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The Partnership Pattern between Farmers in the City of pagaralam with PT. Indofood Fritolay Makmur on Atlantic Potato Farming (Solanum tuberosum L.)

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Abstract: *The objective of this study was to describe the partnerships pattern between farmers in the City of Pagar Alam with PT. Indofood Fritolay Makmur on Atlantic potato farming, then to analyze the factors that influence the decisions of farmers to form partnership with PT. Indofood Fritolay MakmurThe method used in determining respondents was the proportionate stratified random sampling method for the farmer sample of 64 partner farmer respondents and 64 non-partner farmer respondents. The data used were primary data and secondary data. Data were analyzed using binary logistic regression.The results showed: the partnership pattern between farmers and PT. Indofood Fritolay Makmur is operational cooperation in agribusiness and factors that significantly influence the decisions of farmers to form partnership with PT. Indofood Fritolay Makmur is a factor of income, area ofarable land, total dependent family and price.*

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I. Introduction

Potatoes *(Solanum tuberosum L.)* are the fourth major food crop in the world after wheat, corn and rice, and make potatoes an important food commodity of high economic value so that they receive priority development from the government. Indonesia's potato productivity is still relatively low, which is 13 tons / ha, far from the standard productivity potential that can reach 40 tons / ha. Such as the United States of America which reached 20 tons / ha, Australia 50 tons / ha and Japan 31.7 tons / ha (Muhibuddin, 2016).

Furthermore, according to Muhibuddin (2016), the conditions above illustrate that Indonesian potato farmers still have several problems including weak cultivation systems, high pest and disease attacks due to OPT and low mastery of production technology.

Improvement of potato farming is a priority, one of which is by intensifying improvements in seed quality that can increase production. Seedling conditions in Indonesia are still very low due to mosaic and leaf roll virus infections carried by seedlings so that domestic potato seedlings can only be used up to the second generation, while the use of superior seeds requires almost double the cost (Sunaryo, 2007).

Partnership is one of the solutions in helping farmers to improve potato farming. The partnership is realized with its main mission to help solve the problem of inequality in business opportunities, income inequality, inequality between regions and inequality between cities and villages and the quality of products produced (Harsiman, 2017).

One company that is intensifying efforts to increase potato production is PT. Indofood Fritolay Makmur (PT. IFM). It is a potato processing company that has carried out partnership programs with farmers in Indonesia, by providing farmers with superior seeds of certified Atlantic potatoes. In addition, partner farmers received price (market) certainty from partner companies for the yield produced (Rihi, 2014).

According to a survey conducted in the city of Pagar Alam, the partnership carried out by PT. Indofood Fritolay Makmur has increased the number of partner farmers, because with the partnership with PT. Indofood Fritolay Makmur can contribute to market certainty, price determination, and technical guidance for partner farmers.

With the existence of PT. Indofood Fritolay Makmur, it is expected that partner farmers can estimate the income they will obtain before the harvest period. Unlike the non-partner farmers who sell potatoes at prices that fluctuate according to the demand for potatoes in the market so that their income is adjusted to the price of potatoes.

Therefore researchers interested in examining the implementation of partnerships between farmers in the city of Pagar Alam and PT. Indofood Fritolay Makmur, and what factors influence the decisions of farmers to form partnership with PT. Indofood Fritolay Makmur.

II. Material And Methods

Time and Place

This research was conducted in the City of Pagar Alam, South Sumatra, Indonesia. The location was determined intentionally or *purposively* , with the consideration that in the City of Pagar Alam there are potato farmers who have partnership with PT. Indofood Fritolay Makmur. This research was conducted in June 2019 until August 2019 .

Research Method

The research method used was a survey method, this research method took samples from the population using a questionnaire as a primary data collection tool in the form of questions for completeness of data in the research process and direct interviews (Noor, 2016).

Determining Location Method

The sampling method used was the proportionate stratified random sampling method. The City of Pagar Alam, South Sumatra, Indonesia was chosen on the basis that the city was selected city for the development of the *Atlantic* potato commodity through a partnership program with PT. Indofood Fritolay Makmur since 2017. Total of potato farmers chosen to be sample was 128 people, consisting of 64 partner potato farmers and 64 non-partner potato farmers. The potato farmers sampled were expected to be able to describe the population as a whole. This study was also use a key informant namely Agrofield PT. Indofood Fritolay Makmur. This key informant was asked for information as the partner company

Data Collection Method

Data collection method was by collecting the primary and secondary data. Primary data obtained through questionnaires, observations, and direct interviews while secondary data were used to strengthen the findings and complement the information that had been collected in the field.

Data Processing and Analysis Method

The data obtained from the field presented in tabulation and continued with mathematical calculations and descriptively explained in the discussion. Descriptively analysis to describe the partnership pattern between potato farmers in the City Pagar Alam and PT. Indofood Fritolay Makmur. Some of the variables studied and analyzed descriptively including: performance of Atlantic potato farming, fartnership implementation, the partnership pattern carried out by the partner potato farmers with PT. Indofood Fritolay Makmur, benefits of partnerships for farmers and companies and roblems or obstacles that occur in the implementation of partnerships

To answer the second objective about factors affecting farmers' decisions in partnership with PT. Indofood Fritolay Makmur using quantitative methods of logistic regression analysis (binary logistic regression*)* with the formulation Valentine (2017):

$$Yi = \frac{e^{\beta 0+\beta 1x1+\beta 2x2+\beta 3x3+\beta 4x4+\beta 5x5+\beta 6x6}}{1+e^{\beta 0+\beta 1x1+\beta 2x2+\beta 3x3+\beta 4x4+\beta 5x5+\beta 6x6}}$$

Information:

P = opportunity of farmers to partner with PT. IFM
Y = 1 = farmers' decision to join partners
0 = farmer's decision not to join partners
β_0 = constant
X_1 = income (IDR / hectare / season)
X_2 = farming experience (year)
X_3 = area of arable land (hectare)
X_4 = number of dependents in the family (people)
X_5 = price (IDR)
X_6 = education (year)

Model testing criteria and parameter significance (Dewi, 2011):

-2 Log Likelihood Test

Used to assess the overall model. If the value of *log likelihood block number* = 0 is greater than the value of *log likelihood block number* = 1, it can be concluded that the regression model is good. And vice versa, if the value of *log likelihood block number* = 0 is smaller than the value of *log likelihood block number* = 1, then it can be concluded that the regression model is not good.

Hosmer Test and Lemeshow Test

H_0 : There is no difference between partner and non-partner farmers
H_1 : There are differences between partner and non-partner farmers
Decision making criteria:
H_0 : Accepted if probability > ($\alpha = 0.05$) which means there is no difference
H_1: Rejected if the probability < ($\alpha = 0.05$) means that there is a difference

W (Wald) Test

Wald test was used to determine the significance of the effect of the independent variable (X) partially on the dependent variable (Y), with hypothesis:
H_0 : Variable X has no significant effect on the variable Y
H_1 : variable X has significant effect on variable Y
Decision making criteria:
H_0 : Rejected if significant value < ($\alpha = 0.05$)
H_1: Accepted if significant value > ($\alpha = 0.05$)

III. Result

Partnership Patterns between Farmers in the City of Pagar Alam and PT. IFM

Partnership run by farmers in the City of Pagar Alam with PT. Indofood Fritolay Makmur is the Agribusiness Operational Cooperation Pattern. Partner farmers provide land, production facilities and labor while the company provides Atlantic potato seeds, and cultivation guidance (technology). These partnerships are beneficial to both parties in which the companies get their raw materials of Atlantic potatoes, partners farmers received the price certainty, the market certainty, the seeds loan and training.

Analysis of Factors Influencing Farmers' Decisions to Partner with PT. IFM

Based on output of binary logistic regression, factors that significantly affect the decision of farmers in the City of Pagar Alam to partner with PT. Indofood Fritolay Makmur is income, arable land area, number of dependable family members, and potatoes price.

IV. Discussion

Background of the Partnership

Partnership between PT. Indofood Fritolay Makmur with farmers in the City of Pagar Alam is a CSR program from the company to empower small farmers. PT. Indofood Fritolay Makmur has a goal besides fulfilling the needs of factory raw materials, also increasing farmers' income through partnership programs. This partnership has been established since 2017. As a company that produces snack products from potatoes, PT. Indofood Fritolay Makmur does not choose carelessly the potatoes of its raw material for production. One of the potato varieties that is suitable for processing into snacks is Atlantic potato, because this potato has a lower water content and sugar content making it suitable for industrial needs. PT. Indofood Fritolay Makmur is required to provide Atlantic potato seeds with the best quality for partner farmers and will be paid after harvest, at a price of IDR 16.750/Kg. According to the results of interviews that have been carried out, in 1 kg of Atlantic potato seeds that are properly and correctly cultivated, it will get a yield of an average of 10 Kg - 11 Kg of potatoes.

Partnership implemented by PT. Indofood Fritolay Makmur provides benefits for both parties. The benefit for the company is the certainty of supply of raw materials. The benefit received by farmers are the certainty of a price of IDR 6.770/Kg, farmers get seed loan, and the ease of marketing. The obstacle faced by both parties is the weather. Uncertain extreme weather can hamper production, making production targets difficult to achieve. Other obstacle faced by the company is maintaining a commitment to partner farmers, because there are still some partner farmers who sendrejects yields . This promptsupply predictions to be inappropriate (both in quantity and time). While the problem that is often complained by farmers is the lack of capital for the cultivation of potato. The outline of the rights and obligations of the two parties to a partnership listed on the cooperation contract are as follows:

1. Partner Company Obligations
a. Provide Atlantic potato seeds to suit farmers' needs.
b. Buy partner farmers' crops in accordance with prices and quality standards that have been set and agreed upon together.
c. Providing technical guidance on cultivation or counseling to partner farmers
d. Pay compensation for yields to partner farmers after deducting seedling loans.
2. Obligations of Partner Farmers
a. Providing land both land owned or leased.

b. Returns the loan for seed capital
c. Farmers are obliged to use Atlantic potato seeds that have been given by the company as the cooperation contract
d. Selling the entire harvest to the company.
e. Farmers are prohibited from selling their produce to other parties
3. Partner Company Rights
a. Obtain all harvests from partner farmers according to standards and quality that have been set in good condition, not rotten, wet/dry, diameter 4-10 cm, not green and not hollow.
b. Supervise all production activities during the partnership activities starting from the planting process to the post-harvest process.
c. The company has the right to sort the yield.
d. Provide actions or warnings to partner farmers if there is a violation of the cooperation contract
e. Deduct farmers' income from their farm's harvest as payment for seedling loans in accordance with the specified amount / price.
4. Partner Farmer Rights
a. Get Atlantic potato seeds with the best quality.
b. Get technical guidance on cultivation or counseling from agrofield
c. Obtain a guaranteed price (IDR 6.770/kg) and a definite market from the company
d. Obtain the payment of the results of their farming (deducted by the loan of seeds received and in accordance with the specified price) from the company, with a period of 12 to 30 days after the yield is submitted to the company and passed the test.

Partnership Pattern

The partnership pattern implemented between PT. Indofood Fritolay Makmur with Atlantic potato growers in the City of Pagar Alam is a partnership pattern in the form of agribusiness operational cooperation. This partnership is included in the agribusiness operational cooperation pattern because, in this partnership activity, partner farmers provide land, production facilities and labor while the company provides Atlantic potato seeds , and cultivation guidance (technology). Partner companies also play a role as guarantor of the product market by increasing the added value of products through processing and packaging into potato chips. Based on this mechanism, there is a division of responsibilities from each partner which mutually beneficial, the partner company is benefited by the certainty of raw materials supply and farmers benefit from the sale of their products with the availability of markets that are ready to accommodate their products, and the company is obliged to pay for products produced by farmers in accordance with the specified price and payment period . Chronology of cooperation on Figure No. 1:

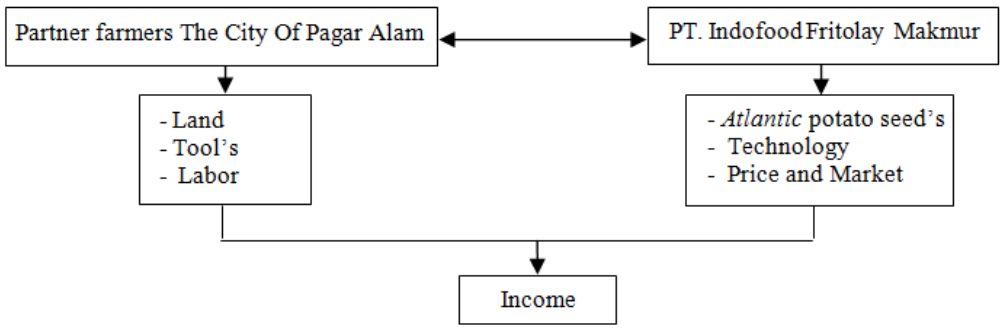

Figure No. 1. Cooperation Chronology of Partner Farmer in the city of Pagar Alam with PT. IFM

Analysis of Factors Influencing Farmers' Decisions to Partner with PT. IFM

Logistic regression analysis is used to test the factors that influence the decision of farmers to join the partnership. Independent variables that are considered influential on farmers decisions (Y) are income (X_1), experience of potato farming (X_2), arable land area (X3), total dependent family (X_4), price (X5) and education (X_6). Several criteria must be met for binary logistic regression analys is regarding the factors that influence the decision of farmers in the city of Pagar Alam in partnership with PT. Indofood Fritolay Makmur as follows:

Classification Table

Classification table is the SPSS output to estimate whether the regression model is correct with the actual conditions. Table No. 1 explained that the overall percentage regarding the decision of farmers to partner with PT. Indofood Fritolay Makmur has increased accuracy from 50.0% to 75.8%. This value indicates that the

model used is considered quite good because the logistic regression model is able to correctly estimate 75.8% of the conditions that occur in the study area.

Table No. 1 *Classification Table*

			Predicted		
			Decision		Percentage Correct
	Observed		Non-Partner Farmers	Partners Farmers	
Step 0	Decision	non-partner farmers	0	64	.0
		partner farmers	0	64	100.0
	Overall Percentage				50.0
			Predicted		
			Decision		Percentage Correct
	Observed		Non-Partner Farmers	Partner Farmer s	
Step 1	Decision	non-partner farmers	49	15	76.6
		partner farmers	16	48	75.0
	Overall Percentage				75.8

Test - 2 Log Likehood

Table No. 2 shows the difference in the value of -2 log likelihood step 1 to step 0. If there is a decrease in the value of -2 log likelihood step 1 to step 0 then the regression model is better. The value of -2 log likelihood in step 0 was 42,507 and the value of -2 log likelihood in step 1 was decreased to 16,221. So it can be concluded that the addition independent variablesof income, potato farming experience, arable land area, number of family dependents, prices, and education into the model will improve the model.

Table No. 2 Value - *2 Log Likehood Step* 0 and *Step* 1

Iteration		*- 2 log likehood*	*Constant Coeffcients*
Step 0	1	177,446	.000
Step 1	1	127,364	-19,244
	2	122,649	-28,165
	3	122,363	-31,079
	4	122,361	-31,317
	5	122,361	-31,319
	6	122,361	-31,319

Hosmer and Lemeshow Test

The Hosmer and Lemeshow test is used to estimate whether the regression model is sufficiently able to explain the data or the regression model matches the data. Based on Table No. 3 the results of the hosmer and lemeshow test obtained a chi square value of 4.015 with a significance value of 0.856. The significance value was greater than 0.05 which shows that at 95% confidence level, it can be believed that the logit regression model used was sufficient to explain the data or logistic regression model based on the data so that it can be further analyzed.

Table No. 3 Hosmer and Lemeshow Test

Step	*Chi-square*	Df	Sig.
1	4015	8	.856

W Test (Wald)

W test in Table No. 4 which is used to examine the effect of each independent variable on the dependent variable. Testing on each independent variable on the dependent variable is determined by the significance value. The significance value of < 0.05 which means it significant, indicating that the independent variable has an influence on the dependent variable.

Table No. 4 Variables in The Equation

	B	SE	*Wald*	df	Sig.	Exp (B)	Note
- Income	.054	.016	11,399	1	**.001**	1,055	A
- Potato farming experience	.018	.94	.036	1	.849	1,081	-
- The area of arable land	-2,230	1,136	3,853	1	**.500**	108	A
- Total dependent family	.757	.253	8,707	1	**.003**	2,132	A
- Price	.004	.001	9,277	1	**.002**	1,004	A
- Education	-0.31	.080	.152	1	.697	.969	-
Constant	-.031	9,067	11,931	1	**.001**	.000	A

Source: Analysis of Primary Data in 2019

Note: A = real on α: 5%, R^2 = 46.6%.

Based on Table No. 4 it was formulated by the binary logistic equation model as follows:

$$Yi = \frac{e^{-31.319+0.054x1+0.018x2-2.230x3+0.757x4+0.004x5-0.031x6}}{1+e^{-31.319+0.054x1+0.018x2-2.230x3+0.757x4+0.004x5-0.031x6}}$$

Income (X_1)

The analysis of logistic regression equation shows that the income variable (X_1) has a wald test value of 11,399 with a significant level of 0.001, which was less than the α 0:05 thus H_0 was rejected. It can be interpreted that the income variable significantly influences the decision of farmers to partner with PT. IFM at 95% confidence level. Regression coefficient value of 0.054 which means that the higher the income of potato farming, it will increase the decision of farmers to join the partnership by 0.54%. Value Odds Ratio which is exp (B) in the variable income of 1,055 showed that the potato farmers with higher incomes have a tendency to partner with PT. IFM 1,055 times greater than potato farmers who have lower incomes. The average partner farmer's income 106,265,602 IDR/ hectare/season, greater than the average non-partner farmer's income of 75,426,061 IDR/hectare/season with the difference in income between partner farmers and non-partner farmers amounting to 30,839,541 IDR/hectare/season

Arable Land (X_3)

The results of the analysis of the logistic regression equation showed that the area of arable land has a value of the wald test of 3,853 with a significant level of 0.050 which is equal to α 0.05 so H_0 was rejected. Thus it can be interpreted that the variable area of arable land does not significantly affect the decision of farmers to partner with PT. IFM at 95% confidence level. The value of the regression coefficient was -2.230 indicates that each addition to land area, it will reduce the decision of farmers to partner with PT. IFM at percentage of 22.3%. Value Odds Ratio which is exp (B) in the arable land variable of 0.108 indicate that the potato farmers with larger arable land area have a tendency to not partner with PT. IFM 0.108 times more than potato farmers who have smaller arable land area. The agricultural land area will affect the scale of the business and ultimately affect the efficiency of the business. The more extensive the agricultural land, the less efficient the land, because the thought to work the land efficiently will decrease. Conversely, in a narrow area, efforts to control the use of production factors will be better so that it is more efficient.

Total dependent family (X_4)

The analysis of logistic regression equation indicates that the number of dependable family members variable has wald test value of 8,970 with a significant level of 0.003, which means a smaller than α 0.05 thus H_0 was rejected. It can be interpreted that the number of dependable family members variable significantly influences the decision of farmers to partner with PT. IFM at 95% confidence level. The regression coefficient value of 0.757 indicates that each additional number of dependable family members will increase the farmer's decision to partner with PT. IFM with percentage of 75.7%. Value Odds Ratio which is exp (B) on the number of dependable family members variable with value of 2,132 showed that the higher the number of dependable family members, then the probability of farmers for partnership PT. IFM will increase 2,132 times than farmers who have a smaller number of dependable family members. The high number of needs and high expenditure resulted in farmers's need of higher income, which encourages farmers to partner with PT. IFM because they hopes to get a higher income to meet family needs.

Price (X_5)

The analysis of logistic regression equation indicates that the price variable has a wald test value of 9,277 with a significant level of 0.002 , which smaller than α 0.05 thus H_0 was rejected. It can be interpreted that the price variable has a significant effect on the decision of farmers to partner with PT. IFM at 95% confidence level. Regression coefficient of 0.004 indicates that each additional price will increase the decision of farmers to partner with PT. IFM at the percentage of 00.4%. Value Odds Ratio which is exp (B) at a price variable (X_5) of 1,004 showed that the offer of higher potato buying price from PT. IFM resulted in the

tendency of farmers to partner with PT. IFM 1,004 times than buying price in regular market which are lower and fluctuate following the market demand. From the research it was revealed that farmers are very worried about very sharp price fluctuations, so that the guarantee of price certainty is needed by farmers to do business.

Potato Farming Experience (X_2)

The analysis of logistic regression equations show that potato farming experience variable has the wald test value of 0.036 with a significant level of 0.849, which was greater than α 0.05. Thus it can be interpreted that the potato farming experience variable has no significant effect on the decision of farmers to partner with PT. IFM at 95% confidence level. The value of regression coefficient of 0.018 indicates that each additional potato farming experience , it will reduce the farmer's decision to partner with PT. IFM at the percentage of 0.18%. Value Odds Ratio which is exp (B) in the potato farming experience variable of 1,018 shows that the potato farmers with higher potatoes farming experience have a tendency to not partner with PT. IFM 1,018 times than potato farmers who have lower potato farming experience. The longer the farming experience possessed by farmers, the bigger farmers understanding in the advantages and disadvantages in the farm. Farmers who have longer farming experience tend to prefer to work individually / independently without collaboration / partnership with other parties.

Education (X_6)

The analysis of logistic regression equation shows that the education variable has a wald test value of 0152 with a significant level of 0.697, which was bigger than α 0.05. Thus it can be interpreted that the educational variable does not significantly affect the decision of farmers to partner with PT. IFM at 95% confidence level. Regression coefficient of -0.031 shows that every addition of education for 1 year, will reduce the decision of farmers to partner with PT. IFM at the percentage of 0.31%. Value Odds Ratio which is exp (B) on the education variables for 0.969 shows that the potato farmers with higher education have a tendency not to partner with PT. IFM 0.969 times more than potato farmers who have lower education. The education referred to in this study is formal education in school that is not directly related to the farming because it does not teach how to cultivate potatoes properly and correctly and does not teach decision making to partner or not to partner with certain companies.

V. Conclusion

Based on the analysis and description of the results of the research that has been done, several things can be concluded from the results of the study, including:

1. Partnership run by farmers in the City of Pagar Alam with PT. Indofood Fritolay Makmur is the Agribusiness Operational Cooperation Pattern. These partnerships are beneficial to both parties in which the companies get their raw materials of Atlantic potatoes ,partners farmers received the price certainty, the market certainty, the seeds loan and training.
2. Factors that significantly affect the decision of farmers to partner with PT. Indofood Fritolay Makmur is income, arable land area, total dependent family, and potatoes price

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