



Business Performance and Farmers' Motivation in the Application of Hybrid Corn Variety Innovation in Lengkiti District

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ABSTRACT

This study aims to determine the performance of farmers and the level of motivation of farmers in using hybrid corn seed assistance and the factors that influence farmers in pursuing corn farming in Lengkiti District, Ogan Komering Ulu Regency. This research is located in Bandar Jaya, Fajar Jaya, and Tanjung Agung Villages, Lengkiti District, Ogan Komering Ulu Regency. Respondent farmers were corn farmers in Bandar Jaya, Fajar Jaya, and Tanjung Agung villages who were selected using the Simple Random Sampling Method of as many as 97 people. The time of conducting the research is around November 2021. The analysis used to answer the first objective is qualitative and quantitative analysis. Qualitative analysis is used to explain each indicator variable. Quantitative analysis will be used on the variables of productivity and farm income. The analysis used to answer the factors that influence farmers in using government-assisted hybrid seeds with the factors studied are Education (X1), Age (X2), Family Dependents (X3), and Government Policy (X4). The average income of farmers who work on corn farming in the research area, both farmers who use hybrid seeds from the government or not, is IDR. 13,680,484.53. Farmer's age variable has a significant effect partially on the motivation of farmers who use hybrid seeds provided by the government in the study area, while the rest does not affect farmers' motivation.

1. INTRODUCTION

1.1. Research Background

Corn is one of the main crop commodities in Indonesia which has an important role in human life, not only as a substitute for carbohydrates in Indonesia but corn plants are also used as animal feed ingredients. According to Made [1], almost 50 percent of the national corn needs is used for the livestock industry. However, it turns out that this is still not balanced between the amount of availability and demand for corn for animal feed, because in fact imports of corn are still increasing rapidly every year.

According to Shinta [2] maize is the main component in animal feed rations, especially poultry, with a proportion of around 60%. It is estimated that more than 58% of domestic corn needs are used for feed, while only about 30% for food, and the rest for other industrial needs and seeds. Based on data from the Central Statistics Agency in 2015 [3] Indonesia produces 19.03 million tons of corn in the form of dry shells, the production of shelled corn in South Sumatra is 289,007 tons per year. Based on these data, it can be seen that there is an increase in the national demand for corn followed by an increase in production.

Various efforts can be used to increase corn production and reduce imports of corn, one of the most important is the agricultural land where the production is carried out. One of the lands that have the potential and is still not widely used is dry land. Almost all smallholder plantation commodities in the South Sumatra region are produced from farming on dry land.

South Sumatra has 17 regencies/cities in which each area has an area for corn farming. One area that has the potential to develop corn on dry land is Lengkiti District, Ogan Komering Ulu Regency. In Ogan Komering Ulu Regency, the area of corn production is 12,314 ha with a production of 104,967 tons in 2018 [3].

One area that has the potential to develop corn on dry land is Lengkiti District, Ogan Komering Ulu Regency. Based on data from the Agriculture Service of Ogan Komering Ulu Regency, the area of Lengkiti Subdistrict, Ogan Komering Ulu Regency in 2019 was 5,405 ha which was used as corn production land. This is wider than other sub-districts in Ogan Komering Ulu Regency.

According to Soehandi et al [4], the agricultural productivity of food commodities in dry land in South Sumatra is generally still low, the average productivity of upland rice, corn, cassava, and soybeans in South Sumatra is 2.51 tons/ha, 3.09 tons, respectively. /ha, 14.18 tons/ha, and 1.44 tons/ha. Therefore, it is

necessary to increase the use of dry land in the Ogan Komering Ulu Regency area.

Farmers in Ogan Komering Ulu Regency grow corn using hybrid variety innovations. Hybrid corn is an innovation of superior varieties created to increase corn productivity. However, unfortunately, the price of hybrid corn seeds in Ogan Komering Ulu Regency is still relatively expensive, so sometimes farmers in the Ogan Komering Ulu Regency have difficulty getting good quality seeds.

In government programs to increase food self-sufficiency, especially in corn, various efforts have been made through

agricultural intensification and extensification programs. Therefore, to support corn agricultural productivity in Ogan Komering Ulu Regency, the Ogan Komering Ulu Regency government assists in the form of seeds aimed at increasing farmers' income efficiency.

The following data on seed assistance distributed by the Agriculture Service of Ogan Komering Ulu Regency in Ogan Komering Ulu Regency can be seen in Table 1.

Table 1. Seed assistance in Ogan Komering Ulu Regency, 2016-2020 [3]

No	Year	Land Area (ha)	Seed Volume (Kg/Ha)	Beneficiaries (Ha)	Non-Beneficiaries (Ha)
1.	2016	4512	46005	3067	1445
2.	2017	8774	54105	3607	377
3.	2018	12296	54465	3631	366
4.	2019	10017	59205	3947	520
5.	2020	10474	59205	3947	3440
Total		46073	272985	18199	6148

It can be seen in the Table 1 that the seed assistance distributed by the Agriculture Service of Ogan Komering Ulu Regency seems stable from 2016-to 2020, but in fact, it is still not comparable with the land area which increases every year. In addition, when compared to table 1 and table 2, the Lengkiti area receives seed assistance every year, but when viewed from the productivity shown, it tends to be stable.

Motivation is a psychological process that can reflect the interaction between attitudes, needs, perceptions, and decisions that occur in a person. The power of motivation can be described through motives, expectations, and incentives. Motive is the driving factor for someone to take action. The motivation of farmers in corn farming is quite interesting to study because of the decision of farmers to continue cultivating hybrid corn even though there are various choices of commodities.

Hybrid corn farming by farmers aims to increase farmers' productivity and income. With this goal, farmers can be encouraged to take an action. The emergence of this urge can be influenced by various factors that come from within and outside the self. Factors originating from the farmer can be in the form of age, education, area of arable land, number of dependents in the family, and experience in farming. Meanwhile, factors that come from outside the farmer can be in the form of the availability of capital, facilities, and infrastructure, as well as counseling.

1.2. Research Objective

This study aims to analyze the factors that influence the motivation of farmers in carrying out hybrid corn farming in Ogan Komering Ulu Regency and to analyze the performance of farmers and the level of motivation of farmers in using hybrid corn seed assistance in Ogan Komering Ulu Regency.

2. MATERIALS AND METHODS

Determination of the sample used 25% of the population in the study area, the number of farmers in the three villages is Bandar Jaya Village: 160 people, Tanjung Agung Village: 125 people, Fajar Jaya Village: 100 people. So that a total of 385 farmers in Lengkiti District were obtained as the research area. So, the sample for this study was taken 25% of the total population of 385 people, namely 97 respondents representing 385 corn farmers in the villages of Bandar Jaya, Fajar Jaya, and Tanjung Agung.

In this study, the author uses a descriptive type using a quantitative approach, where the data obtained from interviews, questionnaires, and direct field observations are processed quantitatively using the SPSS application and described descriptively. The term descriptive comes from the English "to describe" which means to describe or describe something [5].

The analysis was used to answer the first objective with qualitative and quantitative analysis. Qualitative analysis is used to explain each indicator variable. Quantitative analysis will be used on the variables of productivity and farm income. Productivity calculation is done by dividing the total production per unit of land. Meanwhile, farm income is done by farming analysis.

2.1. Productivity

Productivity calculation is done by dividing the total production per unit of land. Meanwhile, farm income is done by farming analysis. Farming analysis was carried out using the following formula:

$$\pi = TR - TC \dots\dots\dots(1)$$

Where,

π = income

TR = total revenue

TC = total cost

2.2. Logistics Regression

Logistic regression is a part of regression analysis that can be used if the dependent variable (response) is dichotomous. Dichotomous variables usually consist of only two values, which represent the occurrence or absence of an event which is usually assigned a number 0 or 1.

Logistic regression will form predictor/response variables which are linear combinations of independent variables. The value of this predictor variable is then transformed into probabilities with the logit function.

$$\pi(x) = \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}{1 + \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)} \dots\dots\dots(2)$$

Where p = the number of predictor variables To facilitate the estimation of the regression parameters, is the probability of a successful event with a probability value and is the parameter value for. is a non-linear function, so it needs to be transformed into logit form to obtain a linear function so that the relationship between the independent variable and the dependent variable can be seen

$$\{\pi(x)\} \{1 + e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}\} = e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\{\pi(x)\} \{\pi(x) e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}\} = e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\pi(x) = e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)} - \pi(x) e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\pi(x) = \{1 - \pi(x)\} e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\frac{\pi(x)}{1 - \pi(x)} = e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\ln \left[\frac{\pi(x)}{1 - \pi(x)} \right] = \ln e^{(\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p)}$$

$$\ln \left[\frac{\pi(x)}{1 - \pi(x)} \right] = \beta_0 + \beta_1 x_1 + \dots + \beta_p x_p$$

So that the equation is obtained:

$$g(x) \left[\frac{\pi(x)}{1 - \pi(x)} \right] = \beta_0 + \beta_1 x_1 + \dots + \beta_p x_p \dots\dots\dots(3)$$

In measuring farm performance, 3 indicator variables are used, such as productivity, income, and price, while to measure motivation in this study, the measurement is done by knowing the score on each measurement tool. Several indicators are used as a measure of farmers' motivation in implementing innovation.

3. RESULT AND DISCUSSION

In the village, there is quite a variety of land uses that are used for corn farming. In addition, the diversity of land ownership is also found in the villages of Bandar Jaya, Fajar Jaya, and Tanjung Agung where land ownership is divided into leased land and privately owned land, this is certainly related to the research objectives because the production expenditure is different for each corn farmer in the research area.

Table 2. Research Site [3]

No	Research Sites	Land Area (Ha)
1.	Fajar Jaya	1.200
2.	Bandar Jaya	3.999
3.	Tanjung Agung	3.470
Total		8.669

Lengkiti sub-district is one of the sub-districts in Ogan Komering Ulu (OKU) Regency which has the potential as agricultural and plantation land. In the research area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages, the existing land is used for various infrastructures including roads, farmland, public buildings, housing, and public facilities. The detailed land use can be seen in Table 3.

Based on the Table 3, the land area in the research area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages is designated as gardens or fields with a total land use of 7,577 ha which is designated as gardens or fields in the research area which are generally used by residents for farming such as trees. rubber, coffee, areca nut, duku, and durian trees. In addition, land use is used for various village facilities such as roads, public buildings, housing, and other public facilities.

Table 3. Land Area by Use in Research Area [3]

No	Research Site	Paddy field (ha)	Garden (ha)	Non-Agricultural Land (ha)
1.	Fajar Jaya	-	500	700
2.	Bandar Jaya	-	3.649	350
3.	Tanjung Agung	9	3.428	33
Total		9	7.577	1.083

3.1. Age

In general, the average age of respondents who cultivate corn plants is between 26-40 years. The age distribution of respondents can be divided into four categories, namely respondents aged 26-40 years (52 percent), respondents aged 40-50 years (36 percent), respondents aged 51-60 years (11 percent), farmers aged 61-70 (1 percent).

This indicates that the corn farmers in the research area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages are at a productive age so it is possible for these farmers to work better, be enthusiastic, and have high motivation. While the respondents aged 50 years and over are relatively few. This is due to the age factor that is less able to carry out the tasks that must be done.

3.2. Education

The sample used in this study was 97 people who were randomly divided into 3 research areas, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages. Based on the age group received from the sample, most of the farmers are in the productive age, namely in the age range of 26-40 years, totaling 50 people, while the farmers in the age range of 60-70 years, there is only one person, the rest are farmers with the age of 40-60 years. It can be concluded that the three research areas are Bandar Jaya, Fajar Jaya, and Tanjung Agung Villages. Most of the

farmers are of productive age so they can improve welfare in the research area.

Table 4. Educational Levels in the Research Area

Education	Person	Percentage
Not-Finish School (0)	3	3%
Elementary School (6)	44	45%
Junior High School (9)	30	31%
Senior High School (12)	19	20%
S1/Diploma (16)	1	1%
Total	97	100%

Based on the research table, the majority of the sample farmers can only complete education at the elementary school level, this is not surprising considering that most educational facilities in the three research areas, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages, have very limited access needed to get to junior high school. and the high school is quite far from the village where the farmer lives.

3.3. Farming Experience

On average, farmers in the research area, namely in the villages of Bandar Jaya, Fajar Jaya, and Tanjung Agung, have 1-5 years of farming experience, this is because maize cultivation in the research area has only been introduced for a few years. Previously, most farmers cultivated rubber and other crops. Farmers who have long farming experience generally have more knowledge than farmers who have just started their farming business. So farming experience is one measure of a person's ability to manage an agricultural business. The more experienced, the more lessons learned in this field. The longer the experience of farming, the easier it is for farmers to make decisions related to the technical implementation of the farming they do.

3.4. Land area

Land status in the research area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages consists of privately owned land and leased land, the average farmer owns 1 to 2 ha of land per farmer, this can be seen in the table of percentage of farmers who own a land area of 1 -2 ha about 81 percent. For farmers who have large areas of land, of course, their farming activities will run as desired by the farmers so that they get large production results and vice versa. So in this case the narrow area of land controlled by farmers will affect the size of the economic income obtained by farmers. In addition, ownership status is also quite influential, farmers who have leased land must pay a land rental fee every corn harvest season, on average each farmer pays IDR. 1,000,000.00 for 1 Ha of rented land. So not only the area of land controlled but also ownership status affects the economic income earned by farmers.

3.5. Number of family dependents

The number of dependents of farming families 1-3 family members is 63 respondent farmers (65%), then 4-6 family members are 33 respondent farmers (34%), and only one farmer with dependents ranging from 7-10 people. This situation greatly affects the welfare of the family to increase corn production to meet the needs of the family. This is because the more members in the family, the more needs. Corn Farming Income in Bandar

Jaya Village, Fajar Jaya Village, and Tanjung Agung Village, Lengkiti District, Ogan Komering Ulu Regency

Farm production revenues include fixed and variable revenues. Fixed income is the result of multiplying the number of products sold with the unit price, while variable income is in the form of production that is not sold and is usually consumed by the farmers themselves. This income analysis also discusses fixed and variable farm costs. Variable costs are costs that are directly incurred by farmers. Fixed costs include all expenses that are not paid regularly but are included in costs.

Table 5. Average Corn Farming Income in the Research Area

No	Description	Value (IDR)
1.	Reception	
	Production (Tons)	5.73
	Price (Rp)	5,087.37
	Total Revenue (TR)	28,993,170.10
2.	Cost	
	<u>Variable Cost (TVC)</u>	
	Production Facilities	4,268,247.42
	Household Expenses	4,068,711.34
	Labor	4,917.608.25
	<u>Fixed Cost (TFC)</u>	
	1. Land Rent	1,115,979.38
	2. Equipment Depreciation Cost	942,139.18
	<u>Total Production Cost (TC) =</u>	
	TVC+TFC	15,312,685.57
3.	Revenue = TR – TC	13,680,484.53

Total corn production revenue in the Research Area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung villages was IDR.2,812,337,500.00/season with an average of IDR.28,993,170,10. The farmers' corn production is sold to collectors and traders who come directly to the corn collection point because the farmers in the research area sell all of their corn production.

The means of production for farmers who receive assistance and do not receive assistance for hybrid seeds from the government distributed by the Department of Agriculture of Ogan Komering Ulu experience a large difference. The seeds used in the research area on average were BISI 18, Pioneer 32, and NK Perkasa where if these seeds were purchased at the nearest store the price for BISI 18 reached IDR. 85,000.00/Kg, for Pioneer 32 it was around IDR 95,000.00/Kg and NK Perkasa of IDR. 100,000/Kg. The seeds used by farmers who receive seed assistance from the Department of Agriculture use the BISI 220 variety which is distributed to the Poktan head with an average land area of 25 Ha where the number of seeds distributed is around 375 Kg for 25 Ha. This means that one Ha is equal to 15 Kg.

3.6. The motivation of Corn Farmers in Implementing Hybrid Corn Innovation

Table 6 shows that the Chi-square value obtained is 7113 with a significance value of 0.524 ($0.524 > 0.05$), then accept H_0 , reject H_1 , meaning that there is no significant difference between the data and the predicted results of the logistic regression model, or the model can predict the observed value of the logistic regression model and the corresponding model.

Table 6. Results of the Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.113	8	.524

Table 7 shows the Nagelkerke R Square value of 0.514, this indicates that the ability of the independent variable to explain the dependent variable is 51.4% and the other 48.6% is explained by other variables outside the model.

Table 7. Test Results of Nagelkerke R Square

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	82.171a	.376	.514

The results of the omnibus test of the motivation of corn farmers in applying government-assisted hybrid seeds can be seen in Table 8.

Table 8. omnibus test of the motivation of corn farmers in applying government-assisted hybrid seeds

		Chi-square	Df	Sig.
	Step	45.783	4	.000
Step 1	Block	45.783	4	.000
	Model	45.783	4	.000

Table 8 shows that the Chi-square value obtained is 45.783 with a sig value of 0.000 < 0.05, so there is at least one independent variable that significantly affects the dependent variable in the logistic regression model.

Table 9. Wald Test Results

		B	S.E.	Wald	df	Sig.	Exp (B)
	X1	-.154	.113	1.855	1	.173	.857
	X2	.234	.051	21.140	1	.000	1.264
Step 1a	X3	-.016	.255	.004	1	.951	.984
	X4	-.614	.541	1.285	1	.257	.541
	Constant	-8.269	2.380	12.071	1	.001	.000

The significant value of the formal education variable is 0.173 where the significant value is greater than (0.173 > 0.1), then accept H0 rejects H1, meaning that the formal education variable (X1) does not affect the motivation of farmers to apply for government assistance hybrid seeds (Y). The insignificant relationship between formal education and the motivation of farmers to apply hybrid innovation which is government assistance shows that formal education does not affect the application of motivation because whatever the level of formal education of farmers, both those with low or high levels of education have the same opportunity to apply hybrid seeds which are assistance. government. This is the same as the research conducted by Apriliana [6] regarding the Analysis of Factors

Affecting Farmers' Decision Making in Using Hybrid Seeds in Corn Farming where the test results on the education variable have a negative effect.

From the above results obtained a significant value for the age variable of 0.000 where the significant value is greater than (0.000 < 0.1), then accept H1 rejects H0, meaning that the age variable (X2) affects the motivation of farmers to apply government assistance hybrid seeds (Y). This shows that the more productive or younger the farmers are, the higher the motivation for farmers to apply government-assisted hybrid seeds. Young farmers are more likely to adopt and accept hybrid seed innovations. This is the same as the research conducted by Listiana [7] on the Motivation of Farmers in Using Hybrid Rice Seeds in Natar District in South Lampung Regency where the age factor has a significant effect, this means that a person's age can have an impact on the way a person acts on the surrounding environment. applies in this study.

The significant value of the variable number of family dependents is 0.951 where the significant value is greater than (0.951 > 0.1), then accept H0 reject H1, meaning that the variable number of family dependents (X3) does not affect the motivation of farmers who apply government assistance hybrid seeds (Y). According to Hasyim [8], the number of family dependents is one of the factors that need to be considered in determining income in meeting their needs. A large number of dependents in the family will encourage farmers to carry out many activities, especially in finding and increasing their family income. The more the number of dependents in the family, the greater the opportunity to apply technological innovations. The results showed that the number of dependents of the respondent's farmer families at most was 7 people with a percentage of 1.03% or only 1 person out of 97 respondents. The minimum number of dependents is 1 person at 6.19%. While the most dominant number of dependents amounted to 3 people, namely 40.21%. These results indicate that the number of dependents in the family has no significant effect on the motivation of farmers in implementing hybrid seed innovation.

For the government policy variable, there is a significant value of 0.257 where the significant value is greater than (0.257 > 0.1), then accept H0 rejects H1, meaning that the Government Policy variable (X4) does not affect the motivation of farmers to apply government assistance hybrid seeds (Y). The results of this study showed that the respondents who considered the selling price of corn to be very cheap were 49 people, while those who thought that the price of corn was quite expensive were 48 people. This can be seen in the results of farmers' production, the lowest selling price of farmers among respondent farmers is Rp. 4,600,000.-/Kg while the most expensive price among respondent farmers is Rp. 6,100,00.-/Kg, while the average price is Rp. 5,087.37. This classification is divided into expensive with category 1 and cheap with category 2. This is the same as the research conducted by Apriliana [6] on the Analysis of Factors Affecting Farmers' Decision Making in Using Hybrid Seeds in Corn Farming where the test results on government policy variables affect negative. The same thing was also found in the research conducted by Habib [9] according to him, the government should conduct direct supervision and monitoring of the distribution of production facilities, such as fertilizers and superior seeds so that the scarcity of superior fertilizers and seeds does not often occur.

4. CONCLUSION

Based on the results and discussion on the performance and motivation of farmers in the use of government-assisted hybrid seed innovations, it can be concluded as follows: 1. The average income of farmers who operate corn farming in the research area, both farmers who use hybrid seed assistance from the government or not, is IDR. 13,680,484.53; 2. There is no significant difference in performance between farmers who use seed assistance from the government and farmers who do not use seed assistance from the government or by their seeds. There are only a few obstacles for farmers who receive seed assistance which are related to the problem of planting time and distribution of seed assistance. In addition to determining the selling price of the products, there is no significant difference because the determination of the selling price is determined by the collecting traders. 3. The farmer age variable has a significant partial effect on the motivation of farmers to use hybrid seeds from the government assistance in the research area, namely Bandar Jaya, Fajar Jaya, and Tanjung Agung Villages, Lengkiti District, Ogan Komering Ulu Regency. Meanwhile, the variables of education, family responsibilities, and government policies do not have a partial significant effect on the motivation of farmers to use government-assisted hybrid seeds in the research area.

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