

Factors Affecting Farmers in Adopting VUB Rice Seeds in Cianjur Regency West Java

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Abstract – Rice is a strategic food crop commodity and priority in supporting agricultural programs in Indonesia. To support food availability, good and quality production inputs are needed, especially the use of seeds. The government continues to disseminate VUB in order to support the success of food self-sufficiency, one of which uses new superior varieties /Varietas Unggul Baru (VUB) rice seeds. The purpose of this study are to analyze the factors that influence farmers using VUB rice seeds and analyze the factors that influence farmers in using seeds in Cianjur Regency. The study was conducted in Cianjur Regency, West Java, because it is one of the centers of rice production. The study was conducted using the logit method with primary data from 186 respondents. Based on the results of the study it was found that the opportunity for farmers to adopt VUB rice seeds in Cianjur Regency, West Java was influenced by experience, land area, seed price and distance ricefield to the input market. Factors that influence farmers in seed use in Cianjur Regency are age, education, business scale, land area and frequency of counseling

Keywords – Production, Seed, Varietas Unggul Baru (VUB).

I. INTRODUCTION

Rice is one of the staple food commodities of Indonesian people, so its availability is very important to be considered by the government. This is in accordance with the Food Law of 1996 which states that food is a human right and its fulfillment is the responsibility of the government, assisted by the community. Rice needed to supplement food needs is shown by the increasing consumption of rice in Indonesian society. Indonesian rice consumption is the third after China and India, with more than 90% of Indonesian people consuming rice every day. This causes instability in the problem of handling food, especially rice, which will affect various aspects of life such as social conditions, economic stability, and employment (Ministry of Agriculture, 2015).

The importance and strategic of rice farming make the government continuously strives to be able to increase production and productivity of rice farming through policies: (1) extensification, that is land clearing;; (2) intensification in

the form of the use of superior variety technology and an efficient production system; and (3) rehabilitation of irrigation networks and damaged land (Prastowo et al 2008).

One of the technological innovations introduced is the use of modern varieties namely new superior varieties/ varietas unggul baru (VUB), hybrid superior varieties/varietas unggul hibrida (VUH), and new types of superior varieties/ varietas unggul tipe baru (VUTB) (Department of Agriculture 2008). The use of modern varieties is included in the basic technology components in integrated crop management because seed is one of the important production factors in farming that determines the success of the farm in the future, especially the harvest period. This is why seeds are also referred to as "delivery mechanisms" which channel technological superiority to farmers and other consumers (Rachman et al 2004).

The low use of superior and certified seeds shows the low level of farmers' adoption of superior and certified rice seeds.

the degree of adoption of an innovation depends on the attitudes or fundamentals that shape the behavior and greatly influence the consumer's decision process, as well as farmers' preferences and perceptions about the variety. Many studies have examined the perceptions and preferences of farmers towards certified superior rice seeds (Wicaksana et al 2013; Hendrawati et al 2014; Killenga et al 2014; Syamsiah et al 2015, Toledano et al 2018). Hendrawati et al (2014) stated that farmers' perceptions of being unfavorable towards the use of certified superior rice varieties were caused by perceptions of seed availability, price of seeds, complexity of use, and suitability of seeds. The results of the study of Dewi et al (2013) also emphasized the importance of seeds that are in line with community preferences in the adoption of certified rice seeds. Thus, it can be concluded that people's perceptions and preferences towards certified superior varieties become important in the adoption process.

In addition to preferences and perceptions, the level of seed availability and the price or accessibility of farmers to superior seeds are also important factors in shaping farmers' perceptions and preferences and adoption (Hendrawati et al 2014). This is also supported by the results of a study by the Center for Agriculture Socio Economic and Policy Studies (2015) which states that farmers are willing to adopt certified seed if available and at affordable prices. Although it can give high yields, but not available at any time can cause farmers to have a poor perception of the certified seed (Hendrawati et al 2014).

The results of the study by Mejaya and Hakim (2016) show that the low adoption of farmers for Inpari-certified superior varieties at the dissemination site in 2011-2015 was caused by: (1) unavailability of seed distribution of Inpari varieties after dissemination (display / demfarm); (2) seed breeders are not interested in producing Inpari VUB seed dispersal because they do not benefit from the increase in yield / hectare achieved with the VUB; (3) grain prices are lower than old varieties that have been developed; and (4) lack of involvement of local extension workers in the introduction of new high-yielding varieties. Thus, it can be concluded that accessibility and selling price are the main factors for farmers in the process of adopting certified superior varieties.

Based on the description, it is interesting to study what factors influence farmers in adopting VUB rice seeds? and what factors influence farmers in using seeds?.

This study aims to analyze the factors that influence farmers in adopting VUB rice seeds and analyze the factors that influence farmers in using seeds in Cianjur Regency, West Java.

II. RESEARCH METHODS

The study was conducted in Cianjur Regency, West Java Province, with one sample sub-district namely Bojong Picung District. West Java Province was chosen because one of the rice production centers in Indonesia and Cianjur Regency was chosen because it has agricultural land with quite good rice productivity. The determination of a sample of sub-districts is determined purposively by considering that the sub-district has a group of farmers or farmer groups combined. The number of respondents was 186 people, with the consideration that the population in the study was relatively homogeneous with almost the same characteristics. The sampling method is carried out in stages. The sample of respondents will be determined based on the simple random sampling method. The study was conducted in January to March 2019.

The type of data used in this study is primary data in the form of cross section data, and secondary data. Primary data were obtained from interviews using questionnaires with respondent farmers. The questionnaire used was made with a list and structured questions followed by interviews for matters that require respondents' clarification. Primary data was also obtained from interviews with several parties related to agricultural extension workers, local seedling institutions, and others. Meanwhile, secondary data was obtained from the Ministry of Agriculture, the Central Statistics Agency, scientific journals and documents or publications from relevant agencies.

To analyze the factors that influence farmers adopting VUB rice seeds in Cianjur Regency were analyzed using logit regression equations. The logit regression equation model is as follows:

$$TA_i = a_0 + a_1AGE_i + a_2EDU_i + a_3EXP_i + a_4PRICE_i + a_5LLT_i + a_6FPYLH_i + a_7JLP_i + U_1 \quad (1)$$

Where: a_0 = intercept or constant, $a_1 - a_{12}$ = regression coefficient, U_1 = error term

The description of Equality Variables for Factors that affect VUB Seed Accessibility can be seen in Table 1.

Table 1. Description of the Variable Equation of Factors Affecting The New Adoption of VUB Yielding Variety

Number	Symbol	Variable Name	Variable Type	Variable Description
1.	TA	Adoption of VUB yielding variety	Biner	Adopted = 1; Not adopted = 0
2.	AGE	The age of the farmer	Continuous	Year
3.	EDU	Level of education	Continuous	Year
5.	EXP	Farmer's Experience	Continuous	Year
6.	PRICE	VUB Seed Price	Continuous	Rupiah
7.	FPYLH	Counseling Frequency	Continuous	Total

After obtaining the influence of the rate of adoption on VUB rice seeds, an estimation is then performed to determine

the factors that influence the level of use of rice seed input (Table 2) with the following equation:

$$TP = b_0 + b_1TA + b_2AGE + b_3EDU + b_4EXP + b_5DSU + b_6LLT + b_7FPYLH + U_2 \quad (2)$$

Where : b_0 = intercept or constant, $b_1 - b_7$ = regression coefficient for each variable, U_2 = error term

Table 2. Description of Variable Equation Factors Affecting the Level of Use of Rice Seed Input

Number	Symbol	Variable Name	Variable Type	Variable Description
1.	TP	Level of Use of Seed	Continuous	Kilogram (Kg)
2.	TA	Adoption of VUB Yielding Variety	Continuous	Predictive Value
3.	AGE	The Age of the Farmer	Continuous	Year
4.	EDU	Level of Education	Continuous	Year
5.	EXP	Farmer's Experience	Continuous	Year
6.	DSU	Business Scale	Interval	Middle; Small
7.	LLT	Land Area	Interval	Hectare
8.	FPYLH	Counseling Frequency	Interval	Total

III. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Farmers

The difference in characteristics of the two groups of farmers is expected to explain the variations in decision making by farmers to determine the choice in adopting VUB rice seeds. The social and economic characteristics of rice farmers in Cianjur Regency can be seen in Table 3. Table 3

shows that there are different socioeconomic characteristics of farmers who adopt VUB rice seeds with those who do not adopt VUB rice seeds. Farmers who adopt VUB rice seeds have lower education rates (7.76 years) compared to those who do not adopt VUB rice seeds (8.35 years). Farmers who adopted VUB rice seeds also had an average of less counseling (1.06 times) compared to farmers who did not adopt VUB rice seeds (1.26 times).

Table 3. Characteristics of Farmers Who Adopt VUB and Farmers Who do Not Adopt VUB in Cianjur Regency, West Java

Nu mbe r	Variable Name	Respondents Adopt VUB	Respondents Not Adopting VUB	Difference	T- test
1.	The Age of the Farmer	55.31034	55.74219	0.4318427	0.8099
2.	Level of Education	7.758621*	8.34375	0.5851293	0.0983
3.	Farmer's Experience	26.75862	26.53906	-0.219558	0.5391

Nu mbe r	Variable Name	Respondents Adopt VUB	Respondents Not Adopting VUB	Difference	T- test
4.	Land Area	0.625431	0.5317891	-0.093642	0.7394
5.	Seed Price	11.41379	13.48438	2.070582	1.0000
6	Counseling Frequency	1.068966*	1.265625	0.1966595	0.0602

Note: * significant at 20% level, ** significant at 5% level, ***significant at 1% level

3.2 Factors That Influence Farmers to Adopt of VUB Rice Seeds

The logit analysis estimation results to analyze the factors that influence farmers to adopt VUB rice seeds obtain the following results, the dependent variable is a dummy variable with a value of 1 if farmers adopt VUB rice seeds and a value

of 0 if farmers do not adopt VUB rice seeds. LR value of χ^2 (7) is 134.09 with a value of Prob> χ^2 of 0.0000 ($P < 0.05$) indicating that this model is fit and explanatory variables can be used to explain variations in the dependent variable. The estimation results of each variable are to see the factors influence farmers to adopt.

Table 4. Factors That Influence Farmers to Adopt of VUB Rice Seeds in Cianjur Regency

Explanatory Variable	Coefficient	Standard Errors	Z-value	P> z	Odds Ratio
Intercept	29.05733	4.49359	6.47	0.000	4.16e+12
Age	-0.004881	0.032524	-0.15	0.881	0.9951309
Education	-0.0569609	0.031546	-1.81	0.545	0.9334847
Farmer's Experience	-0.0569609*	0.031546	-1.81	0.071	0.944631
Land Area	0.4223903*	0.289477	1.46	0.145	1.525604
Seed Price	-2.185976***	0.333691	-6.55	0.000	0.112368
The Distance Ricefield to the Input Market	-0.7608671**	0.383776	-1.98	0.047	0.4672611
Counseling Frequency	0.2585411	0.339357	0.76	0.446	1.295039
Number of observations	186			LR χ^2 (1)	37.09
Prob > χ^2	0.0001			Pseudo R ²	0.1439

Note: * significant at 20% level, ** significant at 5% level, ***significant at 1% level

Table 4 shows that the experience variable of farmers has a negative and real value towards the adoption of VUB rice seeds at the level of 20 percent, which shows that farmers who have longer farming experience have a lower chance of adopting VUB rice seeds. This is consistent with the results of research conducted by Listyati et al (2013) and Rahmawati et al (2010) which states that the longer the experience of rice farming, it makes the adoption of rice farming technology low. Farmers who have a lot of experience are usually more careful in using new agricultural technologies (Thamrin, 1987), because they have knowledge based on their experience so it is not easy to adopt VUB rice seeds.

The land area variable has a positive and significant at the level of 20 percent, this shows the land area that the greater

the opportunity for farmers to adopt VUB rice seeds. These results are consistent with the results of research by Kadar et al (2016) and Siata (2016) which state that land area has a positive effect on the rate of adoption of superior seeds. Farmers have large tracts of land, it will be easier and faster to adopt new technology, because of better economic capabilities (Romdon, Supardi, & Sasongko, 2012).

The more land that is used for farming, the more motivated farmers to adopt new technologies (Rahmawati, Widjayanthi, & Raharto, 2010). The odds ratio value of 1.525604 means that the possibility of farmers using VUB rice seeds on a larger area is 1.525604 times compared to a less extensive area. With a large area of land, the farmers will try to minimize the risks in managing farming, especially

those related to quality seed selection. So farmers who have large tracts of land tend to use VUB rice seeds to avoid risks and increase productivity of rice farming.

Seed prices have a negative and significant at the level of 1 percent, so that the cheaper seed prices will provide greater opportunities for farmers to adopt VUB rice seeds. According to Syamsiah et al (2015) the price of VUB rice seeds is an important attribute that determines farmers in using VUB rice seeds. This causes farmers to make the price of seeds a consideration in using VUB rice seeds. With lower prices, farmers can save the cost of seed inputs in agricultural production.

The variable distance of land to the seed market has a negative and significant at the 5 percent level, this shows that

the farther the distance ricefield to the input market, the lower the opportunity for farmers to access VUB rice seeds. This can be caused by the condition of the farmers' further the farther the distance ricefield to the input market which will create difficulties for farmers to obtain VUB rice seeds, so farmers prefer to use available and easily available rice seeds compared to VUB rice seeds.

3.3 Factors That Influence Farmers to Use Rice Seed Input

Then after the factors that influence farmers accessing VUB rice seeds are obtained, further factors are influenced to farmers in the use of seeds as shown in Table 5.

Table 5. Factors Influencing the Use of Rice Seeds in Cianjur Regency, West Java

Variabel Penjelasan	Koefisien	Standard errors	t-Value	P> t	VIF
Intercept	4.40903	8.16551	0.54	0.590	1.45
Adoption of VUB Yielding Variety	4.34497	3.495543	1.24	0.216	2.28
Age	0.3304925**	0.1532124	2.16	0.032	1.92
Education	0.7344248*	0.5133683	1.43	0.154	1.38
Farmers's Experience	-0.0723233	0.1337652	-0.54	0.589	1.25
Business Scale	17.47176***	3.718081	4.70	0.000	1.21
The distance ricefield to the input market	9.168212***	1.518515	6.04	0.000	1.07
Counseling Frequency	-5.162037***	1.610259	-3.21	0.002	1.06
$R^2 = 0.4144$					

Note: * significant at 20% level, ** significant at 5% level, ***significant at 1% level

Based on Table 5, it can be explained that the factors that influence farmers in the use of seed inputs in Cianjur Regency are age that is positive and significant at the 5 percent level. This means that the higher age of the farmer will influence his decision to use the input of rice seeds used. Based on the estimation results of the age variable, it is found that the more mature age (older) causes farmers to use more input seeds. The same result was also obtained by Gesare et al (2012) who in their research stated that age is an attribute that has a positive influence.

Education has a positive and significant at the level of 20 percent, which means the longer the farmer is educated, the more seeds are used. Because with the education they have, farmers have a logical reason to use more seeds. This is consistent with the results of research from Kalinda et al (2014) and Gesare et al (2012) which states that education has

a positive influence on farmers in considering the use of seeds.

Business scale variables have a positive and significant at the level of 1 percent, meaning that the larger the scale of the farmer's business, the more farmers will use seed input. This study is in line with research conducted by Fahmi (2008) which states that the attitude of farmers in choosing seed inputs will be influenced by the scale of business owned by farmers.

The land area variable is positive and significant at the level of 1 percent, which means that the more land area by farmers, the use of rice seed input will increase. The same research conducted by Siata (2016) stated that the area of farmer's land will be a consideration where the farmers will choose the input of seeds to be used.

The frequency of counseling has a positive and significant at the level of 1 percent, which means that the more often farmers take counseling, the more farmers use seeds. Oluwayemesi (2017) and Ghimere (2015) in their research stated that the frequency of visits is an important determinant for farmers in using seeds.

IV. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

Based on the results and discussion, several things can be concluded as follows:

1. Opportunities for farmers to adopt rice seeds for VUB in Cianjur Regency, West Java are influenced by factors of farmers' experience, land area, seed price and The distance ricefield to the input market.
2. Factors that influence farmers in the use of seed inputs in Cianjur Regency are the age of farmers, farmer education, business scale, land area and frequency of counseling.

4.2 Recommendation

1. Increasing the level of farmers' adoption of VUB rice seeds must be followed by the availability of seeds in the input market. Because at the location of research, the availability of VUB rice seeds is limited, than farmers have difficulty in obtaining VUB rice seeds in the market and still depend on seed subsidies from government programs.
2. The low adoption of VUB rice seeds is caused by farmers perceptions of the use of VUB rice seeds that are not good. So we need more optimal counseling and government programs to increase the use of VUB seeds by farmers.

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