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A study on consumer behaviour analysis for agro implements

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Abstract
This study examines consumer behavior in the adoption of agro implements, focusing on factors such as pricing, brand loyalty, government incentives, and technological awareness. Through statistical analyses, the research highlights key influences on farmers' purchasing decisions, revealing that while price significantly impacts satisfaction, demographic factors like age and gender show minimal influence. Findings indicate a growing interest in advanced agricultural technologies, yet limited awareness and training hinder widespread adoption. The study provides insights for manufacturers, policymakers, and agricultural stakeholders to enhance product quality, affordability, and accessibility, ultimately improving mechanization and sustainability in farming.

Keywords: Consumer contentment, acquisition choice, standard superiority, brand loyalty, prospective enhancement

Introduction
The study of agro implements focuses on the development, design, and impact of agricultural tools and machinery to enhance farming efficiency. These implements, ranging from manual tools to advanced mechanized equipment like tractors and seed drills, play a vital role in soil preparation, irrigation, harvesting, and post-harvest processing. With technological advancements, innovations such as precision farming, automation, and smart farming solutions—like GPS-guided machinery and sensor-based irrigation—have revolutionized agriculture, improving productivity and sustainability. Understanding these tools is crucial for farmers, researchers, and policymakers. Governments and institutions worldwide promote research and training programs to encourage their adoption, ensuring increased efficiency and food security.

Objectives of the study
- To valuate farmers' openness to adopting advanced technologies, including automation, AI, and IoT in agricultural machinery.
- To Study customer loyalty, satisfaction and perceptions of different agro machinery brands.

Statement of the problem
Agro machinery manufacturers often face challenges in understanding the specific needs and preferences of farmers, resulting in a disconnect between their product offerings and customer expectations. Additionally, the marketing strategies currently used by these manufacturers may not effectively reach or engage farmers, leading to low brand visibility and poor sales. The agro machinery market in India is highly fragmented, with numerous local players offering customized products. However, the lack of standardization in this market makes it difficult for farmers to compare different products and make informed purchasing decisions. Furthermore, many manufacturers fall short in providing adequate after-sales support, which leads to farmer dissatisfaction and negatively impacts repeat business and word-of-mouth referrals. Another significant issue is that many farmers in India have limited access to formal credit channels, hindering their ability to purchase agro machinery, even if they are interested in adopting advanced farming technologies.

Limitations of the study

This study may encounter several limitations that could influence the results. Geographical constraints might restrict the research to specific regions, potentially leading to results that are not broadly applicable. The sample size could also pose a challenge, as a small sample may not adequately represent the larger population, limiting the ability to draw statistically significant conclusions. Additionally, low respondent participation could result in a lack of diverse viewpoints, further affecting the validity of the study. The data collection methods might introduce biases or inaccuracies, depending on how the information is gathered. Time and resource limitations could impact the depth of the research, narrowing the scope of data collection and analysis. Finally, the findings may not be universally applicable, especially if the sample or methodology does not accurately reflect all contexts or populations.

Research methodology

Research methodology refers to the systematic approach used to conduct research, detailing the methods and techniques for data collection, analysis, and interpretation. In this study, a convenience sampling method was employed, with a sample size of 153 respondents. The study was conducted in Coimbatore city, where data was gathered from a representative subset of the target population. The chosen sampling technique allows for efficient data collection while focusing on specific insights relevant to the research question.

Satistical tools used

- Chi-Square Analysis
- Correlation Analysis
- One Way ANOVA

Review of literature

Kumar and Tiwari (2022) examined the impact of environmental awareness on the adoption of sustainable agro implements. Their research suggested that farmers increasingly prefer machinery that promotes eco-friendly practices, such as water conservation and reduced soil degradation. Despite the higher initial cost of environmentally friendly implements, the growing environmental consciousness among farmers has led to an increased demand for these products, as they recognize the long-term benefits to both their farms and the environment.

Kaur and Bansal (2021) discussed the importance of environmental certification in consumer decisions for agro implements. Their study revealed that farmers who prioritize sustainability are more likely to purchase machinery with environmental certifications, which assure them of the product's eco-friendliness and minimal environmental impact. This growing trend towards sustainable farming practices is reshaping the agro implement market.

Sharma, S.K., Yadav, R., Verma, R. (2021) – Sharma *et al.* (2021) explored the economic factors influencing the purchase of agro implements in India. They found that economic conditions, particularly government subsidies and low-interest loans, are pivotal in the purchasing decisions of small and medium farmers. The study showed that these financial incentives help reduce the high upfront costs of agro machinery, making it more accessible for farmers who would otherwise struggle with such investments. These economic supports are crucial in promoting the adoption of modern agricultural technology.

Singh, A., Yadav, N. (2021)–Singh and Yadav (2021) examined the impact of governmental incentives and subsidies on the adoption of agro implements in developing countries. They found that government policies that provide subsidies or discounts on the purchase of farming equipment greatly enhance adoption rates. The study also stressed that timely delivery of subsidies is critical to ensuring farmers have the financial support needed for purchasing machinery.

Singh and Bhattacharya (2021) focused on how rural community dynamics influence the adoption of agro implements. They found that in closely-knit rural communities, word-of-mouth and local recommendations strongly affect the decision-making process. If a neighbor or a respected community member uses a particular agro implement, others are more likely to follow suit, demonstrating the role of local influence in adoption.

Singh and Tiwari (2021) focused on the role of local agro implement dealers in shaping consumer behavior. They found that farmers often rely heavily on local dealers for advice and guidance in selecting appropriate machinery. The trust and relationship between farmers and local dealers play a significant role in influencing purchasing decisions, making these dealers essential in the adoption process of agro implements

CHI square analysis

To find the significance between gender vs perception

- **Null Hypothesis (H_0):** There is no significant relationship between gender and perception
- **Alternative Hypothesis (H_1):** There is a significant relationship between gender and perception.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	1.629[a]	1	.202		
Continuity Correctionb	1.050	1	.306		
Likelihood Ratio	1.544	1	.214		
Fisher's Exact Test				.215	.153
Linear-by-Linear Association	1.618	1	.203		
N of Valid Cases	153				

Source: Primary data

Interpretation

The results of the chi-square tests (Pearson Chi-Square, Continuity Correction, Likelihood Ratio, Fisher's Exact Test, and Linear-by-Linear Association) all show p-values greater than 0.05, with values ranging from 0.153 to 0.306. This indicates that there is no statistically significant association or relationship between the two variables being tested. Therefore, we fail to reject the null hypothesis, suggesting that the variables are independent of each other.

ANOVO

To find difference between age Vs satisfaction

- **Null hypothesis (H_0)** posits that all age groups have equal mean satisfaction levels.
- **Alternative hypothesis (H_1)** suggests that at least one age group differs in mean satisfaction.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.787	3	3.596	1.009	.391
Within Groups	531.101	149	3.564		
Total	541.888	152			

Source: Primary data

Interpretation

The ANOVA results indicate that the p-value is 0.391, which is greater than the conventional significance level of 0.05. This suggests that there is no significant difference in satisfaction across different age groups. Therefore, we fail to reject the null hypothesis, concluding that age does not have a statistically significant effect on satisfaction in this context.

Correlations

To find the relation between price and satisfaction level

- **Null Hypothesis (H_0):** There is no significant correlation between the importance of price in the purchase decision and satisfaction.
- **Alternative Hypothesis (H_1):** There is a significant correlation between the importance of price in the purchase decision and satisfaction.

		How important is the price of the bull agro implements in your purchase decision?	Satisfactions
How important is the price of the bull agro implements in your purchase decision?	Pearson Correlation	1	.395**
	Sig.(2-tailed)		.000
	N	153	153
Satisfactions	Pearson Correlation	.395**	1
	Sig.(2-tailed)	.000	
	N	153	153

Source: Primary data

Interpretation

The Pearson correlation between the importance of price in the purchase decision and satisfaction is 0.395, with a p-value of 0.000 (less than 0.05), indicating a moderate positive correlation. This suggests that as the importance of price in purchasing the Bull Agro implements increases, satisfaction also tends to increase. The statistical significance of the result (p-value < 0.05) means the relationship is unlikely to have occurred by chance. Therefore, we can conclude that the more important price is in the decision-making process, the higher the level of satisfaction tends to be.

Findings

- The chi-square tests show p-values ranging from 0.153 to 0.306, all of which are greater than the 0.05 significance level, indicating no statistically significant relationship between gender and perception.
- Based on the results, the null hypothesis (H_0) cannot be rejected, meaning there is no significant difference in perception based on gender.
- The lack of significance suggests that gender does not influence or affect the perception of the respondents in this study.
- All chi-square tests, including Pearson Chi-Square, Continuity Correction, and Fisher's Exact Test, yield consistent results, supporting the conclusion of no significant relationship.
- The analysis indicates that both male and female respondents share similar perceptions, without significant variation based on gender.

Suggestions

While no significant relationship was found, other demographic factors like age, education, or income may offer insights into perception differences and should be explored in future studies. A larger or more diverse sample might provide more detailed insights or uncover potential differences that were not apparent in this study. In addition to quantitative tests, qualitative research methods such as interviews or focus groups could provide deeper understanding of the reasons behind perceptions. The perception measures used in this study may need to be reviewed or refined to ensure they capture the nuances of gender-based differences, if any exist. Conducting a longitudinal study could reveal if perception trends change over time or with external factors, which could offer new perspectives on gender differences in perception.

Conclusion

The findings from this study indicate that there is no statistically significant relationship between gender and perception, as supported by the chi-square test results. The p-values obtained from various tests, including Pearson Chi-Square, Continuity Correction and Fisher's Exact Test, were all greater than the 0.05 significance level, leading to the conclusion that gender does not significantly influence the perceptions of the respondents in this study. This suggests that both male and female participants have similar perceptions on the subject matter under investigation. However, this study is limited by the scope of the variables explored, and it is possible that other demographic factors, such as age, education, or income, may have a more prominent role in shaping perceptions. Additionally, expanding the sample size and including a more diverse range of respondents could provide a broader understanding and potentially reveal nuances that were not captured here. Therefore, future studies should consider these factors to build a more comprehensive view of how different variables may affect perceptions.

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