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Analysis Of The Success Of Digital-Based Agricultural Extension Programs In Rural Areas

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ABSTRACT

An inventive way to raise farmers' knowledge and proficiency in rural regions is through digital-based agricultural extension. The purpose of this study is to evaluate the extension program's effectiveness and how it affects farmers' satisfaction. 50 farmers participating in the initiative were given questionnaires and conducted in-depth interviews as part of the methodology. According to the findings, 75% of farmers learned new skills and 82% of farmers gained more information; on a Likert scale of 5, the average satisfaction level was 4.2. Technology adoption is nevertheless hampered by issues including low digital literacy and inadequate internet infrastructure, despite the program's effectiveness. According to the study's findings, enhancing digital literacy and building infrastructure are critical to the long-term viability of Indonesia's digitally based extension initiatives.

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1. Introduction

The primary pillars supporting the provision of food for humans are farmers. The way farmers labor and produce will determine the availability of the food we eat on a daily basis. But there are still a lot of barriers and restrictions facing many farmers, particularly in Indonesia.

In rural regions, agriculture is a crucial industry that makes a significant contribution to the Indonesian economy. However, farmers' productivity is hampered by issues including poor information availability and low levels of technological use. A creative way to increase the efficacy and efficiency of the extension process in this regard is through digital-based agricultural extension. In order for the main actors and business actors to be willing and able to organize

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themselves in order to access market information, technology, capital, and other resources, as well as to increase productivity, business efficiency, income, and welfare, as well as to raise awareness of the importance of maintaining environmental functions, agricultural extension is explained in Law of the Republic of Indonesia Number 16 of 2006. Extension is an educational endeavor that aims to change the behavior of customers (farmers) in line with the intended or desired outcome, which is that people are more successful and contemporary. Despite the government's diligent efforts to support and educate farmers through extension services, several circumstances may still make these services inaccessible.

A significant breakthrough in improving the efficiency of communication and information sharing with farmers, particularly in rural regions, is digital-based agricultural extension. The information and communication technology-based extension methodology may be used remotely and does not require in-person meetings with farmers. Timely and pertinent information and communication technology in the agricultural industry gives farmers the knowledge they need to make informed farming decisions, which successfully boosts output, profitability, and productivity.

The internet is presently developing at a very fast pace, reaching nearly every level of society and even the most remote places from the city core. Extension agents and farmers can meet in real time as if they were in person by using electronic devices like laptops and smartphones as a communication tool with an internet connection. The internet offers a number of advantages for extension activities, including the ability to be provided at any time and from any location, the simplicity with which the content can be updated, the potential to enhance the number of interactions between presenters and participants, and the ability to connect in real time. Information technology has made it possible to offer extension services from a variety of agricultural areas and contribute significantly to rural development, which has led to a number of developments. Compared to the mass media that was previously available, information technology in the form of the internet offers the possibility of more decentralized and democratic communication.

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Given this, the evolution of agricultural extension and the advancement of information and communication technology (ICT), which permits quicker and more extensive access to information, are becoming more and more significant. Gladden (2019) asserts that the digitization of extension makes it possible for farmers, researchers, and agricultural specialists to effectively exchange knowledge and insights via digital channels like social media and mobile applicationsy [9]. This gives timely and pertinent information, which opens up potential to boost agricultural output.

In addition to facilitating quicker and more comprehensive information transmission, digitalization in agricultural extension helps farmers access cutting-edge technologies that can increase agricultural productivity [1][2].

Particularly in isolated locations, traditional agricultural extension programs frequently fall short of efficiently reaching all farmers. To ensure the effectiveness of digital-based agricultural extension initiatives in rural regions, it is crucial to investigate their implementation and evaluation. The purpose of this study is to evaluate the effectiveness of digitally based agricultural extension initiatives and how they might enhance the wellbeing of local farmers [3][4].

Numerous earlier studies have demonstrated the enormous potential of agricultural extension based on digital technology. For instance, study by Darmawati (2019) highlighted the significance of extension workers' role as change agents in farmers' adoption of new technologies [2]. Furthermore, further research has demonstrated that the adoption of digital apps like "Petani Apps" may enhance information availability and assist farmers in making better choices about their farming methods [1][5]. Even though a lot of research has been done on the advantages of digital extension, little has been done to assess how these programs would affect farmer welfare and productivity over the long run.

This study differs from others in that it will employ a comprehensive qualitative method to analyze the effectiveness of digitally based agricultural extension programs. This study will investigate the social and cultural elements that affect farmers' success in adopting technology, whereas many other studies have

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concentrated more on the technical aspects of using digital apps or platforms. Furthermore, in order to provide a more comprehensive knowledge of farmers' experiences engaging in digital extension initiatives, this study will directly take into account their perspectives [4][6].

It is anticipated that by taking into account a number of variables that affect farmers' acceptance of technology, this study will be able to assess the effectiveness of digitally based agricultural extension programs in rural regions. Additionally, this study seeks to offer suggestions for the creation of agricultural extension policies that are more efficient and sensitive to the requirements of farmers. This work is important because it offers fresh perspectives on how technology might be applied to raise farmer welfare and agricultural output in the digital age [3][5].

Although digital technology has numerous advantages, some farmer groups are resistant to adopting new technologies, according to one of the assumptions to be evaluated in this study. This can be the result of mistrust of the new system or a failure to see the advantages of the technology. This research will examine many perspectives on this subject and look for ways to get over these obstacles.

2. Materials and Method

This study examines the effectiveness of digitally based agricultural extension programs in rural regions using a qualitative methodology and descriptive techniques. This strategy was adopted in order to fully comprehend the experiences of farmers and the elements that affect the effectiveness of extension initiatives. A number of the Regency's villages were chosen for the study based on factors including farmer involvement in extension initiatives and the availability of technology.

Population and sample

Farmers participating in a digital agricultural extension program made up the study's population. Purposive sampling was used to choose farmers who actively participated in the program in order to take the sample. To guarantee data variety, 50 farmers from Sumatera Barat were the intended responders, representing a range of backgrounds and agricultural company kinds.

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Data were collected using a variety of techniques, including: Comprehensive Interviews: Farmers' experiences with the extension program were investigated using semi-structured interviews. Understanding of the technology, perceived benefits, and challenges faced were among the topics covered in the interview questions. Direct Observation: Agricultural extension workers' extension operations were directly observed by researchers. Researchers were better able to comprehend the social background and interactions between farmers and extension workers because to these observations. Questionnaire: To gather quantitative information on farmers' satisfaction levels with the digital extension program, a questionnaire was created. A Likert scale was included in the questionnaire to gauge farmers' opinions on different program elements.

This questionnaire measured farmers' attitudes, views, and impressions of the extension program using a Likert scale. Five response options make up this scale, which indicates how much a respondent agrees with a given statement:

1. Disagree strongly (STS)
2. Disagree (TS)
3. Indecisive (RR)
4: Concur (S)
5. SS (Strongly Agree)

The questionnaire contains comments such as this extension program has increased my knowledge of modern agricultural practices. I feel more confident in using technology after participating in this program. Extension workers provide adequate support during the extension process.

The following formula is used to get the total score based on the information gathered from the questionnaire:

$$Total\ Points = \sum (Score \times Number\ of\ Respondents)$$

Where:

Number of Respondents = the number of respondents who voted in each category.

Score = Score is the Likert scale score based on the respondent's selection.

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The following procedures were included in the qualitative thematic analysis of data gathered from observations and interviews: Interview Transcription: For additional analysis, all interviews were recorded and transcribed. Data Coding: To find important themes arising from farmers' experiences, the transcribed data was coded. Thematic Analysis: To determine the main elements impacting the extension program's effectiveness, the themes that were found were examined. To give an overview of farmers' satisfaction with the extension program, quantitative data from the surveys was subjected to descriptive analysis.

This study's methodology aims to give a thorough picture of how well digital agricultural extension initiatives work in rural regions. It is intended that by using a qualitative and quantitative methodology, the study's findings would offer insightful information for creating agricultural extension strategies that are more efficient and sensitive to Indonesian farmers' requirements. Along with offering suggestions for best practices in digital-based extension, this study adds to the body of knowledge on technology adoption in the agriculture industry.

This research has a number of drawbacks, such as: Interview depth may be impacted by data gathering time restrictions. Some remote locations may be difficult to reach, which might compromise the sample's representativeness. Because this study focuses on specific places, its findings might not apply to other parts of Indonesia.

3. Result

The analysis's findings demonstrate that the program has significantly improved farmers' contentment, knowledge, and abilities. Data gathered from questionnaires and interviews, using both qualitative and quantitative methodologies, paints a clear picture of this extension program's efficacy.

According to a questionnaire analysis conducted with 50 respondents, the majority of respondents experienced an increase in their knowledge and self-awareness after participating in the program. Here is the kuesioner's rincian results:

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Table 1. Result of The Knowledge and Skill Improvement questionnaire

Assessment Aspect	Number of Respondents	Percentage (%)	Average Score
Increased Knowledge	41	82	4,5
New Skills	37	75	4,3
Use of Digital Applications	36	72	4,2
Access to Agricultural Information	39	78	4,4

A questionnaire was also used to gauge how satisfied farmers were with the digital extension program. According to the findings, farmers were happy with a number of program features.

Table 2. Farmer Satisfaction Level towards Digital Extension Program

Assessment Aspect	Average Score Category	Category
Knowledge Improvement	4,5	Very Good
Ease of Access to Information	4,3	Good
Extension Support	4,6	Very Good
Benefits of Digital Applications	4,1	Good
Overall Satisfaction	4,2	Good

Analysis of Qualitative Data

Several important topics surfaced from farmers' in-depth interviews: Extension Workers' Role: Extension agents serve as a liaison between farmers and technology, offering practical instruction and continuous assistanceAdoption Challenges: Despite the fact that the initiative has helped a lot of farmers, issues including poor digital literacy and inadequate internet connectivity still exist. Adaptation

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Techniques: Younger farmers are quicker to adopt new technologies than more experienced ones. Involving the younger generation in the extension process is crucial as a result.

4. Discussion

According to the study's findings, a digital agricultural extension program in rural regions has effectively raised farmer satisfaction, knowledge, and skill levels. A digital approach to extension can help close the information gap that farmers in distant locations frequently encounter, as seen by the notable gain in knowledge (82%) and new skills (75%), as reported by farmers. These results are in line with other studies that demonstrate how successful extension may boost the use of improved agricultural techniques and technology [7][8].

One important aspect of this study is the role of extension workers as facilitators. Extension workers not only convey information but also provide direct support to farmers in using digital technology. This reflects the findings of Gladden (2019) who emphasized the importance of interaction between extension workers and farmers in increasing the effectiveness of extension.[9] Thus, the success of this program is greatly influenced by the ability of extension workers to adapt to the needs and characteristics of farmers.

Even if the study's findings indicate notable progress, adoption hurdles for technology are still a worry. The findings of the interviews showed that a significant problem is the poor level of digital literacy among farmers, particularly among elderly farmers. This is consistent with the working premise that the capacity of users to use new technologies is just as important to their adoption as the technology's availability [10]. Another limiting issue in certain places is the lack of adequate internet infrastructure. Prior studies have demonstrated that information and communication technology (ICT) accessibility is critical to the success of digital extension initiatives [1]. Therefore, in order to build digital infrastructure in rural regions, communities, business organizations, and the government must work together to achieve better outcomes.

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To make digital-based agricultural extension programs accessible to all farmers, they must first be extended and tailored to local circumstances. Second, to guarantee that all farmers, particularly older farmers, can utilize the technology that is already accessible, digital literacy training need to be a crucial component of extension programs.

Third, extension workers' capacity improvement need to be a top concern. To effectively serve as a link between farmers and technology, extension agents must possess strong communication abilities and a thorough grasp of digital technologies. This is crucial to guarantee that the information provided is not only correct but also simple enough for farmers to comprehend.

It is anticipated that future studies will investigate a number of novel avenues. First, to evaluate the long-term effects of digital-based extension initiatives on farmer welfare and agricultural production, longitudinal studies may be carried out. Deeper understanding of the durability of the advantages of digital extension programs will be possible thanks to such study.

5. Conclusions

The success of a digital agricultural extension program in rural regions has been examined in this study, with an emphasis on enhancing farmer happiness, knowledge, and skills. The program effectively raised farmer knowledge by 82% and new skills by 75%, according to the data. Furthermore, with an average score of 4.2 on a Likert scale of 5, farmer satisfaction with the digital extension program was likewise comparatively high. These results support the claim that, in the digital age, digitally based extension may be a useful instrument for raising farmer welfare and productivity.

Nevertheless, this study also noted a number of obstacles to the use of technology, including farmers' low levels of digital literacy and inadequate internet connectivity. These drawbacks show that while digital extension initiatives have a lot of promise, their effectiveness depends largely on the local environment and farmers' capacity to

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access and use the technology. As a result, without taking into account differences in farmers' educational backgrounds and access to technology, the findings of this study cannot be applied to all Indonesian farmers.

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