THE INFLUENCE OF RUBBER PRICE FLUCTUATION ON THE PERFORMANCE OF SMALLHOLDER RUBBER PLANTATION IN CENTRAL KALIMANTAN, INDONESIA

Yuni Erlina¹), Djoko Koestiono²), Nuhfil Hanani³), Syafrial⁴)

¹) University of Palangka Raya, Indonesia
²-⁴) Faculty of Agriculture, University of Brawijaya, Malang, Indonesia

*E-mail: erlinayuni@agh.upr.ac.id; dekate@brawijaya.ac.id; nuhfil.fb@ub.ac.id; syafrial.ub@yahoo.com

Abstract: The fact is that today the price of rubber in the international market fluctuates every year. These conditions indicate the magnitude of the risks faced by rubber farmers. This research relates to the symptoms implementation of the Clean Bokar Program, as well as its impact on the household economic behavior of rubber farmers. The purpose of this study is to identify the profile of rubber plantation business in Central Kalimantan, to assess the performance of the farmers as a result of international rubber price fluctuations, and to analyze the policy simulation of bokar (pre-processed rubber) price enhancement at the farm level on the economic performance of rubber farmer households. The samples were determined by using the disproportionate stratified random sampling method. The data was processed with SAS program (Statistical Analysis System). The results show that the plantation sub-sector has a relatively large contribution to the agricultural. This fluctuating international rubber prices have a significant effect on the activity and production decisions of both rubber farmer groups and rubber farmer households. In addition, the obvious effects are the reduction in the type of products produced, in the working time of the head of the households, and in the type of farming input. The 30 percent increase in bokar price policy simulation (at the farm level) has increased the rubber latex productivity by 22,504 percent in which the total bokar production increased by 25,383 percent. This means that a 30 percent increase in bokar price (at the farm level) increase.

Key-Words: Rubber Price, Farmer Performance, Households Economy, Production Decision.

1 Introduction

Rubber is a plantation commodity that has a very important role in Indonesian economic activities. This commodity is a source of employment for around 1.4 million households (Kepala Keluarga or KK). Rubber also provides a significant contribution as one of the non-oil and gas foreign exchange revenues, rubber raw material suppliers which plays an important role in driving the growth of new economic centers in rubber development areas. As foreign exchange revenues, rubber has a big contribution to farmers' households and the country in general [1].

Based on its development, since and up to 1998, rubber was the largest foreign exchange revenues in the plantation sub-sector with a value of US $ 1.1 billion. However, it dropped to the second position after the palm oil valued by US $ 1.4 billion (the export value of palm oil reached US $ 2.4 billion) in 2003. In 2005, the foreign exchange revenues from rubber commodities reached US $ 2.6 billion or around 5% of non-oil and gas foreign exchange revenues. Besides that, large companies who engaged in the rubber sector also contribute to the country in the form of various types of corporate taxes and levies [2].

Even though nationally the roles and responsibilities of the rubber plantation sub-sector provide a large income contribution to the state’s foreign exchange, the development of the rubber agribusiness still does not seem to provide an adequate income and welfare for the people. Its great economic potential and strengths have not been able to be managed properly by contributing to national development and improving the standard of living and welfare of the people, especially rubber farmers who are predominantly managed by the people itself. This also affected and caused economic disparities for farmers in Central Kalimantan. This gap is a big responsibility to realize an economic prosperity especially for rubber farmer households.

Recently, the rubber price in the international market is very fluctuating. For farmers, the price of rubber is an economic factor which determines their decision-making to produce. Based on the data of the rubber price survey obtained from the Central Kalimantan Plantation Agency for the last 10 (ten) years, it is known that the rubber prices from 2005 to 2014 are varied up and down, both in the production of smoke sheet/RSS, slabs, and bowl lumps. Therefore, the purpose of this study is to (1) identify the profile of rubber plantation business in Kapuas, Central Kalimantan, (2) to assess the
performance of the farmers as a result of international rubber price fluctuations, and (3) to analyze the policy simulation of bokar (pre-processed rubber) price enhancement at the farm level on the economic performance of rubber farmer households.

2 Theory

The household of rubber farmers as an economic unit has a pattern of decision making that is simultaneously related to decisions in production and decisions in consumption [18]. Therefore, the study of farm household economic behavior due to product price fluctuations does not only use a conventional economic approach that examines production and consumption activities partially but also uses a basic model of economic analysis of agricultural households [18]-[19].

The research framework to answer the problems faced by rubber farmer households is to approach the agricultural household models (agricultural household models). The model was put forward by Becker [6] as the basis for the formation of the household model, followed by the assumption that the determinant of household decisions was determined by the head of the household. In general farm households maximize utility by constraints of production functions, constraints on the amount of time available, and income constraints [32].

The household economic model of rubber farmers is developed based on the concept of utility maximization with the constraints of total time available, production functions, and income constraints. The conceptual framework of the household economic model of rubber farmers is an interrelated system as presented in Figure 1.

Based on Figure 1, farmer household utilization in maximizing satisfaction is obtained from the combination of household-produced goods (XPRT), consumption of market-bought goods (XKBP), and casual time consumption (XKWS). The total time for farmer households is allocated to work in farming, work outside farming, and time to rest (leisure time). The farming production function (TPP) is a transformation of work time to produce output in farming.

The Becker household model [6], [18] describes the household in maximizing utility functions with the equation:

\[ U = U (X_1, X_2, \ldots, X_m) \]  \hspace{1cm} (1.1)

\[ \sum_{i=1}^{m} p_i X_i = CI = W + E, \text{ for } i = 1, 2, 3, \ldots, m \]

Where:

- \( p_i X_i \) = Price and product to \( i \)
- \( CI \) = Cash income
- \( W \) = Wages or income
- \( E \) = Other source income

Associated with one of the determining components above, which is related to product prices. Given that the product price or selling price of rubber that is a mainstay of farmers' products is an economic factor that greatly affects economic behavior, especially rubber farmer households, because if the price of bokar (rubber ingredients) is high then the prospect of family income will be good and farmers will be eager to tap the rubber. But once the bokar price suddenly drops, the rubber economy of the rubber farming household changes. It is clear that a decrease in income as a result of a decrease in bokar prices requires farmers to think hard or rationally how to cover their household economic needs almost every day or every month must be fulfilled.

3 Material and Methods

The study was conducted in Kapuas Regency, Central Kalimantan Province, Indonesia. It is important to note that this study is a follow-up to the previous sub-research [13]. The location of the research was determined purposively [14], [21]. The method of determining the sample was performed by using the disproportionate stratified random sampling method. The respondents were chosen with random sampling method and consisted of 30% UPPB members (farmers) and 10% non UPPB members. As a result, a total of 134 households were obtained as respondents. The data used in this study was the cross section data.

The first research objective was analyzed by using descriptive statistics. Meanwhile, the second research objective was assessed by using the two-stage least squares (2SLS) or maximum likelihood method. The data processing was done by using the SAS program (Statistical Analysis System) in 9.1 for windows version [33]. As for the policy simulation, the model was validated by using the Theil's Inequality Coefficient (U-Theil) criteria along with its decomposition [29]. The size used for the model validation in this study includes the Root Mean
clones such as IRR 112 and PB 260 according to the specific locations in the study area obtained from rubber rejuvenation assistance from the Local Plantation and Forestry Service. The number of rubber trees in farm households varies from around 333-457 trees per hectare. The total rubber production of households in the study is illustrated in the following Appendix in Table 1.

4.3 Farmer Performance as an Influence on Rubber Price Fluctuation

Output price is a very important factor for farmer groups and farm households in the production. According to Soekartawi (1989), the prices can cause changes in production. These changes can cause an increase or a decline. Price stimulation of a product tends to influence the decision of farmers in the production as well as the business of rubber plantation cultivated by farmers in the study area.

The effect of this fluctuating international rubber price on the research location has a significant effect on the activities and production decisions of rubber farmer groups and households. At the farm level, rubber prices are very low compared to the prices on FOB (Free on Board) level. The fluctuating effect of rubber prices on the international market has a major impact on the economic performance of rubber farmer households especially if the prices received by farmers are very low.

The fluctuating prices of bokar (pre-processed rubber) have an effect on farmer household performance that is to reduce the type of products produced. If the prices increased, farmers or farmer groups tend to add products in the form of sheet such as wind sheet and smoke sheet that are used as savings for rubber farmer households.

The second impact occurs on the reduction of work time for the head of the households which causes the absorption of labor in rubber businesses to decrease. By that, the process of rubber tapping is usually done by the wife or other members of the households and as a result, it affects the economic performance of the farmer's household.

Besides that, there is a tendency to reduce the needs of farming such as fertilizer and drugs. They also tend to look for cheaper rubber freezing agents which resulted in the decrease of rubber quality. The socioeconomic factors of this phenomena are the tendency of farmers to compare the rubber prices with the prices of other farming outputs such as the output of palm oil and rice commodities at the research area where recently, the products experienced an increase in price compared to the rubber commodities. There is also an indication that the farmers offer the rubber tapping process to other farmers who do not have a plantation with a system of profit sharing, especially to farmers who have large plantation area.
4.4 Increasing Rubber Price Policy Simulation

The factor of output price influences the activities of the farmers in production thus many farmers expect a guaranteed price that at least can cover the production costs. Therefore, there is an attempt to simulate an increase in rubber prices (at the farmer level) by 30 percent which could cover the production costs of bokar. The results of the simulation scenario of the increasing bokar prices by 30 percent are referred to Appendix and presented in Table 2.

Based on the Table 2 above, the increased bokar prices at the farm level as much as 30 percent has caused the productivity of rubber latex (PRDVTTLT) to be increased amounting to 22.504 percent and a total production by 25.383 percent. This means that the increase in bokar prices can improve the tendency of the farmers to apply the recommended farming components. Therefore, it is believed to improve the quality of bokar produced.

Likewise, the impact on the use of farming inputs increases along with the increase in bokar prices because the farmers aware that the use of farming inputs is actually quite large for the continuity and fertility of the plants. The allocation of the use of labor, both men and women is also increased where the workforce in the plantation increased by 11.0 percent. It is seen that the maintenance of the plant becomes maximal and consequently, the labor for other activities (off-farm and non-farm) is reduced by 15.550 percent because farmers are able to focus more on managing their farms. By that, it can be said that the total household workforce is reduced by 2.754 percent. With the increasing bokar revenues, there is a significant effect on the farmers' income from rubber farming which increased by 32.287 percent. Certainly, this encourages the farm households. The reduced use of labor for activities outside rubber farming also caused the external costs of rubber farming to decrease by 3.392 percent.

The total household income is the cumulative income of farmers from the main business (on farm) and non-principal business (off-farm and non-farm). Thus, the total household income is obtained from total bokar income coupled with income from rubber farming. The impact of the increase in rubber prices caused the total household income to also increase by 19.309 percent. This means that the economic welfare of farmer households is improved.

The increased income enable the farmer households to spend more income especially for food and non-food in daily needs. The largest portion of food expenditure occurs on the consumption of main dishes, cooking oil, and other necessities while the largest portion of non-food expenditure can be found on the education of the farmers’ children so that the expenditure of the farmers also experienced an increase.

The excess satisfaction or value obtained by households from rubber farming activities and/or outside rubber farming is realized in the form of household economic surplus. The household economic surplus is known to increase by 24.650 percent. Consequently, the increase in surplus of rubber farmers households resulting from the rubber price simulation is relatively higher compared to the surplus from the simulation of increased rubber latex productivity.

5 Conclusion

Plantations are a sub-sector that have a relatively large contribution to the agricultural sector in Central Kalimantan. It is known that the pattern of rubber plantation development planted by farmers including smallholder rubber plantations with traditional and subsistence patterns has an important role for regional economic income especially for rubber farmer households.

The effect of the fluctuating international rubber prices on the location of the research has a significant effect on the activities and production decisions of rubber farmer groups and rubber farmer households such as (1) reducing the type of product produced; (2) reducing the work time of the head of the households; and (3) the tendency to reduce farm input needs. Besides that, the socioeconomic factor is the tendency of farmers to compare the prices of their product with the prices from other farms; there is also an indication to offer the rubber tapping process to other farmers who do not have a farm.

The increasing bokar price policy simulation (at the farm level) as much as 30 percent had an impact on the increased productivity of rubber latex by 22.504 percent with a total bokar production by 25.383 percent. This means that the increased price of bokar (30 percent) is able to improve the tendency of the farmers to apply the recommended farming components. As a result, it is believed to improve the quality of bokar produced and also the household income of the farmers.

6 Recommendation

At the level of the rubber farmers, price simulation is likely to affect the performance and economics decision of rubber farmer households in the production activity, so that it indirectly affects the household economy of rubber farmers. This also happens in the rubber plantation cultivated by farmers in the research area. Considering that the output price of bokar is a very important factor for rubber farmer groups and rubber farmer households in production, it is necessary to have a joint commitment as an effort to improve the quality of bokar by producing an output that has a higher value.
such as sheet products, both in the form of wind sheet and smoke sheet.

To all policy makers, in order to help rubber farmers and groups improve the quality of the bokar which has an impact on the output price of rubber products, it is recommended to: (1) have an accompaniment by giving more intensive counseling, especially in the management of rubber plantation products; (2) provide the adequate supporting facilities and infrastructure as a complement to the bokar processing technology package in both production and processing level to improve the quality of Bokar produced by farmers; (3) have a rejuvenation with the superior rubber trees at the upstream level to replace the old rubber trees that are not productive anymore.

Acknowledgments:

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Appendix:

Table 1. The Total Rubber Production of Farmer Households in Three Villages

<table>
<thead>
<tr>
<th>Number.</th>
<th>Description</th>
<th>Anjir Serapat Tengah</th>
<th>Tamban Luar</th>
<th>Sekata Bangun</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UPPB</td>
<td>Non UPPB</td>
<td>UPPB</td>
</tr>
<tr>
<td>1.</td>
<td>Latex:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a.Dry Season (Ltr/Thn)</td>
<td>22,101,90</td>
<td>27,809,00</td>
<td>23,720,80</td>
</tr>
<tr>
<td></td>
<td>b.Rainy Season (Ltr/Thn)</td>
<td>33,152,85</td>
<td>41,122,14</td>
<td>35,581,20</td>
</tr>
<tr>
<td>2.</td>
<td>Lump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a.Dry Season (Kg/Thn)</td>
<td>16,965,10</td>
<td>20,848,50</td>
<td>18,339,00</td>
</tr>
<tr>
<td></td>
<td>b.Rainy Season (Kg/Thn)</td>
<td>25,447,65</td>
<td>32,193,58</td>
<td>27,508,90</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2017.

Table 2. The Impact of Policy Simulation on the Changes of Endogenous Variables within the Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Basic Simulation Value</th>
<th>Simulation Scenario (%Δ)</th>
<th>Label</th>
</tr>
</thead>
</table>

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Yuni Erlina, Djoko Koestiono, Nuhfil Hanani, Syafrial

Volume 16, 2019

134
Table 2. Continuation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Basic Simulation Value</th>
<th>Simulation Scenario (%)Δ</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUTPDBS</td>
<td>575987</td>
<td>0.000</td>
<td>Total Income from Rice</td>
</tr>
<tr>
<td>TCLUK</td>
<td>912756</td>
<td>0.000</td>
<td>Cost from non-Rubber Business</td>
</tr>
<tr>
<td>ILUK</td>
<td>6090781</td>
<td>-3.392</td>
<td>Income from non-Rubber Business</td>
</tr>
<tr>
<td>TIRT</td>
<td>17028211</td>
<td>19.309</td>
<td>Household Total Income</td>
</tr>
<tr>
<td>KPGN</td>
<td>3581373</td>
<td>10.440</td>
<td>Household Food Consumption</td>
</tr>
<tr>
<td>KNPGN</td>
<td>3085794</td>
<td>12.130</td>
<td>Household Non-food Consumption</td>
</tr>
<tr>
<td>ERT</td>
<td>6667167</td>
<td>11.222</td>
<td>Household Spending</td>
</tr>
<tr>
<td>SPLUS</td>
<td>10361044</td>
<td>24.650</td>
<td>Household Surplus</td>
</tr>
</tbody>
</table>

Source: Analysis Results, 2018

Table 3. Referral of the 30% Bokar Price Increase Policy Simulation Results

The SAS System
The SIMNLIN Procedure
Simultaneous Simulation
Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N Obs</th>
<th>N</th>
<th>Actual Mean</th>
<th>Actual Std Dev</th>
<th>Predicted Mean</th>
<th>Predicted Std Dev</th>
</tr>
</thead>
</table>
References:


