



Design of Rice Farming Monitor Information System

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Abstract:

This study aims to design an information system that can monitor rice yields in each area in West Java. To support this research, the descriptive method was used through observation and supported by literature studies. The results showed that an information system for harvest monitoring can be the alternative solution for the government and farmers themselves. It helps the government to provide real solutions to farmers in case of a decrease in rice yields. In addition, the monitoring system may help the farmers to prevent loss. For the long-term purpose, it is expected that rice yields can always be stable in every harvest because an application information system monitors it. The website-based application to monitor agricultural products is considered effective. This research is expected to give the government input to shift from manual system to the utilization of information system.

Keyword: information system, design, government

INTRODUCTION

Farming is not a dream job for most Indonesians today. However, agriculture is one of the largest sectors in the contributor to foreign exchange (Prayoga & Raya, 2020). Productivity in the agricultural sector needs to be increased. Increasing productivity will also increase the welfare of agricultural sector actors. One approach to increasing productivity is applying information and communication technology (ICT) for the agricultural sector (Santoso & Delima, 2017). Information technology is a technology used to process data, including processing, obtaining, compiling, storing, and manipulating data. In various ways to produce quality information, namely, information relevant, accurate, and timely, which is used for

personal, business, and government strategic information for decision making (Ariesta, et al., 2020). Information systems as part of information technology contain important information about objects, people, and locations. Information means data that is formed to make sense and become usable for humans (Prifti, et al., 2020). Information systems involve a lot of information technology to perform specific tasks. In general, information systems' interests are in all aspects of the development, dissemination, implementation, and impact of information systems both in society and organizations. However, the field of information systems is not only related to IT technical and computing aspects. The most important thing from it is how technology can be used to realize a design (Boell & Cecez-Kecmanovic, 2015).

There are some previous studies related to this research. Prayoga conducted a study that discusses the development of conventional agricultural machines (Fountas, et al., 2015). Research also discusses an application prototype for precision agriculture using a wireless sensor network with an IOT cloud (Karim., 2017). Another study which discusses the creation of a system for monitoring hydroponic plants and notifying farmers through smartphones (Mogi & Dharma, 2019). For Indonesian journals, previous research related to our title was conducted by Putra et al in 2015. It discusses whether the system as a whole can carry out the process of controlling and maintaining the conditions of temperature, nutrition, and water level in hydroponic agriculture automatically according to the settings desired by the user (Putra & Triyanto, 2018). Another study explains the predictive component that is the key in managing risk quickly to reduce the potential impact (Andri & Prianto, 2020) significantly.

Unlike previous studies that focused more on various information systems, this study aims to design a rice harvest monitoring information system used as a media facility supported by the agriculture agency to monitor each rice farmer's harvest. As a result, if there is a decrease in rice yields, it can be immediately resolved or assisted by the agriculture agency. Using the systems approach method and system development method, the application information system's design for monitoring agricultural rice products based on the website can be more structured.

RESEARCH METHOD

The research method in this study used descriptive qualitative data collection, namely observation. In making a system, the need for a system approach method used in this research is a structured systems approach method and used Data Flow Diagrams (DFD) as aids. Not only with the systems approach method, this research is also supported by the system development method, namely the prototype model. The prototype model uses the system life cycle as shown in Figure 1.

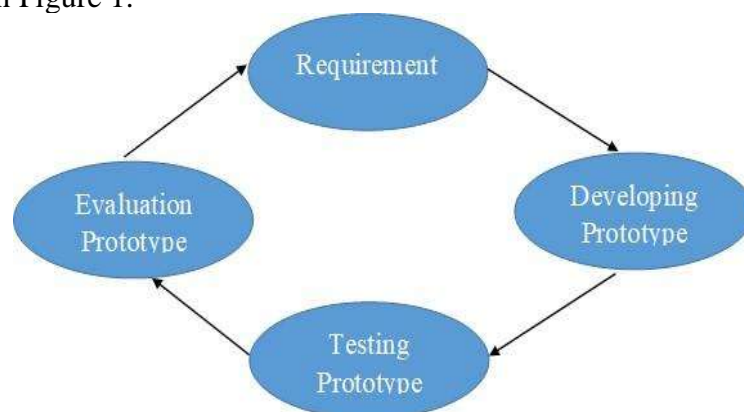


Figure 1. The prototype system life cycle

RESEARCH RESULTS AND DISCUSSION

3.1.Procedure Analysis

Procedures are part of the appropriate stages of instructions that explain what to do, who does it, and how to do it. In this study, the related procedure is rice farmers who have harvested data and fill out a form. The collected data is processed into a report, the report is given back to the analysis team of the agricultural service for analysis. Furthermore, after analyzing the data, there is an output in the form of rice yield analysis. The study results are given to the web admin to be inputted as shown in Figure 2.

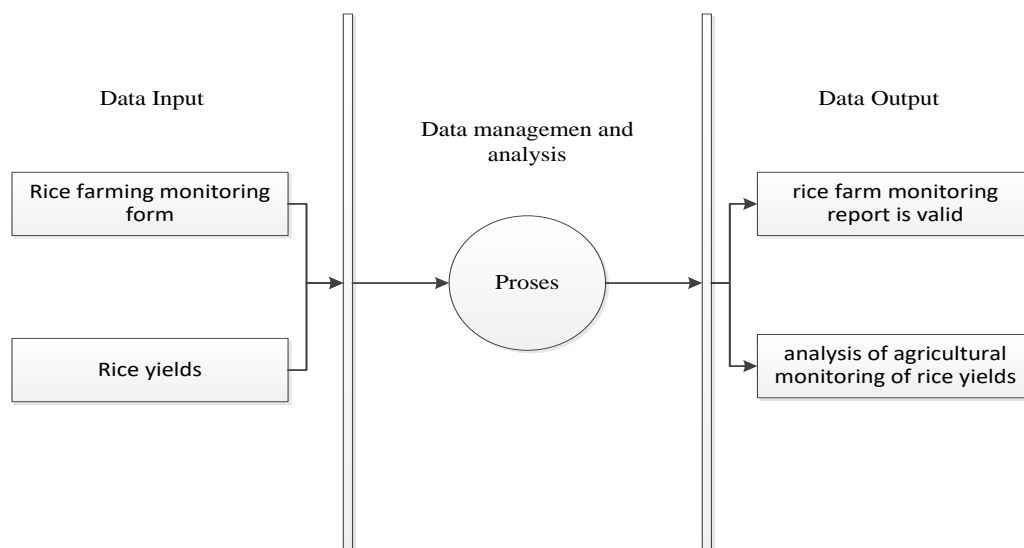


Figure 2. Information system analysis procedures to monitor rice yields

This application uses a GUI. The pointer on the screen acts as a navigation tool so you can perform certain commands. The pointer is moved with the mouse or touchpad. Users can click an icon or button to start certain operations, such as opening or closing a program. The GUI translates the user language, consisting of simple one-line, single click, and double click commands for machine language or assembly language. Based on the experiments and analyses that have been carried out, the monitoring system that has been implemented in this study can perform a monitoring function to detect the number of rice yields. The GUI design results based on processing can produce a monitoring software that can display an interface for detecting the number of rice yields on a computer or laptop.

DFD information system design context

Figure 3 shows the data flow in approximate size from the agricultural results procedure analysis, which aims to be inputted into the application to monitor agricultural results. The internal entities are the admin who manages the website and the village administrator who provides the rice farming monitoring form. They become an external entity, namely farmers who have rice harvest data and the agriculture department analysis team will analyze data from each rice farm. The first data flow from the external entity, namely rice harvest data, rice harvest management form data, and monitoring report data rice farming is valid. Then from the monitoring information system, there is a data flow to other external entities, namely the

agricultural department analysis team, in rice harvest data and rice report data. Finally, data flow from external entities to monitoring information systems, namely data analysis rice yields.

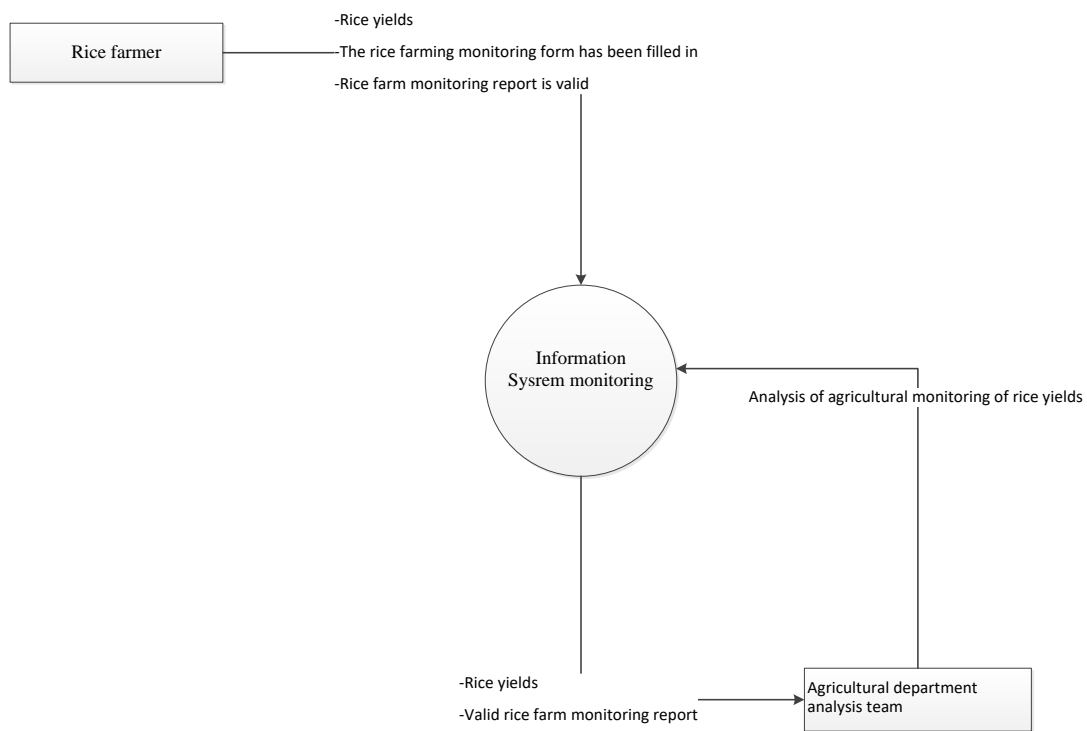


Figure 3. DFD Context

DFD Level 1 Information system design

DFD Level 1 is a chart showing the data flow specifically, which explains the flow of each existing data, which aims to explain the outline in the DFD context. There are many interconnected data flows, such as external entities, namely in the first process data flow. The data that goes into the form filling process is rice harvest data and form data that must be filled in. Rice farmers who want their agriculture to be monitored by the government have to provide rice harvest data to regional administrators. Then, the regional administrators give a form for them to fill. The form requires details of how much land is cultivated, what fertilizer is used, and how much fertilizer is used for the agricultural land area. After the form is filled, all the data will be processed to validate the village management leader. The next data flow is the data inputted by external entity, namely rice monitoring report data and rice harvest data. The validated report data and rice harvest results are given to the agricultural agency's analysis team for further analysis. Next, there is a flow of data that goes into analyzing reports and rice yields. The information which contains detailed data on rice farming intends to find out the decrease in rice yields or error data. The fourth process is entering the data into the website. The data from the analysis results are submitted to the website admin as shown in Figure 4.

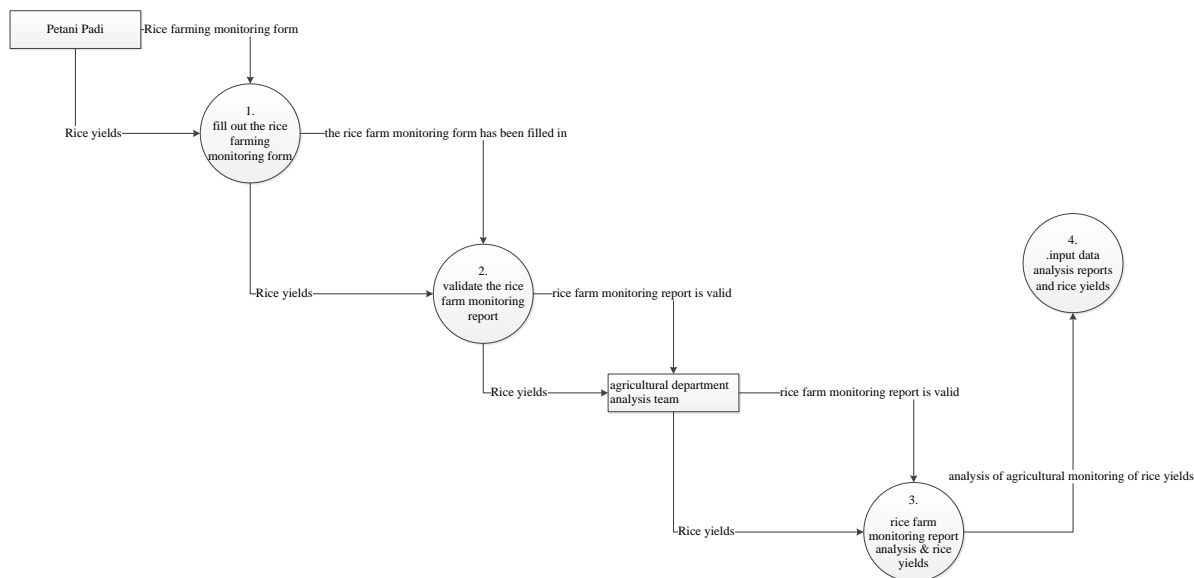


Figure 4. DFD Lv 1

In previous research, Mogi examined the hydroponic monitoring information system using a smartphone [8]. This study designed the same information system, but this research focuses on monitoring rice yields on a website-based, supporting farmers in managing their rice farms. In terms of crop yields, if there is a decrease in the rice harvest, the information system can help rice farmers to find quick solutions. It is in line with the previous research by Nyamekye et al. that stated information systems contribute most to actionable knowledge creation (Nyamekye, et al., 2020). Another previous study also supported that a web-based information system effectively helps farmers (Nyamekye, et al., 2020, Strobel, 2020, Saiz-Rubio & Rovira, 2020, & Sarkr, et al., 2020).

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CONCLUSION

The existence of a website-based agricultural product monitoring information system is useful for the government and farmers. In the long term, it is hoped that rice yields can be stable in each harvest because the information systems monitor it. Also, this application is expected to be useful to share information about agricultural products on the website. Therefore, the user can know the development of rice farming products in West Java Province.

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