

Future Agricultural And Forestry Extension By Applying Information Technology And Communication

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Abstract

Since the past, extension has been seen as a transfer of technology from researchers to farmers. Now the role of extension is seen more as a process of helping farmers to make their own decisions by adding choices for them and helping them develop insights into the consequences of each of these choices. The role of extension workers is clear in bridging and communicating government policies to farmers and business actors who are directly involved in activities to realize food security and independence by utilizing technology and information so that it is easier to get information from various sources that can be accessed using the latest technology and communication equipment. Farmers who tend to master the technological aspect are very dominant seen in those of productive age. The ability to perform good analysis and problem solving is generally often seen in those who tend to be highly educated. In terms of extension activities using information technology media, all farmer groups tend not to have a real role in their members. Almost all farmers have a long experience in farming activities, even though they have quite a lot of knowledge and experience, farmers still need renewable information. While farmers still need additional knowledge and renewable information through information technology media, quite a lot of farmers in Simalungun Regency do not master the aspects of information technology. The majority of farmers stated that extension workers are rarely or sometimes in the field, and extension workers never carry out face-to-face counseling activities or are carried out in the field. Activities with a remote extension model to farmers in Simalungun Regency using information technology media which is very important to support activities. Farmers who tend to master information technology on average have Smartphone communication devices, and farmers who lack technology on average only have ordinary mobile phone devices, which cannot be used to access many functions. The lack of understanding of farmers towards the content of the counseling material presented is enough to explain that the lack of effective extension models for information technology barbasis if the material is presented in the form of visual texts

Keywords: Future Agricultural And Forestry Extension, Information Technology And Communication

INTRODUCTION

Indonesia as an agricultural country, which has the potential for a large wealth of natural resources, certainly relies heavily on the agricultural sector in improving the welfare of its plural people and spread across several regions and islands. This is based on the consideration that directly or indirectly, food needs affect social life and security defense. The issue of food security is a pillar for the existence and sovereignty of a country. For this reason, all components of the nation, both the government and the community, must jointly build national food security. This is as mandated by Law Number 8 of 2012 concerning food which states that the government and the community are responsible for realizing food security.

Development of planned food security designed and driven by humans to improve their quality of life. It is human beings who determine the direction, goals, processes, intensity, time, costs and resources that development requires. Human beings also organize all the resources necessary so that the development process runs productively, effectively, and efficiently and achieves the goals that have been set. Realizing the position and strategic role of human resources in development, efforts are needed to improve their quality. Improving the quality of human resources must be carried out in a planned, sustainable and far-sighted manner and

taking into account changes in the strategic environment. One of the efforts to improve the quality of resources of farmers and their families is through agricultural and forestry extension activities (Damanik, et al, 2022).

At this time, there are actually many strategic environmental changes that affect agricultural extension services in the future. However, there are three strategic environmental changes that significantly have a broad influence on agricultural extension, namely globalization and the enactment of Regional Autonomy and the enactment of Law Number 16 of 2006 concerning Agricultural, Fisheries and Forestry Extension Systems. The changes that occur in the era of globalization are the availability of greater economic opportunities, the rapid development of information and technology and the rapid progress in the field of telecommunications which makes it easier to obtain information from various sources that can be accessed using the latest communication technology and equipment information and communication technology. On this basis our paradigm in the face of globalization is that globalization is not a threat, but an economic opportunity that we can and should make the best use of. The economic opportunities offered by globalization include market opportunities, business opportunities, job opportunities, and cooperation opportunities that are increasingly widespread in the regions, nationally and globally. All these economic opportunities are offered in a highly competitive climate that must be answered by increasing competitiveness, both the competitiveness of farmers, officers, and competitiveness, stakeholders (Damanik, Triastuti, 2022).

And the most important thing is that so that competitiveness can run well is efficiency in the development of food security carried out in order to support the achievement of success in agriculture, namely increasing self-sufficiency and sustainable self-sufficiency, increasing food diversification, increasing added value, competitiveness and exports, and improving the welfare of farmers. Extension workers play a role in conveying information about agricultural innovations so that farmers know, want, and are able to run their agricultural business properly and correctly. Including its ability and providing assistance for business actors and main actors in increasing the production and productivity of agricultural products that are competitive and have high economic value (Rusmono, 2021).

The information and communication technology-based extension model is a method that can be run remotely and does not have to be face to face with farmers. Information and communication technology in the agricultural sector that is timely and relevant provides appropriate information to farmers for decision-making in farming, thereby effectively increasing productivity, production and profits. In addition to socialization of various policies and developments in agricultural activities, education and training for agricultural and forestry extension workers to support activities carried out by agricultural assistants at the field level.

Therefore, through education and training as well as the efforts of extension workers to always strive to develop themselves by continuing to learn and learn the development of agricultural science and technology, they are able to provide great support for farmers. Moreover, agriculture has been designated as one of the priority development programs to improve the economy and the standard of living as well as the welfare of the community. Thus, the role of extension workers is very strategic in agricultural development by utilizing technology that will continuously develop (Damanik, et al, 2022).

With the problems that occur, it is very necessary to have information and solutions that will be taken by agricultural and forestry extension workers to realize future agricultural and forestry extension by applying technological and communication information. This study aims to analyze the effectiveness of the implementation of information technology-based agricultural extension to farmers

RESEARCH METHODS

The location of this research was carried out in Raya District, Simalungun Regency, North Sumatra Province was chosen as the research location because the information technology-based extension model has never been implemented until now. For this reason, information technology-based counseling needs to be implemented in Simalungun Regency. This research uses an experimental approach model by conducting information technology-based counseling trials on farmers.

The population and sample of this study were farmers who belonged to farmer groups. The total number of farmers in the number of 102 people who are members of 5 farmer groups. Farmer sampling techniques are carried out using purposive sampling techniques that meet the following criteria: 1) farmers have a smartphone or computer that can be connected to the internet network. 2) farmers are able to operate smartphones or computers. 3) be active in farmer groups for at least 1 year. 4) have participated in counseling activities before. Furthermore, the number of samples is determined based on opinions (Arikunto, 2002) namely if the population is homogeneous, then the sample size can be taken 10% to 25%, then the entire population is taken. The sample in this study was taken, namely 25% or a total of 26 farmers.

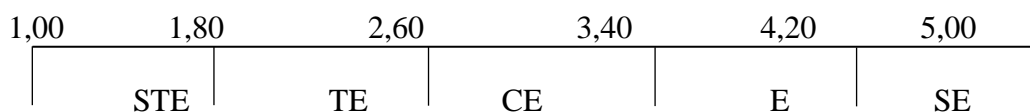
Data Analysis Techniques

The effectiveness of information technology-based counseling conducted in Simalungun Regency uses the EPIC model method, which is one of the tools for measuring media effectiveness with a communication approach. Covers four critical dimensions namely Empathy, Persuasion, Impact and Communication (EPIC). The effectiveness rate of extension media using the EPIC model is determined by the Likerts Summated Rating Scale (LSRS). The EPIC method of the model is to calculate the scale range with the following formula:

$$R_s = R (\text{bobot}) / M (1)$$

Where : R (weight) = Largest weight – smallest weight;
 M = The number of weight categories.

The range of scales used in this study was 1 to 5, then the range of assessment scales obtained was: $R_s = 5 - 1 / 5$. Continuumly, the following categories are made:



Keterangan :

- STE : Highly ineffective
- TE : Ineffective
- KE : Less effective
- E : Effective
- SE : Highly effective

RESULT AND DISCUSSION

Respondent's Demographic Profile

a. Farmer's Age

The age factor has always been the main benchmark of a person said to be a productive or unproductive category. Farmers in Simalungun Regency are more dominated by farmers in the productive age category. Of the respondents, farmers of unproductive age were around 25.7%. Farmers who tend to master the technological aspect are very dominant seen in those of productive age. Of all farmers who master the aspects of information technology, 87.3% are those of productive age.

b. Level of Education of Farmers

The level of education is closely related if it is connected with aspects of knowledge and social status of a person. The ability to perform good analysis and problem solving is generally often seen in those who tend to be highly educated. Farmers who are highly educated up to the undergraduate level can still be found even with a relatively small figure of 2.9%. Interestingly, obtaining the level of secondary education by farmers in Simalungun Regency does not absolutely affect them in terms of mastering aspects of information technology. This can be seen in 52.8% of farmers who have a high school education, it turns out that they are quite familiar with the use of smartphones for the benefit of internet network access.

c. Membership of Main Farmers and Commodities Group

The important role of farmer groups as a liaison for access to seed and fertilizer assistance for corn crops also contributes positively to farmers. In terms of extension activities using information technology media, all farmer groups tend not to have a real role in their members. The cessation of direct field extension activities by extension workers during the Covid-19 pandemic has had an impact on cutting off access to information and knowledge needed by farmers. Some farmers in Simalungun Regency who are relatively proficient in information technology can get additional information with internet access independently.

d. Farming Experience

Experience can refer to how long a person is involved in a certain work environment or field so as to explain a person's level of knowledge or skills with that field. Knowledge formed on the basis of experience, can be called empirical knowledge. A person who is said to be an expert, one of them refers to how much experience he has. Almost all farmers have a long experience in farming activities. Most have an average farming experience of more than 5 years even up to more than 10 years. There are some farmers with an amount of 8.57% who turn out to have longer experience with an average of more than 20 years. Those who tend to have less experience than other farmers are less than 5 years, and on average more than 2 years to 4 years. The factor of considerable experience in farming can explain how strongly aspects of their knowledge and skills are formed. Despite having quite a lot of knowledge and experience, farmers still need renewable information. While farmers still need additional knowledge and renewable information through information technology media, quite a lot of farmers in Simalungun Regency do not master the aspects of information technology.

Agricultural Extension in Simalungun Regency

Agricultural extension workers have an important role in agricultural development because as agents of change, extension workers are the spearheads who are directly in contact with farmers. In this case, extension workers are parties who empower farmers to become independent in carrying out their agricultural business; that is, being independent in thinking,

acting, and controlling it. As a government officer, an extension officer is a functional position that has duties and roles that are in accordance with the job description that has been set.

The Simalungun Regency Government continues to give appreciation to agricultural extension officers in assisting farmers because farmers in Simalungun Regency have succeeded in harvesting during the pandemic for several commodities such as rice, beans, vegetables and chilies.

As a result of interviews with farmers, the majority of farmers stated that extension workers are rarely or sometimes in the field, and more than 55% of farmers stated that extension workers have never carried out face-to-face counseling activities or were carried out in the field. Activities with a remote extension model to farmers in Simalungun Regency using information technology media which is very important to support activities

Table 1. Farmers' Response to Agricultural Extension Activities in Simalungun Regency

No	Penyuluhan	Jumlah		
		Σ	%	
1	The intensity of farmers participating in counseling	Often	21	80,8
		Sometimes	5	19,2
		Never		
		Total	26	100
2	The intensity with which officers come to provide counseling	Often	23	88,5
		Sometimes	3	11,5
		Never	-	-
		Total	26	100
3	Extension officers provide counseling using online media / distance learning	Often	25	96,2
		Sometimes	1	3,8
		Never	-	-
		Total	26	100
4	Farmers' response to online/remote counseling	Agree	12	46,2
		Don't agree	14	53,8
		Total	26	100
		The main reasons farmers disagree :		
	- Lack of mastery of technology	2	7,7	
	- Additional internet costs are quite expensive	13	50,0	
	- Difficult to access the internet	1	3,8	
	- Information will be poorly understood	4	15,4	
	- Difficulty practicing directly	6	23,1	
	- Lack of knowledge of extension mechanisms	-	-	
	Total	26	100	

Source : Primary data processed, 2022

The use of information technology media which is very important to support extension activities has a very good opportunity, considering that many areas in Simalungun Regency have been connected to telecommunications networks. The main obstacle to implementing the extension model by utilizing telecommunications network media is still focused on farmers. The results of this study found that almost all farmers did not agree with remote counseling or using telecommunications media (online). The main reasons for farmers' rejection are expensive costs, difficulty in direct practice, and a tendency to find it difficult to understand the material and information presented. Other reasons stated by farmers are the difficulty of accessing the internet network, not knowing how the online counseling mechanism is, and online counseling is certainly not accompanied by simulations or direct practice.

The information and communication technology-based extension model is a method that can be run remotely and does not have to be face to face with farmers. Information and communication technology in the agricultural sector that is timely and relevant provides

appropriate information to farmers for decision-making in farming, thereby effectively increasing productivity, production and profits. The development of internet technology is currently developing very quickly and almost reaches all levels of society and can even reach the farthest areas from the city center. Through an internet connection, electronic equipment such as computers and mobile phones can be a communication medium that allows extension workers and farmers in real time as if they were face to face. The benefits of the internet for extension activities have several advantages, namely that they can be delivered anywhere and anytime, the material is relatively easy to update, can develop the number of interactions between participants and speakers, and can relate in real time.

With the existence of information technology, it can provide extension services from various agricultural sectors and play an important role in rural development so as to produce various changes. Information technology in the form of the internet offers the potential for more decentralized and more democratic communication compared to the mass media offered previously

Mastery of Information Technology by Farmers in Simalungun Regency

Efforts to implement an information and communication technology-based agricultural extension program in Simalungun Regency need to consider the mastery of information technology by farmers. Communication devices such as smartphones have become a basic necessity as a flexible communication tool and are widely used by all circles of society. Not only does it function as a communication tool, but it has many other functions such as accessing information, teaching and learning activities, to shopping and transaction purposes.

Table 2. Mastery of Information Technology by Farmers in Simalungun Regency

No	Penyuluhan		Jumlah	
			Σ	%
1	Farmers who know to use/operate communication devices (Mobile etc.)	Know	22	84,6
		Don't know	4	15,6
		Total	26	100
2	Types of communication devices / Mobile (HP) owned by farmers	HP Smartphone/other types	19	73,1
		Regular HP	7	26,9
		Don't have a cellphone	-	-
		Total	26	100
3	Ability of farmer communication devices that can be used to access the internet	Can access	23	88,5
		Can't access	3	11,5
		Total	26	100
4	Farmers who know access to the internet network	Know	15	57,7
		Don't know	11	42,3
		Total	26	100
5	The intensity of farmers accessing agricultural extension information/video content through the internet.	Often	14	53,8
		Sometimes	8	30,8
		Never	4	15,4
		Total	26	100
	Reason if not:	Don't have a device and don't understand	5	19,2
	If ever/often access	By being helped by others	-	-
Able to acces on their own		21	80,8	
Total		26	100	

Source : Primary data processed, 2022

In Table 2, it can be seen that the aspect of mastering information technology by farmers in Simalungun Regency is relatively visible only in the number of 84.6% of farmers. All farmers who tend to master information technology on average have Smartphone communication devices, and farmers who lack technology on average only have ordinary

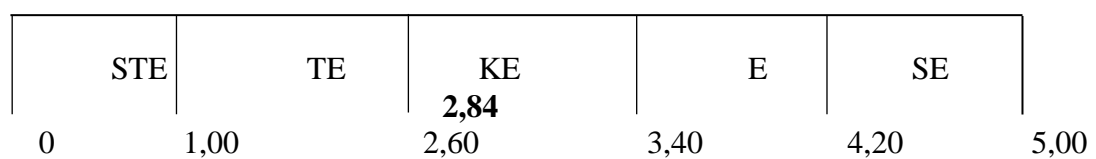
mobile phone devices, which cannot be used to access many functions. The main reason for farmers who do not have a smartphone is not because they cannot afford it, but because they do not understand how to operate the device

Effectiveness of Information Technology-Based Counseling in the Form of Visual Texts Measurement of the effectiveness of counseling for visual text categories using the EPIC Model, generally categorized as less effective.

Table 3. EPIC Model of Counseling Information Content in the Form of Visual Text

No	Variable	Score	category
1	<i>Emphaty</i>	3,05	Less Effective
2	<i>Persuasion</i>	2,87	Less Effective
3	<i>Impact</i>	2,69	Less Effective
4	<i>Communication</i>	2,74	Less Effective
Total Average Score		2,84	Less Effective

Source : Primary data processed, 2022



The overall score of each variable shows a less effective category with an average of less than 3.40. Of the total average score, the level of effectiveness of counseling using visual text with a score of 2.84 was categorized as less effective.

The lack of understanding of farmers towards the content of the counseling material presented is enough to explain that the lack of effective extension models in information technology barbasis if the material is presented in the form of visual text. The ineffectiveness of the extension model/media in the form of text published on the website is caused by several factors, namely : Counseling materials are still considered inappropriate or incomplete based on the demands of information needs by farmers, farmers cannot be free to provide responses, responses and even questions directly if there is an information need that wants to be explored in detail and deepening, emahami sentence by sentence related to the information presented is considered quite troublesome for farmers. The majority of respondent farmers only have a high school education, which is considered not difficult to grasp the meaning of certain sentences that are considered very unfamiliar to hear, very minimal reading habits affect farmers relatively lazy to read the material / information presented, especially if the text of the material is long enough, almost all farmers do not like the information technology-based extension model.

CONCLUSION

1. Agricultural and forestry counseling based on information technology in Simalungun Regency has never been implemented optimally. Information technology-based counseling (online) conducted in this study on farmers in Simalungun Regency, found that the online extension model in general obtained a less effective category to form farmers' knowledge and understanding.
2. Some of the obstacles in information technology-based agricultural counseling include the lack of mastery of information technology aspects, obstacles to ownership of smartphone

devices and the cost of obtaining the internet, as well as the low cognitive ability of farmers and the ability to communicate

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