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THE IMPACT ON FARM PROFITS OF A COMPANY'S PARTNERSHIP WITH A POTATO FARM

The Case of the Partnership Between PT. Indofood Fritolay Makmur and Potato Farmers in Sembalun District, in the Province of West Nusa Tenggara

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ABSTRACT

This research aims to explain the impact of the partnership on potato farms' profits in Sembalun District, West Nusa Tenggara Province. To achieve this goal, we looked at 142 farmers, comprising of 111 partnered farmers and 31 non-partnered farmers. The conclusions from our profit function analysis were: (i) the partnership had a positive impact on potato farmers' profits in Sembalun District, West Nusa Tenggara Province; (ii) productivity, input costs, and labor costs had a significant influence on profits as an impact of the partneship. In this context, it is recomended that the local government encourage and facilitate potato farmers who have not yet established a partnership to enter such an arrangement with the company, so that their productivity and incomes increase. In addition, the local government is expected to build storage facilities for potato seeds. Future research should search for potato seeds that can replace the imported ones.

Keywords: *impact, partnership, profit, potato*

INTRODUCTION

Over the past 2 decades, economic liberalization has led to rapidly increasing activity in the agro-industry of developing countries. However these new opportunities favour the large-scale producers and marketers more than the smaller ones. Farmers with large areas of land, easy access to capital and market information find institutional support easily (Patrick, 2003: 3). Conversely, farmers with little land do not find it easy, and even become marginalized and excluded from the marketing of high-value agricultural and export oriented products, even though they can produce them (Drabenstott, 1995: 14).

This phenomenon indicates that the information among the actors in the agricultural sector is not perfect (imperfect information), whereas perfect information in neo-classic economic theory is a prerequisite for market equilibrium (Bates, 1995: 31; North, 1995: 17). Imperfections such as information are coupled with the uncertainty and high transaction costs that were assumed to be absent in neoclassic economic theory (North, 1995: 18). Therefore, in an effort to overcome these problems, the presence of institutions in such things as agricultural partnerships becomes very important (Grosh, 1994; Key and Runsten, 1999). White (1997) defines agricultural partnerships (contract farming) as a way to organize agricultural production, where small farmers (outgrowers) are contracted by a company to supply agricultural crops in accordance with the terms specified in a contract or agreement.

The motivation for the actors in such partnerships (contract farming) is basically the same, namely to minimize risks and optimize profits. For companies, the motivation to partner primarily is to avoid uncertainty in the supply of the raw materials they need, from the production and action of speculators in the free market. For

farmers, involvement in contract farming reduces the risk of uncertainty in the marketing of their products (Kirsten & Kurt Sartorius, 2002). In addition to securing a market, the farmers who participated in the partnership are provided with credit for production inputs such as seeds, fertilizer and pesticides by the partner companies who will be repaid after the harvest.

Several empirical studies demonstrate the impact of partnerships in agriculture, these partnerships may increase the production and income of farmers as a result of the use of new technologies, a reduction in transportation costs and in marketing costs. Warning and Key (2000) indicated in the results of their research in Sinegal that small farmers participating in a partnership involving peanut production received higher incomes than those who did not participate. Similarly, Winter, et al. (2005) from the results of their studies on the evaluation of hybrid corn seed contracts between the farmers and an American multinational company in East Java concluded that partnerships have a significant effect on the revenue of farmers, the allocation of labor utilization, and the cost of chemical inputs such as pesticides, herbicides, and fertilizers. On the allocation of household resources usage and the use of chemical inputs, Singh (2002) from the results of his research in the Indian Punjabi agricultural sector concluded that the partnership had a positive impact on household resource use, in particular the allocation of household labor and the increasing intensity of the use of chemical inputs for agricultural production.

Empirical studies of the impact of agricultural partnerships have also been carried out by Tatlidil and Akturk (2004) which focused on the comparative analysis between contracted and non-contracted farmers in the production of tomatoes in Biga District, Canakkale Province, Turkey. The research found that: (i) the contracted farmers use more inputs of seeds and chemical fertilizers than non-contracted farmers, (ii) their cost of production per unit of output is lower than that of non-contracted farmers, and (iii) the net profit of contracted farmers is 19 per cent higher than non-contracted farmers. The same conclusions have been found by Hamidi (2010), who focused his studies on the impact of partnership on the profits of Virginia tobacco farmers in Lombok Island. Hamidi found that: (i) the partnership had a positive impact on profits, (ii) the level of productivity, the price of tobacco, the price of fertilizer inputs of NPK, KNO, pesticides, labor, kerosene, and interest rates all have a significant effect on profits as a result of the partnership.

Meanwhile, empirical studies on the impact of partnerships on the profits of potato farmers using a profit function model are very limited. Previous studies focused more on the marketing aspects, as was done by Adiyoga, et al. (2006) who examined the integration of the potato market in some major cities acting as consumption centers (Bandung, Jakarta, Medan, Singapore), the marketing of seed potatoes in West Java (Bachrein, 2004), and the pattern of distribution of potatoes in Bandung, West Java (Agustian and Mayrowani, 2008). It was on the basis of this existing limited research related to the impact of partnerships on the profits of potato farmers that this research was conducted. In addition to the above reason, potatoes became of concern to this study because they are a horticultural commodity that has a very high growth demand. Data from the Ministry of Agriculture (2012) showed that the demand for potatoes rose from 572,342 tons in 1992 to 1,318,690 tons in 2012. The increase in demand cannot be satisfied by domestic production, so potatoes must be imported. In 2005 the import of potatoes from the USA, Canada, Australia, New Zealand, the Netherlands and Germany reached 2,864 tons, and increased to 4,069 tons in 2007. The District of Sembalun was nominated as a research location because it had become one of the top 10 potato producing regions in Indonesia, and the central production point for seed potatoes that are free from the disease Sis Yellow Nematode (PCN).

The presence of PT. Indofood Fritolay Makmur to partner with the potato farmers in the district of Sembalun is expected to significantly increase the benefits for the potato growers. The problem is, is it true that such partnerships can

increase profits for farmers who run potato farms? If true, does productivity, the cost of capital input and labor costs affect the profits as a result of the partnership? Specifically, this study aims to (1) analyze the impact of these partnerships on the benefits for potato farmers in the district of Sembalun, West Nusa Tenggara Province; (2) analyze the effects of factor productivity, capital input cost, and labor cost on profit as a result of the partnership.

THEORY

Partnership (contract farming) originated from the new institutional economic theory or the New Institutional Economics (NIE), that was created to overcome the problem of market failure caused by asymmetric information and other factors that affect transaction costs (Grosh, 1994; Key and Runsten, 1999). Market failure is mentioned by Kirsten and Sartorius (2002) in that agribusiness companies know more information about production technology and input-output markets than farmers do.

In the analysis of the impact of partnerships in this study the Cobb-Douglas profit function was applied. Lau and Yotopoulos (1973) in Sadoulet (1995: 245), stated that the profit function can be derived by using the technique of Unit Output Price Cobb-Douglas Profit Function (UOP-CDPF), with the assumption that producers maximize profits more than satisfaction. UOP-CDPF is a function which involves the production and production factors that are normalized by the output price. Mathematically, profit maximization can be derived from the production function and cost function as shown by Nicholson (1998: 377).

For example, the production function for potato farming is:

$$q = \gamma X^{\alpha} Z^{\beta} \tag{1}$$

with, q = output quantity
X = quantity of the variable input
Z = quantity of the fixed input
γ = intercept (constante)
α and β = elastisity of output from input X dan Z

Cost function: $C(q) = vZ + wX$ (2)

v : capital rent for fixed input
ω : price of variable input

If and are prices of input and output, then profit function (π) becomes:

$$\pi(X,Z) = Pq - C(q)$$
$$= Pf(X,Z) - (\omega X) \tag{3}$$

With, π = profit
P = output price per unit

If $\omega = \omega$/P is the normalized price of variable input, then the equation (3) can be normalized with output so that the output Price Profit (UOP Profit) is as follows:

$$\pi/_{P}(X,Z) = Pq - C(q)$$
$$= Pf(X,Z) - (\frac{\omega}{P}X) \tag{4}$$

The primary requirement for maximizing profit is that the first derivative of the profit function equals zero.

$$\pi = P\gamma X^{\alpha} Z^{\beta} - \omega X$$

$$\partial\pi/_{\partial X} = \alpha P\gamma X^{\alpha-1} Z^{\beta} - \omega = 0 \tag{5}$$

$$\alpha P\gamma X^{\alpha-1} Z^{\beta} = \omega \tag{6}$$

$$X^{\alpha-1} = \left(\frac{\omega}{\alpha P\gamma Z^{\beta}}\right) \tag{7}$$

$$X^{*} = \left(\frac{\omega}{\alpha P\gamma Z^{\beta}}\right)^{\frac{1}{\alpha-1}} \tag{8}$$

Equation (8) indicates that the quantity of input that needs to be provided for profit maximizing depends on the output price, input prices, and fixed input Z. By substituting the equation (8) with (1) optimum output (q*) is gained as follows:

$$q = \gamma X^{\alpha} Z^{\beta}$$

$$q = \gamma\left[\left(\alpha\gamma Z^{\beta}\frac{P}{\omega}\right)^{\frac{1}{1-\alpha}}\right]^{\beta} Z^{\beta}$$

$$= \gamma\left[\left(\gamma Z^{\beta}\right)^{\frac{1}{1-\alpha}}\left(\alpha\frac{P}{\omega}\right)^{\frac{1}{1-\alpha}}\right]^{\alpha} Z^{\beta}$$

$$= \gamma\left[\left(\gamma^{\frac{\alpha}{1-\alpha}}\right)\left(\alpha\frac{P}{\omega}\right)^{\frac{\alpha}{1-\alpha}} Z^{\frac{\beta}{1-\alpha}}\right]$$

$$= \gamma^{\frac{1}{1-\alpha}}\left(\alpha\frac{P}{\omega}\right)^{\frac{\alpha}{1-\alpha}} Z^{\frac{\beta}{1-\alpha}} \quad (9)$$

The equation (9) shows that the optimum output quantity produced to obtain maximum profit depends on output price, input prices, and Z. The formula is:

$$X^* = X^*(P, \omega, Z) \quad (10)$$

By substituting equations (8) and (9) into the profit function then maximum profit is:

$$= P\left[\gamma^{\frac{1}{1-\alpha}}\left(\alpha\frac{P}{\omega}\right)^{\alpha/1-\alpha} Z^{\frac{\beta}{1-\alpha}}\right] - \varpi\left[\gamma\alpha Z^{\beta}\frac{P}{\omega}\right]^{\frac{1}{1-\alpha}}$$

$$= P\left[\gamma^{\frac{1}{1-\alpha}}\alpha^{\frac{\alpha}{1-}}\left(\frac{P}{\omega}\right)^{\frac{\alpha}{1-\alpha}} Z^{\frac{\beta}{1-\alpha}}\right] -$$

$$\omega\left[\gamma^{\frac{1}{1-\alpha}}\alpha^{\frac{1}{1-\alpha}} Z^{\frac{\beta}{1-\alpha}}\left(\frac{P}{\omega}\right)^{\frac{1}{1-\alpha}}\right]$$

$$= \gamma^{\frac{1}{1-\alpha}}\alpha^{\frac{\alpha}{1-\alpha}}(1-\alpha) Z^{\frac{\beta}{1-\alpha}} P^{\frac{1}{1-\alpha}}\omega^{\frac{-\alpha}{1-\alpha}} \quad (11)$$

The equation (11) shows that the maximum profit (π^*) received by potato farmers depends on output price (p), variable input prices (w), and fixed input Z.

METHODS

Data Collection and Sampling Locations

Collecting data for this study used a survey method with face to face interviews of potato farmers with guidance from a structured questionnaire. The study was conducted in the District of Sembalun, East Lombok, West Nusa Tenggara Province for 3 months, running from April to June of 2013, the selected study location was based on consideration of (i) it is the only location in NTB for potato development, (ii) the development is carried out through a partnership, and (iii) it has become a center for potato production in Indonesia and the center for producing seed potatoes that are free from the disease Sis Yellow Nematode (PCN).

Determination of the location of the village for our sample was by purposive sampling, giving consideration to the location of the development, and the number of potato farmers. Based on data from the Office of Agriculture and Animal Husbandry, in 2012 the District of Sembalun became known as the location for the development of the potato, which happened in 3 of the 5 villages in Sembalun. They were Sembalun Lawang, Sembalun Bumbung and Sembalun Timba Gading villages.

Sampling of Respondents

The respondents in this study are potato farmers who are either partnered or not-partnered with PT. Indofood Fritolay Makmur. Determination of the number of samples of respondents in this study used the following formula (Sugiarto, et al., 2003: 60)

$$n = \frac{N}{1 + (N(Moe)^2)} \quad (12)$$

with:

n = number of samples
N = population
Moe = margin of error

Based on data from the Institute of Agriculture and Animal Husbandry, in 2012 Sembalun District had a potato farming population of (N1) 1,098 people who were in partnership, and non-partnered farmers consisted of (N2) 310 people. By taking a margin of error of 10 per cent, then the sample size for partnered farmers (n1) is 111 and for non-partnered farmers (n2) is 31 people. Then the selected sample farmers were distributed to their respective village locations proportionally. Furthermore, determining the respondent farmers in each village used a simple random sampling method by way of lottery.

Variables and Data Analysis

Data collected from the surveys, was then edited, tabulated, and analyzed. The analysis model used was the Cobb-Douglas Profit Function which includes 4 explanatory variables, i.e. productivity, capital input costs, labor costs, and a dummy variable of partnerships. Compared with other possible functions, the Cobb-Douglas function has the following advantages: (i) the solution is relatively easy compared to other functions, such as quadratic, and can be easily transferred to a linear form; (ii) the results of the estimation line through the Cobb-Douglas function produces regression coefficients which also identify the coefficient of elasticity; (iii) the elasticity shows the figure for the returns of scale. However, there are also limitations, primarily located in the estimation problems involved in these least square methods, such as an error in the variable measurement, multi-collinearity, and so on. Because of the primacy of the Cobb Douglas function then this study applied this analysis.

The Empirical Model Profit Function of Cobb-Douglas in this analysis is shown by equation (13) as follows:

$$\pi_{i=\varphi} v^{\alpha} \omega^{\beta} Z^{\gamma} D_i^{\delta} \quad (13)$$

To facilitate the estimation of the equation (13) and also data on profit distribution (π_i) and the determinants of profit nearing normal distribution, then the equation is transformed into a linear form by making it logarithmic, so that the equation becomes:

$$\ln \pi_i = \ln \phi + \alpha \ln v_i + \beta \ln \omega_i + \gamma \ln Z + \delta D_i + \varepsilon_i \quad (14)$$

π_i = Profit (Rp) of potato farmers, partnered and not, and has been normalized with potato prices
ϕ = Cross line of profit function
v_i = Productivity of potato farms, both partnered and non-partnered (kg/ha)
ω_i = Cost of capital input of partnered and non-partnered potato farmers (Rp/ha)
Z_i = Cost of labor input of partnered and non-partnered potato farmers (Rp/ha)
D_i = 1 for parnered farmers
0 for non-partnered farmers

The empirical model equation (14) is hypothesized as follows:

(i) The partnership had a positive impact on the productivity of potato farms, indicated by partnered/non-partnered.

(ii) Productivity (v), the cost of capital input (ω), and the cost of labor input (affect potato farm profits). The hypothesis is accepted when the value of on partnered profit function value of on non partnered farmers at .

(iii) Partnership had a positive impact on profit, based on the coefficient of the dummy variable of partnered farmers ($\delta > 0$) The hypothesis is accepted when the value of δ on the partnered dummy variable (D_i) of the profit function of the partnered is more than the non-partnered farmers at .

RESULTS AND DISCUSSION

Potato Farming Partnership in Brief

The partnership between PT. Indofood Fritolay Makmur and potato growers in the district of Sembalun, West Nusa Tenggara Province started in 2005, at a time when the experiment was tried in a small area of 10 are (1 are = 100 m^2). The experiment showed positive results, so that in 2008 it was expanded to an area of 150 hectares, with 968 farmers involved. In 2013 the number of potato farmers being partnered reached 1,098 belonging to the 3 village groups involved.

In the operationalization of the potato farming partnership in the District of Sembalun, the rights and obligations of the farmers were not laid down in the form of a written contract, but on the basis of mutual trust, which was represented by the groups, rather than individual farmers. Farmers' rights in the partnership included receiving loans in the form of seeds, fertilizers, and pesticides, which were to be repaid after the harvest, while their duties included selling potatoes to the partner company at the specified price agreed upon previously.

The number of seeds, and amounts of fertilizer and pesticides provided to the farmers

depended on the area they planted with potatoes. For an area of 1 hectare the farmers were given 2000 kgs of potato seeds, 3-4 tons of petrorganic fertilizer, 500 kgs of SP36, 500 kgs of NPK, 300 kgs of ZA, and 100 kgs of KCl. Besides these products, they were also provided with a fungicide (such as 2 liters of repus), 20 kgs of nemospore, and insecticides like indomektilin (0.5 liters), 25 grams of cirotex, and herbicides. The farmers do not actually harvest their crop themselves, this is the responsibility of the group which also bears the labor costs of Rp200-300 per kg, depending on the farm's position and the farm's road.

Empirical Model of Profit

In economic theory, the level of profit received depends on the amount of revenue and the production costs incurred. The results showed that the magnitude of the profit for potato farmers who are partnered in farming is Rp26,904,063 per hectare or 14.48 per cent higher compared to non-partnered farms, who received Rp23,501,701 per hectare. The difference in the profit of partner farmers and non-partner farmers is significant at = 0.01 with a p-value of 0.000 (Table 1).

The higher profit of the partnered farmers is due to their higher revenues, i.e. Rp85,772,240 per hectare or 12.03 per cent higher compared to non-partnered farmers who received Rp76,574,572 per hectare. Difference acceptance between partnered and non-partnered farmers is significant at = 0.01 with a p-value of 0.000 (Table 1). The higher revenue of the partnered farmers is caused by their productivity and the selling price of potatoes, although the cost of the capital inputs of partnered farmers is slightly higher than the non-partnered farmers.

The results showed that the productivity achieved is 22,270 kgs per hectare for partnered potato farmers or 9.06 per cent higher than the non-partnered farmers (at 20,419 kgs per hectare). The difference in productivity between the two groups of farmers is significant at = 0.01 with a p-value of 0.000. Similarly, the average selling price of potatoes that partnered farmers received was Rp3,850 per kg, while the non-partnered farmers only received Rp3,750 per kg. The difference in the selling price per kg of potatoes between the 2 groups of farmers is also significant at = 0.01 with a p-value of 0.000 (Table 1).

In general, costs for partnered farmers to cultivate potatoes are higher than the non-partnered farmers. For the various types of capital input, costs incurred by the partnered farmers reached Rp37,743,572 per hectare, or 4.78 per cent higher than the non-partnered growers who paid Rp36,019,866 per hectare. The difference between these 2 capital input costs of the farmers groups is significant at = 0.01 with a p-value of 0.000. However, for the cost of labor inputs for both the partnered and non-partner farmers are relatively equal at Rp14,124,802 per hectare for the partnered farmers and Rp14,115,689 per hectare for the non-partnered farmers. Thus, the test for the differences in the averages of the 2 samples showed no significant difference between the 2 groups of farmers (Table 1). Furthermore, to test the hypothesis whether the partnership with the potato farmers had a positive impact on their profitability, a test of the profit function for partnered farmer groups, non-partnered farmer groups, and combined groups in dummy variables was conducted. Similarly, the testing for the influence of productivity, cost of capital input, and labor

Table 1. Profit of potato farming per hectare in Sub Sembalun, 2013

No	Item	Potato farmer		t-stat	p-value
		Partner	Non-partner		
1	Profit (Rp/ha)	26,904,063	23,501,701	4.4473	0.000
2	Revenue (Rp/ha)	85,772,240	76,574,572	12.1603	0.000
3	Productivity (kg/ha)	22,270	20,419	9.3739	0.000
4	Capital cost (Rp/ha)	37,743,752	36,019,866	10.1805	0.000
5	Labor cost (Rp/ha)	14,124,802	14,115,689	0.0369	1.6659

costs against profits was made by using the regression model of the Cobb-Douglas Profit Function summarized in Table 2.

The regression model for the potato farm profit function in Table 2 shows that the value of the coefficient of determination R^2 is respectively 0.594 for non-partnered farmers, 0.987 for partnered farmers, and 0.842 for the combined farmers. This means that about 59.4 per cent of the variation in profit for non-partner farmers, 98.7 per cent of the variation in profit for partnered farmers, and 84.2 per cent of the variation in profit for the combined farmers can be explained by the explanatory variables of productivity of potato production, costs of capital input, and the cost of labor input. The rest of the 40.6 per cent f = 1 per cent for non-partnered farmers, 1.3 per cent for partnered potato growers, and 15.8 per cent for the combined potato farmers can be explained by other factors.

In the Cobb-Douglas production function of degree 1, the influence of other factors that are not incorporated into the model can be explained by the intercept, which is also an indicator of economic efficiency. Regression analysis showed that the intercept of the profit function of non-partner potato growers amounted to 14.466 lower than the 16.010 of partnered farmers, with a significance at = 1 per cent. Even with the inclusion of a dummy variable, the intercept value of partnerships increased to 21.162 and was significant at = 1 per cent. According to Nicholson (1998: 291), the increasing value of the intercept indicates that the economic efficiency of the production systems has increased. The increased economic efficiency which occurred for partner farmers cannot be separated from the influence of the use of new technologies, technical developments, improvements in production systems, improved economies of scale, the economics of scope, and other benefits bought by the partner companies.

Furthermore, the results of the regression analysis in Table 2 also show that the value of the F statistic for non-partnered farmers was 17.565 lower than those who were partnered, at 976.008. Both values are statistically significant at F = 1 per cent so it can be concluded that all 3 explanatory variables included in the model, i.e. productivity, costs of capital input, and labor

Table 2. Estimates of Farm's Potato Profit earned by Non-Partner Farmers, Partner Farmers, Combined Farmers, in Sembalun District, 2013

No	Explanating Variable	Farmer Profit Function		
		Non-Partner	Partner	Combined
1	Intercept	14.466 (2.556)	16.010 (3.236)*	21.162 (3.291)*
2	Productivity(ln PRODTV)	0.676 (6.115)*	1.097 (50.159)*	1.206 (16.370)*
3	Cost of Capital Input (ln C)	-0.264 (-2.481)	-0.107 (-4.268)*	-0.304 (-3.790)*
4	Cost of Labor Input (ln L)	-0.333 (-2.879)	-0.277 (-9.592)*	-0.253 (-4.725)*
5	Dummy of Partnership (DUMMY)	-	-	0.182 (1.859)**
Adjusted R^2		0.594	0.987	0.842
F		17.565*	976.008*	99.27*
Number of Observation		35	40	75

Source. Analysis profit model from earned Non-Partner Farmers and Partner Farmers, Combined Farmers
Figures in brackets show the statistics of t.
** show statistical significance of = 10%
* show statistical significance of = 1%
Dependent variable is ln profit (π /ha).

input costs incurred by partnered farmers, non-partner farmers, and combined farmers jointly and significantly affect the potato farm's profits in the district of Sembalun, West Nusa Tenggara. Even with the inclusion of dummy variable partnerships, the value of the F statistic for combined farmers increased to 99.87 from the previous 17.565 and significant at = 1 per cent. This increase in the value of the F statistic was followed by a growing number of significant explanatory variables.

Nevertheless, based on the results of the t-test, it is known that not all explanatory variables have significant affects on potato farming profits. For partnered farmers, all explanatory variables significantly affect potato farming profits in the district. The variables include productivity, costs of capital input, and labor costs. For the non-partnered farmers, of the 3 explanatory variables included in the model, only 1 variable significantly affects the potato farm's productivity (ln PRODTV), while the other two explanatory variables, namely the costs of capital input (ln C) and labor input (ln L) have no significant affect. This happens because the usage and input prices as well as the amount of capital and labor among non-partner and partnered farmers are relatively equal. The impact of settlements of farmers who are in a stretch of making the behavior of farmers in the use of capital and labor inputs are relatively the same, so even if the sample is enlarged, possible variations will not show any significance.

The entry of the partnership dummy variables into the model resulted in all explanatory variables, productivity (ln PRODTV), the cost of capital inputs (ln C) and labor inputs (ln L) becoming significant at = 1 per cent. In the explanatory variable productivity (ln PRODTV), both partnered and non-partnered farmers have a positive regression coefficient (as expected). For partnered farmers, productivity per unit of land area (hectares) has a significant affect on the increase in the farm's profits. An additional 1 per cent productivity can increase the profit by 1,097 per cent and is significant at = 1 per cent. In the case of the non-partnered farmers, they experience a lower additional profit of only 0.675 per cent when productivity increased by 1 per cent. The entry of the partnership dummy variable into the model turns the coefficient explanatory variable of productivity to 1.206 and is significant at = 1 per cent. This means that the farmer's participation in the potato farming partnership program is sensitive to an increase in profits as a result of increased productivity. An additional 1 per cent productivity can increase the profit to 1.206 per cent from 0.675 per cent previously. The higher share of the additional profits earned by the farmers is due to the productivity of partnered farmers producing 22,270 kgs per hectare, or 9.06 per cent higher than the non-partnered farmers (20,419 kgs per hectare).

The higher productivity of the partnered farmers over the non-partnered farmers, in addition to their use of new technology, improvements to the production system and the technical guidance of partner companies is also very likely due to better land used. One of the determinants of the productivity variable is the volume of the use of production inputs, which to a certain extent explains that when more inputs are used, the productivity will be higher. In this context, partnered farmers use more than the non-partnered ones. In the use of seeds, for example, partnered farmers used 2,264 kgs while the non-partnered ones used 2,014 kgs per hectare. NPK fertilizer was used by the partnered farmers (567 kgs), while non-partnered farmers only used 504 kgs per hectare. Likewise with the other input types used, such as the SP36, ZA, Petroganic, pesticides, and herbicides. These significant affects on the productivity of potato farming profits as described above is in line with the results of research by Hamidi (2010), entitled "The impact of partnership on profit of Virginia tobacco farming in Lombok Island", that found that the inclusion of dummy variables into the model causes the coefficient explanatory variable of productivity to increase to 0.5777 from previously 0.1037 and significant at = 1 per cent.

In the variable of the input cost of capital (ln C), both partnered and non-partnered farmers have a negative regression coefficient (as expected), but for non-partnered farmers it is not significant at = 1 per cent or 10 per cent . With

partnered farmers, an additional 1 per cent cost of capital input (ln C) can reduce their profit by 0.107 per cent lower than that of non-partnered farmers, which is at 0.264 per cent. The lower proportion of the reduction of profits earned by the partnered farmer is due to the prices of inputs such as the fertilizer NPK which is lower at Rp2,500 per kg compared to Rp2,600 per kg for non-partnered farmers, SP36 price of Rp2,300 per kg lower than the non-partnered farmers of Rp2,500 per kg. Similar to other inputs, such as the pesticide Delta, partnered farmers receive a price of Rp104,000 per liter, non-partner farmers receive Rp110,000 per liter. The entry of the partnership as dummy variable caused the variable of input cost of capital (ln C) significantly affect the profit at = 1 per cent, which previously was non-significant at = 1 per cent or 10 per cent. This means that farmers participating in the partnership program would reduce profit lower than non-partner farmers as a result of lower input prices received. In the variable labor costs (ln L), the coefficient regression for both partnered and non-partnered farmers is negative (as expected), it was -0.333 for non-partnered farmers and -0.277 for the partnered farmers. This means that for every 1 per cent increase in labor costs, partnered farmers' profits will decrease by 0.277 per cent lower than non-partnered farmers at 0.333 per cent. The entry of the partnership dummy variable into the model caused the coefficient of the explanatory variable of labor cost to rise to -0.253 from -0.333 earlier. This means that farmers participating in the partnership program can reduce the decline in profit as a result of increased labor costs from the previous 0.333 per cent to 0.253 per cent. The lower the percentage decrease in profits that occurred in the partner farmers due to the average wage paid per man-days (person-days) lower, i.e. Rp46,624 per person-day, while for non-partner farmers at Rp49,566 per person-day.

The entry of the partnership dummy variable into the model function indicates that the combined profit gained from potato farming increased because of the institution of partnerships. This is shown by a positive coefficient of dummy variable of partnership of 0.182 and significant at = 10%. This means that the involvement of the farmers in partnerships can increase their profits by 0.182 times. The increase in their profit happens because of the application of new technology, improvements in their production systems and technical guidance from the company, which improves the productivity of the potato farms and also increases the product price as well as decreasing the prices of inputs including fertilizers, pesticides, and herbicides.

The empirical examination above concluded that such a partnership has a positive impact of the profit of potato farmers in the District of Sembalun. The indicators are: (1) the intercept of the profit function of partnered farmers is higher than the non-partnered ones; (2) the coefficient of the dummy variable of partnership is positive and significant at = 10 per cent. These conclusions support the theory of NIE that states that partnership is an institution in agricultural sectors that can increase profits as a consequence of reduced transaction costs (North, 1995:18) so that cost per unit output reduces because the farmers receive lower priced inputs as transportation can be done in a collective way (Hennessy, 1996). These conclusion also support the results of previous research into partnerships that showed that farmers who participate in partnerships receive more income that those who do not (Glover, 1994; Little and Watts, 1994, Warning and Key, 2000; Tatlidil and Akturk, 2004. Winters, et al., 2005; Hamidi, 2010).

CONCLUSIONS AND RECOMENDATIOS

Conclusion

This study aimed to explain whether partnerships have a positive or negative effect on profit for potato farmers in the District of Sembalun, West Nusa Tenggara. This research concluded that:

1. Partnership has a positive impact on the potato farmer's profits. This conclusion is drawn from (i) the intercept of the profit function in potato farming for partnered farmers which is higher than that of the non-partnered farmers, (ii) the coefficient of the

dummy variable of partnership is positive and significant at = 10 per cent.

2. Productivity, cost of capital inputs, cost of labor inputs significantly affect the profit as a result of the partnership.

Recommendations

1. Partnership evidenced a profit increase for potato farmers. Thus, this study recommends government programs to push farmers to increase their involvement in partnerships with the company, in order to increase productivity and profits and thus help reduce poverty rates in rural areas.
2. One of the main problems in potato farming is the availability of seeds, which currently must be imported. Also cold storage facilities are needed for storing the seeds until they are distributed. Therefore, more research on seeds and their cold storage is suggested. The government, through the ministry of agriculture, in collaboration with the agricultural office of West Nusa Tenggara, should build seed storage facilities, in the expectation that potato seeds become more readily available, cheaper and with certainty of supply, so that the profits from potato farming will increase.

REFERENCES

Adiyoga, W., Fuglie, K.O. and Suherman, R., 2006. *Integrasi Pasar Kentang di Indonesia: Analisis Korelasi dan Kointegrasi*. Informatika Pertanian (15) 835-852.

Agustian, Odang and Henny Mayrowani, 2008. *Pola Distribusi Komoditas Kentang di Kabupaten Bandung Jawa Barat.* Jurnal Ekonomi Pembangunan, 9(1), 96-106.

Bachrein, S., 2004. *Pengkajian Keragaan Usahatani dan Sistem Distribusi Bibit Kentang di Jawa Barat.* Jurnal Pengkajian dan Pengembangan Teknologi Pertanian, 7: 125-138.

Bates, R.H., 1995. *Social Dilemmas and Rational Individuals: An Assessment of the New Institutionalism.* Dalam Harriss, J., Janet Hunter dan Colin M. Lewis, the New Institutional Economics and Third World Development (eds), Routledge, London and New York, 27-48.

Drabenstott, M., 1995. *Agricultural Industrialization: Implications for Economic Development and Public Policy.* Journal of Agricultural and Applied Economics, 27(1), 13-20.

Grosh, B., 1994. *Contract Farming in Africa: an Application of the New Institutional Economics.* Journal of African Economics, 3(2), 23-61.

Hamidi, Hirwan, 2010. *The Impact of Contract Farming on The Profit of Virginia Tobacco Farming in Lombok Island, West Nusa Tenggara*. Jurnal of Indonesian Economy & Business, 25(1), Januari 2010, 29-40.

Hennessy, D.A., 1996. Information Asymmetry as a reason for vertical Integration. *American Journal of Agricultural Economies*, 78(40): 10, 34-44.

Key, N. and Runsten, D., 1999. *Contract Farming, Smallholders and Rural Development in Latin America: the Organization of Agro Processing Firms and the Scale of Outgrower Production,* World Development.

Kirsten, J. and Kurt Sartorius, 2002. *Linking Agribusiness and Small-scale Farmers in Developing Countries: is there a New Role for Contract Farming?*. Development Southern Africa, October 19.

Nicholson, W., 1998. *Microeconomic Theory*. The Dryden Press, 7th Ed, Harcourt Brace College Publishers.

North, D.C., 1995. *The New Institutional Economics and Third World Development.* Dalam Harriss, J., Janet Hunter and Colin M. Lewis, the New Institutional Economics and Third World Development, Routledge, London and New York, 17-26.

Patrick, I., 2003. *Contract Farming in Indonesia: Smallholders and Agribusiness Working Together*. Australian Centre for International Agricultural Research (ACIAR) Technical Report (54).

Saodulet, Elizabeth, 1995. *Quantitative Development Policy Analysis*. The Johns Hopkins

University Baltimore and London.

Singh, S., 2002. Multi-National Corporations and Agricultral Depelovment: A Study of Contract Farming in the Indian Punjab. *Journal of International Development*, 14, 181-94.

Sugiarto, Dergibson Siagian, Lasmono Tri Sunaryanto, and Deny S. Oetomo, 2003. *Teknik Sampling*, PT. Gramedia Pustaka Utama, Jakarta.

Tatlidil, F., Fusun and Akturk, zDuygu, 2004. *Comparative Analysis of Contract and Non-Contract Farming Model in Tomato Production*. Journal of Agronomy 3(4): 305-310.

Warning, M. and Key, N., 2002. *The Social Performance and Distributional Consequences of Contract Farming: An Equilibrium Analysis of the Arachide de Bouche Program in Sinegal*. World Development, 30(2):255-63.

Winters, P., Phil Simmons and Ian Patrick, 2005. *Evaluation of a Hybrid Seed Contract Between Smallholders and a Multinational Company in East Java, Indonesia.* The Journal of Development Studies, 41: 62-89.

White, B., 1997. Agroindustry and Contract Farmer in Upland West Java. *The Journal of Peason Studies*, 24, 100-36.