4	It is necessary to make prior decisions about the variety of crops to be cultivated in the land	2.63	IV
5	It is necessary to think ahead of the cost involved in raising a crop	2.56	V
6	One need not consult agricultural experts for crop planning	2.53	VI
7	It is necessary to grow the crop based on the price fluctuations of the crop produced in the market	2.48	VII
8	It is necessary to decide the place of sale while planning to grow the crop	2.48	VII
Production orientation			
1	Timely planting of crops ensures good yield	2.73	I
2	One should use the required amount of fertilizer	2.63	II
3	The crop needs to be certified while in the field to meet the quality standards of the market	2.62	III
4	Determining fertilizer dose by soil testing saves money	2.47	VI
5	Application of herbicides can effectively control weeds	2.57	V
6	The application of biological control measures can arrest the population of pests and diseases	2.61	IV
7	Integrated pest management strategy helps to reduce the cost of investment in pesticides	2.43	VII
Crop marketing orientation			
1	Market news is useful to farmers	3	I
2	It is necessary to possess marketing intelligence to get remunerative prices for the crop produce	3	I
3	A farmer can get a good price by grading his produce at the farm gate level	2.95	II
4	One should know the international market for exporting maize produce	2.83	III
5	Warehouses can help the farmer to get better prices for his produce	2.79	IV
6	One should sell his produce to the nearest market irrespective of the produce	2.73	V

correct amount of fertilizer ranks second, aiding soil health and ensuring a nutritious yield. Crop certification ranks third, helping farmers meet market quality standards and secure favorable prices. Biological control techniques ranked fourth, significantly reducing pests and diseases, and supporting sustainable agriculture as an alternative to pesticide-heavy methods. Herbicide use for weed management ranks fifth, with most farmers using paraquat. Herbicides are effective at various crop stages, targeting weeds without harming crops. Farmers' feedback highlights timely crop planting as the top factor for high yield, optimizing crop performance, and reducing risks. Among seven key factors, this approach is crucial for farm success. Applying the recommended dose of fertilizer ranks second, aiding soil health and ensuring a nutritious yield. Crop certification ranks third, helping farmers meet market quality standards and secure favorable prices. Biological control techniques ranked fourth, significantly reducing pests and diseases, and supporting sustainable agriculture as an alternative to pesticide-heavy methods. Herbicide use for weed management ranks fifth, with most of the respondents used paraquat. Herbicides are effective at various crop stages, targeting weeds without harming crops. Farmers greatly benefit from market news, with most prioritizing it as their top marketing orientation factor. This information helps them track prices and sell crops at the most favorable time. Evaluating harvest quality directly at the farm entrance ranks second, as it enables farmers to secure better prices through grading. Understanding the international market for maize exports ranks third, allowing farmers to compare local and global prices for wiser decisions. Warehouses ranked fourth, are crucial for better pricing, letting farmers store goods until market prices

rise. However, many areas lack proper warehousing facilities. Selling produce to the nearest market, regardless of the type, ranks fifth. Farmers often choose the closest market for convenience, prioritizing ease of sale.

Table 2 indicates that all of the participants utilize gunny bags, half of them use lorries for transportation, around a third are chosen to sell their goods in remote towns, more than half sell their produce directly without involving a middleman, nearly half of the respondents find the existing market facility inadequate, over half of them sell their produce immediately after harvesting, and 40 per cent of the respondents consider the maize market price to be at a medium level

The correlation between the respondents' profile and the marketing

The correlation coefficient between the chosen attributes of the participants and their marketing behavior of the suggested maize production technology among maize growers was calculated. The correlation coefficient values are displayed in Table 3.

Marketing behavior of maize growers using multiple linear regression

Additionally, to examine the collective impact of the independent variables on elucidating the variance in marketing behavior among Maize growers, a Multiple Linear Regression (MLR) analysis was conducted. It elucidates the extent to which variations in the dependent variable (for instance, the marketing behavior of maize farmers) can be ascribed to various independent

Table 2. Distribution of farmers based on their item-wise marketing behavior

S.No.	Items	Percentage
Mode of packing		
1.	Gunny bags	100
Mode of transport		
2.	Tempovan\tractor	38.82
3.	Lorry	50.00
4.	Minidor	11.21
Place of sale		
5.	In the village itself	19.43
6.	Nearby town	26.64
7.	Distant town	31.20
8.	Farm gate	22.85
Middleman involvement		
9.	Fully Involved	19.43
10.	Partially	26.76
11.	Direct sale	53.90
Exciting market facility		
12.	Quite sufficient	25.00
13.	Sufficient	27.75
14.	Insufficient	47.33
Mode of sale		
15.	Immediate after harvesting	54.48
16.	Time taken	45.66
Market price		
17.	High	21.10
18.	Medium	40.00
19.	Low	38.97

Table 3. Correlation between respondents' profiles and marketing behavior

S.No.	Independent variables	Correlation coefficient
1	Age	0.128 ^{NS}
2	Education	0.640**
3	Family size	0.004
4	Annual income	-0.003
5	Farming experience	0.511**
6	cosmopoliteness	0.473**
7	Mass media exposure	0.132
8	Achievement motivation	0.155*
9	Risk orientation	0.100
10	Market orientation	0.265**
11	Innovative proneness	0.096
12	Scientific orientation	0.182*
13	Extension participation	0.258**
14	Extension contacts	0.647**
15	Social participation	0.483**

**Significant at 0.01% level of probability, * Significant at 0.05% level of probability, NS–Non significant

variables (including education, income, access to market information, and others).

Dependent Variable (Y): The outcome or the variable you want to predict or explain.

Independent Variables (X1, X2, ..., Xn): The factors that are believed to influence the dependent variable

Table 4. Maize growers' marketing behavior is analyzed using multiple regression

Factors	Independent variables	Coefficient	t-value	Standard Error
X1	Age	-0.642	-0.923	0.695
X2	Education	2.097	6.765	0.310
X3	Family size	0.864	1.457	0.593
X4	Annual income	-0.255	-0.514	0.496
X5	Farming experience	2.318	3.366	0.689
X6	Cosmopoliteness	1.238	2.146	0.577
X7	Mass media exposure	-0.249	-0.933	0.267
X8	Achievement motivation	-0.100	-0.542	0.185
X9	Risk orientation	-0.891	-0.919	0.464
X10	Market orientation	0.457	2.188	0.209
X11	Innovative proneness	0.346	1.018	0.340
X12	Scientific orientation	0.097	0.351	0.275
X13	Extension participation	0.069	0.271	0.253
X14	Extension contacts	0.878	4.737	0.185
X15	Social participation	1.029	4.653	0.221
F value=27.748				
R ² = 0.7174				
Constant=-21.888				

DISCUSSION

Respondents predominantly disagree with the need for pre-planning before the crop season, citing financial constraints and family obligations that influence crop selection. They often lack awareness of the benefits of improved crop varieties and struggle to pre-assess input needs due to climate variability and financial limitations. Predicting cultivation costs is challenging due to unpredictable climate changes and fluctuating input prices. Although they see the benefits of consulting agriculture experts, most farmers rely on their own experience and market demand when choosing crops. Despite understanding the benefits of improved practices, inconsistent yields are often attributed to climate change, pests, and diseases. Crop selection is typically based on personal experience and perceived market demand after harvest, rather than market prices, leading to a lack of planning for sales locations before cultivation.

Due to financial constraints, weather fluctuations, seed availability, labor, and irrigation limitations, many farmers face challenges with timely crop planting. Most exceed recommended fertilizer dosages, unaware of soil testing benefits, indicating a need for education on proper fertilizer use and soil testing by extension agents. Farmers generally oppose herbicides but use paraquat for weed control and prefer biological control for pests and diseases. There's limited understanding of integrated pest management, suggesting a need for education and field demonstrations. Most farmers lack knowledge about crop certification for market standards, missing out on potential income benefits. They value market news for selling at optimal prices and understand grading's role in securing favorable prices. Warehouses are seen as positive for price security, but availability is limited. Farmers often choose nearby markets for convenience, prioritizing ease of access and pricing. Farmers prefer gunny bags for maize for easy handling and lot separation. ales often occur in nearby towns or directly to

merchants and brokers, reducing marketing burdens. Middlemen are important due to limited institutional markets and demand from poultry feed industries. Improved market infrastructure and stable prices influence selling decisions. The study found significant correlations between certain attributes and maize growers' marketing behavior. These factors positively influence the adoption of marketing practices. Overall, higher education, farming experience, a cosmopolitan outlook, market focus, scientific orientation, and active participation in extension and social activities enhance marketing behavior.

CONCLUSION

Based on the analysis of maize farmers' marketing behavior in Srikakulam and Vizianagaram districts, a balanced approach among growers, with significant emphasis on planning, production, and marketing orientations was observed. Farmers demonstrate varying degrees of strategic planning in response to market dynamics, aligning production levels with market demand, and adopting diverse marketing strategies. This integrated approach underscores the importance of farmer education and support in enhancing marketing efficacy, thereby influencing profitability and sustainable agricultural practices in the region. While they recognize the benefits of consulting agricultural experts, they often base crop selection and marketing decisions on personal experience and perceived market demand. There is a significant need for education on proper fertilizer use, soil testing, and integrated pest management based on the planning, production and marketing orientation statements.

REFERENCES

- Bansal, S., & Singh, L. (2020). Export of maize from India: A Markov analysis. *Journal of Krishi Vigyan*, 9(1), 137-143.
- Bhatia, J. K., Bishnoi, D. K., Dhingra, A., & Nimbrayan, P. K. (2022). Arrival and price behavior of major mustard markets in Haryana. *Indian Journal of Extension Education*, 58(2), 177-180.
- Darma, S., Hakim, Y. P., Kurniawan A, E., Darma, D. C., & Suparjo, S. (2022). Understanding market behavior on corn commodity: phenomenon at year-end. *Asian Journal of Agriculture and Rural Development*, 12(2), 53-64.
- Erenstein, O., Jaleta, M., Sonder, K., Mottaleb, K., & Prasanna, B. M. (2022). Global maize production, consumption and trade: trends and R&D implications. *Food security*, 14(5), 1295-1319.
- Geethalakshmi, K., Thalloor, S., & Gajare, P. (2024). Investigating the impact of online media on agricultural practices and rural development: A content analysis. *Indian Journal of Extension Education*, 60(3), 42-48.
- Girma, Y., Kuma, B., & Bedemo, A. (2023). Risk aversion and perception of farmers about endogenous risks: An empirical study for maize producers in Awi Zone, Amhara region of Ethiopia. *Journal of Risk and Financial Management*, 16(2), 87.
- Gumbi, N., Gumbi, L., & Twinomurinzi, H. (2023). Towards sustainable digital agriculture for smallholder farmers: A systematic literature review. *Sustainability*, 15(16), 12530.
- Li, J., Ma, W., & Gong, B. (2023). Market participation and subjective well-being of maize farmers. *Economic Analysis and Policy*, 80, 941-960.
- Murdia, L. K., Wadhwani, R., Wadhawan, N., Bajpai, P., & Shekhawat, S. (2016). Maize utilization in India: an overview. *American Journal of Food and Nutrition*, 4(6), 169-176.
- Nain, M. S., Bhagat, G. R., Kher, S. K., Slathia, P. S., & Ahmad, N. (2007). Adoption of maize production technology in intermediate zone of Rajouri district of J&K. *Journal of Research SKUAST Jammu*, 6(1), 61-66.
- Nwafor, C. U. (2020). The market orientation of South African smallholder farmers in a disaster context. *Journal of Agribusiness and Rural Development*, 58(4), 437-446.
- Parkash, S., & Peshin, R. (2020). Growers' knowledge of improved maize production technologies in Jammu Region of J&K. *Indian Journal of Extension Education*, 56(3), 41-47.
- Rajalakshmi, N., Unnamalai, T., & Gopinath, R. (2020). Study on Motivational Factors behind the Cultivation of Maize in Perambalur District. *International Journal of Management*, 11(10), 2165-2171.
- Saha, S., Sinha, C., & Saha, S. (2024). Agricultural Marketing in India: Challenges, Policies and Politics. *South Asian Journal of Macroeconomics and Public Finance*, 13(1), 39-52.
- Sharma, H., & Burark, S. S. (2015). Market integration of gram in major domestic markets of Rajasthan. *Journal of Progressive Agriculture*, 6(2), 1-7.
- Sibande, L., Bailey, A., & Davidova, S. (2017). The impact of farm input subsidies on maize marketing in Malawi. *Food Policy*, 69, 190-206.
- Venkannanvara, M., Gaddi, G. M., & Gracy, C. P. (2019). Growth performance and marketing of maize in Karnataka, India. *International Journal of Current Microbiology and Applied Sciences*, 8(10), 380-387.
- Wakchaure, M., Patle, B. K., & Mahindrakar, A. K. (2023). Application of AI techniques and robotics in agriculture: A review. *Artificial Intelligence in the Life Sciences*, 3, 100057.
- Yadav, O. P., Prasanna, B. M., Yadava, P., Jat, S. L., Kumar, D., Dhillon, B. S., & Sandhu, J. S. (2016). Doubling maize (*Zea mays*) production of India by 2025– Challenges and opportunities. *The Indian Journal of Agricultural Sciences*, 86(4), 427-34.