THE FEASIBILITY OF FARMING INVESTMENT AND OPPORTUNITIES IN RUBBER INDUSTRY IN MUARA ENIM REGENCY

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ABTRACT

The purpose of research conducted to determine the feasibility of investment in rubber plantations and rubber commodities downstream opportunities. Investment feasibility rubber plantations cover the technical aspects, production aspects, market aspects, farmer institutional aspects and financial rubber plantation business aspects. However, rubber commodities downstream cover products derived from rubber. Data used including primary and secondary data. Secondary data obtained from the relevant agencies, such as BPS and plantation department. Besides, primary data is obtained from observation and focus group discussions with farmers and rubber trader. Methods used include IRR, NPV and B/C ratio. Based on the research results feasibility of investment in rubber plantations from geographical aspect tend to feasible in all regions of Muara Enim to cultivate rubber plants, but the centre area of the rubber in Muara Enim located in the Rambang Dangku district, Rambang district , Gelumbang district, Tanjung Agung district, and Lubai district. Rubber production on monthly average in all districts of Muara Enim is 999 kg of rubber per hectare productivity 1,363 tons a year. Rubber marketing aspect uses only two marketing lines. First line is from farmers to traders then to the rubber plant. This line is preferred by farmers (60%). A group of farmers who choose this line is generally farmers who do not coordinated groups (sold independently). On the second line from farmer to farmer groups further to the auction market and a rubber factory. On the second line the price is more attractive than first line, although the sales period needs longer time to wait (the sales period for rubber with a shelf life of two weeks). The amount of potential latex as raw material, crumb rubber, and the availability of a broad market exposing the chance to increase the added value of natural rubber in Muara Enim . These opportunities should be optimized by promoting the growth of downstream industries of rubber (rubber agro-industry).
Keywords: Rubber, Investment Feasibility, Downstream products

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BACKGROUND

The agricultural sector during the period 2009-2015 contributed an average of 16.08 percent to the GDP of Muara Enim, and absorbed 19.23 percent of labor force, the second largest after the mining sector. Processing industries were responsible for 9.18 percent of GDP, and labor is absorbed by 18.20 percent.

When viewed from the location quotient (LQ), the basis sector or sub-sector in Muara Enim features among other sub plantation crops that are part of the agricultural sector. One commodity sub-sector is the commodity of rubber plantation. Farmers who work in local's plantations for coffee, rubber and palm oil is 107.680 farmers by 2016 consisting 79.664 rubber farmers. Muara Enim regency population in 2015 is 600.390. Based from the mentioned figures, nearly half of the population is dependent on the agricultural sector. The rubber comodity development includes the development of investment in rubber plantations (on-farm) and downstream development of plantation products (off-farm). Based on data analysis of Citra Landsat 8 ETM+ with a path / row 124/062 which was acquired on June 26, 2016, the path / row 125/062 which was acquired on June 6, 2016 and path / row 125/063 which was acquired on August 6, 2016 and a rubber plant in Muara Enim spread over 16 districts with the largest area of rubber plantations in the Rambang District, followed by the Rambang Dangku district, and Gelumbang district. Meanwhile, according to statistics Plantation Muara Enim in 2016, rubber trees were scattered in 18 districts, and the districts of the most widespread coffee plant found in the same sub-district locations with the results of analysis of Citra Landsat ie 16 districts.

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Table 1. Rubber Plant Plant Size According to Muara Enim

No	Districts	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
1	Semende Darat Laut	1.581	1.581	949	945	945	945
2	Semende Darat Ulu	0	0	0	0	0	0
3	Semende Darat Tengah	0	0	0	0	0	0
4	Tanjung Agung	19.209	19.209	11.525	11.563	11.563	11.563
5	Rambang	37.272	37.272	22.346	22.374	22.374	22.055
6	Lubai	36.184	38.184	10.909	11.284	11.284	11.284
7	Lawang Kidul	3.084	3.084	1.850	1.850	1.850	1.463
8	Muara Enim	2.700	2.700	1.620	1.573	1.573	1.573
9	Ujan Mas	16.554	16.554	9.932	10.314	10.314	10.278
10	Gunung Megang	32.889	32.889	11.154	8.570	8.570	8.570
11	Benakat	6.696	6.696	4.018	4.246	4.246	4.246
12	Rambang Dangku	29.025	29.025	17.415	17.505	17.505	17.505
13	Gelumbang	24.624	24.624	14.774	15.044	15.044	13.567
14	Lembak	32.934	32.934	9.890	10.055	10.055	10.208
15	Sungai Rotan	13.464	13.464	8.078	8.078	8.078	8.078
16	Muara Bellida	2.739	2.739	1.643	1.643	1.643	1.643
17	Kelekar	9.021	9.021	5.413	5.432	5.432	5.432
18	Belimbing	0	0	8.579	8.759	8.759	8.759
19	Lubai Ulu	0	0	9.890	10.780	10.780	10.780
20	Belide Darat	0	0	12.001	12.208	12.208	12.208
	Total	**267.976**	**269.976**	**161.986**	**162.223**	**162.223**	**160.157**

Sourced by statistics Plantation Muara Enim in 2016.

THEORIES

Internal Rate of Return is the discount rate that equates the present value of the cash inflows and investment value of a business, in other words IRR is the discount rate that produced the NPV = 0. If the capital cost of a business is greater than the IRR is the discount rate which generates NPV = 0. If the capital cost of a business is greater than IRR, the NPV becomes negative, so that the business is not feasible, the higher the IRR compared to the cost of capital, the better the business to have. Conversely, if the IRR is less than the cost of capital, the project will not be taken. So the maximum capital costs which may be incurred equals to IRR.

Net B/C is the ratio between the sums of PV positive net benefit with the sums of PV negative net benefit. The positive present value number is the numerator and the number of negative present value is the denominator.

Net B/C shows an overview how many times the benefits obtained from the cost incurred. If the net B/C > 1, then the project or business idea to be established is feasible. Vice versa, if the net B/C < 1, then the project or business idea to be established is not feasible. Net B/C ratio is an additional net benefit of acceptable projects from every 1 unit amount spent.

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Break Even Point is the point at which an activity is not gaining money, but it also is not losing money. Break Even Point or BEP may imply an analysis to determine and find the number of goods or services to be sold to consumers at a certain price to cover the costs incurred as well as the benefit / profit.

BEP means a situation in which the company's operations does not earn a profit and does not suffer a loss (income assessed using the total cost). BEP analysis is not solely to determine the state of the company reached the BEP point, but the analysis of BEP is able to provide information to lending companies on various levels of sales volume, as well as its relationship with the possibility of obtaining profits according to the level of sales concerned.

METHODOLOGY

In determining the economic feasibility using Internal Rate of Return (IRR), Benefit Cost Ratio (B / C ratio) and Break Even Point.

Intenal rate of Return

IRR can be counted manually as follows:

$$NPV = 0 = C_0 + \sum_{t=1}^{n} \frac{C_t}{(1 + IRR)^t}$$

Where: t is the year of investment projects
n is the life of the investment project
C_t is net cash flow in year t
C_0 is the initial capital investment in year 0

B/C Ratio

Formula Net B / C ratio is as follows:

$$NETB/C = \frac{\sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=1}^{n} \frac{C_t - B_t}{(1+i))^t}}$$

Where :
Bt is Benefit at year t
Ct is cost at year t
i is Discount Factor
t is the year of investment projects
Indicators NET B/C Ratio is:
If the Net B/C > 1, then the project is feasible to be implemented
If the Net B/C < 1, then the project is not feasible to be implemented

Break Even Point

Formula BEP is as follows:

$$\boldsymbol{BEP = \frac{FC}{P - VC}}$$

Where :
BEP is *Break Even Point*
FC is *Fixed Cost*
VC is *Variable Cost*

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P is *Price per unit*
S is *Sales Volume*

RESULTS

Feasibility Rubber Investment

1. Technical Aspect

Most areas in Muara Enim are suitable for rubber cultivation plants, but the areas that become the center of the rubber in Muara Enim regency are located in the Rambang Dangku, Rambang, Gelumbang, Tanjung Agung, and Lubai.

These areas have geographical conditions, climate and type of soil that ideal for growing rubber trees. From the view point of the technical requirements as well as the productivity of the garden, it is identified that the Lubai has technical feasibility, because of its nature (factor endowment) including the topography that relatively flat, the type of arable land of which andosol, latosol, alluvial, and a little podsolid yellow red , a height of 42-78 meters above sea level and the number of rainy days is 116 days or less than the average of rainy days Muara Enim regency which is126 days. The average temperature ranges from 23-26 where this temperature is so suitable for growing rubber trees.

Rubber plantation area is generally located in a location that is relatively flat. However, the suitability of the land in the S1 category, ideally on an average production in tapping into year 7th or the age of the plant was about 12 years with at least 2.3 tons per hectare. It is due to farmers do not follow the ideal dose of fertilizer to fertilize their plants. Variation in spacing techniques used by farmers are divided into (1) a group of farmers who planted at a spacing in the category of medium density with a spacing size 6 m x 2 m, (2) a group of farmers at a spacing with enough category density with use a spacing size 4 m x 2 m, and (3) a group of farmers who use spacing with a very tightly density with a spacing size 3 m x 2 m x 2 m or 2 m.

Technically, the ideal spacing size is 8 m x 2.5 m or 7 m x 3.3 m with a north-south direction rows. Before the seeds are planted, the planting hole is made two weeks earlier with a size of 40 cm x 40 cm x 40 cm. In reality, the majority of farmers are doing two activities at once, namely seeding is planted at the same time as the planting hole is made. Nevertheless, there are still many farmers who follow the technical guidelines.

The second area with good technical qualifications is Rambang Dangku. Based on geographical aspects, topography and climate, it has not much different from Lubai. The topography is relatively flat, soil types are andosol, latosol, alluvial, and a little red podsolid yellow, the land height is 34-62 meters above sea level and the number of rainy days is 112 days or below average rainfall Muara Enim. The average temperature ranges from 23-26 where this category is suitable for growing rubber trees. Rubber plantation in this area is generally located in areas that is relatively flat. However, this meets the S1 category, ideally an average production in tapping into the age of 7 or 12 years at least about 2.3 tons per hectare. It is caused by the fertilizer used by farmers is less precise than the dose and spacing is too close. Based on the spacing size of rubber in Muara Enim including those in Rambang Dangku can be categorized, as enough category density with spacing size 4 m x 2 m, or even a very tightly density with spacing size 3 m x 2 m or 2 m x 2 m.

The third area is Rambang, also has the blessing of nature (factor endowment) as Lubai and Rambang's topography is relatively flat, soil types include alluvial, red and yellow podsolid, association Gley, and podsolid yellowish brown. The height ranges 34-62 meters above sea level and the number of rainy days is 112 days or below average

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rainfall Muara Enim. The average temperature ranges 23-26, this category is suitable for growing rubber trees. Rubber plantation in the area is generally located in areas that are relatively flat. Although it follows S1 category using fertilizer and too close spacing size. Based on the spacing size Rambang has enough category density with spacing size 4 m x 2 m, or even a very tightly density with spacing size 3 m x 2 m or 2 m x 2 m.

Farmers is tend to use simple technology in the rubber plantations. The development of smallholder rubber plantations in Muara Enim are still largely oriented by land expansion, bur not oriented by the development of intensification, which focus in the implementation of Good Agriculture Practices (GAP). Rubber cultivation technology in the district of Muara Enim still uses the seed sweep (arbitrary), although while using the superior clones, especially on smallholder plantations which manage using PIR system. The seeds of superior clones is used on average of less than 40 percent each area, even in some areas such as Tanjung Agung, Muara Enim, Ujan Mas, Sungai Rotan, Muara Belida and Kelekar most farmers still use non clone seeds, the seed they used is derived from natural rubber. Only partial farmers started planting using the seeds of superior clones. While in Rambang Dangku, Lubai, Rambang, and Gelumbang, most farmers already use the seeds of superior clones.

Nowadays, technological developments at the seedling stage tend to improve, where farmers are able to produce their own seeds, as motivated by the high price of rubber seedlings excelled issued by the Research Institute of Rubber Plantation. The production process of rubber seedlings starts from the cultivation of rubber seed purchased by local farmers, who then bred them from the same clone for grafting, so the quality of the clones back into random.

Based on the observations of a sample selected across the Muara Enim, the spacing of local resident rubber can be grouped into three models. First, a spacing approaching the ideal density with spacing size 6 m x 2 m. Secondly, a spacing is rather tight with spacing size 4 m x 2.5 m, Third, very tight spacing with spacing size 3 m x 2 m. Some areas have been partially high production plant rubber with spacing close to the ideal, such as Lubai, Rambang, and Rambang Dangku. While in other districts, most farmers plant rubber with a distance of 3 m x 2 m.

Another factor that affects production levels, such as fertilizing, weeding and weed management. Fertilization is proven to increase crop production. But in the context of cultivation, many farmers are still do not understand the dose of fertilizer and how to use fertilizer. Farmers tend to give the same treatment to all types of soil and plant age. Whereas the different soil conditions, the different type of crop and a different age needs different dose of fertilizer. Ideally, the application of fertilizer is a site-specific basis, but unfortunately due to lack of knowledge in cultivation, the community do not applying fertilizer dosage in accordance with the specifications of the type of soil and the age of the plant.

Giving the right fertilizer can increase the production of rubber between 10-33 percent. Although fertilizer is important, but fertilizer is not recommended for rubber plants that the old age (> 25 years), or at the weeding land as ineffective. Instead the rubber plant spurred spending sap using hormone (Ethrel 10 PA, Raptor 100 PA, Better 10 PA, etc.). it is advisable to give fertilizing an extra addition to fertilizing common, because the use of these hormones causes increased absorption of nutrients from the soil by plant roots rubber.

Farmers who want to use fertilization need to consider the advantages and disadvantages, because it would be futile if the cost of purchasing fertilizer cannot offset by its revenues from selling rubber production. Ideally, every farmer has a small note about the costs and revenues from application of fertilizer on crops. If the fertilizer

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is more profitable, in increasing production and the price of rubber is quite good, it is not wrong if the fertilizer is still being done.

Farmers need to be caution in buying fertilizer. Farmers generally bought fertilizer from the government, not alternative fertilizer. This avoids fake fertilizer or fertilizer ineffective. However, farmers still do not understand the content or nutrient content of each type of fertilizer, for example, formerly known TSP who had higher levels of P2O5 46%, now replaced SP-36 content of P2O5 is only 36%, instead there is another kind of fertilizer, Superphos or SP-18 is also the shape and color P2O5 nutrient levels but contains only about 18%. This is clearly detrimental to farmers, because the market with a weight of 1 kg price is relatively the same, for example, only Rp. 4000, - / kg. However the effectiveness from different crops, if TSP have P2O5 of 4.6 ounces, the SP-36 has P2O5 weighing 3.6 ounces, the Superphos only 1.8 ounces in its 1 kg (10 ounces). This gives farmers disadvantage as the same price but different effectiveness.

Dose of fertilizer should match the area specifications, but if specific fertilization recommendation does not exist, it can be used the nationally recommended fertilization. Generally, dose of fertilizer base on general advice is given in two (2) phases in a year, ie half-dose each in a year. Fertilizers should be spread above the rubber plant roots. This is due to the absorption of fertilizer nutrients by plant roots is very effective for rubber plant. Spreading fertilizer follow the age of the rubber plant. When fertilizing is highly effective, the rubber plant will begin to form a new leaf after the occurrence of natural leaf fall, although the time varies by location and seed clones. This knowledge is generally known by the farmers, but there are details that are not yet understood by them.Controlling weeds such as grasses, shrubs, and other vegetation in surrounding rubber plant area must be cleaned, while around the center line (gawangan) rubber can still be grown with soft weeds. In the area of row crops of rubber with a radius of at least 1 meter to the left and right rubber plants must be free of weeds. Chemical weed control consisting herbicides need to be used, or manually cleaning the weed. Controlling weeds with herbicides is performed 1 month before the fertilizer so plants can optimally absorb fertilizer. Although the area gawangan weeds are soft but should not grow woody weeds.

In the treatment of the rubber plant itself, we really need to know the types of diseases that usually attack rubber plants. By knowing the types of the disease it is easier to cope.

Gum disease often cause economic loss in the rubber plantations. The losses do not only in the form of yield losses due to damage to crops, but also the costs incurred in controlling efforts. Therefore, the integrated and efficient control aim to minimize losses caused by the disease needs to be done.

More than 25 diseases destroy the rubber plants. These diseases can be classified based on the value of the economic losses it caused. Rubber plant disease that is commonly found on the plantations in Muara Enim are such as, (1) Root Fungus White (Rigidoporus microporus). White root disease caused by the fungus Rigidoporus microporus (Rigidoporus lignosus). This disease results in damage to the plant roots. Symptoms on the leaves look pale yellow and the edges or tips of the leaves folded into followed by autumn leaves and twigs into a dead end. There are times forming young leaves, or flowers and fruit early. The roots of diseased plants appear threads white mushrooms and a bit thicker (rizomorf). Mushrooms sometimes form fruit bodies resemble hat yellowish orange at the base of the plant roots. In severe attacks, the plant roots to rot so easily uprooted and dead plants. Death of plants often propagates neighbor's crops. Transmission of the fungus usually takes place through contact of healthy plant roots into the stubble, the rest of the plant roots or plant roots sick. White

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root disease often found in rubber trees aged 1-5 years, especially in cropping the bush, stumps or residual plant roots and on loose or sandy soil. Treatment of diseased plants should be done at the time of the attack early to get treatment success and reduce the risk of death of the plant. When the treatment is done at the time of the attack, the success of treatment only reaches below 80%. The type of fungicide recommended suggestion is: basting: Calixin CP, Fomac 2, Ingro Shell Pasta 20 PA and CP. Watering: Alto 100 SL, Anvil 50 SC, Bayfidan 250 EC, Bayleton 250 EC, Calixin 750 EC, WP 12.5 Sumiate and Vectra 100 SC. (2) Tapping panel dryness, Brown Bast, this disease tapping grooves drought resulted in drought tapping grooves so it does not drain the latex, but the disease does not kill the plant. The disease is caused by tapping too often, especially when accompanied by the use of stimulant latex echelon. Drought tapping grooves initially characterized by the flow of latex in some tapping grooves. Then within a few weeks of dry whole tapping grooves is not issued latex. The dry area will change color to brown because in this section are formed gum (blendok). Dryness of the skin can be extended to other skin lifetime, but has not spread from skin to skin virgin recovered or otherwise. Other symptom caused by this disease, is the occurrence of cracking of the skin and swelling or bulge on the stem of the plant.

Disease control is accomplished by: avoiding tapping too often and reducing the use Ethepon especially in clones are susceptible to dry tapping grooves that BPM 1, PB 235, PB 260, PB 330, PR 261 and 100. When a decline RRIC dry rubber content constantly on the latex collected and increasing the number of trees affected by the dry tapping grooves up to 10% on the whole area, then tapping lowered intensity of 1 / 2S d / 2 to 1 / 2S d / 3 or 1 / 2S d / 4, and the use of Ethepon reduced or stopped to prevent other trees do not dry experience tapping grooves.

Scrape the dry skin to the extent of 3-4 mm from the cambium using tapping knife or scrapping tool. Scraped skin smeared with skin growth stimulant NoBB or Antico F-96 once a month with three replications. Basting NoBB is followed by spraying of pesticides Matador 25 EC at the smeared once a week to prevent the introduction of weevils.

Tapping can be continued under the skin that is dry or in other panels were healthy with low intensity. Trees are experiencing drought tapping grooves need to be given more fertilizer to accelerate the recovery of the skin.

2. Production Aspect

Rubber plant in Muara Enim spread at Rambang, Rambang Dangku, Gelumbang, Lubai and Tanjung Agung. Age of young plants is less than 4 years old, the productive age is 5-20 years and age-old crop/damaged age is generally over 20 years.

The average production based on the suitability of land (S1, S2 and S3) in all ideal age is equal to 1,706 tons per hectare, while in Muara Enim the suitability of land in all age groups is on average 1,363 tons. Differences in productivity outcomes should be seen as there are still opportunities to increase production. It can be done by applying technologies such as increasing the amount of fertilizer, proper fertilization way, rejuvenation with superior clones, ideal spacing, and good care.

Based on field data, the average rubber production per month in all districts of Muara Enim is 999 kg of rubber per hectare, productivity is 1,363 tons a year. The production rate is lower than the productivity of rubber plantations Service data (Disbun) amounted 1.8 tons. It is based on data from Disbun, productivity of rubber production in Muara Enim up to the 1st half of 2011 reached 239,808.6 tons. Meanwhile, based on data from the study, the production level is not too much different from the data Disbun which has reached 239,776 tonnes.

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There are several high production sub-districts. First, Lubai with a total generating plants and old plants covering an area of 13,965 ha, or about 11.5 percent, resulting in the production of rubber 2,386 kg per month or 11.9 percent. Productivity per hectare rubber plantation is 201 kg. If calculated in a yearly basis, the amount of rubber production amounted is 28,409 kg, or productivity per hectare in 2012 amounted to 2.05 tons.

The productivity of local rubber plantation in Lubai is the highest in Muara Enim, because it has the blessing of nature (factor endowment) includes the topography is relatively flat, the type of arable land consisting andosol, latosol, alluvial, and a little podsolid red-yellow, with a height of 42 -78 meters above sea level and the number of rainy days were 116 days or less than the average of rainy days Muara Enim. The average temperature ranges 23-26, it suitable for rubber plants to grow. Rubber plants in this area is generally located in a relatively flat area. Based on S1 suitability category, average production in tapping into 7 or the age of the plant was about 12 years of at least 2.3 tons per hectare. However, farmers use less precise fertilizer than the dose and plant spacing is too tight. Based on the spacing size of rubber plantation in Muara Enim, Lubai can be categorized as the density of an ideal or a spacing medium is 6 mx 2 m, some of which are quite dense with a distance of 4 mx 2 m, even a spacing there is a very dense 3 mx 2 m or 2 mx 2 m. Ideal spacing is 8 m x 2.5 m or 7 m x 3.3 m with a north-south direction rows. Before the seeds are planted, the planting hole is made two weeks earlier with a size of 40 cm x 40 cm x 40 cm. While farmers generally, seed planting holes made directly inserted.

Second, Rambang Dangku, with a total area of mature and old trees covering 10,917 ha, the production of rubber or productivity is 1,850 kg or 213 kg per month. The yearly rubber production is 21,827 kg, or productivity in 2012 to 2.03 tons per hectare.

Third, Rambang, with plant total area covering 12,253 hectares, and 1,497 hectares of old / damaged, is able to produce rubber to 4030.8 kg per month or productivity is 194 kg per hectare. A yearly amount of rubber production is 27 432 kg, or productivity in 2012 amounted to 1.8 tons per hectare.

The pattern of rubber crop production follows the age of the plants. If local farmers can do well in maintaining rubber cultivation by providing lands with high suitability, moderate suitability or less suitability, it can produce high production level. Rubber plant production patterns according to age of the plants in general are as follows: (a) phase I, production continues to increase in the year 1st to the tapping year 10th , (b) the second phase, production is steady in tapping year 11th to 15th and (c) phase III, production is reduced in tapping year 16th and so on. Nowadays, the high quality clones are able to achieve the level of productivity up to 2,500 kg of dry rubber / ha / year.

3. Marketing Aspects

Farmers generally market the rubber production in the form of bokar after tapping latex is collected, then frozen into bokar with saling period for one week or two weeks. Marketing distribution occurs throughout marketing channels. Marketing channel function is very important, especially to see the price level of each marketing agencies.

The majority mechanism of the Bokar market in Muara Enim is through two marketing channels which involves marketing agencies prior to end target buyers ie the rubber processing factory. Both marketing channels are choosen by farmers to market their bokar can be illustrated by the following chart marketing channels.

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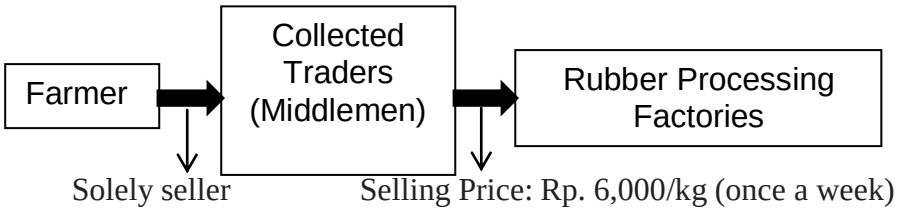
These two types of channels appear to be simple, involving only two channels. Channel 1 is the channel most preferred by farmers (60%). A group of farmers who choose this channel generally farmers who do not coordinated groups (sold independently).

Channel 1 (60% of farmers):



Channel 2 (40% of farmers):

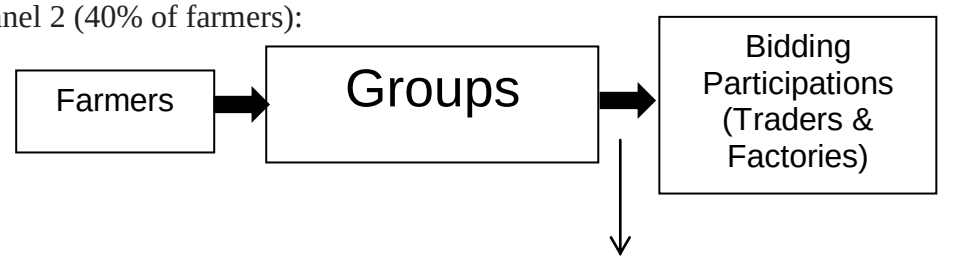


Figure 1. Marketing Channels of Bokar in Muara Enim

This despite the marketing channel 1 provide lower prices than the channel 2, but channel 1 is still preferred by farmers, arguing:

- Channel I though the price is lower but the sales period is shorter than the channel 2. Farmers can sell their product on the shelf life of one week, so they get the money faster.
- Farmers have a lot of debt tied up with middlemen.

The reason of farmers choose the channel 2 is merely due to the price is more attractive than channel 1, although taking longer sales period (the sales period for rubber with a shelf life of two weeks). The two channels show the difference selling prices received by farmers, based on the selling price, the auction market has higher selling price compared to middlemen (brokers). There is a marketing margin amounted to IDR 1,500 / kg. Regardless of lower selling prices, this channel is still the most proffered by the farmers due to the reasons mentioned previously.

Actually, rubber prices received by farmers are still not viable. The decline in rubber prices since 2015 have not returned to normal. Although, it has been gradually improved, the price is still fluctuated and below the expected farmers' prices, namely a minimum R.10.000 / Kg.

In the downstream industry, there are many variations on the rubber processed product. Unfortunately, those variations have not yet occurred in Muara Enim. Farmers expect the presence of the downstream industry to push up the rubber selling price that are currently plummeted because of an excess supply on the world market. Thus, the existence of downstream rubber industry in Muara Enim is expected to accommodate over-production of rubber in the export market.

Judging from the development of the market and profit analysis of the added value obtained in the downstream industry, the market orientation of the rubber commodity indeed should be directed to the development of downstream industries rather than just relying on primary products that have been dominant in progress. Value

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added products and labor absorption through the development of downstream industries is expected to provide great benefits. This development need to be done gradually and by no means of all the production of rubber must be processed into derived products in the country. Surplus production is quite abundant portion can still be exported with comparative advantage possessed, and in addition it is estimated the production capacity of downstream industries in the province of South Sumatra still cannot absorb the total excess supply of raw materials in the short and medium term.

Furthermore, the downstream rubber industry is also important to develop in Muara Enim, the reason is this area has become the center of rubber production in South Sumatra and has a potential as national and international sea port in the province of South Sumatra. The presence of these ports will facilitate the marketing of these commodity exports, while cutting rubber export channels which previously have to go through another province that has a harbor. This extending the marketing channels will have an impact on the increase of marketing costs, which of course would reduce exporters' earnings.

4. Farmer Institutional Aspect

Institutional role becomes very important because it goes beyond the role of technology and the excess of resources. At first, the excess of resources (resource endowment) is considered the most important factor for growth and technological progress. This factor is an important factor in improving the effectiveness and efficiency of resources in relation to resource productivity. Lately, it recognizes that the institutional role is the most important factor as aligning in the process of production, distribution and consumption and also recognized as the most important factor in driving economic growth, beyond technological factors and the excess of resources because technological and resources factors have no means without institutional factors.

Institutional development (institutional capacity building) and organizational behavior must be supported by a social consciousness through values replanting. That means the institutional development along with the contract and the organization is an important factor in development policy. Institutional development needs to be aligned with local values through changing the development paradigm based participation (participatory-based development).

Poktan, Gapoktan and KUD will strengthen farmers 'cooperatives, but because the tight market competitions arrange by middlemen, causing farmers have no power in determining the price of rubber and institutions' bargaining position becomes low. Although in Gelumbang, Rambang and neighborhood have KUD in auctioning rubber, but magnitude of middlemen is too large, so the price set in the auction still profitable to middleman. Middleman relatively has strong position because most of participations come from bokar processing company in Palembang which is the root of rubber selling problems.

Rubber Plantation Financial Feasibility

In this study, it is assumed that equity financing become the financial source of the construction and operation of rubber plantations, and land is readily available for rubber cultivation, so we do not take into account the cost of the purchase or lease of land. To plan and maintain rubber plant properly needs 5 years duration to make it is able to harvest. Therefore, the construction of rubber plantations requires long-term investment with a grace period of 5 years. Components of investment cost of rubber plantations as other plantation crops consists of pre-operating costs, land clearing, planting and maintenance of immature plantations.

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Annual operating costs are calculated to facilitate the third parties interested in assessing the financial outlook for rubber plantations in the future. In the calculation of annual operating costs assumptions are used as: (1) the prices of raw and auxiliary materials will not change significantly; (2) The same thing applies to direct wages, salaries, and overhead costs; (3) the selling price of the processed rubber will not change significantly; and (4) inflation in the country will affect the selling price and direct costs commensurately.

Maintenance of immature plantations starting from year 0 to 5 and maintenance of generating plants starting from year 6 onwards until in year 25 (aged productive rubber trees). The amount of the investment cost per hectare for 5 years early stage is Rp.46,327,505, - assuming that the land is owned by farmers, so there is no cost of purchasing the land again.

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Table 1. Analysis of Financial feasibility per hectare rubber plantation investment period year 0 to year 12th

Costs And Benefits Components	Year											
	0	1	2	3	4	5	6	7	8	9	10	11
Investment cost							0	0	0	0	0	0
Operational Costs	28,924,500	3,062,345	2,455,475	2,875,400	2,426,050	3,656,235	11,476,290	11,585,490	11,702,130	11,710,770	11,716,170	11,750,250
1. Wages and Salaries	20,180,000	1,560,000	900,000	1,080,000	600,000	720,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000
2. Basic Materials	5,615,000	1,223,950	1,332,250	1,534,000	1,605,500	1,579,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250
3. Machines and tools	500,000	-	-	-	-	1,024,600	50,000	50,000	50,000	50,000	50,000	50,000
4. Contingency	2,629,500	278,395	223,225	261,400	220,550	332,385						
B. Management Fee	1,446,225	153,117	122,774	143,770	121,303	187,812						
C.. Insurance (1,5%)	433,868	45,935	36,832	43,131	36,391	56,344	197,040	306,240	422,880	431,520	436,920	471,000
Net Investment Costs (0 - 5 Tahun)	30,804,593	3,261,397	2,615,081	3,062,301	2,583,743	4,000,390						
Total Costs (6- 25 Tahun)							11,476,290	11,585,490	11,702,130	11,710,770	11,716,170	11,750,250
Inflows	0	0	0	0	0	0	13,136,000	20,416,000	28,192,000	28,768,000	29,128,000	31,400,000
Production (slab KKK 45%)	0	0	0	0	0	0	1,642	2,552	3,524	3,596	3,641	3,925
Price (Rp/kg)	0	0	0	0	0	0	8,000	8,000	8,000	8,000	8,000	8,000
Revenues (IV-III)	30,804,593	3,261,397	2,615,081	3,062,301	2,583,743	4,000,390	1,659,710	8,830,510	16,489,870	17,057,230	17,411,830	19,649,750
df = 15%	1	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323	0.3759	0.3269	0.2843	0.2472	0.2149
PVB	0	0	0	0	0	0	717,538	7,675,131	9,216,015	8,177,661	7,199,996	6,749,217
PVC	30,804,593	2,835,998	1,977,377	2,013,513	1,477,264	1,988,901	4,961,517	4,355,415	3,825,447	3,328,932	3,121,762	2,525,637
PVR							5679055.3	7675130.61	9216014.81	8177661.07	7199996.1	6,749,217.19

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Table 2. Analysis of Financial feasibility per hectare rubber plantation investment period year 13th to year 25th

Costs And Benefits Components	Year										
	13	14	15	16	17	18	19	20	21	22	23
Investment cost	0	0	0	0	0	0	0	0	0	0	0
Operational Costs	11,857,530	11,736,210	11,736,210	11,736,210	11,736,210	11,736,210	11,682,090	11,682,090	11,682,090	11,682,090	11,682,090
1. Wages and Salaries	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000	9,600,000
2. Basic Materials	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250	1,629,250
3. Machines and tools	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
4. Contingency											
B. Management Fee											
C.. Insurance (1,5%)	578,280	456,960	456,960	456,960	456,960	456,960	402,840	402,840	402,840	402,840	402,840
Net Investment Costs (0 - 5 Tahun)											
Total Costs (6- 25 Tahun)	11,857,530	11,736,210	11,736,210	11,736,210	11,736,210	11,736,210	11,682,090	11,682,090	11,682,090	11,682,090	11,682,090
Inflows	38,552,000	30,464,000	30,464,000	30,464,000	30,464,000	30,464,000	26,856,000	26,856,000	26,856,000	26,856,000	26,856,000
Production (slab KKK 45%)	4,819	3,808	3,808	3,808	3,808	3,808	3,357	3,357	3,357	3,357	3,357
Price	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

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(Rp/kg)											
Revenues (IV-III)	26,694,470	18,727,790	18,727,790	18,727,790	18,727,790	18,727,790	15,173,910	15,173,910	15,173,910	15,173,910	15,173,910
df = 15%	0.1625	0.1413	0.1229	0.1069	0.0929	0.0808	0.0703	0.0611	0.0531	0.0462	0.0402
PVB	6,265,778	4,305,436	3,743,858	3,255,528	2,830,894	2,461,647	1,887,045	1,640,909	1,426,877	1,240,763	1,078,924
PVC	1,927,180	1,658,663	1,554,530	1,254,187	1,090,598	948,346	820,846	769,570	620,677	539,719	469,321
PVR	6,265,777.79	4,3054,36.237	3,743,857.60	3,255,528.35	2,830,894.20	2,461,647.10	1,887,045.45	1,640,909.10	1,426,877.47	1,240,763.02	1,078,924.36

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Table 3. Analysis of Financial feasibility rubber plantation investment Period year 0 to year 25th

No	Components	Value	Characteristics
1	NPV (df 15%)	Rp4,511,422	Feasible
2	IRR	16.18%	Feasible
3	PP (year)	9.1	Feasible
4	Gross B/C	1.07	Feasible
5	Net B/C	1.00	No benefit, No cost

Rubber Downstream Opportunities

The amount of potential latex, crumb rubber, and the availability of a broad market expose the chance to increase the added value of natural rubber Muara Enim. These opportunities should be optimized by promoting the growth of downstream industries of rubber (rubber agro-industry). Increased rubber agro-industrial can improve the region's natural rubber consumption, reduce imports of rubber goods, increasing local jobs, save foreign exchange and encourage economic growth in the region.

The potential rubber production is approximately 92 percent generated by local rubber farmers, and 8 percent was generated by seven existing companies. However, crude rubber (crumb rubber) has not much value, so there is a necessity for agro-industries to process more crumb rubber. Value added rubber products can be obtained through the development of downstream industry and the utilization of rubber wood as raw material.

Table 4 Creative Agro-Industry Opportunities for Rubber Products in Muara Enim Regency in 2010-2016

Year	Area (Ha)	Production (Ton)	Consumtion (Ton)	Production Surplus (Ton)	Selection of Processed Rubber Product That Can Be Developed in Muara Enim
2010	224,209	409,687	61,453	348,234	Rubber bands, seal LPG, Label Name (Shoes, sandals, rubber, Name Tag), Keychain (cars ,motorcycles), Accessories Rubber Car, Rubber Motorcycles, Table Mats (Tray Tables, Chairs, Glass), Phone Case , Rubber Gloves, Perlak, Rubber Watch Band, Rubber Watch, Tyre Retreading, tile.
2011	220,256	412,372	61,856	350,516	
2012	220,256	375,000	56,250	318,750	
2013	152,402	174,678	26,202	148,476	
2014	152,507	174,915	26,237	148,678	
2015	149,278	182,225	27,334	154,891	
2016	148,337	161,406	24,211	137,195	

Sourced by Statistics Plantation and various sources, 2016 (processed)
Note: PALI is excluded from Muara Enim

SUMMARY AND RECOMMENDATION

Based on the research results, it can be explained rubber plantation investment feasibility of geographical aspects, production, markets, farmer institutional and financial feasibility. Geographically, most of area in Muara Enim tend to suitable to cultivate rubber plants, but the area became the center of the rubber in Muara Enim located in the Rambang Dangku, Rambang, Gelumbang, Tanjung Agung, and Lubai. On average monthly rubber production in all districts of Muara Enim Regency is 999 kg per hectare and annual productivity is 1,363 tons. The production rate is lower than the ideal productivity of rubber plantations Service data (Disbun) amounted to 1.8 tons. Based on Disbun's data, rubber production in Muara Enim on the 1st half of 2011 has reached 239,808.6 tons. Meanwhile, based on data from the study, the production level is not too much different from the Disbun's data which has reached 239,776 tons. Farmers only use two marketing channels. Channel I from farmers to traders then to a rubber factory. This channel is most preferred channel (60%). A group of farmers who choose this channel, generally are farmers who do not coordinated groups (sold independently). On the second line from farmer to farmer groups further to the auction market and a rubber factory. On the second line, the reason farmers to choose this major channel of course the price is more attractive than channel 1, although the sales period requires more time to wait (the sales period for rubber with a shelf life of two weeks).

The potential latex, crumb rubber, and the availability of a broad market expose the opportunities to increase the added value of natural rubber in Muara Enim. These opportunities should be optimized by promoting the growth of downstream industries of rubber (rubber agro-industry). Increased rubber agro-industrial yields to increase the added value product, also can improve the region's natural rubber consumption, reduce imports of rubber goods, increasing local jobs, save foreign exchange and encourage economic growth in the region.