Comparative studies of partnership between Credit Farmers (Tebu Rakyat Kredit) and Independent Farmers (Tebu Rakyat Mandiri) with Pesantren Baru sugar factory in Kediri, East Java, Indonesia

Masyhuri¹, Slamet Hartono, Lestari Rahayu, Hani Perwitasari
¹Faculty of Agriculture, Gadjah Mada University Yogyakarta, Indonesia

E-mail: hani.perwita@ugm.ac.id

Abstract. Sugarcane plays an important role in Indonesian economics. However, recently sugarcane field has been converted into a rice field or housing. It has made a challenging to elevate sugar productivity. Located in Kediri, Pesantren Baru Sugar Factory is one of the potential places to develop sugarcane as a prime commodity in East Java, Indonesia. This study aimed to analyze the model of partnership, Credit Farmers (Tebu Rakyat Kredit/TRK) and Independent Farmers (Tebu Rakyat Mandiri/TRM) in Pesantren Baru Sugar Factory; profit of TRK and TRM; feasibility of TRK and TRM. Primary data were collected with survey method of 60 farmers and independent t-test analysis was used to compare profit and feasibility between TRK and TRM. The result showed the model of partnership in Pesantren Baru Sugar Factory were TRK and TRM. TRK was more profitable and feasible than TRM.

1. Introduction
The consumption of sugar as staple is annually increasing. The demand of sugar is rapidly growing while its production is unbalance so that Indonesia still imports raw sugar and refined sugar. Average consumption growth from 1961 to 2013 was 4.39% and 2.78%, respectively [1]. The increase of price and demand of the consumers become the consideration regarding highly imported sugar in Indonesia, while Indonesia itself had ever reached self-sufficiency. As a big nation with the growing income, Indonesia is potential to be one of the largest sugar consumers in the world.

The consumers’ dependency on sugar consumption is quite high because sugar cannot be substituted with other sweeter, National consumption of sugar will gradually increase along with the growth of population, people’s income, and the emergence of food and beverage processing industries. National consumption of sugar always changes and prone to elevate proportionally with the number of Indonesian people [2]. In 1990, 1995, 1996, and 1997 the consumption of sugar per person per year consecutively increased by 13.38 kg, 16.54 kg, 15.76 kg, and 17.04 kg, respectively. The increasing population in Indonesia caused the increase of total consumption. Sugar consumption during 1993-2004 increased about 4.33% annually. The consumption of sugar reached 2.34 million of tons by 1993 and elevated to 2.46 million of tons in 2004. However, the increase of sugar consumption was not followed by the increase of production to cover the national consumption of sugar.

Tendency to import sugar has been gradually increased in 2010 in which Indonesia imported sugar in slightly huge amount due to the increasing number of white crystal sugar about 3,000,100 tons in 2009 to 378,643,824 tons in 2010 [3]. As the imported sugar still could not cover the whole nation consumption of sugar, the government needs to import more. This caused the level of dependency of imported sugar is higher. During 2009-2011 the level of dependency of imported refined white crystal sugar sharply decreased. This was due to the increase of refined sugar that could be processed by Indonesia sugar factory. For this, the government could reduce imported sugar. The increasing number of processed refined sugar was caused by the number of newly opened sugar factories in Indonesia (eight factories). The establishment of refined sugar factory was aimed to give a value added and absorbed the local labor so that the government did not need to directly import either.
East Java was one of the potential provinces to produce sugarcane in Indonesia [4]. Thus, in the effort to fulfil the domestic sugar demand and reduce the imported sugar it could be done by levelling up the effectiveness and efficiency of the local production in this area. Besides, support from the local farmer is needed to elevate the sugar production through a partnership with sugar factory. By doing a partnership it will benefit to both farmers and its factories. This research aimed to identify the pattern of partnership established between TRK and TRM with Pesantren Baru Sugar Factory, compare the profit of TRK and TRM, and compare the feasibility of the pattern of partnership established between TRK and TRM.

2. Materials and Methods

2.1. Basic Method
The basic method used in this research was descriptive analysis method. Descriptive analysis method is a method in research that serves to describe or give an overview of the object under study through sample data or population, without conducting analysis and making conclusions that are applicable to the public [5].

2.2. Determination of Research Location
The location of the study was determined using a purposive method, namely the determination made by choosing deliberately to adjust to the research objectives [6]. Determination of the location in this study in Pesantren Baru sugar company was because it is one of the largest sugar companies in East Java Province.

2.3. Determination of Research Samples
Farmers who became the sample of this study were farmers who work closely with the Pesantren Baru sugar company. The number of farmers interviewed were 60 farmers who collaborated with the Pesantren Baru sugar company with the People's Credit/TRK system and the Independent People's Sugar Cane/TRM. Sampling was done by simple random sampling method.

2.4. Data Types and Sources
The types of data used in this study were as follows:
1. Primary Data, namely data obtained directly from respondents through the results of interviews in the field. Primary data included data obtained from sugar cane farmers and sugar factory companies in Java.
2. Secondary Data, i.e. data obtained from related institutions which include population data, regional state data, geographical state data, and agricultural data.

2.5. Data Analysis Methods and Hypothesis Testing
Sugarcane farming revenue, income and profits were calculated by the formula [7]:
\[ R = P \cdot Q \]
\[ C = \text{Explicit Costs} + \text{Implicit Costs} \]
\[ \Pi = TR - TC \]
Where:
\[ P \] = Price
\[ Q \] = Quantity
\[ TR \] = Revenue
\[ TC \] = Cost
\[ \Pi \] = Profit
The feasibility of sugarcane farming was analyzed by \( R/C \), with the following criteria [7]:
1) \( R/C > 1 \), it means that farming is feasible
2) \( R/C = 1 \), it means that farming is break event point
3) \( R/C < 1 \), it means that farming is not feasible

In an analysis of the profit and feasibility of rice farming between Credit Farmers (TRK) and Independent Farmers (TRM) with independent t-test.

a. Difference profit between Credit Farmers (TRK) and Independent Farmers (TRM)

Hypothesis:

\[ H_0: \mu_{1.1} = \mu_{1.2} \]
\[ H_a: \mu_{1.1} \neq \mu_{1.2} \]

The variance formula in the independent t-test was determined by testing the variance homogeneity with Levene’s Test \((p > 0.05)\). Furthermore, t statistics are calculated by the formula [8]:

\[
T_{S_1} = \frac{\mu_{1.1} - \mu_{1.2}}{\sqrt{\frac{S_{p1}^2}{n} + \frac{S_{p2}^2}{m}}}
\]

\[
S_{p1}^2 = \frac{(n-1)S_{1.1}^2 + (m-1)S_{1.2}^2}{n+m-2}
\]

Where:

\( \mu_{1.1} \) = The average profit of Credit Farmers (TRK)
\( \mu_{1.2} \) = The average profit of Independent Farmers (TRM)
\( n \) = number of Credit Farmers (TRK)
\( m \) = number of samples of Independent Farmers (TRM)
\( S_{1.1}^2 \) = Variance 1
\( S_{1.2}^2 \) = Variance 2

Critical area: \( \alpha \) used is 5 percent.

Thus, the rules of decision making are as follows:

1) If the significance value > \( \alpha \), then \( H_0 \) is rejected, meaning that the average profit of Credit Farmers (TRK) is not the same as Independent Farmers (TRM) farmers.

2) If the significance value > \( \alpha \), then \( H_0 \) fails to be rejected, meaning that the average profit of average profit of Credit Farmers (TRK) is not the same as the Independent Sugar Cane/TRM farmers.

b. Difference feasibility between Credit Farmers (TRK) and Independent Farmers (TRM)

Hypothesis:

\[ H_0: \mu_{2.1} = \mu_{2.2} \]
\[ H_a: \mu_{2.1} \neq \mu_{2.2} \]

The variance formula in the independent t-test was also determined by testing the variance homogeneity with the Levene’s Test \((p > 0.05)\). Furthermore, t statistics are calculated by the formula [6]:

\[
T_{S_2} = \frac{\mu_{2.1} - \mu_{2.2}}{\sqrt{\frac{S_{p2}^2}{n} + \frac{S_{p2}^2}{m}}}
\]

\[
S_{p2}^2 = \frac{(n-1)S_{2.1}^2 + (m-1)S_{2.2}^2}{n+m-2}
\]

Where:

\( \mu_{2.1} \) = average feasibility of Credit Farmers (TRK)
\( \mu_{2.2} \) = average feasibility of Independent Farmers (TRM)
\( n \) = number of Credit Farmers (TRK)
\( m \) = number of samples of Credit Farmers (TRK)
\( S_{2.1}^2 \) = variance 1
\( S_{2.2}^2 \) = variance 2

Critical area: \( \alpha \) used is 0.05 percent.

Thus, the rules of decision making are as follows:

1) If the significance value > \( \alpha \), then \( H_0 \) is rejected, meaning that the average feasibility of Credit Farmers (TRK) is not the same as Independent Farmers (TRM)
2) If the significance value > $\alpha$, then $H_0$ fails to be rejected, meaning that the average feasibility of sugar cane farming in Sugar Cane/TRK farmers is not the same as Independent Sugar Cane/TRM farmers.

3. Results and Discussion

3.1. Partnership System between Farmers and Madukismo Sugar Factory

The partnership pattern of sugar factory between PTPN X East Java with the local farmers is categorized into two types: petani tebu rakyat kredit (TRK) and tebu rakyat mandiri (TRM) with sugar factory for a particular term to obtain income together with a mutualism benefit; need and benefit each other [9]. As mentioned by Wibowo [10], TRK are the farmers in partnership with the sugar factory in the case of capital cost, techniques of sugarcane cultivation and the process of sugarcane into sugar based on the proposed area and taxation of sugarcane production, which later on the working capital and credit from cooperation will be returned by cutting off the total production of sugar. TRM meanwhile are the farmers in partnership with the sugar factory in the case of sugarcane being processed from sugarcane into sugar based on proposed area and taxation of sugarcane production. However, the techniques of cultivation and capital cost are done by the farmers. Although the farmers perform the cultivation by themselves, the officers from sugar factory help them to overcome the problem during the cultivation. Problems faced by farmers include crop pests, soil fertility and crop production. The pattern of partnership established is mutualism benefit between both parties where sugar factory plays a role in teaching and counseling the farmers about the way of sugarcane maintenance so that the quality and quantity of sugarcane are good and obtain the higher yield. This will be benefiting the local farmers. The role of partnered farmers is to provide high quality of raw material through a good cultivation so that the sugar produced is a high quality product. This matter is related to supply of raw material (sugarcane) supplied from the farmers to sugar factory as grinded material and continuity of grinding process of the factory. Thus, with a high quality and quantity sugarcane, the sugar produced in the grinding process will be good and high in quantity. At last, it will boost the income of the farmers.

3.2. Comparative Study for Feasibility and Profitability of TRK and TRM

The profit of sugarcane farming in Kediri Regency equals to the total revenue minus total cost. Feasibility is measured by comparing total revenue and total cost.

| Description                        | Partnership farming | Independent farming |
|------------------------------------|---------------------|---------------------|
| Average of sugarcane production   | 11,496.87           | 4,093.29            |
| (quintal/Ha)                       |                     |                     |
| Average revenue from sugar (IDR)   | 50,725,438.67       | 16,915,885.71       |
| Average revenue from tetes (IDR)   | 487,800,701.61      | 183,651,693.65      |
| Average of total revenue           | 538,526,140.27      | 200,567,579.37      |

Source: Primary Data Analysis, 2016

Table 1 shows that TRK production and revenue are likely higher than that of TRM. It was indeed because yield obtained by TRK was higher than TRM. Having seen from the financing structure for sugarcane farm it consisted of explicit and implicit cost. Explicit cost is cash expenses spent by farmers, while implicit cost is non-cash expenses but still calculated by the farmers. The cost structure of the farmers is shown in Table 2.
Table 2. Analysis of the sugarcane farm cost structure comparison in Kediri regency

| Description       | Partnership farming       | Independent farming       |
|-------------------|---------------------------|---------------------------|
| Explicit cost     |                           |                           |
| Production facilities | 68,840,718.71            | 26,472,178.57             |
| Labor             | 173,974,710.24            | 53,652,066.33             |
| Other             | 100,697,363.95            | 62,414,642.86             |
| Total explicit cost | 343,512,792.90           | 142,538,887.76            |
| Implicit cost     |                           |                           |
| Family            | 66,624.15                 | 47,066.96                 |
| Depreciation      | 1,243,235.15              | 552,439.29                |
| Equity interest   | 30,916,151.36             | 12,828,499.90             |
| Total implicit cost | 32,226,010.66            | 13,428,006.15             |
| Total cost        | 375,738,803.56            | 155,966,893.90            |

Source: Primary Data Analysis, 2016

The total cost of TRM farmers was less than the total cost of TRK farmers. The biggest financing component of TRM and TRK were non-family labor cost since there were only few farmers running their farms by their own.

Table 3. Analysis of Feasibility and Profitability Comparison of Sugarcane Farm

| Description     | Partnership Farming       | Independent Farming       |
|-----------------|---------------------------|---------------------------|
| Total income    | 538,526,140.27            | 200,567,579.37            |
| Total Cost      | 375,738,803.56            | 155,966,893.90            |
| Total Profit    | 162,787,336.72            | 44,600,685.46             |
| R/C Ratio       | 1.43                      | 1.29                      |

Source: Primary Data Analysis, 2016

Table 3 demonstrates the feasibility and profitability for TRM and TRK. It showed that total profit for TRK was higher than TRM. Compared to R/C ratio it also showed slightly same result in which TRK was higher than TRM.

Table 4 shows the result of t-test analysis to examine the difference between the average of farmers’ profit of TRM and TRK. The result indicated an insignificant value in column sig F-test 0.01, and then it can be assumed that the variants were equal. T-test column showed the value of 0.00 for two-tailed test which was lower than alpha 5% (0.05), thus H0 was rejected. It can be said that the farmers of TRM and TRK were significantly different (alpha 0.95).

Table 4. The result of Independent Samples Test for Sugarcane Farmers’ Profitability

| Levene's Test for Equality of Variances | t-test for Equality of Means |
|----------------------------------------|-----------------------------|
| F           | Sig. | t     | Df | Sig. (2-tailed) |
| Value       |       |       |    |                 |
| Equal variances assumed                | 6.85 | 0.01  | -2.054 | 54 | 0.04    |
| Equal variances not assumed            |       |       | -3.353 | 51 | 0.00    |

Source: Primary Data Analysis, 2016
T-test result as shown in Table 5 presented the significance value sig F-test 0.20, then it can be assumed that the samples were different in variants. Having seen t-test column, it presented the significance value of 0.000 two-tailed in which this value was higher than that of alpha (10%). Thus, H0 was accepted and it means that profitability for farmers of TRM and TRK were insignificantly different from alpha (10%).

| Table 5. Result of Independent Samples Test of Feasibility for Sugarcane Farmers |
|---------------------------------------------------------------|
| Levene's Test for Equality of Variances | t-test for Equality of Means |
|                                              | F   | Sig. | t   | Df | Sig. (2-tailed) |
| Equal variances assumed           | 1.65 | 0.20 | 0.77 | 54 | 0.44 |
| Equal variances not assumed       |      |      | 0.64 | 17 | 0.53 |

Source: Primary Data Analysis, 2016

4. Conclusion
There were two patterns of partnership between farmers and Pesantren Baru Sugar Factory, TRK and TRM. Based on profitability and feasibility, farmers of TRK had higher profitability and feasibility than that of TRM.

Acknowledgments
Authors are very grateful to the Ministry of Research and Technology and Faculty of Agriculture Gadjah Mada University for the grant given to finish this study.

References
[1] FAO. 2019. Supply and Production of Sugar. http://www.fao.org/faostat/en/#data/OA accessed December 22, 2019
[2] Haryanto. 1999. The History Baron. National Sugar Player.
[3] Pujitasih, Handini, Bustanul Arifin dan Suriaty Situmorang. 2014. The Analysis of Position and Level of Dependency of Imported White Crystal Sugar and Refined Crystal Sugar of Indonesia in the International Market. Vol 2, (1), January 2014. JIIA.
[4] Statistic Indonesia. 2014. Statiscatical Year Book of Indonesia. Jakarta.
[5] Sugiyono. 2012. Statistics for Research. Alfabeta. Bandung.
[6] Purwanto. 2011. Statistics for Research. Pustaka Pelajar. Yogyakarta.
[7] Suratiyah, K. 2015. Agricultural Science. Penebar Swadaya. Jakarta.
[8] Ross, Sheldon. 2017. Introductory Statistics 4th Edition. Elsevier Academic Press. London.
[9] Hafsa, J.M. 2000. Partnership Entity Concept and Strategy Pustaka Sinar Harapan. Jakarta.
[10] Wibowo, Edy. 2013. The Pattern of Partnership between Farmers of Credit People (TRK) and Mandiri (TRM) with Modjopangoong Tulungagung Sugar Factory. Vol 13, (1), January 2013. Journal of Agribusiness Management.