

Original Research Paper

Empowerment of Farmers Through the Online Extension in Improving Agricultural Information Literacy

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Abstract: The COVID-19 pandemic has impacted all countries around the world, including Indonesia. The COVID-19 pandemic affects all sectors, especially the agrocomplex. As a strategic step to minimize the impact on the agricultural sector, it is necessary to have a digital transformation to support production stability. Digital media in agriculture can be used as a medium for consulting farmers with agricultural experts so there is validation of information obtained by farmers regarding problems in the field. This empowerment activity was conducted to increase the literacy skills of farmers on cultivation topics as a supporting system for food security during the COVID-19 pandemic. *Klinik tanipanen* was created to provide a medium for farmers to consult directly with agricultural experts. The topic problems are about cultivation techniques (upstream and farming), agroindustry, and marketing. Based on the activities that have been carried out, the majority of farmers' questions are about pests and diseases encountered in the field. Through this program, it is expected that farmers will be able to improve their literacy skills, thereby increasing their productivity and income.

Keywords: agrocomplex sector, digital, *Klinik tanipanen*, literacy skills, the COVID-19 pandemic

Introduction

The COVID-19 pandemic has impacted all countries around the world, including Indonesia. The COVID-19 pandemic affects all sectors, especially the agrocomplex (animal husbandry, agriculture, and fisheries) (Supriyanto 2020). In the agrocomplex sector, the impacts of the whole process are the sluggishness in the production and distribution process due to regional restrictions (Ridhoi 2020). This condition can be a threat to national food security.

Before, the COVID-19 pandemic, at the farmer's level, sharing knowledge and training is conducted through direct meetings or online meetings. However, the COVID-19 pandemic pushes the digital transformation. With the development of the information era and the emergence of the industrial revolution 4.0, information literacy skills can be achieved faster than before the COVID-19 pandemic. Through online activities, people can save time and costs, as well as eliminate regional distance limits. Thus, by having good information literacy skills, farmers can expand access to information, strengthen the

exchange of information with the outside world, and understand all kinds of information needed.

Strategy steps to strengthen the farmer's literacy skills provide the digital platform known as *Klinik tanipanen*. *Klinik tanipanen* is used to provide agriculture extension. Through this platform, farmers can directly communicate with agriculture experts. *Klinik tanipanen* provides all knowledge about cultivation activities, such as seeds, pests and diseases, soils, fertilization, recommendation of agri-input products, climate and weather, cultivation technique, and others.

According to Subejo *et al.*, (2018), digital media in agriculture should be utilized for the educational function with various contents, i.e., technical information on production, marketing, and financing. There are three challenges to increasing information literacy at the farmer level, such as information search, evaluation and confirmation of information, and application of information (Raya *et al.* 2017). This empowerment activity was conducted to increase the literacy skills of farmers on cultivation topics as a supporting system for food security during the COVID-19 pandemic.

Method

a. Program

The activity was conducted during 2022. The target participants were farmers throughout Indonesia who could connect to the internet. The stages of this activity include five stages, namely preparation, program planning, socialization, implementation of activities, monitoring, and evaluation. In more detail, these five stages are as follows:

1. Preparation consists of making media and related instruments. This empowerment activity was carried out using WhatsApp. WhatsApp is one of the chat applications with the highest user penetration in Indonesia. In addition, the use of WhatsApp also makes it easier for several features at once, namely chat, voice calls, and video calls. At this stage, it was also carried out by recruiting several experts in agriculture as experts.
2. Planning of activities was a plan of activities that would take place.

3. Socialization was carried out to introduce a series of activities through various channels, such as Instagram and WhatsApp.
4. Implementation of activities was carried out with a straightforward scheme, considering that the target participants are farmers. Farmers can ask questions by direct message via WhatsApp chat. Chats were conducted by direct message due to efficiency in the discussion process. Farmers can ask questions to experts with attaching pictures to be identified. After that, the farmer can receive the replies from the expert on how to solve their problems. If farmers need further information in the discussion, they can do voice/video calls with an agreement with the expert.
5. Monitoring and evaluation were carried out to evaluate the implementation of activities that have been carried out following the plan.

b. Outcome

Our empowerment activities could be concluded as successful if the community changes in better conditions. The expected outcome of the program implementation is as follows:

- a. Farmers can correctly identify the problems in the field to reduce the risk of errors in using agri-inputs either by the dosage or by misuse.
- b. Farmers use agri-inputs appropriately to create sustainable agriculture that is good for the environment, farmer's health, society, and economy.
- c. Farmers can increase the productivity of the commodities through good agriculture practice.

Results and Discussion

Agricultural Expert

Agricultural experts were selected based on their competence and educational background. In this activity, three experts had more than three years of work experience in the agricultural industry. The three experts are alumni of the Faculty of Agriculture, Universitas Gadjah Mada. Experts have an essential role in improving farmers' literacy skills. Although farmers can currently

access information from various online sources, but experts can help to curate the truth and validity of this information (Sulistyaningsih et al., 2021).

B. Source of Information and Scope

The sources of information used to help experts were collected by the team from various sources books, journals, articles, or other sources of information. As an initial stage, the *Klinik tanipanen* program focuses on staple food, fruit, vegetables, and ornamental commodities. To support the argument from experts, the team also shared the article related to the problems as material in popular writing in light language and came from a trusted source.

The problems faced by farmers are directed to be solved by implementing Good Agriculture Practice (GAP). GAP is an approach to create sustainability in on-farm processes by ensuring food and non-food products (Banzon et al., 2013). In addition, GAP has several advantages, including (1) creating a good governance chain, (2) ensuring the sustainable use of natural resources, health and conditions of workers, and (3) opening up new market opportunities for farmers and exporters. For example, GAP is proven to increase production yields up to 1.7 higher in tomato plants (Islam et al., 2012). Figure 1 shows the agriculture activities covered by the GAP.



Figure 1. Agriculture activities covered by the GAP

C. Fertilizer Calculator

The fertilizer calculator feature provides information to farmers on how to calculate fertilizer requirements correctly. This calculation is based on calculations without conducting a soil analysis. Farmers only need to provide information about crop commodities, types of fertilizers, and land area

to calculate the amount of fertilizer needed. By knowing the correct fertilizer dosage information, it is hoped that farmers can reduce the excess fertilizer use, which increases the number of farming expenses.

D. Q&A Menu

A question-and-answer feature is used to discussion about the farming problems in the field. Farmers can ask questions through this feature by sharing their problems in the field; it can be accompanied by evidence of the problem. Experts can provide comments in the form of solutions to these problems so that interactions occur in them. The most dominant problem faced by farmers is regarding pests and diseases that attack their crops. In addition, to cultivation commodities, many individuals ask about ornamental plants. Individuals who ask about ornamental plants carry out cultivation only for hobbies. According to Afrianto and Dianita (2022), there is an increasing trend in the community to cultivate ornamental plants during the COVID-19 pandemic. Table 1 shows the examples of the question and answers in the consultation section.

Tabel 1 The examples of the question and answers in the consultation section

Questions	Answers	Categories
How to solve fusarium wilt on chili?	<p>Fusarium wilt disease is caused by the fungus <i>Fusarium oxysporum</i>, which is transmitted by air and water.</p> <p>Control way:</p> <ol style="list-style-type: none"> 1. Watering a solution of <i>Pseudomonas fluorescens</i> (2 ml/l) or benomyl fungicide (2g/l) or watering chlorine (15 g/1,000 liters) in the planting hole one day before planting at a dose of 200 ml/hole 2. Making beds that are high enough (30-40 cm) in the rainy season to prevent the roots from flooding 3. Affected plants are removed, then burned <p>Pesticide recommendation: Botanical pesticide: Onion</p>	Pest and diseases

<p>How to solve yellowing on monstera?</p>	<p>extract Synthetic pesticides: Cabriotop 60 WG, Nativo 75 WG, Folicur 430 SC 80% of yellow leaf problems in monstera are caused by conditions that are too cold, too much watering, or a combination of both. Solution: Place it in a location that is exposed to direct sunlight and reduce the intensity of watering 20% due to natural processes, namely the leaves are aging and starting to fall off. In addition, if the yellow colour appears with brown spots, it could be a sign of nutrient deficiency. Solution: Fertilize properly</p>	<p>Pest and diseases</p>
<p>Does the herbicide Nugrass 69 EC need a mixture of other herbicides?</p>	<p>Nugrass 69 EC can be mixed with Serendy 28 WP for optimum results. Recommended dosage: 1. Dose of Serendy 100 g/ha + Nugrass 250/ha 2. Spraying in humid conditions 3. Spraying when weed stage 2-3 leaves 4. Spray evenly 5. Fertilization is done after spraying Serendy + Nugrass</p>	<p>Agri-inputs</p>

Figure 2 shows the consultation process of *Klinik tanipanen*.



Figure 2. The consultation process of *Klinik tanipanen*

E. Search Pesticides

This feature provides information about pesticides to solve pests and diseases. Farmers can ask experts based on crop commodities, age names of pests and diseases, and choose the category of pesticides, trade names, active ingredients, working code, and level of danger. Through the information provided, it is hoped that farmers will be able to find the types and regulations of pesticides. The proper use of pesticides will be beneficial for the economic conditions of farmers and the land environment.

F. Supporting information

This feature provides additional information, namely market prices, climatic and weather conditions, suitability of commodities with area conditions, and information on potential market access.

Conclusions and Suggestions

Digitization of information systems in the agrocomplex sector has an important role in increasing literacy skills for farmers. So that the condition of food security in terms of production and distribution remains stable despite facing a force majeure event, such as the COVID-19 pandemic. Through an online consultation system, it can answer the challenges in educating farmers on how to utilize information and communication technology. Although currently, the majority of farmers can get information online, the truth or validity of the information obtained needs to be evaluated with validation by experts in their fields. To make the display more attractive

Digital extension services provide convenience in disseminating the latest information, particularly in efforts to improve agricultural supply chain management (Naika et al., 2021). Digital technology can increase the effectiveness of extension because it can reach a wider area and help adjust the information needed by farmers (Rajkhowa and Qaim, 2021). A practical question and answer process for farmers is at least one-way communication. In group discussions, farmers tend to be passive (Raya et al., 2018).

(UI/UX), it needs efforts to create a platform in the form of an application. In addition, to maximize extension activities, it is necessary to collaborate with the government sector or educational/research institutions.

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