SMART FARMING IN AN EFFORT TO IMPROVE THE WELFARE OF FARMERS IN JAJAR VILLAGE, GANDUSARI SUB-DISTRICT, TRENGGALEK DISTRICT

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Abstract: Indonesia is a country with a large population, of course this has an impact on the need for food for the community. To meet the needs of the community, of course, a more modern agricultural system is needed in order to meet the needs of the community. A more modern agricultural system is needed in order to be able to provide a greater amount of agricultural production, effectively and efficiently. The method that needs to be developed in Jajar Village, Gandusari District, Trenggalek Regency is by using smart farming systems. Trenggalek Regency is to use smart farming by using the intelligent irrigation system based on the Internet Of Think's that makes it easy for farmers to manage water needs for their agricultural land. The system this smart irrigation system answers the problems that occur at the research location regarding the lack of water for their agricultural land. Research location regarding the lack of water for their agricultural land. With the application of the system is certainly the hope of farmers to be able to increase their agricultural productivity so as to increase farmers' income and be able to improve the welfare of farmers in particular and the community in general and society in general.

INTRODUCTION

Agriculture is one of the most important sectors in Indonesia, through the current agricultural system, it is certainly a phenomenon that needs a system update in order to improve the quality of agriculture starting from upstream to downstream. smart farming is a new system that can have a positive impact on the sustainability of the agricultural system in Jajar Village, Gandusari District, Trenggalek Regency. Smart farming is an agricultural system based on artificial intelligence and has now become a strategic issue for the Ministry of Agriculture in the digital era. Smart farming can be a stimulant for farmers to carry out agricultural cultivation in a more effective and efficient way.

Seeing from the phenomenon that will occur in the coming year is the number of farmers with old age, the increase in population which is increasing rapidly will certainly also greatly affect the amount of food needs in agriculture. which correlates with the amount of productivity of agricultural products that can meet the needs. Farmers with advanced age are very difficult to accept a new innovation so that it hampers their productivity. The development of technology that is increasing when not accompanied by qualified resources for farmers to change the pattern of their agricultural system will certainly not provide much change in the amount of productivity that is decreasing from time to time. so that there is a mismatch of demand and the number of agricultural products.

Based on the condition of the area in Jajar Village, Gandusari Subdistrict, Trenggalek Regency, which experiences a long dry season and the threat of a long drought, it can certainly have an impact on the productivity of farmers in the area.

The geographical conditions in Jajar Village, which consist of two contours of lowlands and mountain slopes, certainly affect the need for water to irrigate their rice fields.In an effort to meet the needs of farmers in the long dry season, of course, there is a need for new innovations based on appropriate technology which must also be accompanied by farmer resources by revitalizing agricultural business actors so that when the system is ready to be implemented and farmers are able to accept modern technological developments.

In an effort to meet food needs in Jajar Village, of course, the integrity of modern technology is needed for the effectiveness of the smart farming program. one of the most important things to meet these needs is the need for the Internet of Things (IoT). by using this IoT, farmers can collect data related to crop cultivation to identify plant diseases and pests and soil PH.

The function of the application of IoT is that farmers can take strategic and responsive steps in a short time so that they are alert in recognizing a problem to be able to immediately address the problems that are happening more accurately.

Photo 1. Location of Jajar Village, Gandusari District, Trenggalek Regency

RESEARCH METHODS

This researcher is one type of qualitative research. The data used by researchers are primary and secondary data. the techniques used by researchers to collect data are observation, interviews and documentation. in the process of determining informants, researchers first determine key informants (key informants) to extract information in the research area in Jajar Village. the Key Informant is the head of the Dewi Sri farmer group. While the next informants are farmers, youth groups and the Jajar Village government.

RESULTS AND DISCUSSION

Jajar Village, Gandusari Subdistrict, Trenggalek District, which has a large area of rice fields on the slopes of the mountains, certainly has the characteristics of the need for an innovation in an effort to answer the problems that arise in the area. erratic weather, geographical conditions that are less supportive in terms of irrigation systems which of course will also have a major impact, especially in agriculture. along with the development of the era that can provide solutions to the problems of agricultural cultivation, it brings innovation to elderly farmers who already have to retire to enjoy their old age. Agriculture in Jajar Village

currently still uses a traditional agricultural system, this can be seen from the lack of modern internet-based technology applied by farmers.

Internet of Thing's (IoT) as one of the right ways to overcome the problems that exist in the area. The need for water to irrigate rice fields is certainly a major obstacle for farmers, where the condition of the area does not allow farmers to get a qualified irrigation system, it is necessary to implement smart farming. Smart farming is an agricultural concept that uses advanced technology to improve the quality and quantity of production. The technology used in smart farming includes:

1. Big data
2. Machine learning
3. Internet of Things (IoT)
4. Artificial intelligence (AI)
5. Sensors
6. Data analytics

The main goal of smart farming is to improve the efficiency, productivity and sustainability of the agricultural sector. Smart farming can help farmers in:

1. Monitoring and predicting crop conditions
2. Optimizing the use of resources such as water, fertilizers, and pesticides
3. Improve overall production performance
4. Saves time as the amount of water used to water the plants is more precise.

Jajar Village with the need for less water and the need for additional water intake for water needs for farmers' rice fields is to implement a smart irrigation system. in the agricultural system, smart irrigation is needed to meet water needs with an effective and efficient time in terms of quantity, time, target and coverage of more affordable areas in an effort to increase productivity and expand irrigation areas and make it easier when farmers are not in the rice fields because they can be controlled remotely using Internet of Think's (IoT) technology.

Sensors are electronic devices that can detect various environmental parameters, such as temperature, humidity, soil nutrient levels, and others. The data collected by the sensor is then sent wirelessly to cloud computing through the Internet of Think's (IoT) network.

Here are some of the steps in how smart farming works:

1. Monitoring, Smart farming uses sensors to monitor farm environmental conditions such as temperature, humidity, soil pH, and water quality. This data is then collected and analyzed in real-time to provide more accurate information about farm conditions.

2. Data processing, the data obtained from sensors is then processed and analyzed using data processing software. This software can provide more detailed information regarding farm conditions and help farmers to make smarter decisions.

3. Decision-making, farmers can make smarter decisions in managing the farm. For example, with this system farmers can adjust the time of watering or fertilizing according to the needs of farmers.

4. Automatic control, Smart Farming uses automation technology such as robotics to monitor and control the agricultural environment automatically.

Based on the results of extracting information, there are several advantages and disadvantages of implementing an irrigation system using a smart irrigation system, including:

No.	Advantages	Shortages
1.	Simplifies Irrigation	Difficult to purchase equipment
2.	Shorten the time	There must be sufficient water availability
3.	Watering is done automatically	Highly dependent on internet connection
4.	Applications can be operated through other devices at the same time	Not all farmers can operate
5.	Cost is not too large	Cannot run when there are network constraints
6.	Reduce the use of labor	Constrained when extreme weather (heavy rain, wind)
7.	More effective in water usage	
8.	Water distribution is evenly distributed	
9.	More accurate control	
10.	Adjustment to weather conditions	
11.	Increased Productivity	

Source; data processed 2024

CONCLUSIONS AND RECOMMENDATION

Agriculture is the main sector in efforts to grow the economy in Indonesia. food needs for the community become a necessity that must be met, but the obstacles to meeting food needs are still a long story because currently these needs cannot be fully met so that it has an impact on the welfare of the people in an area. traditional agricultural systems are the main key to an agriculture cannot develop quickly. One of the ways that agriculture in a country can develop, especially in Jajar Village, Gandusari District, Trenggalek Regency, is by providing an introduction and technological changes in the agricultural system to become more modern through Smart Farming. One of the agricultural systems that can be developed in the area is using an intelligent irrigation system based on the Internet of Think's. Through the improvement of this method, it is hoped that it can provide renewal for the existing agricultural system from traditional to more improved. With this software can help the farmer's work system so that farmers are easier to operate an irrigation on their rice fields.

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