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Farming and Production Factors of Independent Oil Palm and Rubber Plantations in Rengat Barat

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Abstract. However, the production of Fresh Fruit Bunches (TBS) and rubber latex (Bokar) remains low. The objectives of this research are (1) to analyze the characteristics of farmers and the plantation agribusiness profile of oil palm and rubber, (2) to analyze the oil palm and rubber plantation agribusiness, and (3) to identify the dominant factors affecting TBS production in oil palm and Bokar production in rubber in West Rengat. The research method used was a survey with a sample size of 60 oil palm farmers and 60 rubber farmers selected through simple random sampling. The results show that 1) The average age of oil palm and rubber farmers is relatively old. Generally, the educational level of oil palm and rubber farmers is junior high school graduates. The land cultivated by oil palm and rubber farmers is their own. The average land area owned by oil palm farmers is 2.0 hectares, and rubber farmers own an average of 0.93 hectares. 2)The use of oil palm seedlings is 139 plants per year, and rubber seedlings are 488 plants per year, with fertilizer usage still below the recommended dosage. The majority of labor used comes from external family labor. 3)The net income of oil palm plantation farmers is Rp 23,347,787 per hectare per year with an Efficiency RCR of 2.37, and the net income of rubber plantation farmers is Rp 13,181,195 per hectare per year with an Efficiency RCR of 2.17, indicating that oil palm and rubber plantation agribusinesses in West Rengat are viable for development. The dominant factors influencing oil palm TBS production are the age of oil palm trees, fertilizer and labor usage, while for rubber, the factors affecting latex production are the number of trees and labor. Oil palm plantation production requires higher production costs compared to rubber plantation production.

1. Introduction

The Oil palm is one of the plantation crops that has an important role for the plantation subsector. The development of oil palm, among others, provides benefits in increasing the income of farmers and communities, providing raw materials for processing industries that create added value in the country and CPO exports that generate foreign exchange. (Pahan, 2008)

Rubber plantations are also among the largest contributors to the country's foreign exchange which has considerable export opportunities. In addition to export opportunities, rubber is also still very valuable domestically. Potential markets that still use rubber are the tire industry, automotive, asphalt, and others (Suhariyanto, 2019).

Smallholder oil palm plantations in West Rengat Sub-district face significant challenges that hamper farmers' productivity and welfare, including inappropriate cultivation techniques, the use of superior seeds that only reach 50%, and suboptimal plant maintenance. In addition, limited capital hinders the procurement of production factors, while fluctuations in the selling price of Fresh Fruit Bunches (FFB) and poor harvesting skills also affect the quantity and quality

of production. These conditions directly impact the income and welfare of oil palm farming families in the region.

Smallholder rubber farming in West Rengat Sub-district faces various challenges that make farmers tend to switch to other commodities. rubber plants are old, the high cost of replanting, sap production is low, and rubber farmers are unable to grow rubber.

2. Research Methods

This research uses survey methods and comparative studies, the research location is in West Rengat District, Indragiri Hulu Regency. With sampling done by Simple Random Sampling method, 2 villages totaling 60 oil palm farmers and 60 rubber farmers (50%) of the 120 population of oil palm farmers and rubber farmers in the village which is done randomly because each farmer has the same opportunity to be selected as a sample contained in 2 villages, namely: Pematang Jaya Village and Air Jernih Village because the two villages that meet the research criteria both in terms of crop age and land area with consideration of the samples taken represent other farmers.

3. Results and Discussion

3.1. Farmer Characteristics and Farming Profile

a. Characteristics of Oil Palm and Rubber Farmers.
   Oil palm farmers, with an average age of 51 years, have a junior high school education and a family of four. They have 15 years of farming experience, manage 1.6-2.0 ha of private land, and use dumpy and simalungun varieties of oil palm seedlings. This oil palm farm operates on a small scale. Rubber farmers, on the other hand, have an average age of 54 years, have a junior high school education and a family of 4. 23 years of farming experience
b. Profil Usahatani Petani Kelapa Sawit dan Karet
   Oil palm farmers manage a private land area of 1.6-2.0 ha, and use dumpy and simalungun varieties of oil palm seedlings. These oil palm farms operate on a small scale. On the other hand, rubber farmers manage a private land area of 0.5-1.0 ha, and use the PB 260 rubber seedling variety. This rubber farm operates on a small scale.

3.2 Analysis of Oil Palm and Rubber Farmers' Farms

1. Cultivation Technology of Oil Palm and Rubber Farmers' Farms :
   a. Cultivation Technology of oil palm farming: In the technical aspects of cultivation of oil palm plantations in West Rengat District, oil palm plantation farmers buy 3-6 month old seedlings according to the ability and needs of farmers, in terms of technical cultivation: planting, replanting, and fertilizing oil palm has not been in accordance with the recommendations of the Center for Plant Protection (BPTP). b). Cultivation Technology of rubber farming: In the technical aspects of cultivation of rubber plantations in West Rengat District, rubber plantation farmers buy 3-8 month old seedlings according to the ability and needs of farmers, in terms of cultivation techniques: planting, fertilizing and controlling rubber pests and diseases have not been in accordance with the recommendations of the Center for Plant Protection (BPTP).
   b. Analysis of the Use of Production Factors
      Production factors will provide optimal production results. The use of production factors such as land, seeds, fertilizers, medicines does not fully guarantee that production will be better if the efficiency of their use is not considered.
   a. Use of oil palm farming factors: The use of oil palm production factors are: Number of stems, amount of fertilizer, labor, plant age and herbicides.
   b. The use of rubber farming factors: number of plants, urea fertilizer, TSP fertilizer, KCL fertilizer, Roundup, Gromoxon and Labor

2. Cost, Production, Income, and Farm Efficiency

a. Oil Palm

The net income of oil palm farmers is Rp 6,649,767 Garapan/MT or Rp 26,299,067 Ha/MT with farming efficiency measured by the Cost Revenue Ratio (RCR) reaching 2.37. This figure indicates that every Rp 1 invested in paddy rice farming yields Rp 2.37, which means that farming is profitable and worthy of further development farming is profitable and worthy of further development. Farmers can improve efficiency through the application of new technologies and better agribusiness practices.

b. Rubber

The net income of rubber farmers is Rp 12,319,038 Garapan/MT or Rp 13,181,195 Ha/MT with farming efficiency measured by the Cost Revenue Ratio (RCR) reaching 2.17. This figure shows that every Rp 1 invested in paddy rice farming yields Rp 2.17, which means that this farm is profitable and worthy of further development. Farmers can improve efficiency through the application of new technologies and better agribusiness practices.

3. Factors Affecting Palm Oil and Rubber Production

a. Oil Palm

The Prob value produced by the Shapiro-Wilk Test for palm oil is 0.13. The value of the rubber value is more than 0.05 so that the palm oil data is normally distributed. The Durbin-Watson value and the 4-du value of oil palm are 1.938. Because the Durbin Watson value lies between the limits (du) and (4-du), the autocorrelation coefficient is equal to zero, so the oil palm farming data does not have autocorrelation. The resulting coefficient of determination is 0.646 palm oil, it can be explained that palm oil production is 64.6% influenced by the number of stems, the amount of fertilizer, herbicides, plant age and labor, while 35.4% is influenced by other than these variables.

b. Palm Oil Production Function Model Equation

The calculation of the RTS or production elasticity of oil palm farming in West Rengat District in 2023 is as follows:$\sum\beta i$ =10349 + 74.59 + 7.03 + 40.45 + 882.01 + 128.69 = 11,481.77 The RTS value is >1, so it is classified as Increasing returns to scale, which means that additional yields increase over the scale of production. This means that if oil palm farmers use all their inputs in the form of the number of stems, the amount of fertilizer, the age of the plant and the amount of labor used by farmers is doubled to produce production that is more than twice the original production. he resulting coefficient of determination is 0.969 rubber, it can be explained that rubber production is 96.6% influenced by the number of seeds, Urea, KCL, TSP, Gramoxon Round up and labor, while 3.1% is influenced by other than these variables.

c. Rubber Production Function Model Equation

The calculation of RTS or the elasticity of rubber farming production in West Rengat District in 2023 is as follows:$\sum\beta i$ = 347.909 + 0.620 + 0.002 + 0.007 + (-0.004) + (-0.005) + (-0.003) + 0.250 = 347.909. The RTS value is> 1, so it is classified as Increasing returns to scale, which means that additional yields increase over the scale of production. This means that if rubber farmers use all their inputs in the form of the number of seeds, the amount of fertilizer, the amount of pesticides and the amount of labor used by farmers is doubled to produce production that is more than twice the original production.

4. Analysis of Differential Test of Average Total Production Costs and Farm Income of People's Oil Palm and People's Rubber.

a. Analysis of Differences in Total Production Costs of Smallholder Oil Palm and Smallholder Rubber Farms in West Rengat District

The total production costs of community oil palm and community rubber are homogeneous (the T test results read are equal variances assumed), Sig value. (2- tailed) obtained at 0.000 (<0.05) on smallholder oil palm farms is greater than the average production costs on smallholder rubber farms per ha per year, through descriptive statistics that the average (mean) production costs of smallholder oil palm (3.258) is higher than the production costs of smallholder rubber (1.318). This means that the comparison of the level of costs of

smallholder rubber farming is lower than smallholder oil palm farming in the research area can be accepted.

b. Analysis of Differences in Production Income of People's Oil Palm and People's Rubber Farms in West Rengat Distric

4. Conclusions and Suggestions

4.1 Conclusions

The conclusions obtained from this research are: 1) The results showed that the average age of oil palm and palm oil farmers was classified as old. In general, the education level of oil palm and rubber farmers is junior high school graduates. Cultivated land of oil palm and rubber farmers is self-owned land. The area of plantation land owned by oil palm farmers averaged 2.0 ha and rubber farmers averaged 0.93 ha. The use of oil palm seedlings 139 stems/year and rubber seedlings 488 stems/year fertilizer use is still below the recommended dose. The use of labor comes from labor outside the family (TKLK). 2) Net income of oil palm plantation farmers amounted to Rp 23,347,787 Ha / Year with RCR Efficiency = 2.37 and net income of rubber plantation farmers amounted to Rp 13,181,195 Ha / Year with RCR Efficiency = 2.17 which means that oil palm and rubber plantation farms in West Rengat District are feasible to develop.

4.2 Suggestions

1) Improve the technical efficiency of oil palm and rubber farming, namely by using production factors, especially fertilizers according to the recommended dosage standards or managing the use of production factors properly and correctly so that the resulting production can be achieved. 2) It is hoped that the government or plantation extension agency is obliged to improve the resources of farmers, especially in the field of knowledge in the technical cultivation of oil palm and rubber crops so that farmers are able to use their production factors optimally so that the positive impact can contribute to increased productivity and community welfare, especially oil palm and rubber farmers. 3) For farmers it is advisable to immediately carry out rejuvenation, especially rubber farmers to improve production and farm income

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