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Evaluation of Marketing Strategy Effectiveness and Technology Adoption in Drone Spraying Services: A Study on Farmer Adoption in Tamil Nadu

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Abstract--This paper looks at how marketing strategies affect the adoption of drone spraying services among farmers in Tamil Nadu. Even though these technologies are available, many farmers are still hesitant to use them because of cost concerns, lack of trust, and limited real-world experience.

For this study, responses were collected from 100 participants through a questionnaire shared using Google Forms. The data were then examined using basic statistical methods to understand how awareness, perception, and trust relate to adoption behaviour.

The results suggest that simply being aware of drone spraying is not enough to influence usage. Farmers tend to make decisions only after they are convinced about reliability and economic benefits. It was also noticed that field demonstrations and personal recommendations play a stronger role than digital promotions.

Overall, the study shows that practical exposure and trust are key factors in improving adoption among farmers.

Keywords==Drone Spraying, Marketing Strategy, Technology Adoption, Agriculture, Customer Acquisition

I. INTRODUCTION

Agriculture continues to be one of the most important sectors in India, particularly in terms of employment and food production. However, farmers today face several challenges, including labour shortages, increasing costs, and inefficiencies in traditional farming practices. As a result, there is a growing need for modern and efficient solutions.

Drone spraying technology has emerged as one such solution, offering benefits such as reduced manual effort, improved efficiency, and safer application of chemicals. Despite these advantages, the adoption of drone spraying services remains limited among farmers.

This paper focuses on identifying why this gap exists, particularly by looking at how marketing activities shape awareness, trust, and eventual adoption decisions.

This study provides a focused analysis of how marketing strategies influence the adoption of drone spraying services in rural agricultural markets, where trust and practical exposure play a critical role.

II. LITERATURE REVIEW

In earlier studies, it has been observed that farmers usually adopt new technologies only when they clearly understand the benefits and feel comfortable using them. This highlights the importance of both usefulness and ease of use in influencing their decisions.

This idea is explained in the Technology Acceptance Model, which highlights the role of perceived usefulness and ease of use in adoption decisions.

In many cases, new technologies spread gradually, where farmers first observe and then decide whether to adopt them, which reflects the idea behind diffusion of innovation. Farmers often rely on practical experience and recommendations from others before adopting new technologies.

However, most existing studies focus mainly on the technical aspects of drone technology. Limited research has explored the role of marketing strategies in influencing adoption, especially in rural agricultural contexts. This study addresses this gap.

III. RESEARCH METHODOLOGY

This study follows a descriptive approach to understand how farmers think about and respond to drone spraying services, especially in terms of awareness, trust, and adoption behaviour. The study focuses on analysing awareness, perception, trust, and adoption behaviour among respondents.

Primary data were collected using a structured questionnaire distributed through Google Forms. This approach enabled efficient data collection without direct field visits.

A total of 100 valid responses were used for analysis. Convenience sampling was adopted due to accessibility and time constraints.

Data analysis was conducted using percentage analysis, along with basic correlation and regression techniques to identify relationships between variables. Reliability of the data was tested using Cronbach's alpha, which indicated acceptable internal consistency.

**Table 1:
Constructs and Variables**

<u>S.NO</u>	CONSTRUCT	DESCRIPTION
1	Marketing strategies	Field demonstrations, word of mouth, digital marketing
2	Awareness	Knowledge of drone spraying services
3	Perception	Attitude toward usefulness and efficiency
4	Trust	Confidence in drone technology
5	Economic benefits	Cost savings and productivity improvement
6	Adoption	Willingness to use drone spraying services

3.1 Hypothesis Development

Based on the observations from the study, the following assumptions are considered:

H1: Farmers who are more aware of drone spraying services are more likely to show interest in adopting them.

H2: Trust in the performance and reliability of the service plays an important role in adoption decisions.

H3: Farmers are more willing to adopt drone spraying when they clearly see economic benefits.

H4: Practical demonstrations have a stronger influence on adoption compared to digital marketing efforts.

IV. RESULTS AND ANALYSIS

When the responses are examined closely, awareness does appear to be linked with adoption interest, but it does not automatically lead to actual usage.

Many farmers seem to look beyond basic information and focus more on whether the service is dependable and cost-effective before making a decision.

Perception toward drone spraying services also has a positive influence on adoption behaviour. Among all variables, trust and perceived economic benefits show a comparatively stronger influence on adoption than awareness and perception. This indicates that farmers prioritize reliability and cost advantage over basic awareness.

In addition, demonstration-based marketing strategies were found to be more effective than digital marketing in influencing farmer decisions. Farmers prefer to see real-life results and rely on recommendations from others before adopting new technology.

Although detailed statistical coefficients are not presented, the analysis consistently indicates positive relationships among the key variables.

These observations indicate that decisions are driven more by perceived value and trust rather than awareness alone.

Some respondents also mentioned that they would be more willing to try the service if they could first observe it in nearby farms.

From the overall responses, it can be understood that farmers do not rely on a single factor while making decisions. Instead, they consider a combination of trust, cost benefits, and practical experience before deciding whether to adopt the service.

Conceptual Relationship

Based on the findings, adoption of drone spraying services can be understood as being influenced by awareness, trust, perceived benefits, and the type of marketing approach used.

**Table 2:
Regression summary**

<u>S.NO</u>	VARIABLE	IMPACT ON ADOPTION
1	Awareness	Positive
2	Perception	Positive
3	Trust	Strong positive
4	Economic benefits	Strong positive



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V. DISCUSSION

The results make it clear that having information alone does not influence farmer behaviour. In most cases, farmers prefer to see how the technology works in real situations or hear feedback from others before deciding whether to use it.

This is consistent with the Technology Acceptance Model, which explains that perceived usefulness and reliability influence adoption behaviour. Similarly, the effectiveness of field demonstrations supports the Diffusion of Innovation theory, where real-life observation plays an important role.

The study also shows that digital marketing has limited impact in rural areas. Farmers depend more on demonstrations and recommendations from other farmers, highlighting the importance of trust and practical exposure.

This shows that practical exposure plays a bigger role than theoretical awareness in rural decision-making.

VI. CONCLUSION

Drone spraying offers clear operational benefits, yet its adoption remains limited. The results suggest that farmers need confidence in both performance and value before they are willing to try such services.

Marketing strategies should therefore focus on field demonstrations, relationship-building, and localized communication rather than relying only on digital methods.

Improving these areas can significantly increase adoption and support the growth of drone-based agricultural services.

VII. CONTRIBUTION TO STUDY

This study contributes by showing that marketing strategies play a key role in bridging the gap between awareness and actual adoption.

It highlights the importance of trust, demonstration, and local engagement in influencing farmer decisions.

VIII. LIMITATIONS

The study is limited by its sample size and geographic focus, which may affect generalizability. In addition, only basic analytical techniques were used.

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