

**THE ATTITUDE OF FARMERS TOWARDS THE ADOPTION OF  
NEW SUPERIOR RICE SEED VARIETIES IN COASTAL AREAS  
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**ABSTRACT**

*New superior varieties (NSVs) of rice seed was created to increase rice production. The availability of high-quality rice seeds for farmers is a requirement to improve sustainable rice productivity. Various varieties of rice seed with distinctive characteristics, advantages, and disadvantages have been developed. The government introduced the NSVs to farmers as a form of innovation. However, the farmers have not been fully willing to use the seeds. This research aimed to investigate the attitude of farmers towards the adoption of the NSVs. The research was conducted in Sambas and Kubu Raya Regency. The Farmers' attitudes in adopting superior seeds were measured from 5 aspects of innovation adoption, namely relative advantage, compatibility, complexity, trialability, and observability. The total sample was 150 farmers. The collected data of farmer's attitude were processed by tabulating the frequency distribution and calculating the mean. The mean value was compared to the scale range based on the Scale Range Formula. The results showed that regarding the aspect of relative advantage and complexity, the farmers were hesitant to use NSVs, but considering the aspect of compatibility, trialability and observability the farmers agreed to use it. In general, this research shows that the farmers agree to adopt the NSVs as seen from the mean value of 366.7, within the score range of 352-452 because the seeds can accelerate the harvest period, the rice yield is easier to sell, the rice price is higher and stable, the rice taste fulfills people's taste, and the seeds are triable for narrow fields.*

**Keywords:** *new superior varieties, rice, seeds, farmer, attitude.*

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**1. INTRODUCTION**

Increasing sustainable rice production can be done in environmentally friendly ways, by making the best use of natural resources and the availability of inputs that are harmonious and evenly distributed. The use of certified superior seeds and the application of appropriate technology has been proven to increase the productivity and yield of food crops. The adoption the innovative new superior varietal is a form of input utilization to support sustainability. Introducing seeds of new superior variety (NSV) is one of the government's efforts in increasing rice production. The use of certified seeds is one of the factors that

influences the increase in rice productivity. Therefore, the availability of certified superior seeds for farmers in carrying out their farming activities is an absolute necessity (Dewi et al., 2013)

Many new superior varieties (NSVs) of rice have been produced and distributed to farmers, and the government has provided assistance of the superior varieties. Nevertheless, the rice production in West Kalimantan has not shown a sustainable increase in production. Based on observations and interviews in the field, several farmers who have used the superior varieties switched to reusing local varieties or derivatives of the superior varieties that had been used many times. The current agricultural development paradigm has led to a decline in farmers' creativity and fostered an attitude of dependence on assistance from the government. This is reflected in the behaviors of several farmers received assistance program in Sambas and Kubu Raya Regency. After planting, farmers used the entire harvest for consumption, without setting aside grain for seed, yet they expect more assistance from the government for the seed use. The achievement of a program is inseparable from the farmers' attitudes towards the program. The attitudes of farmers who support and do not support a program certainly greatly affects the success or failure of the program that has been launched by the government (Suandi et al., 2013). The main factor to be considered in the development of superior rice varieties in an area is the attitude and preference of farmers in choosing and using the appropriate superior seeds (Syamsiah et al., 2015).

Conclusions about attitudes must be based on observed and measured phenomenon. This phenomenon takes the form of a response to the object of attitudes in various forms. In the process of adoption of the NSV seeds, changes in farmers' attitudes play a role. Changes in inputs in the form of seeds and the way they are applied have certainly changed attitudes, and this cannot be immediately adopted by the farmers because it has an impact on the economic situation of their households. The use of the superior seeds will result in an increase in farming costs, especially for fertilizers and agricultural medicines. This is different from using local seeds where farmers use less fertilizer and agricultural medicine for their crops. For farmers who experience problems with independent superior seed supply, they purchase the seeds from seed breeders, thus incurring seeds purchase costs. Not all farmers can produce their own high-yielding seeds to be used in the next planting season.

This research aims to determine farmers' attitudes in adopting new superior varietal innovations. This is necessary because similar research where the object using adoption level variables and measuring farmers' attitudes in adopting the innovations in coastal areas regency have not been done, so that the results of this research can provide recommendations for policy makers in increasing the productivity of using NSV seeds in West Kalimantan.

## 2. Literature Review.

New technology that enables sustainable and profitable production of food and fibre is critical for both food security and economic development. Whether in the context of modernisation, productivity enhancement, poverty reduction, social protection, environmental protection or adaptation to climate change, technical change is at the heart of most agricultural policy, programmes and projects (Loevinsohn et al., 2013)

The attitude of rice farmers towards the use of seed varieties is important for increase rice production and ensure food security. Governments and organizations can provide education, training, and motivation to farmers to encourage the use of new superior variety seeds and modern technologies. Understanding local agricultural practices and cultural factors can also help in developing successful initiatives to strengthen rice cultivation and improve the livelihood of small-scale rice farmers. Psychological constructs in theory of planned behaviour (attitude, subjective norm and perceived behavioural control) influence farmers' decisions regarding the strategy they adopt. Attitude and subjective norm were found to be especially influential in decision making (Hansson et al., 2012).

The new superior variety (NSV) is an innovation component of integrated crop management (ICM). One of the driving factors for increasing rice production is the superior seeds, providing the biggest contribution to the increase compared to the application of other technologies; seeds are one of the main factors that determine the success of farming (Moenawar, 2019; Sukadi et al., 2021). Through the certification process, the seeds receive field inspections and laboratory tests from authorized agencies by meeting predetermined standards. The use of the NSV through the 2:1 or 4:1 legowo system in the ICM program is able to produce higher grain compare to the non-ICM technology applied by farmers (Sirappa, 2011). The use of rice seeds among farmers is more than 60 percent from the informal sector, which is in the form of grain taken repeatedly from the previous harvest seasons (Makruf & Iswadi, 2014). The advantage of using the

certified seeds is the guaranteed success of farming in which the use of qualified seeds, detectable seed progeny, guaranteed seed quality, known genetic purity, faster and same growth and optimal plant population results in high yields, healthy seeds with many roots, more robust plants, simultaneously maturity and harvest time, high productivity, so as increasing the farmers' income (Panjaitan, P.H., 2020). Inpara 6 production (5.61 tons/ha), Inpari 30 (5.40 tons/ha), Inpara 8 (5.14 tons/ha), and local (3.73 tons/ha) (Nurita, 2019); Inpari 16 and Inpari 22 are able to increase production and are feasible to develop in Sambas Regency with  $R/C > 1$  (Burhansyah, 2020).

### 3. Research Methods

This study was conducted from March to September 2022 in Sambas and Kubu Raya Regency. The area was chosen as it is one of the largest rice barns in coastal area in West Kalimantan. Semparuk, Pemangkat, Tebas, Sungai Kakap, Rasau Jaya 1, Sungai Raya Sub-district were selected as research sites because these areas are the rice production centers of the regency, and some of the farmers have already used the superior seeds. The collected data were primary data obtained from the survey method using questionnaires. Sampling was carried out by a simple randomization with the proviso that sample farmers are user of the superior varieties. There were 25 sample farmers from each selected sub-district, so that the total sample was 150 farmers. The Farmers' attitudes in adopting superior seeds are measured from 5 aspects of innovation adoption, namely relative advantage, suitability, complexity, trialability, and observability. Data on the farmers' attitudes are quantified qualitative data. This refers to data on the attitudes in ordinal form collected from Likert scale survey questions. The characteristic data of the respondents were processed with frequency tabulation. The data were analyzed with the frequency tabulation and the following scale range from (Umar, 2013)

$$RS = \frac{n(m-1)}{m}$$

whereby:

RS = rating scale range  
 m = number of alternative answers  
 n = number of samples

$$RS = \frac{150(3-1)}{3}$$

$$RS = 100$$

The score ranges and their categories are as follows:

150-250 = disagree  
 250,1-350,1 = hesitate  
 350,2-450,2 = agree

### 4. Results And Discussions

#### Characteristics of Respondents

The respondents were 150 farmers who used the new superior seed varieties. Defined by age, the largest age group of the farmers was 42-56 with average age of 47.5 years, included in productive age. Defined by education level, most of the respondents graduated from Junior High School and Senior High School. Education is related to the success of farmers in managing their farming because it influences the way farmers' think in making decisions regarding their farming activities (Sukiyono & Sigit, 2018).

#### Farmers' Attitude towards the Adoption of NSVs

Farmers in coastal areas of West Kalimantan have adopted the new superior varieties which are Inpari 1, Inpara 2, Inpari 32, Inpari 36, Inpari 37 Inpari 42, Batuta, Baroma, Ciherang, Cilosari, Kalina varieties. In addition, the farmers have planted local seeds including Sakok, Padi Labat, Ringkak Bulat, and Siam Lena varieties.

#### Aspect of Relative Advantage

All of the respondents were user of the NSVs rice seed. Based on the aspect of relative advantage, the mean value of the farmers' attitude towards the adoption of the NSVs in the coastal areas is 308.6 (Table 1).

Table 1. The Farmers' Attitude towards the NSVs Adoption based on Relative Advantage Aspect

| Indicators   | Score |
|--|-------|
| The NSVs use reduces the cost of seeds.                | 358   |
| The NSVs use reduces the cost of tillage.              | 251   |
| The NSVs use reduces the cost of fertilizers.          | 231   |
| The NSVs use reduces the cost of herbicides.           | 242   |
| The NSVs use reduces the cost of fungicides.           | 231   |
| The NSVs use reduces the cost of pesticides.           | 224   |
| The NSVs use reduces the cost of rodenticides.         | 228   |
| The NSVs use reduces labor costs.                      | 287   |
| The NSVs of rice seed are resistant to pests.          | 281   |
| The NSVs of rice seed are resistant to plant diseases. | 293   |
| The NSVs use increases the rice production.            | 416   |
| The NSVs of rice seed have faster harvest period.      | 442   |
| The rice yield is preferable/easier to sell.           | 401   |
| The rice yield has higher/stable price.                | 436   |
| Total Score  | 4321  |
| Mean   | 308.6 |

Source: Analytical Results, 2022

That the produced rice has higher and stable price reaches a high score, that is 436. There is a difference in the selling price of farmers of at least 200.00 rupiahs per kilo of harvested grain. The grain price of the NSVs is higher, which is 4,500.00 rupiahs while the grain price of the local rice is 4,300.00 rupiahs. This difference is caused by the different treatment for the superior and local rice seeds. According to the farmers, the NSVs of rice seed require intensive care, fertilizers, medicines, and tillage. The low scores are on that NSVs use reduces the cost of fertilizers (231) and that the NSVs use reduces the cost of fungicides (231). The lowest score is on that the NSVs use reduces the cost of pesticides (224). This shows that farmers still spend considerable costs for fertilizers, pest control and fungal attacks. The highest score was the NSVs rice seeds have faster harvest period (442). The farmers in the coastal areas of West Kalimantan initially planted once a year because the crop age was more than 120 days old. The NSVs that have been introduced to the farmers provide an opportunity for planting rice twice a year. In terms of relative advantage aspect, the mean value is 308.6 that is within the score range of 250,1-350,1 (doubt category) indicating that the farmers are still hesitant to state that the use of NSVs is more advantageous than the use of local seeds.

The tabulation of the frequency distribution shows that: 68% of the respondents agree that the use of NSVs reduces the cost of seeds; 62.7% of the respondents disagree that the use of NSVs reduces the cost of tillage; 68.7% of the respondents disagree that the use of NSVs reduces the cost of fertilizers; 67.3% of the respondents disagree that the use of NSVs reduces the cost of herbicides; 71.3% of the respondents disagree that the use of NSVs reduces the cost of fungicides, 72.7% of the respondents disagree that the use of NSVs reduces the cost of pesticides; 70% of the respondents disagree that the use of NSVs reduces the cost of rodenticides; 50.7% of the respondents disagree that the use of NSVs reduces labor costs; 45.3% of the respondents disagree that the use of NSVs rice seed are resistant to pests; 44% of the respondents disagree that the use of NSVs rice seed are resistant to plant diseases; 84.7% of the respondents agree that the use of NSVs increases the rice production; 96.7% of the respondents agree that the use of NSVs rice seed have faster harvest period; 78.7% of the respondents agree that the rice harvest is preferable/easier to sell; and 92.7% of the respondents agree that rice harvest has higher/stable price.

#### Aspect of Compatibility

In terms of compatibility, the mean value of the farmers' attitude towards the adoption of the NSVs of rice seed is 378.4, and this is within the score range of 250.1-350.1, showing that the farmers agree to use the improved seeds. Considering the indicators used by the farmers, the way to cultivate both the NSVs and local rice seed is the same in general. It is in accordance with the local customs, the farmers' technological and financial capabilities, the conditions of the land, climate, water, and consumer taste.

Table 2. The Farmers' Attitude towards the NSVs Adoption based on Compatibility Aspect

| Indicators  | Score |
|---|-------|
| The NSVs use is in accordance with the method applied by the farmers.       | 412   |
| The NSVs use is in accordance with the local customs.                       | 383   |
| The NSVs use is in accordance with the farmers' technological capabilities. | 347   |
| The NSVs use is in accordance with the farmers' financial capabilities.     | 374   |
| The NSVs use is in accordance with land/soil conditions.                    | 353   |
| The NSVs use is in accordance with climatic conditions.                     | 351   |
| The NSVs use is in accordance with local water conditions.                  | 388   |
| The taste of the rice yield fulfills people's taste.                        | 419   |
| Total Score   | 3027  |
| Mean  | 378.4 |

Source: Analytical Results, 2022

That the taste of the rice harvest fulfills people's taste reaches the highest score, that is 419. Consumer preference has begun to shift from hard crumbly round-grain rice to fluffy long-grain rice. The lowest score is on that the NSVs use is in accordance with the farmers' technological capabilities (347), included in doubt category. This indicates that the farmers agree to adopt the NSVs of rice seed.

The tabulation of the frequency distribution shows that: 83.3% of the respondents agree that the use of NSVs is in accordance with the method applied by the farmers; 70.7% of the respondents agree that the use of NSVs is in accordance with the local customs; 56% of the respondents agree that the use of NSVs is in accordance with the farmers' technological capabilities; 67.3% of the respondents agree that the use of NSVs is in accordance with the farmers' financial capabilities; 54.7% of the respondents agree that the use of NSVs is in accordance with land/soil conditions; 54.7% of the respondents agree that the use of NSVs is in accordance with climatic conditions; 71.3% of the respondents agree that the use of NSVs is in accordance with local water conditions; and 86.7% of the respondents agree that the taste of the rice fulfills people's taste.

### Aspect of Complexity

In terms of complexity, the mean value of the farmers' attitude towards the adoption of the NSVs in the coastal areas is 347.4, within the score range of 250.1-350.1 (doubt category) indicating that the farmers are hesitant to use the NSVs of rice seed because the varieties are more complicated to cultivate.

Table 3. The Farmers' Attitude towards the NSVs Adoption based on Complexity Aspect

| Indicators  | Score |
|---|-------|
| The NSVs of rice seed are simple to use.                                | 381   |
| The NSVs of rice seed are easy to obtain.                               | 390   |
| The NSVs of rice seed are easy to develop into advanced seeds.          | 362   |
| The NSVs of rice seed are easier to cultivate than the older seeds.     | 254   |
| The NSVs of rice seed require less fertilizer than the older varieties. | 350   |
| Total Score   | 1737  |
| Mean  | 347.4 |

Source: Analytical Results, 2022

That the NSVs of rice seed are easy to obtain reaches the highest score, that is 390. According to the respondents, they can easily obtain the seeds when the planting season arrives. To have sustainable planting of the NSVs, the farmers perform seeding by themselves by taking and storing some of their own rice; in addition, the farmers buy the superior rice seeds from breeders, agricultural stores, *online* stores and the government assistance. The lowest score is on that the NSVs of rice seed are easier to care than the older seeds (254), included in doubt category. According to the farmers, the NSVs of rice seed are more difficult to plant because they require more fertilizers. Inadequate fertilizer results in the slow growth minimum rice yield. Similarly, the farmers provide fertilizers to their local seed varieties although their need for the fertilizers is less than the NSVs. The problem faced by the farmers is the unstable availability of both subsidized and non-subsidized fertilizers. This results in nonoptimal use of the fertilizers for the NSVs of rice. Thus, in terms of the complexity aspect, the farmers are hesitant to adopt the NSVs of rice seed.



The tabulation of the frequency distribution shows that: 73.3% of the respondents agree that the NSVs rice seed are simple to use; 76% of the respondents agree that the NSVs rice seed are easy to obtain; 64.7% of the respondents agree that the NSVs rice seed are easy to develop into advanced seeds; 60% of the respondents disagree that the NSVs rice seed are easier to cultivate than the older seeds; and 63.3% of the respondents agree that NSVs rice seed require less fertilizer than the older varieties, as to that the NSVs need as much fertilizaer as the local seeds.

#### Aspect of Trialability

Considering trialability aspect, the mean value of the farmers' attitude towards the adoption of the NSVs in the coastal areas is 386, within the score range of 350.2-450.2 (agreement category), indicating that farmers are willing to use the NSVs rice seed because they are triable for narrow fields before planted in the entire fields.

Table 4. The Farmers' Attitude towards the NSVs Adoption based on Trialability Aspect

| Indicators  | Score |
|---|-------|
| The NSVs of rice seed are triable for narrow fields.      | 402   |
| The NSVs of rice seed are triable with minimum financing. | 392   |
| The NSVs of rice seed are triable in a simple way.        | 388   |
| The NSVs of rice seed are simply triable.                 | 358   |
| The NSVs of rice seed are triable for all types of soil.  | 390   |
| Total Score   | 1930  |
| Mean  | 386   |

Source: Analytical Results, 2022

That the NSVs rice seed are triable for narrow fields reaches the highest score, that is 402. Most of the farmers own one hectare rice field. Before planting the NSVs rice seed in their entire fields, the farmers initially tried to plant them on a narrower field (200-400 m). This is intended to see the plant development and productivity before the seeds are actually planted in the farmland. Considering this, the farmers agree to adopt the NSVs rice seed.

The tabulation of the frequency distribution shows that: 83.3% of the respondents agree that the NSVs rice seed are triable for narrow fields; 76.7% of the respondents agree that the NSVs rice seed are triable with minimum financing; 73.3% of the respondents agree that the NSVs rice seed are triable in a simple way; 66.7% of the respondents agree that the NSVs rice seed are simply triable; and 76% of the respondents agree that the NSVs rice seed are triable for all types of soil.

#### Aspect of Observability

In terms of observability, the mean value of the farmers' attitude towards the adoption of the NSVs in the coastal areas is 412.7, and this is within the score range of 350.2-450.2 (agreement category), indicating that the farmers are willing to use the NSVs rice seed because the plant growth and development can be easily observed.

Table 5. The Farmers' Attitude towards the NSVs Adoption based on Observability Aspect

| Indicators   | Score |
|--|-------|
| The plant conditions of the NSVs are noticeable.                       | 405   |
| The NSVs plant resistance to pests is noticeable.                      | 412   |
| The NSVs plant resistance to diseases is noticeable.                   | 406   |
| The NSVs plant resistance to climate changes is noticeable.            | 416   |
| The NSVs plant resistance to changes in water condition is noticeable. | 421   |
| The fertilizer need of the NSVs is noticeable.                         | 416   |
| Total Score  | 2476  |
| Mean   | 412.7 |

Source: Analytical Results, 2022

The NSVs plants resistance to changes in water condition was seen to reache the highest score, that is 421. Farmers are willing to use the NSVs rice seeds because the seeds are resistant to changes in water condition. The occurrence of water changes at the research location is due to seawater intrusion, the movement of seawater into the agricultural area, during the high tide.

The tabulation of the frequency distribution shows that: 82.7% of the respondents agree that the plant conditions of the NSVs are noticeable; 84% of the respondents agree that the NSVs plant resistance to pests is noticeable; 80% of the respondents agree that the NSVs plant resistance to diseases is noticeable; 84% of the respondents agree that the NSVs plant resistance to climate changes is noticeable; 86% of the respondents agree that the NSVs plant resistance to changes in water condition is noticeable; and 84% of the respondents agree that the fertilizer need of the NSVs is noticeable.

In brief, Table 6 shows the mean value of the five aspects of innovation adoption namely: relative advantage, compatibility, complexity, rialability, and observability.

Table 6. Aspects of Innovation Adoption

| Aspects of Innovation Adoption | Score  | Category |
|--------------------------------|--------|----------|
| Relative Advantage             | 308.6  | Hesitate |
| Compatibility                  | 378.4  | Agree    |
| Complexity                     | 347.4  | Hesitate |
| Trialability                   | 386    | Agree    |
| Observability                  | 412.7  | Agree    |
| Total Score                    | 1833.1 |          |
| Mean                           | 366.6  | Agree    |

Source: Analytical Results, 2022

The mean value of the five aspects is 366.6, within the score range of 350.2-450.2. This means that the farmers accept the NSVs innovation, and they are willing to use the seeds. The farmers are interested in adopting the superior rice seeds because the harvest period is faster. Superior rice varieties that are adaptable and high-yielding can contribute to shorter planting periods. These varieties produce more seeds per unit area, allowing farmers to plant more seeds in a shorter amount of time. By choosing these high-yielding varieties, farmers can increase their seed supply and potentially reduce the planting period. (Jonharnas et al., 2023). In addition, the farmers can plant twice a year so as to increase the production of their farming. Farmers shows positive attitude towards the new superior varieties of rice seed, and they adopt the seeds (Chanifah et al., 2021). The NSV display and preference test considered farmers to choose the NSV to be developed for rotating varieties to be planted (Surdianto et al., 2021)

New superior rice varieties developed with a focus on high yield potential. These varieties were selected based on their growth and productivity performance, resulting in higher yields compared to traditional varieties. Higher yields make it easier for farmers to meet market demand and supply rice in larger quantities, potentially leading to higher prices. Farmers' preferences play a crucial role in the adoption and cultivation of new rice varieties. In some cases, farmers may prefer certain superior varieties due to specific characteristics preferred by consumers, such as grain shape, rice color, and taste. Grain with a fluffier quality will have a higher selling price compare to grain with a softer quality. The price difference range can reach Rp. 200.00 per kg, so farmers prefer to choose to plant seeds with varieties that will produce grain with fluffier rice quality. When farmers cultivate varieties that align with consumer preferences, it can result in higher market demand and potentially higher prices (Putri et al., 2023; Yani & Utomo, 2014)

The NSVs cultivation is in accordance with the method applied by the farmers, the seeds easily develop into superior seeds, the seeds are triable for narrow fields, and the seeds need quite a lot of fertilizer. Consumer demand for tender rice products in NSVs is indicated by a higher selling price, and it is supported by the milling businesses that receive any amount of superior rice grain sold by farmers. The shift in consumer tastes from hard crumbly rice to fluffy rice is another cause of the high demand for rice produced by the NSVs of rice seeds. Access to selling grain is an attribute that is important for farmers to consider because this attribute is related to marketing and the selling price of the grain produced. Farmers usually sell their grain directly to middlemen because sales access is easy, the procedures are simple, and the price set by the middleman is in line with the price of grain on the market.

The obstacle to utilizing the NSVs rice seed in the coastal areas of West Kalimantan is fertilizer shortage. The sent fertilizers do not meet the farmers' needs, and the arrival of the fertilizers is delayed, so that it did not match the needs of rice cultivation period. In addition, concerning the plant resistance to pests and diseases, the superior seeds have not been fully resistant to pests and diseases. The use of superior seeds by

farmers can not only increase the quantity of production with a short planting time and obtain quality rice production, but also maintain food security. Farmers' rice production is not only consumed but also used as seeds for subsequent planting. Regular monitoring of rice seed adoption and strengthening of the improved seeds supply system is essential to ensure efficient and effective use of improved seeds as well as a return on investment in seed development (Kangile et al., 2018). Some specific measures that can be taken to ensure efficient and effective use of improved seeds include: 1). Providing adequate training and support to farmers regarding the proper use and management of superior seeds, 2). Conducting regular monitoring and evaluation of the seed adoption process to identify any challenges and make necessary adjustments.

### Conclusion and Suggestion

The farmers agreed to adopt new superior varieties of rice seeds, shown from the mean value of 366.5, which is in the score range of 350.2-450.2. Farmers agreed to adopt the seeds because the seeds can accelerate the harvest period, the rice yield is easier to sell, the rice price is higher and stable, the rice taste meets people's taste, and the seeds are triable for narrow fields. Superior variety seeds require extra conditions compared to local rice based on the need for fertiliser, pest management, irrigation, and maintenance, all of which require the discipline of farmers. Farmers' interest in planting high-yielding varieties is still high. Shown by the arrival of farmers to the Agricultural Extension Centre asking for new superior seeds and assistance from the government. In order to maintain the continuity of the availability of superior varieties of seeds and grain, it is necessary to build a system that coordinates between farmer economic institutions and agricultural extension workers who work together with the Association of Farmers Groups in each village. The demand from consumers for rice from superior varieties has not been fulfilled, so this creates a great opportunity for farmers and superior seed rice breeders.

For further research in the future, it is expected to find new superior varieties of rice seeds that are fully resistant to pests and diseases because in this current research regarding the relative advantage aspect, the use of the NSVs has not reduced the cost of herbicides, fungicides, pesticides and rodenticides. To support maximum production, stable availability of fertilizers, concerning time, amount, types, price, and places, is required.

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