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Analysis of Coconut Farming (*Cocos Nucifera L*) in the Tidal Area of Jambi Province, Indonesia

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Abstract:
This study aims at analyzing the cost, revenue, income and efficiency of coconut farming. Method of this research was descriptive by using survey technique. To select locations of thebstudy, purposive sampling was used in two regencies namely Tanjung Jabung Barat and Tanjung Jabung Jambi Timur with consideration as the central of the coconut farming. The data used in this study are primary and secondary data. The analysis model used was the analysis of the cost of farming, farm receipts, farm income and farm business efficiency analysis. The results showed that the averagecost of coconutfarming is Rp. 6,895,159 / ha / year, the average receipts of coconut farming is Rp.25.805.995 / ha / year and the average income of coconut farming is Rp.19.098.135 / ha / year. R / C ratio of 3.74 (> 1) showed the farming by the farmers is efficient and profitable to keep running.

Keywords: farming, coconut (Cocos nucifera L), Jambi Province.

1. Introduction

Jambi has several plantation commodities that have given contribution, consisting of rubber, oil palm, coconut, cinnamon, coffee, areca nut and some other commodities. Coconut is in the third rank with 117.954 ha or 7.97% of the total area of agricultural commodities in Jambi Province after rubber (662.213 ha) and palm oil (405.949 ha). Coconut plantation is entirely farming activities of the people. It is in contrast to other farming activities whose role is dominated by state estates or private estates (Department of Plantation Jambi Province, 2015).

Coconut plantation areas in Jambi Province spread in several districts. The illustration of the distribution of area and production of coconut in Jambi province can be seen in Table 1.

No.	Regency	Area (Ha)				Production (Ton)	Productivity	Number of Farmers (KK)
		TBM / Immature	TM / Mature	TIM/TR/ Damaged	Total			
1.	Batanghari	14	389	109	512	395	1.015	1.561
2.	Muara Jambi	98	636	168	902	587	923	5.816
3.	Bungo	86	583	30	699	476	816	13.432
4.	Tebo	92	843	72	1.007	541	642	1.459
5.	Merangin	342	1.251	246	1.839	908	726	12.029
6.	Sarolangun	111	360	99	570	304	844	15.743
7.	Tanjung Jabung Barat	6.257	38.372	9.095	53.724	53.382	1.391	21.889
8.	Tanjung Jabung Timut	6.119	43.928	8.573	58.620	50.254	1.144	21.480
9.	Kerinci	-	42	35	77	19	944	1.315
10	Kota Sungai Penuh	-	3	1	4	3	1.000	22
	Total	**13.119**	**86.407**	**18.428**	**117.954**	**106.869**	**1.237**	**94.574**

Table1: Area and Production of Coconut in Jambi Province based on Regency in 2014
Source: Department of Estate Crops in Jambi Province, 2015

Table 1 shows that Tanjung Jabung Barat and Tanjung Jabung Timur are the central of coconut farming in Jambi province. Then, to see the distribution of land exploitation of coconut in detail based on the amount of production and the number of farmers in each of Tanjung Jabung Barat and Tanjung Jabung Timur, it isdescribed in Tables 2 and 3.

No.	Regency	Area (Ha)				Production (Ton)	Productivity	Number of Farmers (KK)
		TBM / Immature	TM / Mature	TIM/TR/ Damaged	Total			
1.	Tungkal Ilir	512	4.336	1.087	5.935	5.732	1.322	1.639
2.	Seberang Kota	674	3.185	268	4.127	5.506	1.729	2.111
3.	Bram Itam	592	3.870	1.275	5.737	6.264	1.619	2.856
4.	Betara	173	1.922	2.143	4.238	1.566	815	2.211
5.	Kuala Betara	401	6.878	1.745	9.024	10.729	1.560	3.166
6.	Pengabuan	2.808	9.694	1.063	13.565	13.364	1.379	5.180
7.	Senyerang	1.057	8.421	1.513	10.993	10.154	1.206	4.606
8.	Merlung	-	-	-	-	-	-	-
9.	Muara Papalik	6	7	-	13	2	286	30
10	Renah Mendaluh	6	6	-	12	4	667	4
11.	Tungkal Ulu	-	3	-	3	3	1.000	10
12.	Batang Asam	2	13	1	16	11	846	42
13.	Tebing Tinggi	24	37	-	61	47	1.270	34
	Total	**6.257**	**38.372**	**9.095**	**53.724**	**53.382**	**1.391**	**21.889**

Table 2: Area and Production of Coconut in Tanjung Jabung Barat based on the District 2014
Source: Department of Estate Crops in Jambi Province, 2015

Table 2 presents that commodity of coconut plantations in Tanjung Jabung Barat spreads across several districts, especially in the coastal parts of the region, such as Pengabuan district as the widest area of the plantation industry 13.565 ha, followed by the Senyerang district 10.993 ha, Kuala Betara district 9.024 ha, with a number of farmers as much as 21.889 households. It showed that coconut is one of superior plantation commodities in Tanjung Jabung Barat Jambi Province. Furthermore, the distribution of coconut farming based on districts in Tanjung Jabung Timur can be seen in Table 3 below.

No.	Regency	Area (Ha)				Production (Ton)	Productivity	Number of Farmers (KK)
		TBM / Immature	TM / Mature	TIM/TR/ Damaged	Total			
1.	Muara Sabak	138	314	200	652	368	1.372	1.145
2.	Nipah Panjang	689	5.020	1.557	7.266	6.877	1.370	1.439
3.	Mendahara	2.854	15.347	3.412	21.613	17.812	1.161	6.906
4.	Rantau Rasau	278	637	45	940	630	989	1.274
5.	Sadu	904	4.331	262	5.497	4.946	1.142	2.589
6.	Dendang	74	337	42	453	412	1.223	209
7.	Mendahara Ulu	203	412	127	742	464	1.175	443
8.	Geragai	45	4.226	316	4.587	3.905	924	2.122
9.	Berbak (Rantau Rasau)	32	118	8	158	123	1.042	540
10	Sabak Timur	519	8.288	610	9.417	9.125	1.101	2.592
11.	Kuala Jambi	383	4.898	1.994	7.275	5.572	1.138	2.221
	Total	**6.119**	**43.928**	**8.573**	**58.620**	**50.254**	**1.144**	**21.480**

Table 3: Area and Production of Coconut in Tanjung Jabung Timur based on the District 2014
Source: Departmen of Estate Crops in Jambi province, 2015

Table 3 explains that coconut plantation in Tanjung Jabung Timur spreads across all districts. The widest exploitation was in Mendahara district 21.613 ha, then Sabak Timur district 9.417 ha, Kuala Jambi district 7.275 ha, Nipah Panjang district7.266 ha and Sadu district 5.497 ha, with a number of farmers as much as 21.480 households.
Therefore, the study on the analysis of coconut was necessary to be conducted in order to know the cost, revenue, income and investigate the efficiency of coconut in the tidal area of Jambi Province.

2. Methodology
The method used in this study was a survey method. According to Moch.Nazir (2003), survey method is an investigation conducted to obtain the facts of existing issues and find out the factual information, including the social institutions, economic, or politic of a group or an area.

2.1.Population and Sample of Research
To determine the sample size of the population can be calculated by the formula Slovin (Sevilla et. Al., 1960) as follows:

$$n = \frac{N}{1+N\,(e)^2} \text{and } n\beta = \frac{N}{N}\,\xi\,\nu$$

Description:

N : number of samples to be determined

N : number of population in this study

E : percent leeway inaccuracy (precision) because of sampling error is still tolerated. Precision used in this study was 10 percent (%).

Nβ : number of samples strata i

Nβ : number of population strata i

Farmers selected as respondents were taken through a formula of proportional sample allocation method. From the formula above, the number of samples in this research area can be seen in the following Table 4.

No.	Regency/ District	Population (KK)	Sample (KK)
I	Kabupaten Tanjung Jabung Barat		
	1. Kecamatan Pengabuan	5.180	18
	2. Kecamatan Senyerang	4.604	16
	3. Kecamatan Kuala Betara	3.166	11
	Total	**12.950**	**45**
II	Kabupaten Tanjung Jabung Timur		
	4. Kecamatan Mendahara	6.906	24
	5. Kecamatan Sabak Timur	2.592	9
	6. Kecamatan Sadu	2.589	9
	7. Kecamatan Kuala Jambi	2.221	8
	8. Kecamatan Nipah Panjang	1.439	5
Total		**15.827**	**55**
	Total	**28.777**	**100**

Table 4: Number of population and sample in location research

The results of the calculations in Table 4 by using Slovin method obtained sample of coconut farmers in this study as many were 100 households spread in several districts in Tanjung Jabung Barat and Tanjung Jabung Timur. Samples were taken by stratified random sampling.

2.2. Data Collection Methods and Sources of Data

2.2.1. Data Collection Methods

1. The primary data collection method is by observation and interview. Observation is a method used by observing and reviewing directly to farmers. Interview is by asking questions based on a list of questions (questionnaire) which has been prepared to farmers in order to obtain information related to the problems of the study.

2. The secondary data collection method is by reading and quoting from reports of governmental institutions and results of previous related studies and literature related to problems studied.

2.2.2. Sources of Data

Sources of data in this study include:

1. Primary Data

Primary data is the main data that must be met in order to answer the problems to achieve the research objectives, obtained directly from the selected respondents consisting of farmers through structured interviews and in-depth by using a questionnaire which has been prepared based on the variables that were observed and other data as they might be necessary in this study.

2. Secondary Data

Secondary data is supporting data that is necessary to obtain additional information to explain the phenomena that exists in the field. This data was obtained through documents, previous research reports, as well as field observations and agencies associated with this research.

2.3. Analysis Methods

Data analysis method used is: to determine the costs of farming:

$$TC = FC + VC \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Description:

TC=Total cost (IDR)

FC=Total fixed costs (depreciation tool) (IDR)

VC=Total variable costs (labor, pesticides) (IDR)

To determine farm receipts using the formula:

$$TR = Y. Py .... (2)$$

Description:
TR=Total revenues,
Y=Production obtained (Kg) and
Py= Price Y (IDR)

To determine farm income using the formula:

$$Pd = TR-TC .... (3)$$

Description:
Pd=Revenue farming (IDR)
TR=Total receipts (IDR) and
TC=Total cost commercialize (IDR)
(Soekartawi, 2006: 58).

To assess the efficiency of farming using the formula:

$$R / C = TR / TC .... (4)$$

Description:
R/C=Revenue cost ratio,
TR=Total revenue and
TC=Total cost.

Criteria:
If the R / C> 1, then the farming is efficient,
If R / C = 1, then farming is in the state to break even (no loss and no gain) and
If R / C <1, then farming is inefficient.

3. Findings and Discussion

3.1. Characteristics of Coconut Farming

3.1.1. Land Use of Coconut Farming
Land tenure gives farmers the power to make decisions. A status in their own land determines the size of the revenue being received. It can be seen from the result of the study that farm land is generally the property of their own. The land area affects the amount of production and employment. A well-managed land will have different results from the land which is not managed properly. The number of samples of coconut farmers based on land area can be seen in Table 5.

Land Area (Ha)	Sample	
	The number of farmers	Percentage (%)
2,0 – 2,7	30	30
2,8 – 3,5	44	44
3,6 – 4,3	21	21
4,4 – 5,1	5	5
5,2 – 5,9	0	0
Total	100	100

Table 5: The Distribution of the Number of Coconut Farmers based on Land Area on the Regional Research in 2016
Source: Primary data, 2016

Based on Table 5, it indicates that the sampled farmers got most of the land area from 2.8 to 3.5 hectares for 44 samples, or 44 percent, while 30 samples or 30 percent of farmers had the land area from 2.0 to 2, 7 Ha. A farmer who had a land area of 3.6 to 4.3 was 21 people or 21 percent. Those who had land area from 4.4 to 5.1 was only 5 percent. In general, farm land is an inheritance that must have fragmented from the previous land.

3.1.2. Planting Pattern Farming
All farmers did a mixed cropping pattern, which means that the cropping patterns of coconut are not only planting the coconut tree but also other plants. The dominant plants are betel, banana and palm trees. In addition, some farmers tried to cultivate coffee plants.

3.1.3. Maintenance Activities

Maintenance activities for coconut consisted of some actions such as cleaning the plantation area from weeds and trench drain system surrounding the area. Drainage channel (trench) must be well-maintained because it affected the condition of the plant. Moreover, it was also be used in harvesting time as a transportation of the production. The farmers did not do fertilization activities because of financial reasons, that is for the purchase of fertilizers which requires a high cost. Additionally, the frequency of maintenance activities in the coconut plants done by the farmers were 3 times a year, i.e. before the harvesting activities with the aim to facilitate the harvesting operations easily.

3.1.4. Harvesting Activities

Coconut harvesting activities in the area of research was generally done 3 times in one year. The frequency of the harvest can be seen in Table 6.

Farming Patterns	Sample	
	Number of Farmers	Percentage (%)
4 times in 1 year	0	0
3 times in 1 year	100	100
Total	100	100

Table 6: The Frequency of Sampled Farmers of Coconut Farming in Harvesting Time Event on the Regional Research in 2016
Source: Primary data, 2016

Based on Table 6, this indicates that the harvesting activities for coconut was generally done 3 times over a period of one year. Although the sampled farmers harvest the production 3 times in a year but there is still a possibility to do it for 4 times. Actually, if they did so, there might be a certain condition which made them carry out harvesting activities over the normal time, for example to pay the needs of school fees for their children or other needs.

3.2. Economic Analysis of Coconut Farming

3.2.1. Farming Cost Analysis

Analysis of farming was done to calculate the amount of expenditures incurred and revenues earned from production activities of coconut. The production cost is all costs incurred for coconut farming consisting of fixed cost and variable cost. Fixed cost is a cost that does not change over the short-term, and can be used for more than one production process (Rupiah / ha). In this case, it is calculated from the depreciation of the tools used in farming activities. Meanwhile, the variable cost is a cost incurred by farmers where the cost can affect the size of the number of the production produced and it is consumable in one production process of (Rupiah / ha).

a. Fixed Cost Farming

Fixed cost used the depreciation calculator is the value derived from the purchase price minus the residual value divided by the time it is used. Depreciation tool incurred by farmers is a cost of depreciation tools used by farmers in the coconut farming activities. The average cost of depreciation in the coconut farming was almost the same because the time range of the use of the tool did not significantly influence the depreciation cost. The depreciation calculator was also affected by the economic life of farming tools.
The tools used in the coconut farming activities were hoes, machetes, hands prayer and harvest knife. The average cost of depreciation tool on coconut farming in expanding the cultivated land was 145.643 rupiahs / year, or an average cost of depreciation tool in coconut farming was 50.767 rupiahs / ha / year. Details of the depreciation tool can be seen in Table 7.

Description	Fixed Cost Components				Total of fixed cost
	Hoes	Machetes	Harvest Knife	Hand sprayer	
The Average of Fixed Cost in Expanding the Cultivated Land (Rp/Year)	64.800	19.530	14.513	46.800	145.643
The Average of Fixed Cosr (Rp/Ha/Year)	22.056	6.879	5.109	16.723	50.767

Table 7: Fixed Cost of Coconut Farming in Jambi Province

b. Variable Cost Farming

The variable cost is the cost of consumables in one production process. In this case, the variable cost is fertilizer, and labor costs. For more details about the variable cost of paddy farming consumption incurred by the farmers can be seen in Table 8 as follows:

Description	The Components of Variable Cost		The Total of Variable Cost
	Pesticide	Labor	
The Average of Variable Cost (Rp/Lg/Year)	1.323.000	18.674.750	19.997.750
The Average of Variable (Rp/Ha/Year)	450.000	6.394.392	6.844.392

Table 8: Variable Costs of Coconut Farming

The average variable cost of coconut farming was 6,844,392 rupiahs / ha / year. Variable cost is used for three times in a harvest season. The variable cost is a cost incurred for pesticides and labor. Farmers did not fertilize at their farming. This caused the variable costs incurred were only pesticide and labors.

c. Total Production of Farming Cost
Based on Table 9, it can be recognized that the production cost of coconut farmers was 20,143,393 rupiahs / Lg / Year. If it was converted into hectare, the incurred cost was 6.895.159 rupiahs / ha / year. Coconut farmers must pay for 912 rupiahs / Kg.

Description	The Components of Farming Cost		Total	
	Fixed Cost	Variable Cost		
The Average of Land Expansion (Rp/Lg/Year)	145.643	19.997.750	20.143.393	
Average (Rp/Ha/Year)	50.767	6.801.956	6.895.159	
Average (Rp/Kg/Year) *	7	905	912	

Table 9: Total Production Cost of Coconut Farming
Note: The production was 22.485 Kg/Lg/Year or 7.694 Kg/ Ha/Year

3.2.2. Farming Admission
An admission is a total production multiplied by the selling price. For more details in relation to production result, price and revenue that the farmers earned, it can be seen in Table 10.

Description	Production (Kg/Th)	Price (Rp)	Revenue (Rp/Year)
The Average of Land Expansion	22.485	3.354	75.413.013
The Average Per Hectare	7.694	3.354	25.805.995
The Average Per Kg.	1	3.354	3.354

Table 10: The Admission of Coconut Farming

3.2.3. Analysis of Farm Income
Income is very essential for farmers in order to survive from their economic life. Based on Table 11, it can be seen the average income earned by farmers is 55,835,308 rupiahs / ha / yr.

Description	Components		
	Total Revenue	Total Cost	Income
The Average (Rp/Lg/Year)	75.978.700	20.143.393	55.835.308
The Average (Rp/Ha/Year)	25.993.293	6.895.159	19.098.135
The Average (Rp/Kg/Year)	3.354	912	2.442

Table 11: The Revenue of Coconut Farming

3.3. Farm Efficiency

3.3.1. The Efficiency of Coconut Farming
The analysis of farm efficiency coconut farming can be seen from the value of R / C or cost of revenue ratio that compares the total revenue and total cost of farming:
R / C = TR / TC
    = 25,805,995 / 6,895,159
    = 3.74

Because the analysis value of coconut farming R / C was> 1, then the coconut farming particularly was said to be efficient and could be developed as it is profitable.

4. Conclusion
Based on research findings that has been done in the tidal area of Jambi Province, it can be concluded that:
1. Coconut farming cost was 6.895.159 rupiahs / ha / yr.
2. The total revenue of coconut farming was 25.805.995 rupiahs / ha / yr.
3. The income of coconut farming was 19.098.135 rupiahs / ha / yr.
4. The analysis value of R / C farming > 1 was 3,74, which meant that coconut farming can be said as an efficient process and can be developed due to its advantages.

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