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Farmers Behavior in Allocation of Products and *Marketed Surplus* in Two Types of Land as the Basic Government Policy in Controlling Rice Supply In Banjar District

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Abstract. *Rice is basically a subsistence commodity. Farmers as producers also act as consumers. With an average ownership of 0.6 ha, most farmers in Indonesia cultivate rice to meet family needs, if there is an excess, that amount is marketed by farmers as a supply of rice to the community (marketed surplus). This study aims to identify and analyze what factors influence the size of the marketed surplus of rice on land types (A/B and C) in Banjar Regency. The analysis used to answer the purpose of this study is a different test and multiple linear regression models. Based on thecalculation t-student, it shows that the value of* t_{test} *(16.958) >* t_{table} *(2.00172) or sig. (0.0000) < real test level (α = 0.05). So it can be concluded that there is a significant difference between marketed surplus of rice farmers in tidal land type C and marketed surplus of rice farmers in tidal land type A/B. In tidal land type A/B, there are nine variables that have a significant effect on marketed surplus. The variables that have a significant effect are grain production, grain prices, non-farming income, season, number of family members, farmer's age, drying floor area & storage area, farmer education and land tenure. In tidal land type C, there are eight variables that have a significant effect on marketed surplus. The variables that have a significant effect consist of grain production, grain prices, non-farming income, season, number of family members, farmer's age, farmer's education and land tenure. While the variables that do not have a significant effect are the area of the drying floor & storage area, as well as the source of capital.*

Keywords: *Marketed Surplus, rice, banjar, t-student, regression*

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I. INTRODUCTION

As a basic need, rice is basically a subsistence commodity. Farmers as producers can also act as consumers. With an average ownership of 0.6 ha, most farmers in Indonesia cultivate rice to meet family needs, if there is an excess, that amount is marketed by farmers as a supply of rice to the community (*marketed surplus*).

But on the other hand, with the increasing and pressing level of household needs of farmers, some farmers will sell all their produce directly at harvest time. A system like this also allows farmers to directly receive*cash income*from farming, so that it can be immediately used to meet urgent household needs and result in a large *supply of* rice for farmers at harvest time and will ultimately affect the price level. rice in the output market.

Studies on *marketed surplus* or *marketable surplus* have been carried out for a long time, namely since the 1960s. The concepts of *marketable* and *marketed surplus are* usually attached to food or subsistence commodities, such as: rice in Asia, potatoes in Latin America, maize in India, and wheat and bananas in Africa. However there are few studies that examine theof *marketed* and *marketable surplus* non-food commodities are vegetables. However, this study did not find an in-depth description of *marketed* or *marketable surplus* vegetables due to limited access to information.

The dependence of farmers on middlemen is still very high. Farmers often borrow capital from middlemen so that farmers indirectly have an obligation to market their crops to these middlemen. Or, if farmers who have limited capital often sell their crops before the rice enters the harvest period.

Under these conditions, farmers no longer store their grain, but sell it entirely, while for consumption purposes, farmers can buy it from the market. So that there is a shift in the behavior pattern of farmers from saving some of their harvest to selling all of their harvest which can affect the supply of rice to the community. Supply of rice or rice will accumulate at certain times, namely at harvest.

Farmers still allocate some of their products for household consumption (Nusril and Sukiyono (2007), Kusnadi *et al* (2008) and Ellis *et al* (1992)). The proportion of the harvest shows the proportion of consumption

that varies, but is still below 10 percent of the total harvest. However, a larger proportion is shown in Siregar (1990). This is because the average area of land cultivated by farmers is under one hectare.

In addition, farmers are also still setting aside their harvest to be used as seeds in the upcoming planting season. Sadhu (2011) and Chaucan and Chabbra (2005) revealed that farmers still set aside their harvest for seeds. However, the seeds that are set aside are only limited to the needs of the land itself, so the proportion is still relatively small, namely 2 percent of the total production.

Storage or stock is also carried out by farmers (Ellis *et al*, 1992). It was found that farmers, especially rice farmers, still set aside their harvest for storage. However, this study did not explain in detail the use of the storage or stock, but only explained the amount of storage carried out by farmers in each season.

Excess or difference in consumption or harvest that is set aside with new production is sold by farmers (*marketed surplus*). The proportion of *marketed surplus* found is different in each study. A high proportion is shown by Kusnadi *et al* (2008), Ellis *et al* (1992) and Dwi (2007) which show that on average, rice farmers sell more than half of their production or gross harvest. Meanwhile, Siregar (1990) and Nusril and Sukiyono (2007) show that the proportion of farmers' sales is less than half of the total production. This is due to differences in the average area of rice cultivated by the farmers themselves. Aproportion of *marketed surplus* highis also found in vegetable commodities. Mehta and Chaucan (1996) in Sadhu (2011) and Praminik and Prakash (2010) revealed that the *marketed surplus of* vegetables in India reached more than 95 percent. This can be said to be reasonable, because vegetables are generally not the main food and their storage period is relatively short, so the amount of *marketed surplus* that appears can be high.

On the other hand, rice production in Banjar Regency is not only produced by rice fields with various types of land (A, B, C and D), this difference in land types has an impact on cropping patterns and rice cultivation technology. That has implications for the difference in yield and productivity of the rice produced. This difference can lead to differences in the characteristics of the behavior of the farmers themselves. With these differences, there is also different treatment from farmers in each farming pattern for their rice products so that it will have an influence on the *marketed surplus*.

Based on the previous description, in this study several factors can be investigated as an estimator of the *marketable surplus* of farmers' rice, both on land type A/B and land type C. Therefore, it is interesting to know how the factors affect thefarmers. *marketable surplus of* rice produced byfarmers and to know the form of selling rice production by farmers. It is hoped that this research can enrich insight and knowledge in relation to the *marketable surplus of* rice produced by farmers and the factors that influence the *marketable surplus of* rice.

In general, this study aims to identify what factors affect the *marketed surplus of* rice on land types (A/B or C) as a basis for determining policies to increase production and control the *supply of* rice or rice in Banjar Regency. In particular, the objectives of this study are: 1) to identify the behavior of farmers in lowland and upland rice farming patterns in allocating their products in Banjar Regency; 2) identify and analyze the factors that influence the amount of *marketed surplus* in rice farming patterns on land types (A/B or C) in Banjar Regency.

II. METHOD

determination of the location of the study was carried out*purposively*on two sub-districts in Banjar Regency which represented two types of land, namely Aluh Aluh Subdistrict representing A/B land type and Gambut Subdistrict representing C land type. The data used in this study were primary data. sourced from rice farmer households as the sample. Data was collected by interviewing the sample rice farmer households based on a questionnaire that was specially designed for this research.

The research focuses on primary and secondary data collection to analyze the relationship between the factors that affect the *marketed surplus* in land type land (A/B or C) as the basis for the government in determining policies to increase production and control the *supply of* rice or rice in Banjar Regency.

The data that has been collected is then analyzed further to obtain results that are used as answers to research problems. In answering the problem, descriptive and quantitative analysis methods are used.

Nazir (2003) defines descriptive analysis as a method in examining a group of people, an object, a set of conditions, a system of thought or a class of events in the present. The aim is to make a systematic, factual and accurate description, picture or painting of the facts, characteristics, and relationships between the phenomena being investigated. Descriptive method is used to explain the reasons for selecting farmers' decisions.

Quantitative and descriptive methods were used to find the allocation of farmers' harvests, seasonal patterns of *marketed surplus*, and the factors that influence the amount of *marketed surplus* farmers'. To analyze the allocation of crop yields, descriptive and tabulated methods were used. For the allocation of crop yields, the time span used is the last planting season (MT 2020). To compare seasonal patterns, a comparison of two seasons is used.

The model that is built is separated between the models of factors that affect the *matketed surplus of* paddy rice, tidal land type A/B and tidal land type C. This aims to see the differences in the factors that affect the *marketed surplus* of the two types of land so that it can be seen different characteristics.

To answer the objectives of this research activity, two analytical tools were used. The first analysis uses different test analysis and the second analysis tool uses multiple linear regression analysis.

Analysis of the factors that affect the amount of *marketed surplus* will be carried out using data from all respondents, then thefactor model is obtained *marketed surplus*. The model used is multiple linear regression. The significance level of the chosen variable is up to 15 percent because the variables used are socio-economic. Based on the available data, the equation model can be written as follows:

$Y=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+ b_7X_7 +b_8X_8+b_9X_9+b_{10}X_{10}+e_i$

Where :

Y = Number of products marketed (*marketed surplus*) (%)
X1 = Farmer's grain production (kg)
X2 = Price of grain/kg (Rp)
X3 = Income from outside farming (Rp)
X4 = season(dummy)
X5 = Number of Dependents Family (person)
X6 = Age farmers (year)
X7 = area where drying and storing Grain (m2)
X8 = Education farmers (years)
X9 = Status Tenure farmers(dummy)
X10 = Source Farming Capital (*dummy*) A

Summary of the relationship between research objectives, methods and analytical procedures from this research can be seen in the *Fish Bone diagram* following:

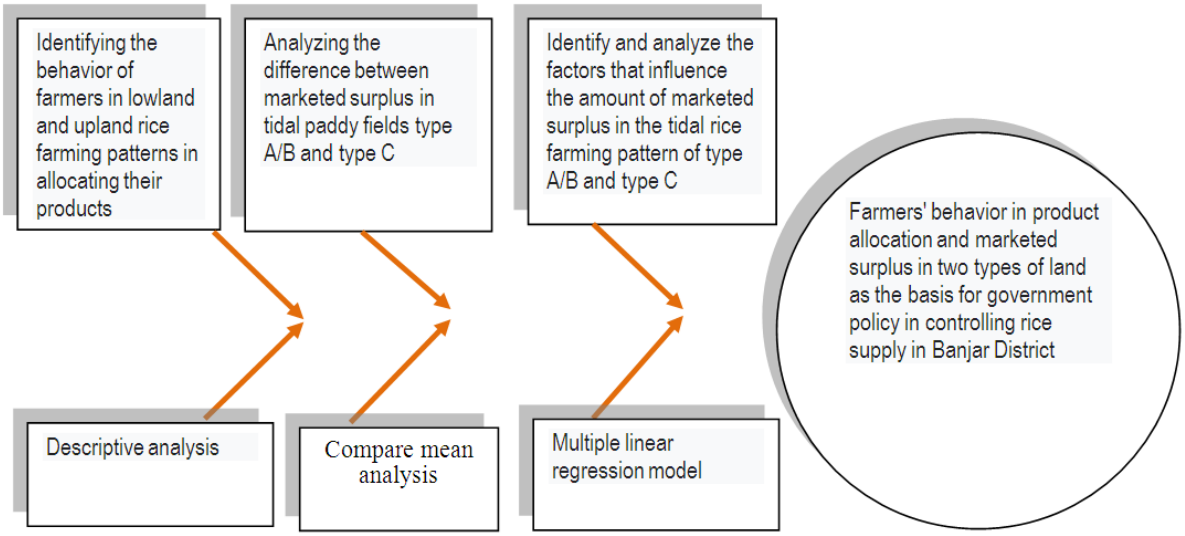

Figure 1. Summary of the Relationship between Research Objectives, Analysis Procedures and Research Goals (*Fish Bone Diagram*)

III. RESULTS AND DISCUSSION

3.1 Production Allocation Rice The

allocation of rice production seen from the research is the amount of consumption and the number of sales of farmers to the rice production. Based on the data produced, the average amount of grain consumed by farmers from production is 1,137.89 kg per household for farmers on tidal land type A/B, while the consumption set aside by farmers from production on tidal land type C is 1,005.42 per household. The amount of rice sales made by farmers has been deducted from consumption needs, which is 1,012.97 kg (45.94%) per household to rice farmers on tidal land type A/B, while rice sales made by rice farmers on tidal land type C of 2,067.25 kg (65.62%) per household.

Based on the calculation of the results of the different test (*t-student*) with an average value of *marketed surplus* of rice farmers on tidal land type C of 65.62%, while *marketed surplus* of rice farmers on tidal land of type A/B of 45.94%. The value of t_{test} = 16.958, is bigger than t_{table} = 2.0172 or *sig.* 0.0000 is smaller than the real test level ($\alpha = 0.05$), at df = 58. So it can be concluded that reject H_0, accept H_1 means that there is

a significant difference between *marketed surplus* of rice farmers on tidal land type C and *marketed surplus* of rice farmers in tidal land type A/B.

3.2 Factors Affecting *Marketed Surplus*

3.2.1 Grain

Production The grain production produced by farmers varies according to the area of the farm they cultivate. The grain production on tidal land type A/B, ranging from 910 kg to 4,200 kg, with an average grain production value of 2,150.87 kg / household. Meanwhile, grain production on tidal land type C, ranging from 1,300 kg to 6,000 kg, with an average value of grain production of 3,072.67 kg / household.

3.2.2 Prices of Grain

Farmers make sales at different times, because most farmers sell their grain to meet their daily needs. So the price at the time of sale is different for each farmer. Based on the tabulation of data, it is known that the lowest price of grain is Rp 5,100,-/kg to the highest Rp 7,500,-/kg. The average price of grain is Rp 6,431.67 / kg.

3.2.3 Income Outside Farming

As a form of farmer's business in meeting household needs, for farmers whose farm income is still insufficient for these needs, farmers and their household members do work outside of farming. The work outside his farm also varies, ranging from farm laborers, construction workers/builders, motorcycle taxi drivers, private employees, fishermen, and others. The average income obtained from outside the farm is Rp. 1,566,167,-/month, with the lowest income of Rp. 2,000,000.-/month and the lowest income of Rp. 800,000,-/month.

3.2.4 Season The

season starts the process of cultivating lowland rice farming in tidal lands of type A/B and type C, predominantly starting from the end of the year (November/December). The implementation begins to prepare seedlings (*taradak*), *ampak*, *trace* planting, maintenance, until harvest starting around August to September.

3.2.5 Number of Family Members

The more the number of family members, then there is a tendency to cause the demand for rice to increase as well. Based on the data tabulation, it is stated that the average number of dependents of rice farmer families in tidal land type A/B is around 3.73 (4 people), while rice farmers in tidal land type C are around 3.8 (4 people).

3.2.6 Age of Farmers

Normally, age is closely related to a person's physical condition in carrying out activities, in this case farming activities. If someone is in a position of productive age, which is between 16-50 years, it tends to provide maximum results in business activities. The average age of farmers who became research respondents on tidal land type A/B was around 43.73 years, while the age of farmers who became research respondents on tidal land type C was around 41.70 years.

3.2.7 Age of Farmers

Generally, the drying area used by farmers in the research area is in the form of tarpaulins or *mats* that are spread out in their yards, on road shoulders or even in paddy fields not far from their homes. The area of the drying area follows the size of the tarpaulin or *mat* owned by the farmer. While the rice storage area used by farmers is mostly in the room in the house, but the stored grain is put into sacks first, then placed in a closed room or room without a partition. The average area of drying and storage area calculated for rice farmers on tidal land type A/B is around 96.2 m^2, and on tidal land type C is about 86.8 m^2.

3.2.8 Farmer

Education Education is a process that forms a mindset for decision making, in this case decision making in the farming process. The number of respondent farmers in tidal land type A/B and type C with an average education ranging from junior high school graduates/equivalent and above is only 36.67%, while the rest are still below junior high school/equivalent.

3.2.9 Land Tenure

Status Farmers' land tenure status in tidal land type A/B is dominantly owned by 80% of farmers. Meanwhile, the land tenure status of farmers on tidal land type C, which is also dominant is self-owned land with a distribution of 76.67% of farmers.

3.2.10 Farming Capital

Sources The dominant source of farming capital comes from own capital, both on tidal land type A/B and type C. Based on the distribution of respondent farmers in tidal land type A/B and type C whose source of capital comes from their own capital as much as 83.33%. Most farmers are still hesitant to use other sources of capital other than their own capital, because there are still doubts for farmers to guarantee being able to repay the loan money from these other sources of capital.

3.2.11 Multiple Linear Regression Model

Table 1. Results of Multiple Linear Regression Calculation on the factors that affect *marketed surplus* rice in tidal land type A/B

Variable	Coefficient	t_{test}	*sig.*
Constant	-19.451	-2.619	0.017[a]
Grain production (in 100 kg) (X_1)	0.242	4.096	0.001[a]
Grain price (in 100 rupiah) (X_2)	0.700	6.284	0.000[a]
Income from outside farming (in 100,000 rupiah) (X_3)	- 0.596	-3.272	0.004[a]
Season (*dummy*) (X_4)	0.771	2.259	0.036[a]
Number of family members (persons) (X_5)	-0.403	-1.715	0.103[a]
Farmer age (years) (X_6)	0.168	1.639	0.118[a]
Area of drying & drying area storage area (m^2) (X_7)	0.042	1.726	0.101[a]
Farmer education (years) (X_8)	0.665	4.869	0.000[a]
Land tenure (X_9)	-1.234	-2.964	0.008[a]
Capital Source (X_{10})	-0.484	-1.175	0.254
R square (R^2) = 0.995 F_{test} = 376.097 ====> *sig.* = 0.000 F_{table} ($\alpha = 0.15$) = 1.71331 t_{table} ($\alpha = 0.15$) = 1.4814			

Source: Primary Data Processing, 2021

Based on the processing results of the multiple linear regression model in Table 1, it shows that the value F_{test} (376.097) is greater than the F_{table} (1.71331) or with *sig.* 0.000 is smaller than the real test level used of 15% ($\alpha = 0.15$), which means that the independent variables together have a significant effect on the dependent variable (*marketed surplus*). Besides the determination coefficient regression model also shows the considerable value which amounted to 99.5% ($R^2 = 0.995$), which means that the variation of *marketed surplus* (dependent) which can be explained by the variation of the independent variable that is equal to 99.5%.

Partially testing (t-test) conducted on each independent variable on the dependent variable with a real test level (15%), indicating that there are nine variables that have a significant effect on the *marketed surplus of* rice from farmers on tidal land type A/B , while only one variable has no significant effect. The variables that have a significant effect consist of grain production, grain prices, non-farming income, season, number of family members, farmer's age, drying area & storage area, farmer education and land tenure. While the variable that has no significant effect is the source of capital.

The regression coefficient of the variable grain production in tidal land type A/B shows a coefficient value of 0.242. This shows a positive relationship between grain production and *marketed surplus*. Where the increase in grain production by 100 kg, will increase thevalue *marketed surplus* by 0.242%.

The regression coefficient of the variable price of grain in tidal land type A/B shows a coefficient value of 0.700. This shows a positive relationship between grain prices and *marketed surplus*. Where the increase in the price of grain by Rp 100/kg, will increase the value of the *marketed surplus* by 0.7%.

The regression coefficient of the non-farming income variable on tidal land type A/B shows a coefficient value of -0.596. This shows an inverse relationship between non-farm income and *marketed surplus*. Where the increase in non-farm income of Rp 100,000/month, will reduce thevalue *marketed surplus* by 0.596%.

The regression coefficient of the seasonal variable in tidal land type A/B shows a coefficient value of 0.771. This shows a positive relationship between season and *marketed surplus.* Where if the season in which the implementation of farming begins at the end of the year (1), it will increase the value of the *marketed surplus* by 0.771%.

The regression coefficient of the variable number of family members of farmer households on tidal land type A/B shows a coefficient value of -0.403. This shows an inverse relationship between the number of family members and *marketed surplus.* Where the increasing number of family members by 1 person, will reduce the value of the *marketed surplus* by 0.403%.

The regression coefficient of the variable age of farmers in tidal land type A/B shows a coefficient value of 0.168. This shows a positive relationship between the age of the farmer and the *marketed surplus*. Where the increase in the age of farmers by 1 year, will increase the value of the *marketed surplus* by 0.168%. However, it should be noted that the respondent farmers in this study are predominantly in the productive age group.

The regression coefficient of the variables of drying area and grain storage area on tidal land type A/B shows a coefficient value of 0.042. This shows a positive relationship between the area of the drying area and the grain storage area and the *marketed surplus.* Where the vast increase in spot grain drying and storage area of 1 m^2, will increase the value of *marketed surplus* of 0.042%.

The regression coefficient of the farmer's education variable in tidal land type A/B shows a coefficient value of 0.665. This shows a positive relationship between farmer education and *marketed surplus*. Where the addition of education for 1 year, will increase the value of the *marketed surplus* by 0.665%.

The regression coefficient of the variable of land tenure status on tidal land type A/B shows a coefficient value of -1.234. This shows an inverse relationship between land tenure status and *marketed surplus*. Where if the status of land tenure is not self-owned (1), it will reduce thevalue *marketed surplus* by 1.234%.

The regression coefficient of the variable source of capital in tidal land type A/B shows a coefficient value of -0.484. This shows an inverse relationship between sources of capital and *marketed surplus*. Where if the source of capital is not from own capital (1), it will reduce the value of the *marketed surplus* by 0.484%.

Table 2. Results of Multiple Linear Regression Calculation on the factors that affect *marketed surplus of* rice in tidal land type C

Variable	Coefficient	t_{count}	*sig*.
Constant	-31.069	-2,159	0.044[a]
Grain production (in 100 kg) (X_1)	0.314	4,443	0.000[a]
Grain price (in 100 rupiah) (X_2)	1.088	4.841	0.000[a]
farm income (in 100,000 rupiah) (X_3)	- 0.768	-2.256	0.036[a]
Season (*dummy*) (X_4)	1.452	2.260	0.036 [a]
Number of family members (person) (X_5)	-0.645	-1.654	0.115[a]
Farmer age (years) (X_6)	0.283	1.536	0.141[a]
Area of drying area & storage area ($m^{2)}$(X7)	0.031	0.677	0.506
farmers Education (years) (X8)	1.161	3.886	0.001[a]
tenure (X9)	-1.157	-1.742	0.098[a]
Source of Capital (X10)	-0.539	-0.878	0.391

R square (R^2)	= 0.993
$F_{calculate}$	= 253.568 ====> *sig*. = 0.000
F_{table} ($\alpha = 0.15$)	= 1.71331
t_{table} ($\alpha = 0.15$)	= 1.4814

Based on the processing results of the multiple linear regression model in Table 2, it shows that the value F_{test} (253.568) is greater compared with F_{table} (1.71331) or with *sig*. 0.000 is smaller than the real test level used of 15% ($\alpha = 0.15$), which means that the independent variables together have a significant effect on the dependent variable (*marketed surplus*). Besides the determination coefficient regression model also shows the considerable value which amounted to 99.3% ($R^2 = 0.993$), which means that the variation of *marketed surplus* (dependent) which can be explained by the variation of the independent variable that is equal to 99.3%.

Partially, the test (t test) conducted on each independent variable on the dependent variable with a real test level (15%), shows that there are eight variables that have a significant effect on the *marketed surplus of* rice from farmers on tidal land type C, while which does not significantly affect only two variables. The variables that have a significant effect consist of grain production, grain prices, non-farm income, season, number of family members, farmer's age, farmer's education and land tenure. While the variables that do not have a significant effect are the area of the drying area & storage area, as well as the source of capital.

The regression coefficient of the variable grain production in tidal land type C shows a coefficient value of 0.314. This shows a positive relationship between grain production and *marketed surplus*. Where the increase in grain production by 100 kg, will increase thevalue *marketed surplus* by 0.314%.

The regression coefficient of the variable price of grain in tidal land type C shows a coefficient value of 1.088. This shows a positive relationship between grain prices and *marketed surplus*. Where the increase in the price of grain by Rp 100/kg, will increase thevalue *marketed surplus* by 1.088%.

The regression coefficient of the non-farming income variable on tidal land type C shows a coefficient value of -0.768. This shows an inverse relationship between non-farm income and *marketed surplus*. Where the increase in non-farming income by Rp. 100,000/month, will reduce the value of the *marketed surplus* by 0.768%.

The regression coefficient of the seasonal variable in tidal land type C shows a coefficient value of 1.452. This shows a positive relationship between season and *marketed surplus*. Where if the season in which the implementation of farming begins at the end of the year (1), it will increase the value of the *marketed surplus* by 1.452%.

The regression coefficient of the variable number of family members of farmer households in tidal land type C shows a coefficient value of -0.645. This shows an inverse relationship between the number of family members and *marketed surplus*. Where the increasing number of family members by 1 person, will reduce the value of the *marketed surplus* by 0.645%.

The regression coefficient of the variable age of farmers in tidal land type C shows a coefficient value of 0.283. This shows a positive relationship between the age of the farmer and the *marketed surplus*. Where the

increase in the age of farmers by 1 year, will increase the value of the *marketed surplus* by 0.283%. However, it should be noted that the respondent farmers in this study are predominantly in the productive age group.

The regression coefficient of the variable area of drying area and grain storage area on tidal land type C shows a coefficient value of 0.031. This shows a positive relationship between the area of the drying area and the grain storage area and the *marketed surplus*. Where the vast increase in spot grain drying and storage area of 1 m^2, will increase the value of *marketed surplus* of 0.031%.

The regression coefficient of the farmer's education variable in tidal land type C shows a coefficient value of 1.161. This shows a positive relationship between farmer education and *marketed surplus*. Where the addition of education for 1 year, will increase the value of the *marketed surplus* by 1.161%.

The regression coefficient of the variable of land tenure status on tidal land type C shows a coefficient value of -1.157. This shows an inverse relationship between land tenure status and *marketed surplus*. Where if the status of land tenure is not self-owned (1), it will reduce thevalue *marketed surplus* by 1.157%.

The regression coefficient of the variable source of capital in tidal land type C shows a coefficient value of -0.539. This shows an inverse relationship between sources of capital and *marketed surplus*. Where if the source of capital is not from own capital (1), it will reduce the value of the *marketed surplus* by 0.539%.

IV. CONCLUSION

The conclusions from the results and discussion of this study :

1. The amount of rice sales made by farmers has been deducted from consumption needs, which is 1,012.97 kg (45.94%) per household for rice farmers in tidal land type A/B, while the sales of rice by rice farmers on tidal land type C is 2,067.25 kg (65.62%) per household.
2. The results of the analysis of the difference test show that there is a significant difference between the *marketed surplus* of rice farmers on tidal land type C and *marketed surplus* of rice farmers on tidal land of type A/B.
3. Based on multiple linear regression model on tidal land type A/B, the variables that have a significant effect on *marketedsurplus* riceconsist of grain production, grain prices, non-farm income, season, number of family members, farmer age, drying area & storage area. , farmer education and land tenure. While the variable that has no significant effect is the source of capital.
4. Based on the multiple linear regression model on tidal land type C, the variables that have a significant effect on *marketedsurplus* riceconsist of grain production, grain prices, non-farm income, season, number of family members, farmer's age, farmer's education and land tenure. While the variables that do not have a significant effect are the area of the drying area & storage area, as well as the source of capital.

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