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Farmer's Perception on Farm Mechanization

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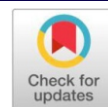
ABSTRACT

This study explores the perception of farmers towards farm mechanization in Telangana, focusing on paddy, maize, and cotton crops across three districts. A total of 240 farmers were selected through purposive and random sampling techniques. The study utilized an ex-post-facto approach and conducted data analysis using correlation, regression, and path analysis. Results revealed that the majority of farmers (61.66%) had a medium level of perception towards farm mechanization. Key influencing factors included education, farm size, irrigation availability, source of information, and extension contact. Stepwise regression analysis identified eight significant variables, with irrigation status, age, education, and extension-related factors showing the strongest influence. The model explained 48.90% of the variance in farmers' perceptions. To address the key challenges in understanding the benefits of farm mechanization by farmers. The findings highlight the need for improved access to information, extension services and availability of mechanization services had increased the level of perception towards mechanization. Recognizing these determinants is essential for policymakers striving to promote efficient & sustainable agricultural practices through mechanization.

Keywords: Perception, Mechanization, Adoption, Agriculture, Profile, Telanagana, Stepwise regression, Determinants.

1. INTRODUCTION

In many countries, agriculture remains the primary source of income, especially in emerging nations where a significant portion of the population is employed in this sector. In this context, farm mechanization using machinery to perform agricultural tasks plays a crucial role in enhancing productivity, reducing labor costs, and ensuring timely farm operations [1]. However, the adoption and acceptance of farm mechanization vary widely among farmers, influenced by various factors. By factors such as socioeconomic factors.

Understanding farmers' perceptions towards farm mechanization is essential for designing effective policies and interventions that encourage its adoption. A positive perception can lead to increased use of technology, improved efficiency, and better crop yields, while skepticism or resistance may hinder progress and maintain dependence on traditional labor-intensive methods. This study aims to explore how farmers perceive mechanization, the benefits and challenges they associate with it, and the key factors shaping their attitudes and decision-making processes.

2. OBJECTIVES

I. To study the extent of perception of farmers towards farm mechanization.
ii. To ascertain the relationship between the profile of farmers and their perception towards farm mechanization.

3. METHODOLOGY

The study focused on three major crops—paddy, maize, and cotton—purposively selected due to their significance in Telangana's agriculture. The research was conducted across three districts: Jagtial, Siddipet, and Nalgonda. From each district, four villages were purposively chosen, resulting in a total of 12 villages. In each village, 20 farmers were selected randomly, bringing the total sample size to 240 farmers.

The perception of farmers regarding farm mechanization and the impact of various factors on it occurred previous to the survey. The study utilized an ex-post-facto research design. Perception of farmers was measured using the scale developed by Krishna et al. (2025) [2]. Collected data was processed and analyzed by employing the statistical tools viz, frequency, percentage, class interval, correlation, regression, and path analysis.

4. RESULTS AND DISCUSSION
4.1 The extent of the perception of farmers toward farm mechanization

Table 4.1: Distribution of respondents according to the level of perception towards mechanization

Categories	Frequency	Percentage
Low level of perception	41	17.08
Medium level of perception	148	61.66
High level of perception	51	21.25
Total	240	100.00

In this study, respondents' perceptions were measured using the scale developed by Krishna et al. (2025) [2]. Based on their scores, respondents were categorized into three groups: low, medium, and high perception of farm mechanization, using the exclusive class interval method. The data from the table indicated that the majority (61.66%) had medium-level perception followed by 21.25 per cent having higher-level perception and 17.08 per cent with low perception.

The findings indicated that farmers had a medium level of perception regarding farm mechanization. This suggests that they had a moderate to fairly good understanding of both the benefits and drawbacks of using machinery in agriculture. Several factors could contribute to this level of perception. One of the most significant is the extent to which farmers use machinery in their daily farming activities. Greater exposure and hands-on experience with farm equipment help farmers better understand its role in improving efficiency, reducing labor dependency, and increasing productivity.

Additionally, farmers who are exposed to modern agricultural practices and technologies through training, demonstrations, or peer interactions tend to develop a deeper understanding of mechanization. Such exposure allows them to form a more positive and informed view of its advantages. On the other hand, in regions where farm mechanization is limited due to financial constraints, lack of awareness, or inadequate access to suitable machinery, farmers may not fully recognize its potential benefits. As a result, their perception remains moderate rather than highly positive. The findings were supported by Mridula and Devi (2016) [3].

Table 4.2: Relationship between the profiles of respondents and their perception towards farm mechanization

V. No	Profile characteristics	"r" Value
X1	Age	-.461**
X2	Education	.315**
X3	Farm size	.234**
X4	Farming experience	-.070[NS]
X5	Annual income	.148*
X6	Access to credit	0.70[NS]
X7	Irrigation	.435**
X8	Labour availability	.324**
X9	Source of information	.371**
X10	Ownership of power sources	.221**
X11	Investment on farm mechanization	.131*
X12	Source of machinery	.330**
X13	Availability of mechanization services	.146*
X14	Extension support services	.357**
X15	Social participation	.125[NS]
X16	Extension contacts	.341**

**Significant at 0.01 level of significance, *Significant at 0.01 level of significance NS= Non-significant

A farmer exhibits varying degrees of awareness regarding different facets of automated farming due to differences in personal qualities. Therefore, it can be asserted that farmers' perspective of agricultural mechanization is influenced by their personal, economic, situational, communicational, and psychological features. Therefore, in light of the significance of these characteristics, this inquiry endeavored to determine any correlation between the personal, economic, situational, communicational, and psychological traits of farmers and their perceptions of agricultural mechanization.

A statistical method utilizing Karl Pearson's coefficient of correlation (r) was employed to determine the relationship between farmers' attributes and their perceptions regarding farm mechanization. The results are represented in Table 2. Indicates that among 16 independent variables, nine variables namely Education (.315**), farm size (.234**), Irrigation status (.435**), Labour availability(.324**), Source of information(.371**), Ownership of power sources (.221**), Source of machinery(.330**), Extension support services (.357**) and Extension contact (.341**) were positive and highly significant. In contrast, age (-.461**) is negative and highly significant at the 0.01 probability level. Annual income (.148*), Investment in farm mechanization (.131*), and Availability of mechanization services were positive and significant at 0.05 level of probability. Access to credit (0.70) and social participation (.125) were positive and non-significant, whereas farming experience (-.070) was negative and non-significant. This finding is supported by the findings of Sutariya *et al.* (2015), Sahana *et al.* (2018), and Hossain *et al* (2018) [4, 5, 6].

4.2 Stepwise regression Analysis

Stepwise multiple regression was used to identify the most parsimonious variables that show the combined effect of independent variables in explaining the variation on the dependent variable (Perception), The model excludes variables that do not significantly contribute to the dependent variable. The cumulative impact of the independent factors together accounted for a 48.90 percent variation in farmer's perception. The ultimately chosen variables with regression coefficient (b), Standard Error (SEb), and partial regression coefficient were presented in Table 4.25

Table 4.3: Model summary of stepwise regression analysis of the determinants of farmer's perception of farm mechanization

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Values
1	.461[a]	.213	.209	6.265	64.240
2	.575[b]	.331	.325	5.788	58.54
3	.619[c]	.383	.375	5.571	48.76
4	.651[d]	.424	.414	5.393	43.76
5	.672[e]	.451	.440	5.274	38.49
6	.684[f]	.467	.454	5.208	34.08
7	.692[g]	.479	.463	5.161	30.49
8	.700[h]	.489	.472	5.121	27.66

From Table 4.25, it could be summarised that the variables in the last model accounted for 48.90 percent of the variation in the dependent variable. Among the sixteen independent variables, age, farming size, education, irrigation, Source of information, Ownership of power sources, Availability of mechanization services, Extension support services, and Extension contact were the most influential and consistently appeared in the retained models. Hence, based on the step-wise regression, eight variables were retained.

Table 4.4: Stepwise Multiple linear regression analysis of determinants of farmer's perception towards farm mechanization at the 8ᵗʰ step

	Coefficients					
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
8	(Constant)	64.859	4.902		13.230	.000
	Age	-.178	.034	-.265	-5.210	.000**
	Irrigation status	3.055	.691	.230	4.421	.000**
	Source of information	.374	.114	.171	3.285	.001**
	Extension contacts	.384	.100	.190	3.828	.000**
	Education	.724	.204	.173	3.554	.000**
	Extension support system	1.406	.625	.120	2.251	.025*
	Availability of mechanization services	.211	.083	.125	2.537	.012*
	Ownership of power sources	.785	.367	.106	2.140	.033*
a. Dependent Variable: Perception						

**Significant at 0.01 level of significance, *Significant at 0.01 level of significance NS= Non-significant

The results of the stepwise regression analysis presented in Table 4.26 indicate that five variables Age. Irrigation, Source of information, extension contact, and education were significant at a 0.01 probability level. A unit increase in Irrigation, Source of information, extension contact, and education increases by 0.230, 0.171, 0.190, 0.173-, 0.120-, 0.125- and 0.106-unit perception levels respectively, whereas a unit increase of age decreases by 0.265 unit of perception level. Extension support system, Availability of mechanization services, and ownership were significant at 0.05 probability level. A unit increase of Extension support system, Availability of mechanization services, and ownership increases by 0.120,0.125 and 0.106 units in perception respectively.

5. CONCLUSION

The study concludes that farmers in the selected districts of Telangana hold a moderate perception of farm mechanization, reflecting a balanced awareness of its benefits and challenges. The analysis revealed that key variables such as education, irrigation, extension contact, and access to information had positively influenced farmer's perceptions, while age had a significant negative impact. The results presented highlight the significance of focused interventions, particularly in regions with restricted exposure to mechanization. Enhancing awareness through training, demonstrations, and strong extension networks can significantly improve farmers' attitudes and encourage the adoption of modern farming equipment. Additionally, improving the availability of mechanization services and ownership of power sources can boost farmers' confidence in mechanized agriculture. With 48.90% of the variance in perception explained by the identified variables, policymakers and agricultural development agencies can use these insights to frame strategies that encourage mechanization, ultimately improving productivity, reducing labor dependency, and ensuring sustainable agricultural growth.

Conflict of interest,

I hereby declare that all authors have no conflict of interest. All authors agree that the findings of the study can be published.

Future scope of the study

The study examined farmer's perceptions of farm mechanization in paddy, cotton, and maize cultivation. Future research could include other crops and different regions to identify the broader trends of the farmers perception. Longitudinal studies may track changing perceptions, particularly with technological and policy shifts. Investigating mechanization's effects on productivity, labor, drudgery and income will enhance relevance. Exploring adoption barriers, custom hiring centers, and perspectives of women and youth will offer deeper insights. Research on emerging technologies like drones and AI tools will be vital for advancing sustainable mechanization.

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