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Productivity and income analysis of certified cacao farmers (UTZ Certified) and non-certified cacao farmers

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Abstrak. A certification program named UTZ Certified has the indicator of the certification process. This program is considered to have a positive impact on cacao farmers due to the increasing quality, productivity, and profitability of farmers. This study aims to analyze product certification impact on cacao farmers' productivity and income in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province. Analytical techniques used are farm productivity analysis, income analysis, R/C ratio, and t-test. The result shows that the land productivity of certified farmers is higher than the non-certified farmers. The average income per year for certified farmers is also higher than the non-certified ones, with each value of their R/C ratio is more than 1. The t-test result shows a significant difference between certified farmers and non-certified farmers.

1. Introduction

Cacao (*Theobroma cacao L.*) is one of the best plantation commodities that play a big role in Indonesia's economy, which donates to the nation's foreign exchange, being the source of income, create jobs, boosting agribusiness development and agroindustry, also developing and managing the regional resource. Cacao has contributed to the nation's foreign exchange through export for USD 1,2 billion per year from a total of land 1,6 million hectares. In 2016, cacao production reached 629.884 tonnes from 95% public farms. It was successfully placed cacao at the 3rd place as the excellent commodity after palm oil and rubber. On the other side, cacao is also involving 1,7 million workers of village farmers who mostly lived in eastern Indonesia (Directorate General of Plantation, 2017).

West Sulawesi's people mostly depend on their lives through plantation commodities. Cacao in West Sulawesi Province is the biggest contributor to the regional economic growth for 48% [1]. Seeing this as an opportunity, Gerakan Peningkatan Produksi dan Mutu Kakao Nasional (GERNAS) which first initiated by the Central Government of West Sulawesi in 2009 through the intensification, rehabilitation, and rejuvenation program. In 2017, West Sulawesi placed as the 5th biggest cacao producers in Indonesia with a total contribution of 9.32% [2].



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Align with its contribution to economic growth; the West Sulawesi government still needs to boost the production and productivity of cacao. Oppose to that, countries who are cacao's consumers are starting to increase their demand for high-quality cacao. This could be caused by changing the lifestyle of cacao consumers who allegedly prioritizes their health and the environment. The global consumer requires high-quality cacao has insisted producers develop their cacao farming sustainably along with its quality and productivity that increases each year.

The certification program is named UTZ Certified. This program is done to implement standard national quality certification for farmers. The benefit of this program is cacao will positively affect the farmers because it will boost up quality, productivity, and profitability of their products. However, to formulating standard indicator that has been implementing by certification boards is possibly hard to implement because the system should align with local culture and situation of the farmers.

Nevertheless, through cooperation with all involved stakeholders at the cacao sector in Indonesia, which consists of government, food security board, scholars, exporters, and farmers who represented by their farmer groups, the board certification, could be a warrant for a successful certification program. Based on that problem, this study aims to analyze the impact of the product certification program due to reach productivity and income goals at cocoa farmers in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi.

2. Methodology

The study was conducted in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province. It has been chosen purposively with consideration of Guliling Village have the most amount of certified cocoa farmers, and they were already connected with Swisscontact. The study took time from April to May 2019.

Sampling techniques were using destratification or proportional stratified random sampling. This technique took a sample from a population whose characteristic is heterogeneous or variated. Besides, this could be implemented on a population whose member or element proportionally have the strata or stages [3]. The population sample at Guliling Village in total is 197 farmers, including certified farmers and non-certified farmers. According to Setiawan [4] and the enacted sample that greater than 100 people should use Slovin's Formula with 10% of the critical value, so the total sample is 66 people. Afterward, the sample is determined by proportional stratified random sampling with 49 certified cocoa farmers and 17 non-certified cocoa farmers.

Data analysis is the next step after collecting data. The purpose of it is to give meaningful information from the collected data. Firstly, the data is collected into two categories: qualitative and quantitative data. Qualitative should be descriptively elaborate on the process of the UTZ Certified product certification program. Meanwhile, quantitative data is used to see how the program affects the farmer's productivity and income among the certified and non-certified farmers [5].

2.1. Farm Productivity Analysis

Cacao productivity is a comparison between cacao production with cacao farmland area. The production used to calculate productivity of cacao is an average of cacao production within a year that resulted from cacao farmers in the research area. Productivity cacao estimation was done to identify whether or not productivity differences in the agricultural business of certified and non-certified cacao farmers. Systematically, it can be formulated as follow:

$$\text{Cacao productivity} = (\text{Cacao Production (kgs)}) / (\text{Cocoa Land Area (Ha)}) \quad (1)$$

2.2. Farm Income Analysis

Farm income is the subtraction of revenue with costs. According to Soekartawi [6], farm income formula can be seen below:

$$Y = TR - TC \quad (2)$$

Information:

Y = yield from the farm (Rp/year)
TR = total revenue (Rp/year)
TC = total cost (Rp/year)

Total revenue is a total of all revenues from the sold product. To calculate total revenue, then the formula can be seen below:

$$TR = Q \times P \quad (3)$$

Information:

TR = total revenue (Rp)
Q = quantity of product (Kg)
P = price per unit product (Rp)

Total cost (TC) is every cost spend on the production process that started in a single unit. To calculate the total cost, then the formula can be seen below:

$$TC = TFC + TVC \quad (4)$$

Information:

TC = Total cost (Rp)
TFC = Total fixed cost (Rp)
TVC = Total variable cost (Rp)

2.3. Independent Sample T-Test

Independent Sample T-Test is used to explain whether or not certified and non-certified cacao farmers' income has a significant difference. The hypothesis used in this research are as follow:

H₀ = Certified and non-certified cacao farmers' income does not have a significant difference.
H_a = Certified cacao farmers' income is higher than non-certified farmers.

Adapun interpretasi yang digunakan dari pengujian ini [7] adalah: At such, interpretations that used in this study are:

- If value of sig (2-tailed) > 0,05, then accept H₀ and deny H_a.
- If value of sig (2-tailed) < 0,05, then accept H₁, deny H₀.

2.4. (R/C) ratio

To recognize whether the agricultural business is profitable or not, it could be analyze using the R/C ratio, which is a comparison between total revenue with total cost. The formula can be seen below [6]:

$$R/C \text{ ratio} = TR/TC \quad (5)$$

6
eterangan :

TR = Total revenue (Rp)
TC = Total cost (Rp)

Measurement criteria in the R/C ratio are:

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R/C < 1, if it is not profitable

R/C > 1, if it is profitable

R/C = 1, if it meets the break-even point

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3. Results and discussion

3.1. General Description of Farmers' Identities

Research respondents were categorized in the productive age, which is 15-55 years old, with a percentage of 69,38% for certified cacao farmers and 47,06% for non-certified cacao farmers. The average of recent education background for each certified farmers and non-certified farmers is an elementary school for 48,98% and 52,94%.

The amount of farmers' family members for the certified ones is 4-5 people (65,30%), and the total average of family members for the non-certified farmers is less than four persons (70,59%). Cacao farmers whose certified and the one who doesn't have the total average of land ranging from 0,6 – 1 Ha. Certified farmers in Guliling Village are adjoint into cooperation with PT Nestle under the supervision of the Swisscontact and PT Koltiva, which implemented the UTZ Certified certification.

3.2. Condition of cacao farms

A non-governmental organization, in this case, the Swisscontact, holds some training that should be fit the standard applied by the UTZ Certified, following GAP (Good Agriculture Practices) in the cultivation case. With that method, farmers are hoped to be able to keep their cacao farms clean, so it can increase their income and sustaining their production. The PsPSP method is also including often harvesting, pruning, sanitation, and fertilization, which is done by the certified and non-certified farmers.

3.3. The Cacao Farmers Productivity Analysis

Land productivity can be calculated using the total of production (kg) divide with the land area (Ha). The average of the land area in total, production, and productivity of certified and non-certified cacao farmers as a whole had already shown in Table 1.

Table 1. Average of land productivity per hectare within a farm year for certified and non-certified farmers in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province, 2019.

No.	Details	Certified Farmers	Non-certified Farmers
1.	Land area (Ha)	1.25	1.41
2.	Production (Kg)	235	185
3.	Productivity (Kg/Ha)	204	128.47

Table 1 shows that the average of land productivity for each certified and non-certified cacao farmer is 204 kg/ha and 128,47 kg/ha. Meanwhile, an average of land area 1,25 ha and an average of production is 235 kg for certified farmers, also 1,41 ha and 185 kg for non-certified farmers. Nevertheless, the productivity on average owned by certified farmers is higher than the average land-owned of non-certified farmers in the same period.

3.4. The Cacao Farmers' Income Analysis

Farming, as one of the activities to gain the benefit from the agricultural sector will value from its spending and revenue. The farm income analysis is done to see a specific activity in it. The level of farmers' income can affect certain components, i.e., total production, price, and costs process. The analysis income of certified and non-certified farmers can be seen in Table 2 below.

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Table 2. The average income per hectare analysis of certified and non-certified farmers within a year in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province, 2019.

No.	Details	Certified Farmers	Non-certified Farmers
		Value (Rp) per hectare	
1.	Jumlah Produksi(Kg/Ha)	204	128,47
	Harga (Rp)	32,300	30,500
	Penerimaan (Rp)	6,589,200	3,918,353
2.	Biaya Variabel (VC)		
	Biaya Pupuk	715,408	697,451
	Biaya Pesticida	332,994	380,716
3.	Biaya Upah Tenaga Kerja	1,035,156	867,784
	Total Biaya Variabel	2,083,508	1,945,951
	Biaya Tetap (FC)		
	Nilai Penyusutan Alat	30,523	25,636
	Pajak Lahan	10,000	10,000
4.	Total Biaya Tetap	40,523	35,636
5.	Total Biaya (TC)	2,124,031	1,981,587
6.	Harga Premi (Rp 900/Kg)	211,739	0
7.	Pendapatan Bersih	4,676,908	1,936,766
	R/C Biaya Total	3.10	1.97

Table 2 shows that the income average of certified farmers is Rp 6,589,200 per ha per year, with the average total cost is Rp 2,124,031 per ha per year, so in conclusion, their net income per year is Rp 4,676,908. This is obtaining from subtraction the revenue and total cost, then the result is added with farmer's premi as to their certified status. While for non-certified farmers, they only gained an average revenue for Rp 3,918,353 per hectare per year with total cost Rp 1,981,587 per ha per year, so their net income values on Rp 1,936,766 per hectare per year.

R/C ratio has explained the comparison between revenue and cost of certified and non-certified cacao farmers. R/C ratio for certified farmers valued as 3.10 means that farmers will gain Rp 3.10 for every Rp 1 spend. Otherwise, to non-certified farmers, they only valued Rp1.97 for every Rp 1 spend. The conclusion is that both certified and non-certified farmers had gained profit from their business, which, shown by their R/C ratio result is greater than 1. However, certified farmers are gaining more profit than non-certified farmers in the same period.

3.5. Independent Sample T-Test on Certified and Non-Certified Farmers' Income

The average of independent sample t-test analysis using SPSS is useful to identify the availability of average differences among two samples group that has no relation. The result has shown below in Table 3.

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Table 3. Comparative T-Test analysis of certified and non-certified farmers within a year in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province, 2019.

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Independent Samples Test

		Income	
		Equal Variances Assumed	Equal Variances Not Assumed
<i>Levene's Test for Equality of Variances</i>	F	14.435	
	Sig.	0.000	

<i>t-test for Equality of Means</i>	t		4.968	7.833
	df		64	61.644
	Sig. (2-tailed)		0.000	0.000
	Mean Difference		2737585.15	2737585.15
	Std. Error Difference		551023.330	349476.989
	95% Confidence Interval of the Difference	Lower	1636789.50	2038910.25
		Upper	3838380.80	3436260.04

Table 3 shows the sig. (2-tailed) for farm income of certified cacao farmers and non-certified cacao farmers produce a significantly smaller value than the 5% (0.005) significance level of 0.000. It can be concluded that H_1 is accepted, which means that there's a difference between certified and non-certified cacao farmers statistically toward increasing revenue of cacao farmers in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province.

21 4. Conclusion

Based on the description above, the conclusion is that the land productivity of certified farmers considered higher than the non-certified farmers, which is for certified farmers valued 204 kg per hectare per year while for non-certified farmers valued at 128,47 per hectare per year in the same period. This is aligned with cultivating methodology of GAP (good agriculture practices), which enacted as a standardized certification process of UTZ Certified.

The income of certified farmers is also higher than non-certified farmers in Guliling Village, Kalukku Regency, Mamuju, West Sulawesi Province. This can be seen in their R/C ratio value of certified and non-certified farmers that valued greater than 1, scored 3,10, and 1,97 for each category, concluding that farmers are gaining profit and their business can be running appropriately. The t-test result of farmers' income, both on certified and non-certified farmers, is significantly different in 5% on the significance level.

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