

Factors Affecting the Productivity of Rubber Plantations in West Kalimantan Province

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Abstract. Rubber is a plantation commodity that plays an important role in Indonesia's economic activities, as well as a foreign exchange earner. However, the productivity of smallholder plantations in West Kalimantan is still relatively low because smallholder plantations have not implemented good cultivation technology. Therefore, the adoption of postharvest cultivation technology and identification of economic factors that affect the productivity of smallholder plantations is very important and to improve the welfare of rubber farmers. In this study, regression with the Ordinary Least Square methodology was used as the research strategy. The findings revealed that the area of productive land, rubber farmer human resources, investment, banking finance, and rubber pricing all had a significant and beneficial effect on production, both simultaneously and partially of rubber plantations.

Keywords: land, rubber farmers, investment, banking financing, prices

1 Introduction

One of the largest rubber producers in Indonesia is West Kalimantan Province. This province is the fifth largest rubber producer in Indonesia after South Sumatra, North Sumatra, Riau and Jambi. Rubber is one of the leading commodities of plantation crops in the province of West Kalimantan. West Kalimantan with a population of 4,395,983, the province covers an area of 146,807 m² people in February 2018. This province has quite a lot of natural resources because one of the supporting factors is the tropical climate of this area which causes a lot of biodiversity. The development of rubber plantations has considerable opportunities in West Kalimantan, this can be seen from the availability of land and Rubber plant growth is aided by favorable meteorological conditions. Furthermore, the prospect of marketing this rubber plant commodity is also very good, this can be explained by the large demand for rubber products abroad.

Based on data obtained from the BPS publication of West Kalimantan Province, rubber planting area in large plantations in 2020 increased by around 16.43 percent compared to 2019, from 5,013 ha to 5,837 ha, while in smallholder plantations, the planted area only increased by about 0.1 percent, namely from 598,651 ha to 599,232 ha. The average total production of rubber plantations for the last 5 (five) years was 261,315 tons which resulted in an average productivity of 0.77 percent with the highest growth value occurring from 2016 to 2017 of 0.64 percent.

Seeing the clear potential and market prospects, investment in rubber plantations is a business opportunity that has bright prospects, thus the management of rubber plantations in the West Kalimantan region is quite potential to be developed. Investment is defined as the process of putting money into one or more assets over a period of time in the hopes of earning money or growing the value of the investment [1].

The realization of bank credit disbursement to revitalize rubber plantations is still low because farmers are constrained by administrative requirements from banks. The realization of lending for the revitalization of smallholder rubber plantations is still low because not all farmers have the certificates required by the banking sector. Therefore, the realization of the provision of bank credit in the revitalization program only covers 720 hectares of rubber plantations managed by 21 farmer groups. In addition to the rubber plantation revitalization program, financing for rubber farmers can use people's business credit (KUR) for the agricultural sector. Farmers can already get KUR with a low interest rate of 6 percent per year and without collateral for a maximum loan of IDR 50 million.

A very important factor influencing the productivity of rubber plantations is the price of rubber. The price is actually the value expressed in one currency or medium of exchange for a particular product. So, The price is the amount of money required to obtain a specific number of items its or a combination of goods and services. Currently, the price of processed rubber at the factory level in West Kalimantan with 100% K3 has reached Rp. 18,700 per kilogram. The average selling price of rubber for the last 5 (five) years is Rp. 6,909 per kilogram with the highest growth value from 2016 to 2017 of 10.79 percent. The increase in rubber prices at that time was the impact of the growth of the export destination country of West Kalimantan, the economy began to improve. One of West Kalimantan's export destinations is China. It can be predicted that rubber prices will improve again with a record that the economic growth of West Kalimantan's export destination countries is also good as predicted.

2 Literature Review

Agricultural Productivity

Productivity is the ratio between the input and output of a production process over a period of time Management, labor, manufacturing costs, equipment, and time are examples of inputs, while production, product sales, and money are examples of outputs. One of the most important indicators of economic performance is productivity. Productivity is defined as the proportion of total output to the weighted average of inputs. Productivity, which measures output per unit of labor, and total factor productivity, which measures output per unit of total inputs, are two key types (usually capital and labor). [2]

The product contains an understanding of the comparison between the results achieved and the participation of energy per unit of time [3]. This understanding shows that there is a relationship between work results and the time required to produce labor productivity. Furthermore, productivity contains philosophical understanding, work definition and operational technical.

In terms of philosophy, productivity denotes a way of life and a mental attitude that is constantly striving to better one's quality of life. According to this viewpoint, productivity in the agricultural business is strongly dependent on the input units provided by the labor and the output units produced by the workforce [4]. Suprihanto in [5] agricultural productivity is the ability of a set of economic resources to produce the desired agricultural products. Economic sources or often called factors of production include land, capital, technology, labor and raw

materials. In a process of agricultural management, these economic resources are processed to produce goods and services.

The Cobb-Douglas production function which includes labor and capital, which means that these two variables affect production. In essence, Productivity rises as a result of economies of scale and technical advancements. Over the last century, economies of scale and manufacturing, for example, have been critical components of productivity development. The consequence of a general increase in the scale of economic activity is that if the yield rises, the larger the scale of inputs and production, the higher the productivity [6].

Rubber Plant

The rubber plant comes from Brazil. This plant is the main source of natural rubber plant material in the world. Long before this rubber plant was cultivated, indigenous people in various places such as America, Asia and South Africa used other trees that also produce sap. Latex-like sap can also be obtained from the *Castillaelastica* plant (family moraceae). Now the sap of this plant is not being used anymore because the rubber plant is widely known and widely cultivated. As a latex producer, rubber plants can be said to be the only plants that are planted on a large scale [7].

Rubber plant (*Hevea brasiliensis*) is a highly profitable plantation crop. At the age of five, this annual plant can be tapped for its sap for the first time. Rubber sheets (sheets), lumps (boxes), or crumb rubber (crumb rubber), which is the basic material for the rubber industry, can be made from the sap of the rubber plant (latex). Rubber plant wood can also be utilized for construction materials, such as houses, furniture, and other structures, if the rubber garden is to be revitalized. [8]

Investment

Domestic and international investment can be described as the expenditure or expenditure of investment or corporations to buy production products in order to expand the ability to manufacture goods and services accessible in the economy. Increased investment will support a rise in output volume, resulting in more productive employment options and an increase in per capita income while at the same time increasing people's welfare [9]

Investment activities in the region have so far played an important role, among others, in increasing people's income and being labor intensive, which ultimately led to the creation of economic transformation [10]. Therefore, it is necessary to have an investment policy that can stimulate the entry of investors to be willing to invest in a business sector in a certain area.

Banking Financing

Term The definition of financing or Financing is money given to someone else to help them make a planned investment, whether they be individuals or institutions [11]. In a broad sense, financing is defined as trust. So, the meaning of trust is that the party providing the financing believes in the party receiving the financing that the financing provided will definitely be returned in accordance with the agreed agreement. In another book, it is stated that the term "financing" is derived from the phrase "I believe, I trust" (I believe, I put my trust). The word finance means "trust," implying that the bank places its faith in someone to carry out the shahibul maal mission. These monies must be used properly and fairly, with clear and mutually advantageous ties and conditions for both parties [12].

Prices

Price is a unit of value assigned to a commodity as a type of counter-performance information from the commodity's producer/owner. According to economic theory, the high and low prices of an item or service with a competitive market are determined by market supply and demand. According to [13], price is the expressed worth of a monetary medium as a means of exchange in cash or another monetary medium. The concept of pricing has a relationship with

the concepts of value and use in economics. The amount given by a product when it is traded for another one is referred to as its value. Usability is an attribute of an object that provides consumers with a specific amount of satisfaction.

3 Research Methods

The Scope of Research

The site or object of the research data is carried out in the province of West Kalimantan by conducting firsthand observations in a number of districts and cities where rubber plantation production activities are growing rapidly.

Population and Research Sample

In this study, Since the foundation of West Kalimantan Province till 2020, population refers to all data on research variables that pertain to all variables to be investigated. The data for semester research variables from 2005 to 2020 were used in this study's sample the productivity of rubber plantations, the welfare of rubber farmers and the export of rubber commodities in the province of West Kalimantan. Thus, the number of samples used in this study, namely semester data from 2005 to 2020, amounted to 64 (sixty-four) samples.

Design of the Study

Explanatory research analysis or hypothesis research through explanation is the research design used. Explanatory research is an analytical approach that uses hypothesis testing to understand the causal link between variables. Because the goal of explanatory research is to describe a generalization or explain the relationship between two variables, hypothesis testing and inferential statistics are used (for hypothesis testing) [14]

Data analysis technique

This study uses regression analysis where the Several independent variables are utilized to describe the behavior of the dependent variable in a model with more than one explanatory variable. One independent variable is used to explain one dependent variable in a simple linear regression study. The Ordinary Least Square (OLS) regression analysis technique was used in this investigation.

3 Results and Discussion

Hypothesis Test Results

Table 1. Multiple Linear Regression

Dependent Variable: PRODUCTIVITY

Method: Least Squares

Date: 12/22/21 Time: 10:15

Sample: 2005Q1 2020Q4

Included observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Beta	Prob.
C	13,93915	0,599801	23,23962		0,0000
Ln_LAND	1,177625	0,053610	21,96647	0,667	0,0000
Ln_HR	0,038396	0,017266	2,223798	0,296	0,0301
Ln_INVESTMENT	0,017911	0,002360	7,590142	0,406	0,0000

Ln_FINANCING	0,054410	0,008306	6,550786	0,341	0,0000
Ln_PRICE	0,016861	0,005918	2,848792	0,303	0,0061
R-squared	0,832000	Mean dependent var			0,793396
Adjusted R-squared	0,828120	S.D. dependent var			0,030325
S.E. of regression	0,006704	Akaike info criterion			-1,083043
Sum squared resid	0,002607	Schwarz criterion			-1,880648
Log likelihood	232,6574	Hannan-Quinn criter.			-1,003309
F-statistic	246,1749	Durbin-Watson stat			1,845668
Prob(F-statistic)	0,000000				

Source: Data processed Eviews 10

Simultaneous Test Results (F-Test)

According to the findings of the multiple linear regression test in Table 1, the first hypothesis is that the amount of productive land, the number of rubber farmers' human resources, investment, banking finance, and rubber prices all have a significant effect at the same time on the productivity of rubber plantations in West Kalimantan, this is indicated by the F-Statistic Value. **0.00000** < 0.05.

Partial Test Results (t-test)

The findings of the multiple linear regression are based on the results of the multiple linear regression test in Table 1. shows the results that:

- a). **The second hypothesis**, the area of productive land has a **significant and positive effect** on the productivity of rubber plantations in West Kalimantan, this is indicated by the probability t-statistic value of $0.0000 < 0.05$.
- b). **Third hypothesis**, Rubber Farmer Human Resources has a **significant and positive effect** on the productivity of rubber plantations in West Kalimantan, this is indicated by the probability t-statistic value of $0.0301 < 0.05$.
- c). **Fourth hypothesis**, investment has a **significant and positive effect** on the productivity of rubber plantations in West Kalimantan, this is indicated by the probability t-statistic value of $0.0000 < 0.05$.
- d). **The fifth hypothesis**, banking financing has a **significant and positive effect** on the productivity of rubber plantations in West Kalimantan, this is indicated by the probability t-statistic value of $0.0000 < 0.05$.
- e). **The sixth hypothesis**, rubber prices have a **significant and positive effect** on the productivity of rubber plantations in West Kalimantan, this is indicated by the probability t-statistic value of $0.0061 < 0.05$.

4 Conclusion

The Based on the findings of the research and the analysis of the debate, the conclusions of this study are as follows:

1. Rejuvenation of productive land area, competence of human resource rubber farmers, conducive investment climate, massive banking financing distribution, and increasing

- rubber prices have a significant effect on the productivity of rubber plantations in West Kalimantan Province.
2. Effective and optimal utilization and rejuvenation of productive land area can increase the productivity of rubber plantations in West Kalimantan Province.
 3. The increasing number of competent and competent human resources for rubber farmers has been proven to increase the productivity of rubber plantations in West Kalimantan Province.
 4. The rubber plantation industry has had a favorable investment climate boosted the productivity of rubber plantations in West Kalimantan Province.
 5. Distribution of banking financing that is quite selective and massive to the smallholder rubber plantation business sector is very helpful for rubber farmers to increase the productivity of rubber plantations in West Kalimantan Province.
 6. Rubber prices which tend to rise and improve make rubber farmers very eager to increase the productivity of rubber plantations in West Kalimantan Province.

Acknowledgment

The authors would like to thank the Chancellor, Director of Postgraduate and Head of the Doctoral Program in Economics, Borobudur University, Jakarta for the opportunity to take part in this International Conference.

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