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# PREFERENCES FOR THE USE OF SUBSIDIZED FERTILIZER AMONG RICE FARMERS IN NORTH INSANA DISTRICT, NORTH CENTRAL TIMOR REGENCY (CASE STUDY OF HUMUSU WINI VILLAGE)

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**ABSTRACT**

Humusu Wini Village is one of the villages in North Insana District, North Central Timor Regency, which uses subsidized fertilizers. The subsidized fertilizers used by farmers in Humusu Wini Village are Urea and NPK fertilizers. This study aims to determine the decision to purchase subsidized fertilizers, use of subsidized fertilizers, and preferences for subsidized fertilizers for rice farmers in Humusu Wini Village, North Insana District, North Central Timor Regency. This research was carried out in Humusu Wini Village from July 2022 to completion. The data collection method uses a survey method. The data analysis used was logistic regression analysis to analyze purchasing preferences and use of subsidized fertilizers in Humusu Wini Village. The results showed that the variables that significantly affected the purchase of subsidized fertilizer were land area, income, and knowledge. In contrast, the variables that substantially affected the use of subsidized fertilizer were land area and income.
**Keywords**: farmers preference; purchase; logistic regression; subsidized fertilize; usage

***ABSTRAK***

*Desa Humusu Wini merupakan salah satu desa yang berada di Kecamatan Insana Utara Kabupaten Timor Tengah Utara yang menggunakan pupuk subsidi. Jenis pupuk subsidi yang digunakan oleh petani di Desa Humusu Wini adalah pupuk Urea dan NPK. Penelitian ini bertujuan untuk mengetahui keputusan pembelian pupuk subsidi, penggunaan pupuk subsidi serta preferensi penggunaan pupuk subsidi pada petani padi di Desa Humusu Wini Kecamatan Insana Utara Kabupaten Timor Tengah Utara. Penelitian ini dilaksanakan di Desa Humusu Wini pada bulan Juli 2022 sampai selesai. Metode pengumpulan data menggunakan metode survei. Analisis data yang digunakan adalah analisis regresi logistik untuk menganalisis preferensi pembelian dan penggunaan pupuk bersubsidi di Desa Humusu Wini. Hasil penelitian menunjukan bahwa variabel yang berpengaruh nyata terhadap pembelian pupuk subsidi adalah variabel luas lahan, pendapatan dan pengetahuan sedangkan variabel yang berpengaruh nyata terhadap penggunaan pupuk subsidi adalah variabel luas lahan dan pendapatan.*

*Kata kunci: Preferensi pembelian, penggunaan, pupuk subsidi.*

## INTRODUCTION

The agricultural sector is one of the critical sectors in economic development both nationally and regionally (Harris *et al.*, 2018). Natural and climatic conditions provide excellent opportunities for people to do business in the agricultural sector. The food subsector is one of the farming subsectors that plays a vital role in meeting people's daily needs. The agricultural commodity that is the main food crop is rice. Increasing rice productivity cannot be separated from various supporting factors. Apart from land area, labor, and capital, one of the supporting factors for increasing rice productivity is fertilizer. Using fertilizer appropriately in terms of quantity, quality, price, and time will increase the quantity and quality of agricultural

products produced.

Darwis and Supriyati (2013) define fertilizer as an essential and strategic element in increasing production and productivity and as an inseparable part of the farming system. Fertilizer contains nutrients added to the planting medium to fulfill the nutrients plants need to maximize production results.

Fertilizer subsidies are intended to increase farmers' purchasing power for fertilizer to increase agricultural production. Apart from that, fertilizer subsidies aim to protect farmers from the impact of spikes in fertilizer prices, support efforts to improve farming income, prevent a decline in fertilizer use and fertilizer efficiency, prevent a decline in agricultural production capacity, and support efforts to strengthen food security. East Nusa Tenggara (NTT) Province is one of the provinces that receive subsidized fertilizer assistance with the amount of subsidized fertilizer allocated: Urea (tons) 27,598, SP-36 (tons) 2,120, Za (tons) 624, NPK (tons) 16,994 and Organic (tons) 1,211 (PT. PUPUK INDONESIA 2020). The subsidized fertilizer assistance was distributed again to 21 regencies/cities in the East Nusa Tenggara region.

North Central Timor Regency (TTU) is one of the districts that receive subsidized fertilizer with types of fertilizer, namely Urea, NPK, SP-36, ZA, and Organic fertilizer. Rice production results in TTU Regency with a land area (Ha) of 15,019, production results (Tons) of 40,668, and productivity (Kw/Ha) of 27.08 ( TTU Central Statistics Agency 2015).

North Insana District is one of the sub-districts in North Central Timor Regency, which has an area (land) of 53.84 Km $^2$ or 2.02% of the area of North Central Timor Regency. In developing the rice commodity, subsidized fertilizer can reduce the burden on society and affect rice production. In this case, it can be seen from the output of rice plants in North Insana District with a land area (ha) of 514, production (tons) of 1,681, and productivity (kg/ha) of 32.77 (TTU Central Statistics Agency 2015), the largest of which is occupied by Humusu Wini Village with an area of 15.34 km $^2$ or 28.49% of the area of North Insana District. Humusu Wini Village has 950 KKT with 4144 people spread across 24 RT (TTU Central Statistics Agency, 2018).

Subsidized fertilizer is an item that is constantly under supervision and is usually distributed to official fertilizer kiosks or through farmer groups in each village. There are requirements issued by the government that to obtain subsidized

fertilizer; farmers must be members of a farmer's group and have a Definitive Group Needs Plan (DGNP or RDKK in Indonesian terminology) as well as farmer cards so you can choose the type of fertilizer that the government has provided at the highest retail price (HRP). However, in the development of the rice commodity, there are several problems, such as the cultivation often needing more than optimal use of subsidized fertilizer from the user community and varying types of fertilizer and fertilizer prices, thus affecting farmers' income. Several studies at the same sub-districts in TTU regency imply that the effectiveness of the use of subsidized fertilizer can be seen from the four indicators, which are the criteria showing that indicators that are on time and in the right way are said to be quite effective and the right type and correct dose are said to be ineffective (Salukh et al., 2022; Koli & Joka, 2023). It is necessary to study farmers' preferences regarding purchasing subsidized fertilizer.

## METHODS

This research was carried out in Humusu Wini Village, North Insana District, North Central Timor Regency, in July 2022 until completion. ). In this research, the number of (KKT) in Humusu Wini Village was 512 members of 6 Farmer Groups with 20-40 people in each group. The sampling technique in this research used a purposive sampling technique, namely 150 respondents from each group totaling 25 people, consisting of the chairman, secretary, treasurer, and 22 members (Sugiyono, 2008). Data collection was carried out using a survey method. The data collected is in the form of primary data and secondary data. Primary data is obtained through direct interviews with respondents, in this case, rice farmers, based on previously prepared questions. Meanwhile, secondary data is obtained from data (BPS), the internet, and related agencies.

The first model analysis collected interview data, observation results, and appropriate documents for the research problem. Descriptive analysis was conducted to determine the general picture of rice farmers' fertilizer. The Likert scale measured attitudes, opinions, and decisions about fertilizer use. In contrast, logistic regression analysis was used to determine the influence of each factor in purchasing and using fertilizer on decisions about using fertilizer.

**Calculations to determine the influence of fertilizer purchasing factors on rice plants**

The respondent variable (Y) from the purchasing factor is 1 = using fertilizer on time, the right type, the correct dose, and the right price. The purchasing factor's respondent variable (Y) is 0 = not using fertilizer at the right time, type, dose, and cost. Meanwhile, the predicator (X) of the purchasing factor is: land area (X1), experience (X2), income (X3), Access to Information (X4), and 6 T: right price, correct type, right time, right place, correct quantity and exact quality (X5) then this equation shows that:

If Y = 0, rice farmers do not use subsidized fertilizer

If Y = 1, then rice farmers use subsidized fertilizer

The regression model used to calculate fertilizer purchasing factors with the model:

$$L1 = ln\left[\frac{Pi}{1-P}\right] = \beta o + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + e$$

Information:

L1 = Respondent variable (Yi) in this case, farmers' preferences in using subsidized fertilizer
Ln = Natural logarithm.
If Y = 1, then farmers use subsidized fertilizer
If Y = 0, then farmers do not use subsidized fertilizer
p = Probability (chance or possibility that it will happen)
β = Logit regression coefficient (change parameter X1-X5)
X1 = Land area (Ha/are)
X2 = Experience (Years)
X3 = Income (Rp)
X4 = Access information.
X5 = Knowledge 6 T (accurate type, quantity, time, price, place, and quality)
e = Error

**Calculations to determine the influence of preference factors for fertilizer use**

The use factor's respondent variable (Y) is 1 = Farmers use subsidized fertilizer. The use factor's respondent variable (Y) is 0 = Farmers do not use subsidized fertilizer. Meanwhile, the predictors (X) of the purchasing factor are Land area (X1), Experience (X2), Income (X3), Access to Information (X4), and the 4 Ts, namely proper method, type, time, and dose (X5). So this equation shows that:

If Y = 0, then farmers do not use subsidized fertilizer

If Y = 1, then farmers use subsidized fertilizer

The regression model used to calculate usage factors with the model:

$$L1 = Ln\left[\frac{pi}{1-pi}\right] = \beta o + \beta X1 + \beta X2 + \beta X3 + \beta X4 + \beta X5 + e$$

Information:
L1 = Respondent variable (Yi) in this case, farmers' preferences in using subsidized fertilizer
If Y = 1, then farmers use subsidized fertilizer
If Y = 0, then farmers do not use subsidized fertilizer
Ln = Natural logarithm.
p = Probability (chance or possibility that it will happen)
β = Logit regression coefficient (change parameter X1-X5)
X1 = Land Area (Ha/are)
X2 = Experience (Years)
X3 = Income (Rp)
X4 = Information Access
X5 = Knowledge of 4 T (Right way, time, type, and dose)
e = Error

## RESULT AND DISCUSSION

### Preferences for Purchasing and Using Subsidized Fertilizer in Humusu Wini Village

Fertilizer is one of the input materials in agriculture that supports the success of farming and can provide food security for the community in HumusuWini Village. Subsidized fertilizer is an agricultural input procured by the government at an affordable price, making it easier for people to buy fertilizer. According to Agnes Larasati (2022), the decision to use subsidized fertilizer reduced production costs by 5%.

The preference for purchasing subsidized fertilizer is the farmer's choice. The rice farmers who were research respondents in Humusu Wini Village had an average of low education, namely only at the elementary school level, which influenced farmers' knowledge in purchasing subsidized fertilizer. This is by Budianto et al. (2016), who stated that the level of education will affect the level of knowledge, attitudes, and skills of farmers, which will influence the pattern of their farming activities.

The preference for farmers to use subsidized fertilizer is the farmer's tendency or choice to use a fertilizer that has been purchased and will be used according to the size of the land and knowledge. Knowledge of accessing information is limited, so farmers rely on their experience in farming rather than following government dosage recommendations. This has dramatically influenced rice farming in Humusu Wini Village. This is supported by Akbar *et al.* (2018), who say that using urea fertilizer based on habit and experience will make the dosage used vary for each farmer, which affects production.

Based on the results obtained in the field, distributing subsidized fertilizer to diluent kiosks is often late and not by the planting season (late), which affects income and causes farmers to switch to buying non-subsidized fertilizer. This is supported by Ramlayana (2020), who stated that timely distribution of

subsidized fertilizer cannot be effective because there are often delays in distributing subsidized fertilizer to farmer groups.

**Factors Influencing Decisions to Purchase Subsidized Fertilizer in Humusu Wini Village**

Table 1. Results Analysis of Subsidized Fertilizer Purchase Preferences

| Variables | B | Sig | Exp(B) |
|---|---|---|---|
| Land Area (X1) | 0.034 | 0.005 α | 1,034 |
| Experience (X2) | 0.001 | 0.862 | 1,001 |
| Revenue (X3) | -0.026 | 0.028 α | 0.974 |
| Information Access (X4) | 0.008 | 0.509 | 1,008 |
| Knowledge (6T) (X5) | 0.113 | 0.014 α | 1119 |
| | **Chi-square** | **Sig** | |
| ***Omnibus Test*** | 18,792 | 0.002 | |
| ***Hosmer and Lemeshow Test*** | 16,811 | 0.032 | |
| ***Nagelkerke R Square*** | 0.190 | | |

Source*: Primary Data Processed 2022.* Information α = 0.05

**Model Goodness Test (Overall Model of Fit)**

In testing the model's goodness, it can be seen from the Hosmer and Lemeshow Test value. The Hosmer and Lemeshow Test value for purchasing subsidized fertilizer is 16,811, with a significant value of 0.032, smaller than α = 0.05. This shows that these variables partially influence the purchase of subsidized fertilizer, and it can be concluded that the model can be used for further analysis.

**Model Feasibility or Suitability Test (Omnibus Test)**

It can be seen from the Omnibus Test of Model Coefficients value to test the feasibility of the model. The Omnibus Test value for purchasing subsidized fertilizer is 18,792, with a significant value of 0.002, which is smaller than the significance level of α = 0.05. This shows that the independent or free variable really influences the dependent or dependent variable. It can be said that this model is suitable for predicting rice farmers' decisions in purchasing subsidized fertilizer in Humusu Wini Village, North Insana District.

**Nagelkerke R Square (Model Summary)**

In this analysis, the model's accuracy can be measured by the Nagelkerke R Square value, which will explain the ability of the independent variable to be the dependent variable. The Negelkerke R Square value in this model is 0.190 (19%), which shows that the independent variable can explain 19% of the dependent variable and that variables

outside the model can explain the remaining 81%. This identifies that the ability of the independent variables, namely land area, experience, income, Access to information, and knowledge, can explain the dependent variable, namely the purchase of subsidized fertilizer, by 19%, and the rest are other factor variables that were not used as research variables.

**Partial Test**

The partial test determines the influence of the independent variables: land area, experience, income, Access to information, and knowledge. These variables are measured using the Partial or Wald Test to determine the partial influence on purchasing subsidized (dependent) fertilizer.

**1. Land Area (X1)**

From the results of the data that has been analyzed, the independent variable land area has a significant value of 0.005, which is smaller than the significance level or α = 0.05, which has a real influence on rice farmers' decisions in purchasing subsidized fertilizer. The odds ratio value shows the magnitude of the impact for land area of 1.034, which shows that if there is an increase in one unit of land area, the opportunity for rice farmers to buy subsidized fertilizer will increase by 1.034 times compared to farmers with a smaller land area.

Large or narrow land will not influence farmers not to buy subsidized fertilizer because most farmers are more likely to buy subsidized fertilizer. After all, the price is cheaper than non-subsidized fertilizer. This aligns with research by Agung Budi Santoso (2015), which states that land area is inelastic to rice production in both the long and short term.

**2. Experience (X2)**

Based on the results of the data that has been analyzed, the independent variable experience has a significant value of 0.862, which is greater than the significance level α = 0.05 with an experience odds ratio value of 1.001, meaning that if there is an increase of one unit of experience in buying subsidized fertilizer, it will increase the chance of buying subsidized fertilizer by 1.001 times compared to rice farmers who have low experience. The research results show that experience has no real influence on the decision to purchase subsidized fertilizer because the price of subsidized fertilizer is low and affordable for farmers with low incomes. Hence, the experience does not influence the purchasing of subsidized fertilizer. This is supported by research by Oscardo Jason (2021), which

states that experience does not significantly affect consumer decisions when making purchases at PT. Cahaya Sejahtera Riau Pekanbaru.

**3. Revenue (X3)**

From the data that has been analyzed, the independent variable income has a significant value of 0.028, which is smaller than the significance level of α = 0.05. This shows that income influences the decision to purchase subsidized fertilizer for rice farmers in Humusu Wini Village. The magnitude of the influence can be seen from the income odds ratio value of 0.974. This means that for every additional income unit, the decision to purchase subsidized fertilizer will also increase by 0.974 times compared to farmers with small incomes. This is because the more significant the income, the greater the farmer can purchase subsidized fertilizer. This is supported by Teme (2020), who states that the income earned will influence a person's consumption and the number of purchases.

**4. Information Access (X4)**

From the results of the data that has been analyzed, the independent variable Access to information has a significant value of 0.509, greater than the significance level of α = 0.05.

This shows that Access to information only significantly influences rice farmers' decisions to purchase subsidized fertilizer in Humusu Wini Village. The magnitude of the influence is indicated by the odds ratio value of Access to information of 1.008, which shows that every additional unit of information obtained about subsidized fertilizer will increase the opportunity to buy subsidized fertilizer by 1.008 times compared to rice farmers who receive little information. The research results show that most rice farmers in Humusu Wini Village do not access information from the Internet because the means to access information regarding fertilizer availability still need to be expanded. Hence, farmers only rely on information from agricultural extension workers. This is in line with Nurunnisa *et al.* (2022), who stated that the majority of farmers in their farming do not use information facilities such as the Internet.

**5. Knowledge (6T) (X5)**

The independent variable knowledge (6T) has a significant value of 0.014, greater than the significance level α = 0.05. This shows that knowledge has a real influence on the decisions of rice farmers in Humusu Wini Village to purchase subsidized fertilizer. The magnitude of the impact is demonstrated

by the knowledge odds ratio (6T) value of 1.119, which shows that every time there is an increase in one unit of knowledge of rice farmers in buying subsidized fertilizer, the opportunity to buy subsidized fertilizer will increase by 1.119 compared to rice farmers who have minimal knowledge. The research results show that the information farmers obtain to improve their understanding comes from socialization organized by the government because socialization is the only information received directly. This aligns with Suharyono (2016), who stated the importance of socialization in introducing a program. Through socialization, there is interaction between farmers and related agencies, which can increase farmers' knowledge and achieve program objectives.

**Decision Factors to Use Subsidy Fertilizer in Humusu Wini Village**

In data analysis, several factors influence the use of subsidized fertilizer in Humusu Wini Village, including land area, experience, income, Access to information, and knowledge. Some factors have a real influence, and some have an insignificant impact. These factors can be seen in the following table.

**Table 2. Results Analysis of Preferences for Using Subsidized Fertilizer**

| Variables | B | Sig | Exp(B) |
|---|---|---|---|
| Land Area (X1) | -0.039 | 0.019 α | 0.961 |
| Experience (X2) | -0.001 | 0.871 | 0.999 |
| Revenue (X3) | 0.043 | 0.003 α | 1,044 |
| Information Access (X4) | 0.005 | 0.569 | 1,005 |
| Knowledge (6T) (X5) | -0.001 | 0.925 | 0.999 |
| | **Chi-square** | **Sig** | |
| ***Omnibus Test*** | 17,564 | 0.004 | |
| ***Hosmer and Lemeshow Test*** | 10,253 | 0.248 | |
| ***Nagelkerke R Square*** | 0.224 | | |

Source*: Primary data processed in 2022.* Information α = 0.05

**Model Feasibility Test (Overall Model of Fit)**

In testing the model's goodness, it can be seen from the Hosmer and Lemeshow Test value. The Hosmer and Lemeshow Test value from subsidized fertilizer is 10.253, with a significance level of 0.248. This significant value is greater than α = 0.05 (5%). This shows that these variables have a real influence on the use of subsidized fertilizer, and it can be concluded that the model can be used for further analysis.

**Feasibility Test or Model Suitability**

To test the feasibility of the model, use the Omnibus Test of Model Coefficients value. The Omnibus Test of Model Coefficients value is 17,564,

significant at α = 0.05 (5%). This shows that the independent variable or free variable can influence the dependent variable or dependent variable, which can be said that this model is suitable for predicting farmers' decisions to use subsidized fertilizer in Humusu Wini Village, North Insana District.

**Nagelkerke R Square (Model Summary)**

The model's accuracy in this research can be seen from the Nagelkerke R Square value to test the model's accuracy. The Nagelkerke R Square value for subsidized fertilizer is 0.024 (24%), which means that the independent variables can influence the dependent variable, and the remainder can be explained by variables outside the model of 76%.

**Partial Test**

The partial test determines the effect of the independent variables, namely land area, experience, income, Access to information, and knowledge, on the dependent variable.

**1. Land area**

From the results of the data analyzed, the independent variable land area has a significant value of 0.019, which is smaller than the considerable value α = 0.05 with an odds ratio (Exp B) value of land area of 0.961, which shows that every time there is an addition of one unit of land area, it will reduce the opportunity to use fertilizer. The subsidy is 0.961 times that of rice farmers with a narrow land area. The land area has a real influence on the use of subsidized fertilizer because farmers with large areas of land will seek certainty about their productivity and make preparations regarding their farming so that large areas of land require high levels of fertilizer use compared to narrow areas of land. This is supported by Nirzalin (2017), who states that the area of land owned by farmers is related to fertilizer needs. If the land owned is large, then the need for fertilizer is relatively more significant than narrow land.

**2. Experience**

The independent variable experience has a significant value of 0.871, which is greater than the significance level α = 0.05, meaning that experience does not influence rice farmers' decisions to use subsidized fertilizer. The magnitude of the impact is shown by the experience odds ratio value of 0.999, which shows that every additional unit of experience will reduce the chance of using subsidized fertilizer by 0.999 times compared to rice farmers with minimal experience. Farmer

experience shows the farmer's ability to do farming. The more experienced the farmer, the higher his knowledge of farming needs will be. Susilo (2015) and Laklo et al. (2022) stated that the higher the farmer's experience, the higher the farmer's response to using chicken feces as *bokashi* fertilizer.

**3. Income**

From the data analyzed, the independent variable income has a significant value of 0.003, which is smaller than the significance level α = 0.05, which means that income partially influences the rice farmers' decision to use subsidized fertilizer. The magnitude of the influence is shown by the income odds ratio value of 1.044, which shows that every additional unit of income will increase the opportunity to use subsidized fertilizer by 1.044 times compared to rice farmers with low incomes. Farmers in Humusu Wini use fertilizer according to land area and income. The greater the farmer's income, the greater the ability to use subsidized fertilizer. Adiyanti (2015) supports this, stating that high income increases users' interest in *e-money products.*

**4. Information Access**

Based on the results of the data that has been analyzed, the independent variable Access to information has a significant value of 0.059, which is greater than the significance level α = 005. The magnitude of the influence is shown by the odds ratio value of Access to information of 1.005, which shows that the more information rice farmers obtain, the more opportunities they have to use subsidized fertilizer. This will increase by 1,005 compared to rice farmers who received little information. Access to information does not partially influence rice farmers' decisions to use subsidized fertilizer due to the lack of ability of rice farmers to access information regarding the accuracy and dosage of fertilizer. Setiawati (2016) and Andriani *et al.* (2018) stated that farmers who can access information from the Internet have more references than farmers who have less ability to access the Internet.

**5. Knowledge (4T)**

Based on the research results analyzed, the independent variable knowledge (4T) has a significant value of 0.925, greater than the significance level α = 0.05, which means it has no partial effect on the use of subsidized fertilizer. The magnitude of the influence is shown by the knowledge odds ratio value of 1,649, which shows that every additional unit of knowledge

will reduce the opportunity to use subsidized fertilizer by 1,649 times compared to rice farmers with low knowledge. Knowledge does not partially influence farmers' decisions to use subsidized fertilizer due to farmers' lack of knowledge about the correct dosage, time, type, and method of using fertilizer. Therefore, the government needs to provide outreach through extension workers to help farmers know the proper dosage, method, type, and time so that they can get new information regarding the use of subsidized fertilizer. This is supported by Saadah *et al.* (2011), Saekoko & Joka(2023), and Haneloy et al. (2021), stating that agricultural instructors play a role in increasing farmers' knowledge of technology and new agricultural information to improve the welfare of farmers and their families.

## CONCLUSION

Based on the research results above, it can be concluded that:

1. The variables of land area, income, and knowledge partially influence rice farmers' decisions to purchase subsidized fertilizer, while the variables of experience and Access to information do not partially influence preferences for purchasing subsidized fertilizer.
2. Land area and income are the variables that partially influence rice farmers' decisions to use subsidized fertilizer. In contrast, experience, Access to information, and knowledge do not partially influence the use of subsidized fertilizer.

The variables that partially influence the preference for using subsidized fertilizer are the land area and income variables.

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