Level of Farmers' Knowledge in The Use of Inorganic Chemical Fertilizer in Rice Plants in Krajan Pagertoya Hamlet

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Abstract

Agricultural systems using inorganic chemical fertilizers are still being used among village farmers. This is based on the yields obtained can be satisfactory and tend to be fast even though in practice inorganic chemical fertilizers are not good for the soil and the surrounding environment. The purpose of this study was to determine the level of knowledge of farmers in the use of inorganic chemical fertilizers on rice plants in Krajan Pagertoya hamlet. This research was conducted in February 2022. The sampling method used was purposive sampling with 3 respondents. The data collection method was carried out using a survey using a questionnaire which was later filled out by the respondent. The results showed that the level of knowledge of farmers in the use of inorganic chemical fertilizers on rice plants in Krajan Pagertoya hamlet was included in the "high" category.

Keywords: *knowledge level, farmer, rice, inorganic fertilizer.*

Introduction

Rice is one of the staple foods consumed by the Indonesian population. The rice will later be ground into the rice and usually processed into the rice and other foods made from rice. Having the nutritional content needed by the body, especially carbohydrates, is the reason rice has been named a staple food ingredient in Indonesia. Therefore, failure to fulfill basic needs will destabilize national food security. Planning to achieve food self-sufficiency is one of the ideals of the struggle for independence until now and for the future. The people's food needs are met as a benchmark for the progress of a country and Indonesia is a very strategic country to make this happen(Artawan et al., 2017).

The need for very high rice cannot be separated from the long treatment process. Rice plants need approximately 3 months from planting to harvest. Various important processes must be carried out in the process of caring for rice plants, one of which is fertilization. According to Supartha et.al (2012) Fertilizer itself is one of the ingredients that contain nutrients as support for plant growth. In general, fertilizers have a function as a source of nutrients for plants and as agents that improve soil fertility. The majority of Indonesian farmers currently still use inorganic chemical fertilizers as a supporter of productivity in rice plants. Although it has an unfavorable impact, the yield of rice production increases significantly when the rice cultivation process uses inorganic chemical fertilizers (Kurniawan et al., 2017). The use of inorganic chemical fertilizers creates dependence on

rice plants until farmers have to wait for the realization of subsidies for inorganic chemical fertilizers such as urea, SP36, and ZA. The use of inorganic chemical fertilizers that are not inappropriate doses will cause long-term damage to the soil in terms of physical, chemical, and biological properties. (Gama et al., 2016).

Knowledge of the use of inorganic chemical fertilizers is very important for farmers so as not to cause severe losses to both the environment and the farmers themselves. Fertilization is one of the important processes in rice cultivation because it will affect the final result and its sustainability on a long scale later. Looking back at the New Order era in 1984, Indonesia was once a food self-sufficient country thanks to the green revolution program implemented by President Soeharto. This success was achieved because the government gave great attention to the agricultural sector at that time by assisting, one of which was fertilizer subsidies for farmers and also counseling related to how to manage good agriculture. This can be a reference for farmers today to be more serious in processing the agricultural sector. One of them is knowing about good fertilization for rice plants so that crop yields can be maximized. The response of plants to fertilizers increases if the fertilizers used are of the right type, dose, time, and method of application (Sholeh & Ringgih, 2017).

Balance in the use of fertilizers, especially inorganic chemical fertilizers is very important. Rauf et.al (2000) In his book he explains that most farmers only use inorganic chemical fertilizers in the form of urea. This is inseparable from economic factors and the lack of knowledge of farmers about the use of fertilizers themselves. Balanced fertilization must be given by the existing soil conditions. Because the main elements in fertilizers when used properly not only control but also balance, support, and complement each other. This should be a special concern so that everything that has been planned for planting rice can run well. One way to do this is by providing counseling on the importance of knowledge related to the use of inorganic chemical fertilizers.

Krajan Pagertoya Hamlet is located in Pagertoyo Village, Limbangan District, Kendal Regency, Central Java Province, which is located approximately 19 km from Walisongo State University, Semarang. Most of the population makes a living as farmers. The commodities produced are lowland rice and horticultural crops. The majority of farmers in the hamlet still use inorganic chemical fertilizers as the main fertilizer to support rice farming. Farmers' knowledge regarding the use of inorganic chemical fertilizers is strongly influenced by several factors such as education, mass media, the environment, and so on. The obstacle faced by farmers in the Krajan Pagertoya hamlet is that there is still a lack of knowledge about the overall use of good inorganic chemical fertilizers to be applied to rice plants. This study aims to determine the level of knowledge of farmers in Krajan Pagertoya hamlet on the use of inorganic chemical fertilizers on rice plants as a whole.

Methods

This research was conducted in February 2022 in Krajan Pagertoya Hamlet, Pagertoyo Village, Limbangan District, Kendal Regency. The method of selecting the sample was purposive sampling, that is, farmers who have often used inorganic chemical fertilizers on the rice plants they manage. The method of sampling proportionally (Proportionate Random Sampling) is taking samples without regard to the strata contained in a population

(Prabowo et al., 2018). The number of farmers who are members of the Nugi Rahayu farmer group is about 20 people. One way to determine the size of the sample in a study to get accurate results is the standard level that is adjusted to the level of ability, effort, cost, and time available, so the researcher sets an error limit value of 15% by using the Slovin formula (Lesmana & Margareta, 2017).

$n = N/(1 + (N \,.\, (e)^2)$

Information :

n : Sample size

N : Population size

$(e)^2$: Fault tolerance limit value

From the calculation above, it can be determined that the number of respondents from the farmers of the Krajan Pagertoya hamlet is 3 people. This amount is considered sufficient to be used for research if it refers to the equation above.

The research method used in this research is a research method using qualitative approach which later on this research data is descriptive. The test to determine the level of knowledge of farmers on the use of inorganic chemical fertilizers in rice plants was measured by four indicators including knowledge of the time of fertilization, the type of fertilizer used, the dose of fertilizer, and the method of fertilization. The measurement of these four indicators uses the Likert method of measurement. This method uses a scoring method in which each different answer is given a different score. The indicators mentioned earlier were analyzed descriptively qualitatively by describing each indicator into several question items scored based on the opinions obtained, namely very high (5), high (4), moderate (3), low (2), and very low. (1). The scores for each respondent are added up to determine the respondent's participation.

The data collection technique used is a survey. The research instrument used is a list of questions (questionnaire) (Artawan et al., 2017). The questionnaire contained several questions regarding the characteristics of the respondents including age, level of formal education, occupation, and area of arable land. After the data is obtained then the data is processed and the class interval is calculated. The indicator class intervals can be divided into five classes, namely very high, high, medium, low, and very low. The class interval can be calculated using the following formula:

$$C = \frac{Xn - Xi}{K}$$

Keterangan :

C : Class Interval

K : Number of Classes

Xn : Maximum Score

Xi : Minimum Score

Table 1. Assessment Score of Farmers Knowledge Level in Using Inorganic Fertilizer in Krajan Pagertoya Hamlet, Pagertoyo Village, Limbangan District, Kendal Regency, 2022.

	Indicator	Score	
		Minimum	Maximum
1.	Fertilizing Time	27	135
2.	Fertilizer Type	27	135
3.	Fertilizer Dosage	27	135
4.	Fertilization Method	24	120
Total Score		**105**	**525**

From this table, class intervals can be determined using the following calculations:

$$C = \frac{Xn - Xi}{K}$$

$$C = \frac{525 - 105}{5} = 84$$

After the class interval is obtained, then the results of the above calculations can be used to create a distribution list of indicators, each of which is presented in the following table.

Table 2. Farmer Knowledge Level Class Interval on Use of Inorganic Fertilizer

	Value Interval	**Farmer Knowledge Level**
1.	105 - 189	Very low
2.	189,01 – 273,01	Low
3.	273,02 – 357,02	Medium
4.	357,03 – 441,03	High
5.	441,04 – 524,00	Very high

Furthermore, the data from the field are processed and interpreted descriptively.

Results

The general characteristics of respondents in this study include age, level of formal education, occupation, and area of arable land.

Age is the length of life measured by years and the length of life in years calculated from birth. Age is one of the factors that determine the level of work productivity, with a range of 1 to 46 years. Age also affects a person's opinion of the stimuli that come to him or he feels (Wardhana et al., 2017). The results showed a range of 20 to 50 years. The three respondents fall into the productive category. Age shows that respondents still can receive new knowledge or information to improve their farming business regarding inorganic fertilizers and their application to rice cultivation.

The level of formal education of the respondents was divided into not completing elementary school, graduating from elementary school, and graduating from junior high school. Graduated from high school, undergraduate/college. The results showed that the respondents had received education up to junior high and high school.

The respondent's work is divided into main and side jobs. Control of arable land is one of the influential factors in farming and also affects production resulting in increasing agricultural yields. The results showed that the respondents had jobs that were farmers.

Based on the results of the study, the respondent's arable land on average is still less than 1 hectare and the land is cultivated by the owner himself.

Based on the results of observations made and the results of calculations from questionnaires that have been determined and measured using a Likert scale, the results obtained by the level of knowledge of farmers on agriculture using inorganic fertilizers can be seen in table 3.

Tabel 3. Knowledge Level of Rice Farmers on the Use of Inorganic Fertilizer

	Indicator	**Number of Respondents**	**Percentage (%)**	**Total Score**	**Category**
1.	Fertilizing Time	3	100	101	High
2.	Fertilizer Type	3	100	104	High
3.	Fertilizer Dosage	3	100	108	High
4.	Fertilization Method	3	100	93	High
Number of Score				**406**	**High**

The knowledge of farmers in Krajan Pagertoya Hamlet in the use of organic fertilizers is included in the high category with a total score of 406. This means that farmers know the use of inorganic fertilizers in their farming business by the advice of extension workers and sourced from information media. Knowledge of this high category is due to information obtained from extension workers and information from local farmers about inorganic fertilizers that can be understood well. In addition, the education factor that the respondents received was junior high and high school graduates, thus enabling farmers to more easily remember and absorb the material presented by the extension worker and from the information media.

Conclusion and Suggestion

Based on the results of the research and discussion, it can be concluded that the Knowledge Level of Farmers in the Use of Inorganic Chemical Fertilizers in Rice Plants in Krajan Pagertoya Hamlet obtained results in the "High" category. The level of knowledge of farmers in the use of inorganic chemical fertilizers on rice plants in Krajan Pagertoya Hamlet has 4 indicators, namely Fertilization Time, Fertilizer Type, Fertilizer Dosage, and Fertilization Method. For all indicators, the category "High". This is based on several characteristics of respondents who received education until they finished junior high and high school.

Suggestions that the author can give regarding this research are:

1. It would be nice if the number of respondents in this study was increased
2. It is hoped that farmers can reduce the use of inorganic chemical fertilizers and switch to organic fertilizers so that soil health is maintained.

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