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A study on perception of paddy, maize and turmeric farmers about organic fertilizers in nizamabad district of Telangana

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Abstract

Excessive use of chemical fertilizers has raised concerns about soil health and environmental sustainability, increasing interest in organic fertilizers as sustainable alternatives. This study examined the perception of paddy, maize, and turmeric farmers towards organic fertilizers in Nizamabad district of Telangana using the 7 P's of marketing framework. Primary data were collected from 120 farmers (40 from each crop) through structured interviews employing a five-point Likert scale. Three major perception dimensions—Product Performance and Accessibility, Post-Purchase Support and Guidance, and Field Staff Support and Reliability—were identified. Perceptions varied significantly across crops, with turmeric farmers showing the most favourable views, followed by paddy farmers, while maize farmers exhibited comparatively lower acceptance. The findings indicate that farmer perceptions are influenced by both product- and service-related factors, highlighting the need for crop-specific marketing strategies, strengthened technical support, and efficient distribution mechanisms to enhance organic fertilizer adoption and promote sustainable agriculture.

Keywords: Farmer perception, Organic fertilizers, 7 P's of marketing, Factor analysis, Crop-specific strategies, Nizamabad district, ANOVA, Sustainable agriculture, Telangana

Introduction

Agricultural sustainability has become a critical concern globally as the adverse effects of excessive chemical fertilizer use on soil health, environmental quality, and human health have become increasingly evident. The Green Revolution, while successful in boosting agricultural productivity, led to over-dependence on synthetic inputs, resulting in soil degradation, groundwater contamination, reduced microbial activity, and declining soil organic matter (Sharma and Chetani, 2017) [3]. In response, organic fertilizers have emerged as viable alternatives that not only provide essential plant nutrients but also improve soil structure, enhance water retention, increase microbial diversity, and promote long-term agricultural sustainability (Hazra, 2016) [2].

Organic fertilizers, derived from plant residues, animal waste, compost, and other biological sources, release nutrients gradually through natural decomposition processes. Unlike synthetic fertilizers that provide quick nutrient availability but often lead to nutrient imbalances and environmental pollution, organic inputs support balanced nutrient supply, improve soil health progressively, and reduce the ecological footprint of agriculture. The adoption of organic fertilizers aligns with global sustainability goals and addresses growing consumer demand for chemical-residue-free food products (Assefa and Tadesse, 2019) [1].

In India, the organic fertilizer market is expanding steadily, valued at USD 586 million in 2024 and projected to exceed USD 1.1 billion by 2033, with annual growth above eight percent. Government initiatives such as PKVY, PM-PRANAM, and MOVCD-NER provide financial incentives, technical support, and infrastructure development to encourage organic farming. Under PKVY, India produced 3,772,884 metric tons of organic fertilizers in 2022-23, led by Karnataka (2,278,241 MT), followed by Gujarat and Tamil Nadu. Telangana has also promoted organic input adoption, producing 27,695 MT and 28,788 MT in 2021-22 and 2022-23, respectively. Nizamabad district, a major producer of paddy, maize, and turmeric, presents a diverse agricultural setting suitable for studying farmer perceptions

Despite their benefits, adoption of organic fertilizers varies across regions, crops, and farmer categories, influenced by product quality, price, availability, awareness, technical

knowledge, and support services. Few studies have systematically examined farmer perceptions using comprehensive marketing frameworks. Analyzing these perceptions through the 7 P's of marketing—Product, Price, Place, Promotion, People, Process, and Physical Evidence—can guide effective promotion strategies and address adoption barriers. This study examines perceptions of paddy, maize, and turmeric farmers in Nizamabad, identifies underlying perception dimensions through factor analysis, explores crop-specific differences, and proposes strategies to enhance adoption, supporting policy and marketing interventions for sustainable agriculture in Telangana and similar regions.

Materials and Methods

Study Area

The study was conducted in Nizamabad district of Telangana state and was purposively selected due to its significant area under paddy, maize, and turmeric cultivation., active presence of organic fertilizer dealers, progressive farming community, favorable agro-climatic conditions, and accessibility for primary data collection.

Sampling Design

A multi-stage purposive sampling technique was employed to select respondents, with one mandal chosen for each of the three major crops based on the highest area under cultivation Balconda for paddy, Armoor for turmeric, and Kammarpalle for maize. From each mandal, five villages were selected based on crop area under organic fertilizer usage and accessibility, and eight farmers using organic fertilizers were chosen from each village. This resulted in a total sample of 120 respondents, comprising 40 farmers from each crop category, providing a balanced representation for crop-specific perception analysis.

Table 1: Distribution of Sample Respondents

S. No	State	District	Selected Mandals	Selected Villages from each Mandal	Sample Farmers from each Village	Total Sample Size
1	Telangana	Nizamabad	3	5	8	120

Data Collection

Primary data were collected through personal interviews using a well-structured, pre-tested schedule, which included demographic information (gender, age, education, landholding, and crops cultivated) and farmer perceptions measured via 21 statements based on the 7 P's of the marketing mix—Product, Price, Place, Promotion, People, Process, and Physical Evidence—on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Secondary data were obtained from the Department of Agriculture (Government of Telangana), district agricultural records, NCONF databases, published research, and industry sources to provide contextual background and support primary findings.

Descriptive statistics (frequencies, percentages, means, and standard deviations) summarized demographic characteristics and perception scores. Sampling adequacy and suitability for factor analysis were assessed using Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity, with KMO > 0.70 and significant Bartlett's test ($p < 0.05$) indicating appropriateness.

Principal Component Analysis (PCA) with Varimax rotation was applied to identify underlying perception dimensions, retaining factors with eigenvalues greater than 1.0 and removing weak (<0.50) or cross-loading variables. One-way ANOVA tested differences in mean factor scores across crop categories (paddy, maize, turmeric), and Tukey's HSD post hoc test identified specific crop pairs with significant differences. All analyses were conducted using SPSS version 31.0 at a 5% significance level

Results and Discussion

1. Demographic Characteristics of Respondents

Table 2: Gender Distribution of Sample Farmers (n=120)

S. No	Gender	No. of Respondents	Percentage (%)
1	Male	109	91.00
2	Female	11	9.00
Total		120	100.00

All 109 respondents (91.00%) were male, while 11 respondents (9.00%) were female. This indicates that farming in the study area is predominantly a male-dominated occupation, with men playing the primary role in agricultural decision-making and input usage.

Table 3: Age Distribution of Sample Farmers (n=120)

S. No	Age Group (Years)	No. of Respondents	Percentage (%)
1	26-35	38	31.7
2	36-45	42	35.0
3	46-55	26	21.7
4	Above 55	14	11.6
Total		120	100.0

A significant proportion of farmers belong to the 36-45 years age group, accounting for 35 percent of the respondents. The concentration of respondents in the 26-45 years age bracket (66.7% combined) indicates that farming is largely driven by middle-aged individuals who possess both physical vigor and substantial farming experience.

Table 4: Educational Qualification of Respondents (n=120)

S. No	Education Level	No. of Respondents	Percentage (%)
1	Illiterate	18	15.0
2	Primary Education	38	28.3
3	Secondary Education	42	35.0
4	Graduate & Above	22	18.3
Total		120	100.0

The majority of respondents (66.7%) had completed up to secondary education, indicating a reasonably educated farming population with varying capacities for processing technical information.

Table 5: Landholding Size Distribution (n=120)

S. No	Farm Size Category	Average Land Holding (acres)	No. of Farmers	Percentage (%)
1	Small/Marginal (<5 acres)	3.2	62	51.7
2	Medium (5-10 acres)	7.1	38	31.7
3	Large (>10 acres)	12.8	20	16.6
Total			120	100.0

More than half of the respondents (51.7 percent) belong to the small and marginal farmer category, with an average landholding of 3.2 acres, showing that limited landholding is the most common feature among farmers in the study area.

2. Assessment of Farmer Perceptions Through Factor Analysis

Table 6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.836
Bartlett's Test of Sphericity	Approx. Chi-Square	896.276
	df	153
	Sig.	<0.001

The KMO value of 0.836 demonstrates that the sample size and data structure are well-suited for factor analysis, since it surpasses the recommended threshold of 0.70. Bartlett's Test of Sphericity yields a chi-square statistic of 896.276 with 153 degrees of freedom, which is highly significant at $p < 0.001$.

Table 7: Total Variance Explained for Farmers' Perception

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%
1	5.927	32.928	32.928	4.508	25.045	25.045
2	2.337	12.984	45.912	2.624	14.576	39.621
3	1.402	7.787	53.699	2.534	14.078	53.699

After Varimax rotation, three factors were extracted explaining a cumulative variance of 53.70%, indicating they capture substantial information about farmer perceptions.

Table 8: Rotated Component Matrix with Factor Names

Factor Number	Factor Name	Variables Under Factor	Factor Loadings
1	Product Performance and Accessibility	Demonstrations and awareness programs conducted locally	0.733
		Products available at local agri-input shops	0.725
		Prices affordable for small farmers	0.701
		Products of good quality	0.672
		Promotional activities visible in village/mandal	0.668
		Discounts or credit options available	0.642
		Price justified by product performance	0.636
		Rarely face delays or shortages	0.632
		Product accessible during peak season	0.628
		Products distinguishable from competitors	0.769
		Professional appearance and branding	0.712
2	Post-Purchase Support and Guidance	Guidance on correct application and dosage	0.680
		Regular updates on product usage	0.647
		Complaints/issues resolved effectively	0.535
3	Field Staff Support and Reliability	Field staff polite and cooperative	0.882
		Information from field staff accurate and understandable	0.872
		Field staff provide timely support	0.542

		Packaging clearly labeled	0.510

3. Crop-Specific Analysis of Farmer Perceptions

Table 9: One-Way ANOVA Results for Farmer Perceptions Across Crops

Factor	Source	Sum of Squares	df	Mean Square	F-Value	Sig.
Factor 1 (Product Performance and Accessibility)	Between Groups	22.38	2	11.19	13.55	<0.001***
	Within Groups	96.61	117	0.826	-	-
	Total	119.00	119	-	-	-
Factor 2 (Post-Purchase Support and Guidance)	Between Groups	11.98	2	5.99	6.55	0.039*
	Within Groups	107.01	117	0.915	-	-
	Total	119.00	119	-	-	-
Factor 3 (Field Staff Support and Reliability)	Between Groups	10.545	2	5.272	5.688	0.004**
	Within Groups	108.455	117	0.927	-	-
	Total	119.000	119	-	-	-

**Significant at p<0.05*

The ANOVA results revealed statistically significant differences across crops for all three factors. For Factor 1, the F-value was 13.55 with significance level p<0.05, indicating that farmers' perceptions of product performance, pricing, availability, and promotional activities vary substantially across paddy, maize, and turmeric cultivation. Similarly, Factor 2 demonstrated significant differences (F=6.55, p=0.039), suggesting that the perceived importance and quality of post-purchase support differ across crop categories. For Factor 3, the F-value was 5.688 with significance level p=0.004, confirming that farmers' evaluation of field staff interactions and packaging reliability varies based on crop type.

Table 10: Post Hoc Multiple Comparisons (Tukey HSD)

Factor	Crop (I)	Crop (J)	Mean Difference (I-J)	Std. Error	Sig.	Interpretation
Factor 1 (Product Performance and Accessibility)	Maize	Paddy	-0.699*	0.197	0.002	Paddy > Maize
	Maize	Turmeric	-1.182*	0.197	<0.001	Turmeric > Maize
	Paddy	Maize	0.699*	0.197	0.002	Paddy > Maize
	Paddy	Turmeric	-0.483*	0.197	0.041	Turmeric > Paddy
	Turmeric	Maize	1.182*	0.197	<0.001	Turmeric > Maize
	Turmeric	Paddy	0.483*	0.197	0.041	Turmeric > Paddy
Ranking: Turmeric > Paddy > Maize						
Factor 2 (Post-Purchase Support and Guidance)	Maize	Paddy	0.425	0.219	0.132	Not significant
	Maize	Turmeric	-0.111	0.219	0.868	Not significant
	Paddy	Maize	-0.425	0.219	0.132	Not significant
	Paddy	Turmeric	-0.536*	0.219	0.042	Turmeric > Paddy
	Turmeric	Maize	0.111	0.219	0.868	Not significant
	Turmeric	Paddy	0.536*	0.219	0.042	Turmeric > Paddy
Ranking: Turmeric > Paddy ≈ Maize						
Factor 3 (Field Staff Support and Reliability)	Maize	Paddy	-0.556*	0.215	0.030	Paddy > Maize
	Maize	Turmeric	-0.683*	0.215	0.005	Turmeric > Maize
	Paddy	Maize	0.556*	0.215	0.030	Paddy > Maize
	Paddy	Turmeric	-0.127	0.215	0.825	Not significant
	Turmeric	Maize	0.683*	0.215	0.005	Turmeric > Maize
	Turmeric	Paddy	0.127	0.215	0.825	Not significant
Ranking: Turmeric ≈ Paddy > Maize						

*Mean difference is significant at p<0.05

Interpretation of Post Hoc Results

For Factor 1 (Product Performance and Accessibility), turmeric farmers showed significantly higher scores compared to both paddy (mean difference = 0.483, p=0.041) and maize farmers (mean difference = 1.182, p<0.001). In addition, paddy farmers reported higher perceptions than maize farmers (mean difference = 0.699, p=0.002). These findings indicate that turmeric farmers view product quality, pricing fairness, and promotional activities more positively, followed by paddy farmers, while maize farmers remain the least convinced.

For Factor 2 (Post-Purchase Support and Guidance), a significant difference was observed between paddy and turmeric farmers (mean difference = 0.536, p=0.042), with turmeric farmers assigning higher ratings. Differences between maize and the other two groups were not statistically significant.

For Factor 3 (Field Staff Support and Reliability), both turmeric and paddy farmers recorded significantly higher perceptions than maize farmers, with mean differences of 0.683 (p=0.005) and 0.556 (p=0.030), respectively. However, no significant difference was found between turmeric and paddy farmers (p=0.825).

Conclusion

This study provides comprehensive insights into farmer

perceptions of organic fertilizers across paddy, maize, and turmeric crops in Nizamabad district, Telangana. The analysis reveals that farmer perceptions are structured around three principal dimensions—Product Performance and Accessibility, Post-Purchase Support and Guidance, and Field Staff Support and Reliability—collectively explaining 53.70% of variance. Significant differences exist in perceptions across crop categories, with turmeric farmers showing highest satisfaction, followed by paddy farmers, while maize farmers demonstrate lowest acceptance levels.

The findings emphasize several key points. First, farmers evaluate organic fertilizers holistically across multiple marketing mix elements rather than focusing on individual attributes, necessitating integrated marketing strategies addressing Product, Price, Place, Promotion, People, Process, and Physical Evidence simultaneously. Second, Process-related factors (delivery reliability, technical guidance, updates, complaint resolution) constitute the largest share of perception variables, indicating that operational efficiency and post-purchase support are critical for adoption. Third, crop characteristics and cultivation practices substantially mediate farmer perceptions, requiring differentiated marketing approaches for different crops.

Based on these findings, the following recommendations are proposed:

1. Develop crop-specific organic fertilizer formulations addressing unique nutrient requirements and growth patterns of paddy, maize, and turmeric
2. Intensify field demonstrations particularly for maize, establishing comparative plots showing tangible yield benefits of organic inputs
3. Strengthen distribution networks ensuring timely availability during peak seasons through improved inventory planning and dealer coordination
4. Enhance field staff training focusing on technical knowledge, communication skills, and farmer relationship management
5. Formalize post-purchase support systems including regular technical guidance, dosage recommendations, and prompt complaint resolution
6. Improve packaging communication incorporating crop-specific visual cues, usage illustrations, and QR codes for digital guidance
7. Design differentiated promotional campaigns addressing specific concerns of paddy, maize, and turmeric farmers through vernacular materials and demonstrations

Implementation of these strategies will enhance organic fertilizer adoption rates, contributing to sustainable agriculture development in Telangana and similar agro-ecological regions.

References

1. Assefa S, Tadesse S. The principal role of organic fertilizer on soil properties and agricultural productivity: a review. Agric Res Technol Open Access J. 2019;22(2):1–5.
2. Hazra G. Different types of eco-friendly fertilizers: an overview. Sustain Environ. 2016;1(1):54–68.
3. Sharma A, Chetani R. A review on the effect of organic and chemical fertilizers on plants. Int J Res Appl Sci Eng Technol. 2017;5(2):677–680.
4. National Centre of Organic and Natural Farming. State-wise production and consumption of organic fertilizers under PKVY. New Delhi: Department of Agriculture and Farmers Welfare, Government of India; 2024.
5. Wang Y, Zhu Y, Zhang S, Wang Y. What could promote farmers to replace chemical fertilizers with organic fertilizers? J Clean Prod. 2018;199:882–890.
6. Dahlin J, Halbherr V, Kurz P, Nelles M, Herbes C. Marketing green fertilizers: insights into consumer preferences. Sustainability. 2016;8(11):1169.
7. Okuma LO, Isiorhovoja RA. Farmers' perception and willingness to pay for organic fertilizer in Delta State, Nigeria. J Agric Food Environ. 2017;4:9–20.
8. Shanker R. Services marketing: the Indian perspective. New Delhi: Excel Books; 2002.