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Determinants Decisions of Wetland Paddy Farmers Switch to Fishery at South Sumatera Indonesia

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Abstract: ***Determinant Decision of Wetland Paddy Farmers Switch to Fishery at South Sumatera Indonesia. This study aimed to analyze the factors that influence the farmer households in the conversion of wetland into fisheries and calculate how differences in income received by households of farmers from the conversion of paddy fields to fishery in East OKU Regency, at South Sumatera Indonesia. Research has been conducted in the month of January to May 2015. The location determination is done intentionally (purposive), in the district of East Buay Madang, East OKU regency with the consideration at that location, there were a lot of wetland paddy farmers do a lot of land conversion to fishery at South Sumatera Indonesia. The method used in this study is the survay method and sampling method used was multistage purposive random sampling. The population is taken at 302 farmers comprised 261 rice farmers who did land conversion to fisheries, 100 farmers were taken as the samples. The data used is primary data obtained directly from the field using a questionaire as a data collector and secondary data is data obtained from agencies involved in this study. Data processing was performed using logistic regression model to determine the factors that influence the conversion by rice farmers and t-paired test analysis to determine differences in farm income of paddy with fish. Based on the survey results revealed factors significantly influencing household farmers to land conversion of paddy to fisheries that income fish farmers (US$/ha/year), the number of family members and the amount of rice production (kg/ha) , The effect is not obvious is the level of education (year) and the age of the farmer (year). Having analyzed using the t-paired test analysis showed that t test on 17,149 sig 0,000. There was Rp.33.650.854 a year or Rp.2.750.000 a month between fish and paddy income. The fish income was Rp 75.439.619 per hectare per year bigger from the income of paddy was Rp 41.788.765 per hectare per year.***

Keywords: Decision Farmer Households, Land Transfer Function, Fishery

1. Introduction

The agricultural sector is a strategic sector and important role in the national economy and the survival of the community, particularly in the contribution to Gross Domestic Product (GDP), a provider of employment, and the provision of domestic food. Awareness of the role of causing the majority of people are still maintaining their agricultural activities. Various data indicate that in some developing countries over 75 per cent of the population are in the agricultural sector and over 50 per cent of the national income is generated from agriculture and almost all exports are agricultural materials (Ario, 2010).

Conversion of agricultural land in Indonesia is difficult to stop. Extensive land converted was not able to offset by extending through the opening of new rice fields. Productive land for food is also becoming a deficit. In addition, the prices of agricultural products in Indonesia, especially rice at farm level is very low priced, very different from the farmers in other countries such as Japan, Korea, Malaysia and allied countries. Stabilize the price of rice in the real of traditional farmers market prices will make farmers more prosperous and have the initiative to produce and improve productivity. At least no longer thought to land conversion because their primary needs are fulfilled (Nita, 2014).

Government of East OKU of South Sumatera create Regional Regulation (Perda) No. 7 of 2009 dated December 12, 2009 to tighten permit conversion of paddy fields to non-agriculture, people have a tendency to land conversion lowland rice fields, compared to maintain acreage fields for planted with rice, but this is a granary district in South Sumatra. It needs to be aware because if it is not anticipated early, it is not possible thousands of hectares of irrigated rice technical and rainfed previously harvested two to three times a year, it will be changed into the area of aquaculture, plantations and into settlements with permanent buildings. Within the last five years in the district of East OKU paddy land area decreased while the land area of fish has increased shows that dozens of hectares of irrigated fields of technical and rainfed land has changed into aquaculture. Farmed fish species are species of freshwater fish are catfish, tilapia, carp, and catfish captious. Where 1.233 people farming households cultivate tilapia is with total area of 337.88 hectares whose production 2032.69 tons. 296 households of farmers cultivating a goldfish with a land area of 79.87 hectares whose production is 430.10 tons. 192 households of farmers cultivating the land nag with 75.12 hectares whose production 430 tons. 1.995 people farm households cultivate catfish with total area of 268.58 hectares whose production 4890.66 tons. (UPTD Fisheries and Livestock East Buay Madang, 2014). Farmers in the district of East OKU more cultivate the kind of catfish than other fish species, although it takes longer farming but catfish are more resistant against diseases.

Liman Sari one of subdistrict of East Buay Madang, East OKU Regency, at South Sumatera Indonesia belonging to the most number of households catfish farmers, land area, and its production with the number of farming households as many as 278 people with total area of 119, 29 hectares and production of 1.51748 tons annually. The following table 1 peasant households land and catfish production at Subdistrict of East OKU, South Sumatera Indonesia 2014.

Table 1: Land area, Farmer Households, and production of catfish in East Buay Madang, East OKU, 2014

No .	Subdistrict	Catfish		
		Household	Land Area (Ha)	Production (Ton)
1.	Tanjung Mas	161	78,47	988,72
2.	Liman Sari	278	119,29	1.517,48
3.	Sumber Harjo	42	29,98	285,97
4.	Sumber Mulyo	19	17,56	259,25

5.	Bangun Harjo	17	15,87	201,54
6.	Karang Tengah	-	-	-
7.	Sri Katon	59	24,95	314,37
8.	Tanjung Sari	-	-	-
9.	Sumber Asri	8	2,56	32,51
10.	Sukamaju	-	-	-
11.	Suko Harjo	14	12,34	156,71
12.	Tekorejo	-	-	-
13.	Pengandonan	16	19,23	244,22
14.	Tambak Boyo	28	18,78	238,50
15.	Rejodadi	-	-	-
16.	Rowodadi	33	23,25	380,75

Source: Fisheries and Livestock East Buay Madang UPTD, 2014

The district of East Buay Madang is an area vulnerable to flooding because of the farm located in swampy areas. This causes rice farmers often suffered losses. Since the last 6 years many farmers in the area who do conversion of wetland into the fishery (majority at Liman Sari, and Tanjung). They assumed by switching functions, they are much more land be productive. The government's commitment of East OKU District, continue to make this area as an agricultural area or center crop. In accordance with law number 41 of 2009 on the Protection of Agricultural Land Husbandry (PLP2B) is set issue land use are among others mentioned, for those who would rather functions irrigated land technically one hectare must replace with new land of three hectares. Whereas if the rainfed one hectare converted shall be replaced by two hectares. While wetland that has been unproductive transformed to enable one hectare must be replaced with one hectare as well. To implement the provisions of article 26 and article 53 of Law No. 41 of 2009 on the Protection of Agricultural Land Husbandry (PLP2B), it is necessary to stipulate Government Regulation No. 1 of 2011 on the Determination of Transfer Function and Sustainable Agricultural Land. Even with such a rule made public in the district of East OKU land conversion continue in doing this was due to farmers' lack of knowledge about the rules of land use, lack of education and lack of traction on the local authorities regarding the rule. Land area over the function in East OKU has so far not so fast, but if allowed to continue the case may be the extent will increase. Based on the description above, researcher interest to study more about the Determination Factors of Wetland Paddy Farmers of Switching their land into fisheries at East OKU Regency, South Sumatera Indonesia.

2. Objectives and Purpose

Based on the above problems, the implementation of the study aims to:

1) To analyze the factors that influence farmers in paddy land conversion to fisheries.
2) To analyze the differences in income received by households of farmers of paddy land conversion to fisheries.

The results of this study are expected to be useful for:

1) For the writer to broaden primarily related to the factors that affect the rice crop land conversion into fisheries, and is useful as a reference for further research, especially within the same scope.
2) Provide information or consideration for farmers in making land use fields that having an optimal advantage.
3) Given this research, the farmers know the difference of revenue to be received when making land use fields to fisheries

3. Research Method

This research was conducted in the District of East Buay Madang, East OKU Regency of South Sumatera Province, Indonesia. The location determination is done intentionally (purposive) and collecting data on the location of the research conducted in January to May 2015.

The method used in this study is the case study method, and the sampling method used was multistage purposive random sampling.

The population is taken at 302 farmers comprised 261 rice farmers who did land conversion to fisheries. 100 farmers were taken as the samples from 2 subdistrict of East OKU South Sumatera Indonesia ie Tanjung Mas and Liman Sari, as the majority place whom the farmes did land conversion to fisheries.

Data collection methods used were observation and interviews by using questionnaires that had been prepared. The data collected in this study are primary data and secondary data. Primary data were obtained from the sample of farmers who perform conversion of wetland into fisheries using interviews aided by a questionnaire that has been prepared. Secondary data collected is the data monograph and topography as well as the District of service agencies associated with this research such as the Department of Agriculture, Fisheries and the Central Bureau of Statistics East OKU . To answer the first objective, which is to analyze the factors that influence farmers to land conversion from rice to fish, it can be analyzed using logit model approach with the formulas :

$$K = \underline{\log}\ \underline{Pi} = \log_{\beta 0} + \log_{\beta 1} PD + \log_{\beta 2} UP + \log_{\beta 3} TP + \log_{\beta 4} JAK + \log_{\beta 5} JP + u$$
$$1\text{-}Pi$$

Where:
K = 1 farmer's decision to switch the function of rice to fish, 0 if farmers do not switch Function
Pi = Opportunity farmer's decision (0 <P <1)
β0= Coefficient Estimates
β1- β5 = Parameter Estimates
PD = Income from Aquaculture (USD/ ha / yr)
UP = Age Farmers (yr)
TP = Level of Education (yr)
JAK = Number of Family Members
JP = Amount of Rice Production (Kg / ha / yr)

The accuracy of the model formulated in a manner known to perform statistical analysis of value-F by proposing hypotheses:
Fhitung = JK regression/(k-1) JK residual/(n-1)
Where:
K = Total Variable
n = Number of Observations Example
Decision Rule:

H0: βi ≤ 0
H1: βi> 0

When, Fhit ≤ Ftab decided to accept H_0, which means not significant explanatory variables jointly on farmer's decision to transfer the functions of rice the fishery.

When, Fhit> Ftab, it was decided to reject H_0 which means that the explanatory variables are jointly significant effect on the decision of rice farmers in conducting land conversion to fisheries.

To analyze the regression coefficients will simultaneously likelihood ratio test (chi-square test In the method OLS) that spread the chi-squared (X_2) using degrees of freedom to the hypothesis to be tested are as follows:
H0: β1 = β2 = ... βk = 0
H1: at least one βj = 0 (j = 1,2,3, ... k)

To answer the second objective, which is to calculate how big a difference the income of farmers after the conversion of wetland into the fishery. By doing the following calculation:

Rdi=TRpi-TCpi
TCpi=Yi.Ppi
TCi= TFi + TVi

Where :
Rdi = Revenue to i (fish,rice) (US$/ha/yr)
TRpi= Revenue Total to i (fish, rice) (US$/ha/yr)
TCpi= Total Cost of Production to i (fish,rice) (US$/ha/yr)
Yi = number of products marketed to i (fish, rice) (Kg/ha)
Ppi = Price Production to i (fish, rice) (USD/kg)
TCi = Total Cost to i (fish, rice) (US$/ha/yr)
TFi = Fixed Cost to I (fish, rice) (US$/ha/yr)
TVi = Variable Costs to i (fish, rice) (US$/ha/yr)

Furthermore, to know determinant variables which significantly determines the conversion of paddy rice farmers to fisheries done by the student's t-test tested the following hypotheses:

Value calculation formula used is:
βiT = where Se (βi) = √ (variant(βi)) Se (βi)

Where :
βi = partial regression coefficient for the independent variable to i
Se (βi) = The standard deviation of the independent variable to i

Decision Rule:
H0: βi ≤ 0
H1: βi> 0
If Thit> Ttab reject H_0.

This means that the partial explanatory variables significantly influence the dependent variable. Conversely, if Thit ≤ Ttab it was decided to accept H_0. This means that partially independent variables no effect or a significant difference.
And the second purposed of this research, to analyzed the difference between the paddy income and fishery using the t-pared test analysis.

4. Results and Discussion

Analysis of Determinants of Farmer Households Doing Land Transfer Function Rice to Fisheries. There are several determinants of farm households in conducting land conversion from rice paddy to the fishery is comprised of income from fish farming, age of farmers, farmer education, household size, and the amount of rice production

Table 2: Results of the logit regression coefficient estimates Farmers Decision in Determining the Transfer Function Rice to Fisheries

No	Variabel	Koefisien	Wald	Sig	Ket	α
1	Revenue of fish	3,353	2,933	0,087	*	0,1
2	Age Farmers	0,029	0,151	0,698	Tn	
3	Number of Family Members	0,410	2,786	0,095	*	0,1
4	Total production of rice	-0,228	5,695	0,017	*	0,05
5	Level of education	0,075	9,197	0,657	Tn	
	Constant	-23,969	3,266	0,071		

X^2 (Chi-square) = 70.894 with α = 0,05
R^2 (R-square) = 83,5
* = Significant
Tn = Not significant

Logit analysis results showed that the coefficient of determination (R^2) , which is 83.5 percent or 0.835 . This shows that 83.5 percent of the variation in choosing the farmer's decision to transfer the functions of paddy to fisheries can be explained by factors of income , number of family members , the amount of production , the level of education and age of the farmer . While the remaining 16.5 percent is explained by other variables not included in the research model . Statistically , the value of X^2 count of 70 894 with a p-value of 0.000, which is less than 0.05 α reject H_o , which is proven together five variables able to explain the determinants of farmers' decision in choosing to do the conversion of paddy to the fishery . Logit regression to the fishery. Logit regression equation for the results as follows:

$$Y = \text{Log}\left|\frac{Pi}{1-Pi}\right| = -23,969 + 3,353PD + 0,029UP + 0,075TP + 0,410JAK - 0,228JP + U$$

1) Revenues
The regression equation suggests that the effect of income amounted to 3,353 fish. If the higher income of farmers in the rupiah will increase the chances of farmer household decision to land conversion from rice paddy to fisheries by 3,353 times. Then, after the value of α can be tested in the real effect of 0.087 is smaller than the value of α = 0.10. Revenue significantly affect over function fields to fishing because of the revenue that the fish farmers is greater than the rice farmers and fish selling price is higher than the selling price of rice, so that the income of fish farmers will increase and will influence household decisions rice farmers to undertake conversion lowland rice paddy fields to fishing.

2) Age Farmers
The regression equation suggests that the effect of age of farmers amounted to 0,029. Increasing age of farmers in one year it will increase the chances of household decisions farmers in paddy land conversion to fisheries amounted to

0.029 times. Then after the test on the value of α can be as big as 0.689, which means no significant effect on the farmer's decision. According to circumstances on the ground that the rice farmers who do land conversion on average 52 years older than rice farmers who do not switch that is with an average age of 51 years.

3) Level of Education

The regression equation suggests that the education level of farmers to influence household decisions rice farmers to fisheries 0.075. If the farmer the higher education one year the chances of farmer household decision to land conversion from rice paddy to the fisheries of 0.075 times. Then after the test on the value of α can be as big as 0.657, which means no significant effect on the farmer's decision. In accordance with the facts shows that farmers field samples with the highest education is elementary school, so the effect of education level does not significantly affect the farmer's decision to switch from rice farming.

4) Number of Family Members

The regression equation suggests that the effect of the number of family members to the household decisions rice farmers to fisheries is 0.410. The more the number of farm families one person it will raise the chances of farmer household decision to land conversion from rice paddy to fisheries by 0.410 times. Then after the test on the value of α can significantly at 0.095 less than the value α = 0.1. This shows that the factor of the number of family members significantly affected rice farmers in the decision to transfer the functions to fisheries. With the increasing number of families, the more dependent on subsistence farmers, farmers can view and compare the benefits they will get when they perform conversion of paddy fields into fish and see losses if they do not perform conversion of wetland into the fishery.

5) Amount of Rice Production

The regression equation suggests that the effect of the number of production on household decisions rice farmers to fisheries is -0.228. If the amount of rice production increased by one kilogram, the lower the chances of farmer household decision to land conversion from rice paddy to the fisheries of -0.228. Then after the test on the value of α can significantly by 0,017 less than the value of α = 0.05. This shows that rice production factors significantly affected rice farmers in the decision to transfer the functions to fisheries. The amount of rice production per hectare is much higher than the number of fish, however, but the price is much more expensive than rice prices.

Having analyzed using the t-paired test analysis showed t test 17,149 with sig 0,000 and there was difference income about Rp.33.650.854 per year or Rp. 2.750.000 a month. The fish income of Rp 75,439,619 per hectare per year bigger from the income of paddy Rp 41,788,765 per hectare per year.

5. Conclusion

Based on the analysis of the research conducted, it can be concluded as follows:

1) Factors that significantly influence the farmer households in the conduct of paddy land conversion to fisheries that fish farmers' income (US$/ha /yr), the number of family members, and the amount of production (kg/yr). The effect is not obvious is the level of education, and the age of the farmer.
2) The amount of the average income earned total domestic rice farmers who did land conversion is Rp 41,788,765 per hectare per year and the average total income of rice farmers who do fish to land conversion is USD 75.439.619 per hectare per year. Having analyzed using the t-pared test analysis showed that t test was 17,149 with sig 0,000 and there was difference income about Rp.33.650.854 per year or Rp. 2.750.000 a month. The fish income of Rp 75,439,619 per hectare per year bigger from income of paddy rice was Rp 41.788.765 per hectare per year.

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