

Contribution of oil palm (*Elaeis guineensis* J.) plantations to farmers' income in West Sulawesi

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ABSTRACT

Oil palm is an industrial plantation that is useful as a producer of cooking oil, industrial oil, and fuel. This research was conducted in West Sulawesi, Indonesia on June to September 2020. The purpose of this study was to determine oil palm, to calculate contribution of non-oil palm and non-farming household and contribution of oil palm plantations to farmers' income. Sampling for respondent in this study was carried by simple random sampling to the oil palm farmers in the study location. This study conducted at one of oil palm location center in Central Mamuju Regency, West Sulawesi by using questionnaires. The first results showed that oil palm is very profitable with an average income of IDR 30,666,620 per hectare per year. The second, source of household income for farmers is obtained from oil palm farming, non-oil palm farming and non-farming activities with an average total household income of the oil palm farmers of IDR 46,363,655 per year. The third, the contribution of oil palm plantations to farmers' income is moderate around 66 percent as a medium category.

Keywords:

Oil palm, Farmers' income, West Sulawesi, Contribution

1. Introduction

The role of the agricultural sector is a foundation of national economic development during times of crisis and economic recovery, the agricultural sector needs to be positioned as a mainstay sector and consistently supported to develop a resource-based economy. On this basis, it is hoped that the potential for the rural economy will become a determinant of the national economy as a whole. Thus, changes that occur in the structure of the rural economy need to be examined, especially its impact on the structure of employment and income opportunities in rural areas [1]. Moreover, the role of oil palm production in the future in Indonesia depends on the size of projected expansion and also agricultural management practices, earlier replanting with higher yielding plants, as well as establishing of new plantations on degraded land [2].

The world's need for vegetable oil is currently more than 50 percent sourced from oil palm, while the rest comes from sunflower oil and coconut oil. Oil palm companies currently absorb more than 5.5 million workers in the plantation sector or on-farm subsystem, the absorption of this workforce will be even greater if it includes workers in the off-farm sector and services in oil palm agribusiness. Besides that, in terms of regional development, it has been proven that oil palm development, which is generally built-in remote areas, has been able to encourage the development of areas with oil palm based economic centers.



Oil palm (*Elaeis guineensis* J.) is a type of plantation that occupies the most important position in the agricultural sector, this is because oil palm is able to produce the largest economic value per hectare when compared to other oil or fat producing crops. In addition, oil palm also has many benefits, namely as an alternative fuel for biodiesel, compost, other basic industrial materials such as the cosmetic industry, the food industry, and as medicine.

The market prospects for processed oil palm are promising, because the demand from year to year has increased quite significantly, not only domestically, but also globally. As a tropical country which still has a large area of land, Indonesia has a great opportunity to develop oil palm plantation [3]. Oil palm plays a role in regional development in Indonesia as well as agro-industry sector [4].

Oil palm, which is considered to still occupy the best portion compared to other plantations, as a mainstay non-oil and gas commodity contributing to the country's foreign exchange for good management, requires three aspects of agribusiness. These are interrelated with one another in this case production, marketing and finance. If the three aspects are running well, it is not impossible that the results obtained are more than just getting benefits [5].

Indonesia is a major country for oil palm farming or production. Indonesian Plantation Statistics (2015-2017) noted that Indonesian oil palm production in 2015 was 31.28 million tons, of which 50.77 percent was cultivated by private companies, 34.45 percent was cultivated by the smallholder plantation and the rest by state-owned companies. Oil palm in Indonesia demanded for cooking oil, biodiesel, the available land for plantations, production capacity for crude oil palm and fresh fruit bunches and restricting condition for environment [6].

Mamuju Tengah, a city district in West Sulawesi Province which is very well known for the prospect of existing plantations which is quite wide, one of which is the oil palm plantation which until now has contributed to meet the needs of farmers in West Sulawesi. The total area of oil palm plantations is about 41,748 hectares with production of 106,383 tons as well as the productivity is 3,376 tons per hectare [7]. This situation showed that, it's important to calculate the contribution of oil palm to increase the income of farmers in West Sulawesi, Indonesia.

2. Methods

This study conducted at one of oil palm farming centers in West Sulawesi, Indonesia from June to September, 2020. The number of populations in this study are about 464 oil palm farmers in which the sample was taken is 46 respondents equal to 10 percent from the total of population [8]. The research implementation technique used survey by conducting interviews with oil palm farmers using a questionnaire. The respondents are chosen by simple random sampling with the error margin about 5 percent. This study uses a quantitative research method in which the type of research whose specifications are systematic, well-planned and clearly structured from the start to the making of the research design [8]. Sources of data used in this research are primary data supported by secondary data. Moreover, information obtained indirectly from the object of research which consists of the organizational structure of archival data, documents, reports, books and article journals with respect to this study [9].

The study used three analyzes as follows:

2.1. Income Analysis

$$\pi = TR - TC \quad (1)$$

Where:

$$TR = Y \times Py \quad (2)$$

$$TC = VC + FC \quad (3)$$

- π = Income (IDR)
- TR = Total Revenue (IDR)
- TC = Total Cost (IDR)
- Y = Production (Kilogram)
- Py = Production Price (IDR)
- FC = Fixed Cos (IDR)
- VC = Variable Cost (IDR)

2.2. Household Income (HI) Analysis

$$Prt = I \text{ on farm oil palm farming} + I \text{ on farm non-oil palm farming} + I \text{ off farm (non-farming) income} \quad (4)$$

Where:

- HI = Household income
- P *on-farm* = Income of oil palm farming
- P *on-farm* = Income of non-oil palm farming

2.3. Analysis of Farming Income Contribution

$$A = \frac{B}{C} \times 100\% \quad (5)$$

- A = Contribution of oil palm farming (percent)
- B = Income of oil palm farming (IDR)
- C = Income of non-oil palm farming (IDR)

3. Results and Discussion

3.1. Oil Palm Farming Income

Farming system can be overviewed to be profitable if total revenue (TR) earned is bigger than the total costs incurred. Farming profits are obtained from reducing the total revenue from the total cost of farming. Income is one indicator of the success of farming activities, apart from that farm income also provides an overview of the benefits that farmers get. The purpose of income analysis is to describe the present and future conditions of business activities [10]. In other words, income analysis aims to measure the success of a business. In the income analysis, two main information are needed, namely the state of income and expenditure during the specified time period to determine the income and profits received by farmers, which can be seen in Table 1.

Table 1. Total revenue and income of oil palm farming

No	Description	Total (64 Ha)	Total (1 Ha)
1	Oil palm production	1,962,800	42,670
2	Price	1,000	1,000
3	Total revenue	1,962,800,000	42,670,000
4	Fixed cost		
	tax	2,368,000	51,478
	Depreciation cost	17,667,500	384,076
	Total of fixed cost	20,035,500	435,554
	Variable cost		
	Fertilizers	198,400,000	4,313,044
	Pesticides	38,400,000	834,782
	Labor cost	34,200,000	743,400
	Seed cost	261,120,000	5,676,522
	B. Total variable cost	532,120,000	11,567,748
5	Total cost (A+B)	552,155,500	12,003,380
6	Income (3-5)	1,410,664,500	30,666,620

Based on table 1, it explains that the average income of oil palm farming is IDR 1,962,800,000 in 64 per year per hectares with the cost required for oil palm farmers is IDR 42,670,000. Meanwhile, the income of the oil palm farmers with a land area of 64 hectares are IDR 1,410,664,500. Moreover, the income of the farmers with a land area per hectare are about IDR 30,666,620. Thus, the total income of oil palm farmer in Central Mamuju Regency, West Sulawesi can be seen from the following calculating:

$$\pi = TR - TC \quad (1)$$

$\pi = \text{IDR } 42,670,000 - \text{IDR } 12,003,380$ per year per hectare

= IDR 30,666,620 per year per hectare

Then, the value of R/C ratio oil palm farming is:

R/C Ratio = IDR 42,670,000 / IDR 12,003,380

= 3.5

The total income of oil palm farmers is IDR 30,666,620 per hectare with an R/C ratio of 3.5 indicating that oil palm farming in Central Mamuju Regency, West Sulawesi is feasible to be developed with an R/C ratio of more than 1. Return cost ratio is the number of ratios used for overview the relative benefits that will be obtained in a business. Basically, a business will be said to be feasible to run if the R/C value obtained is greater than 1 [11]. It means, the higher the R/C of a business, the higher the level of profit a business will get.

3.2. Non-Oil Palm Farming Income

Most of the people in the study area are oil palm farmers, but not a few of them also have business outside the oil palm to increase their household income. Among other things, they have pig and chicken farming. To find out the income of farmers from non-oil palm farming can be seen in Table 2.

Table 2 describes that the source of income from non- oil palm farming is the highest source of income from pig farming with an average income per year of IDR 9,027,037

or with a percentage of 65.6 percent. While the source of income from chicken farming with an average income per year of Rp. 4,742,368 with a percentage of 34.4 percent.

Table 2. Non-oil palm farming income sources

No	Non- oil palm farming	Average value/year (IDR)	Percentage (%)
1	Pig farming	9,027,037	65.6 %
2	Chicken farming	4,742,368	34.4 %
	Total	13,769,405	100

3.3. Non-Farming Income

Farmers in the research location do not only rely on farming activities as a source of income. However, farmers also carry out activities outside of farming to increase household income in order to maintain their survival. Non-farming activities carried out by farmers are trading and construction workers. To be able to describe non-farming income, it can be seen in the Table 3.

Table 3. Non farming income source

No	Non-Farming Activities	Average value.year ⁻¹ (IDR)	Percentage (%)
1	Trading	7,096,700	36.3
2	Construction worker	12,451,667	63.7
	Total	19,548,367	100

The highest source of non-farming income for farmers was the source of income for construction workers with an average total income per year of IDR 12,451,667 with a percentage of 63.7 percent. Meanwhile, the source of income from trading activities was an average of IDR 7,096,700 per year with a percentage of 36.3 percent. Overall, the total non-farming income with an average per year of IDR 19,548,367.

3.4. Household Income Analysis

Household income is income that comes from oil palm farming, non-oil farming, and from outside the agricultural business (non-farming). Income is obtained by calculating the difference between the total income from the business and the total production costs incurred by farmers for a year [12]. The household income of oil palm farmers can be calculated:

$$\text{Prt} = \text{IDR } 30,666,620 + \text{IDR } 6,592,222 + \text{IDR } 9,104,813$$

$$\text{Prt} = \text{IDR } 46,363,655 \text{ per year}$$

From the calculation above, it can be concluded that the average total household income of oil palm farmers is about IDR 46,363,655 per year.

3.5. Oil Palm Contribution to Farmers' Income

In general, farmers' income in rural areas comes from more than one source of income, namely from the agricultural sector and from outside the agricultural sector. Income contribution can provide information on how much the contribution of oil palm farming in providing income for farmers, where family members also do work outside of oil palm farming. In order to increase farmers' income in oil palm farming,

partnership between oil palm smallholders' farmers and company is needed, it is also rising a smallholder friendly crop [13].

The purpose of the contribution analysis is providing considerations for business actors to choose to continue farming oil palm or to switch jobs with a larger contribution to maintain household income. The following can be seen from the contribution of oil palm plantations to farmers' income in Central Mamuju District, West Sulawesi:

Oil palm farming contribution	= IDR 30,666,620 × 100%
	IDR 46,363,655
	= 66%
Non-oil palm farming contribution	= IDR 6,592,222 × 100%
	IDR 46,363,655
	= 14%
Non-farming income contribution	= IDR 9,104,813 × 100%
	IDR 46,363,655
	= 20%

The income of oil palm farming has a major effect on the household income of farmers with an average income of IDR 30,666,620 per year per farmer with a percentage of 66 percent which is included in the medium category. The classification of 33.3–66.6 percent of total household income. Non-oil palm farming income is only about IDR 6,592,222, per year with a percentage of 14 percent in the low category with a classification of 0–33.3 percent of total household income. Meanwhile, non-farming income is IDR 9,104,813 with a percentage of 20 percent in the low category also with a classification of 0–33.3 percent of total household income.

It indicates that oil palm farming income is one of the influential incomes because it has a greater contribution than non-oil palm farming income and non-farming income. As described in the classification table of the contribution of oil palm farming to household income, it states that if the contribution is between 33.3–66.6 percent, it is said to be in the medium category. To find out how much contribution from each source of income, contributions can be classified into three categories, it is low (0–33.3 percent), medium (33.3–66.6 percent) and high (>66.6 percent) [14]. One indicator of the sustainability of farming can be seen from how much profit from the investment capital that has been issued by farmers in order to continue their farming system or business [15].

4. Conclusion

The conclusions that can be drawn from the results of this study are palm oil farming is fairly profitable with an average income of IDR 30,666,620 hectare per year, the contribution of palm oil plantations to farmers' income is moderate, about 66 percent into the medium category, and contribution of non- palm oil is 14 percent in the low category with a classification of 0–33.3 percent. Then, the non-farming contribution is about 20 percent as the low category with a classification of 0–33.3 percent.

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