

## **MARKETING PERFORMANCE OF RUBBER IN NORTHEASTERN THAILAND**

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### **ABSTRACT**

The performance of local rubber auction markets and the central network market in Northeastern Thailand was investigated. Data was randomly collected from 320 rubber farmers and 6 middlemen within the two provinces of Northeastern Thailand. Results revealed that most farmers (89.94%) had sold rubber through cooperatives or groups of farmers at local auction markets or rubber network central markets in the Northeast. Marketing costs at the farmer level were found to be 0.0240 USD/kg (rubber sheets) and 0.0179 USD/kg (cup lumps) for marketing channel 1, and 0.0323 USD/kg (rubber sheets) and 0.0250 USD/kg (cup lumps) for marketing channel 2. The local auction trader had a marketing cost of 0.0301 USD/kg (rubber sheets) and 0.0307 USD/kg (cup lumps) for marketing channel 1, and 0.0384 USD/kg (rubber sheets) and 0.0254 USD/kg (cup lumps) for marketing channel 2. Factors positively affecting rubber market participation include education, farm size, membership in farmer groups, access to credit, and distance to a market. Although groups of farmers or cooperatives are important in increasing negotiation with traders in local auction markets and the network central market, groups of farmers would need financial support to manage their rubber bidding. Therefore, the government should provide financial support with lower interests to allow stronger management of farmer groups in the rubber market.

**Key words:** cooperative, farmer groups, cup lump, marketing margin, marketing cost

### **INTRODUCTION**

In the past decade, rubber trees have been grown predominately in the upper Northeastern areas, rather than in the lower Northeastern regions. The upper area plantations account for 410,120.96 ha (1 rai = 0.16 ha), with a collection area of 102,232.48 ha producing a total of 161,975 tons or an average of 1.58 tons per ha (The Office of Nongkhai Rubber Market, 2015). This has resulted from the expansion of rubber plantations in 2006 which was the government's rubber extension period under the One-Million Rai Rubber Plantation Project. The target was an extension of rubber plantations in 36 provinces from 2004-2006 to cover an area of 48,000 ha in 17 Northern provinces and 112,000 ha in 19 Northeastern provinces. Moreover, rubber prices have been relatively stable and profitable since from 2003, especially in 2011 when the price steeply increased from 1.87 \$/kg to 3.31 \$/kg, drawing more farmers to grow rubber trees in higher numbers than the target. In this context, the Office of Agricultural Economics (2015) stated the total national tapping area had also increased to 2.21 million ha, which represents an increase of 0.17 million ha or 8.16% from the previous year. The level of productivity per ha was 1.64 tons with an export rate of 2.95 million tons. This was a decrease from the previous year of 3.06 million tons (3.59%) because the primary consumers, such as China, USA, and Europe, were facing economic regression and required less rubber.

As above mentioned, although the trend for Northeastern rubber production is increasing, i.e., from 154,917 tons in 2008 to 504,000 tons in 2015 (The Office of Agricultural Economics, 2015), there are several problems and constraints. This is especially true in the area of marketing where middlemen take advantage of producers with respect to prices owing to the fact that raw rubber material is below the marketing price. Also, problems with low-quality rubber production have been significant, such as the result of dirty contaminants in the raw rubber sheets and an unstable rubber supply required meeting the demand placed on manufacturing factories, as well as the factor of dealing with the low yield per area. From this viewpoint, it is obvious that the problem of marketing also needs to be considered since the middlemen have often given very low prices for raw rubber sheets. Due to the rush of selling rubber cup lumps, farmers accepted all prices offered by traders; thus, the inefficiency of rubber marketing becomes the main problem for smallholder (Zakky, 2009) and the smallholder farmers have small market participation (Barret, 2008). In working towards a timely and sensible solution to these problems, the local rubber auction market of the Office of the Rubber Replanting Aid Fund (ORRAF) could be an alternative choice of a platform where the rubber farmers could sell their products by acting as an interface between buyers and sellers. The local rubber auction market has been set up to solve the problem of low prices by using the same methods as the central rubber market under ORRAF and to reduce marketing costs. Depending on rubber types, the rubber auction market of ORRAF consists of 4 systems, in general. However, the faxing auction market is the most operational in the Northeastern region (Rubberthai, 2014). The local rubber market helps farmers to increase income but not fully helps farmers as a price taker in the rubber market system (Zakky, 2009).

Most of the rubber cooperatives or farmer groups located far from the central rubber market had insufficient information on rubber marketing. This information can be the standard for trading decisions. There were insufficient officers of the central rubber market to publicize the accurate information to the farmers in specific areas. Thus, the network central market in Ubonratchathani province is established to be the trading center as a central network market of rubber which is the option for the farmers to directly access without the middleman. The central rubber market will support marketing devices, academic training, and trading system which is similar to the rubber central network market given that the farmers can sell higher costs of rubber production than the local price (Central rubber market of Buriatum, 2015). Therefore, it can be said that with the collection action in market smallholders can reduce the transaction cost for input and output access (Kersting and Wollni, 2012) and can have more a bargaining power in negotiation (Marklova *et al.*, 2009). The collective action in term of cooperatives or farmer groups has increased market participation (Jari and Fraser, 2009). However, the clarity of the information about this market system is not well presented, including the distinguishing market types and marketing management. In addition, many studies have been conducted on rubber technology and development. Thus, this study focused on the market performance of the local rubber auction market and the central network market in the Northeast and the estimated costs and returns from rubber marketing, as well as the marketing margin.

## **METHODOLOGY**

In this study, data collection used comprehensive questionnaires for personal interviews by collecting information from the samples. Close-ended questions and open-ended questions were used in the questionnaires. The purposive sampling focused on provinces that had large amounts of rubber and local auction markets: Nongkhai and Ubonratchathani, provinces. The respondents by random sampling consisted of 150 households in Nongkhai province and 170 households in Ubonratchathani province, totaling 320 households and also 6 middlemen. For margin analysis, the wholesale margin is the difference between the sale price and the purchase price. The data was

analyzed by descriptive statistics, marketing costs, and marketing margins. The net market margin refers to the difference between the gross margin and the total cost in that the gross margin is the difference between the sale price and the purchase price (Tomek and Robinson, 1981).

In this study, in order to determine the factors affecting farmers' participation in rubber marketing the logit model was used and the model is specified as:

$$Y = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon \quad (1)$$

Where

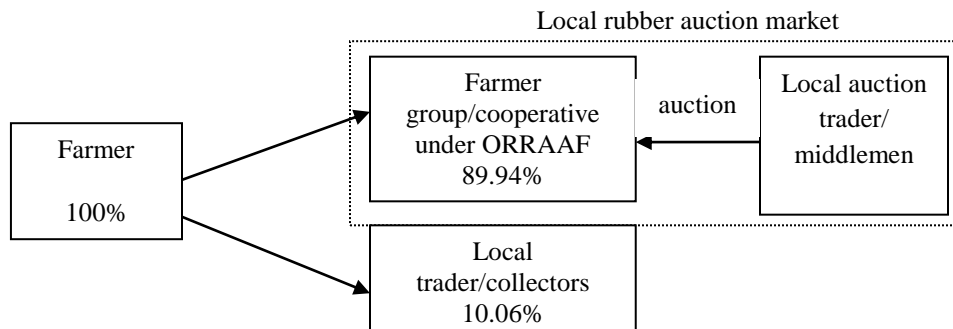
- Y = dependent variable (1 = farmer participate in rubber market, 0 = otherwise)
- X<sub>1</sub> = the farmer's gender (0=otherwise and 1=male)
- X<sub>2</sub> = education level (years)
- X<sub>3</sub> = farm size (ha)
- X<sub>4</sub> = membership in marketing group farmer (0=otherwise and 1=member)
- X<sub>5</sub> = access to credit (0=No and 1=Yes)
- X<sub>6</sub> = distance to the market (km)
- ε = the disturbance term

Positive coefficient of the independent variable (X<sub>i</sub>) indicated the increasing participation of rubber market including male, higher education levels, access to credit, group membership, distance market, and larger farm sizes (Holloway *et al.*, 2000; Conway *et al.*, 2005; Hoden and Binswanger, 1998).

## RESULTS

### ***Rubber Marketing in Northeastern Thailand***

Most of the farmers (89.94%) sold rubber through the cooperatives or farmer groups in the Northeast via the local auctions market. The yields were sold at the assembly point for the rubber and auctioned in order to receive the bidding price. The next day it would then be weighed and the money would be paid to the farmers under the control of ORRAF. On the other hand, the remaining 10.06% of the rubber in the local market was sold to local traders or middlemen. Farmers urgently need money to use for their households. This has led to a practice of not grading the rubber, and as a result, the farmers are being commercially exploited in terms of both purchase price and given weight rise that the farmers are not being treated fairly (Fig.1).



**Fig. 1.** Rubber marketing channel 1

### ***Rubber Auction Market Systems in Northeastern Thailand***

Most farmers sold 89.94% of their rubber to groups of farmers or cooperatives, in the form of rubber sheets (21.42%) and rubber cup lumps (68.52%). Cup lumps were sold through a local auction market, and became an outstanding point for the rubber markets in the Northeast which included a grading process, rubber quality analysis and was under the control of ORRAF. As for the local rubber market auction, the price auction is done via fax or phone. The ORRAF participates in the auction in order to increase farmers' confidence and serves as a mentor to make sure that the farmers do not receive prices lower than the market price. The ORRAF guides the market mechanism, coordinate the buyers, participates in the rubber auction and takes into consideration the welfare of the farmers. Due to the fact that the stability of the rubber prices is quite low, the government has implemented a local auction market project aimed at maintaining the stability of the rubber prices to make sure that the farmers get the fairest prices, but under the project, the farmers have to wait for 45-60 days to get their money. However, the farmers are helped with the following: 1) the weighing the rubber products, 2) participating in the auction venue, and 3) the transporting of the products. Despite the help that they receive and the fact that the prices are higher, this waiting period is a definite disadvantage of the project.

Most of the bidders are factory representatives, who participate in the auctions by trading the rubber. The bidders, who offer the highest price, are the auction winners. After the auction, the rubber is weighed and delivered to those who had won in the bidding. The marketing expenses incurred by the middleman, who came to bid at auction rubber, can also be included in all the costs of transporting the inventory to the warehouse for storage. In the case of cup lumps, farmers must bring cup lumps to the assembly point of purchase one night before in order to reduce the moisture content. Then the bidders are informed that it is time to participate in the auction. When the price is right, it will then be auctioned off. Then it is weighed again on a queue at a later date in order for the bidders to make payments to farmers. However, in the case of the rubber farmers, who have brought rubber sheets to the point of purchase prior to bidding for that day, the bidders have to know the number of rubber sheets before at 10:30 A.M. After that, when the highest bid of the auction has been made, the rubber is randomly checked for quality, and is then later weighed. After which, farmers are paid. The price for the auction from the bidders is based on the reference price from the office of Hat Yai Central Rubber Market. Yet, some middlemen depended on the prices from the local rubber factory.

### ***Selling Through Cooperatives***

The rubber cooperative in the Northeast has helped to increase the farmers' power in price bargaining in order to get the fairest deal. In this case, the farmers bring their rubber products, gather them at the rubber assembly point, and wait for an auction under the faxing auction market. The faxing auction market was developed from the general auction market by making improvements and offering greater accessibility. On the auction day, when the auction prices are known, the rubber products will be weighed and payments made to the farmers. In order to increase the farmers' confidence, the ORRAF participates in the auction. The ORRAF can be compared to a mentor who makes sure that the farmers will not receive any price lower than the market price. ORRAF guides the market mechanism by contacting and giving consideration to the buyers participating in the rubber auction. ORRAF is also responsible for the following: 1) contacting and coordinating with the agricultural cooperatives and 2) financing the cooperatives to help them maintain their liquidity and financial effectiveness. Moreover, an important role that ORRAF plays is helping with the accounting and auditing activities of the cooperatives (Figure 1). However, for small cooperatives, the farmers have to wait for 45-60 days to get their money. Although the prices are higher and the farmers are helped both in weighing their rubber products and in the auction venue, the waiting period is a weak point of the local auction market through rubber cooperative.

The PhonePhisai Cooperative in Nong Khai Province covers five areas: the Poanpisai District, the Fao Rai District, the Rattanawapi District, the PakKhat District, and the Beung Gaan district. There are 1,080 members in the cooperative. This cooperative is only opened for the purchase of rubber cup lumps, and the main target groups include farmers, who are members of cooperatives and non-members. About 500 farmer members sell cup lumps to cooperatives. The cooperative participated in rubber purchasing itself, and not through the local auction. The cooperatives have obtained a benefit averaging around 0.0691 \$/kg.

The cooperatives have been responsible for providing the following: 1) the rental of transport vehicles for 96.69 \$/round {10-wheel vehicle}, 2) a wage for loading rubber at 4.14 \$/ton, 3) the rental of the assembly point at 55.25\$/round, and 4) food and drinks for the committee at 27.62 \$/round.

It opens for buying and selling twice a month. Moreover, with respect to the transportation of the rubber to a factory, it was found that there was a problem causing about 5% loss of weight of the total rubber weight per round. This situation has made it necessary for the cooperative to bear the risk because the quantity of water is not fixed. However, a benefit, given to the farmers who sell cup lumps through cooperatives, is that they are eligible for a special dividend each year: an investment credit for agriculture and an input credit. The main reason the cooperatives have chosen to become entrepreneurs is due to the need to help the member farmers. By doing so, there is a reduced risk of the farmers being exploited by the local middlemen, and furthermore, there is an increase of the marketing effectiveness for cup lumps which can be driven by market mechanisms.

#### *Selling through Groups of Farmers*

The buying and selling of rubber through the Wangluang Rubber Group in Nong Khai Province have been operated via local auctions by local merchants. The process of auctioning the cup lumps is not different from the cooperative under the Office of the Rubber Replanting Aid Fund. However, the group's only role is rubber collection in order that the auction process does not have to be financed and farm input support. Therefore, the middleman, who wins the auction, must pay the management cost for the group at around 0.0138-0.0193 \$/kg and must also pay for the transportation of the rubber to the factory.

#### ***Phu Foi Lom Rubber Community Group as Central Network Market***

Buriram central rubber market organized the network central rubber market for the lower northeast which was recently found at Phu Foi Lom rubber community enterprise group of Ubonratchatani province that assists the farmers in the remote area so that they can access the central market for rubber trading.

Phu Foi Lom rubber community enterprise group was found by a group of farmers for unsmoked rubber sheet trading. The network market was located in Kho Laen sub-district, Buntharik district, in 2005, and that later advanced to be the Community Enterprise Group in 2006 with the suggestion from the Faculty of Agriculture, Ubonratchathani University. In addition, the group was also supported by the Agricultural Land Reform Office that formed the group and the register of community enterprise. The Office of the Rubber Replanting Aid Fund, as a mentor, helps to promote the production, plantation, tapping, conservation, and rubber marketing. Unsmoked rubber sheet trading was the main business of the group and later, in 2008, it began to trade the cup lump, wet and dry. Recently, there was only trading of unsmoked rubber sheet and dried cup lump.

The motivation of group establishment was a far distance from the rubber farm to the market place which takes a long time to travel. Sometimes, the farmers have to ask for help from

their neighbors in case they have no car as well as to provide bargaining power to the traders for the fairness. Additionally, the motivation of assembling to be the network market of the central market was to protect and reduce the financial risks, to gain the bargaining power and the income for the farmers, to reduce the difficulty of trading price, and to reduce the transportation cost.

In 2016, there were about 630 members. The group management committee consists of 13 persons: 1 chairperson of the group, 1 vice-chairperson of the group, 1 treasurer, 1 secretary, and 9 committees divided into 1 for marketing, 6 for rubber selection, and 2 for the general committee. The trading was opened from June each year and closed in February of the following year. Recently, the trading capacity is calculated in the average of 50 tons per time, about 200 tons per month. For trading opening that is four times a month, the farmers have to take the rubber for trading on Monday. The auction is held on a Tuesday. A group will send the total weight of the rubber to central rubber market at 10 AM. The rubber is received from member group and sub-network marketing group (Fig. 2). The bidding price is announced at 11AM. The deal price goes to the bidder who offers the highest price. The bidder transfers the money to Buriram Central Rubber Market's bank account. The central market will transfer the money to the network market group. The farmers will receive the money on Wednesday through the bank. Regarding, the payment charge includes the cost of group management and divided to be the group saving money in the amount of 0.0193 \$ that was managed as the committee allowance, public utility, and other expenses occurred during the period of trading. The other 0.0138 \$ will be the saving of the group and allocated as compensation to the members.

There were several reasons for farmer joining the group. Firstly, there was to increase the income with the percentage of 42.1. Secondly, the group can facilitate farmers in purchasing production factors in a form of credit. With the percentage of 17.5, the farmers are able to increase the selling of products. From the above statement, price motivates the farmers to expand the production area for the unsmoked rubber sheet quantity to increase the household income. As members of the group, the farmers can find the funding source by gaining the production factors such as fertilizer and working capital through credit. The farmers are able to sell the quality products to fill the market demand that leads to the fairness of price and weighing.

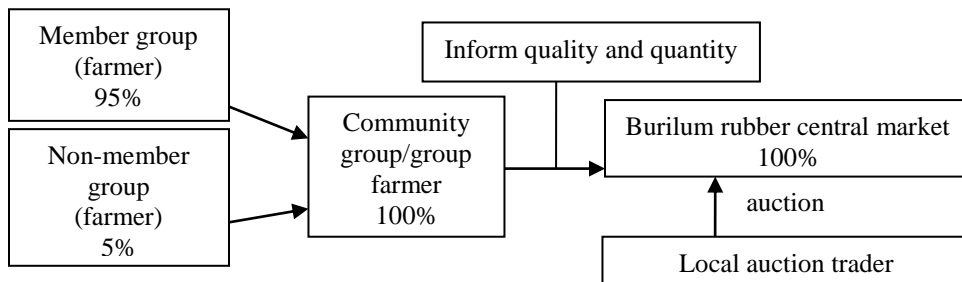


Fig. 2. Rubber marketing channel 2: Phu Foi Lom Rubber Community Group

**Marketing Costs of Rubber Farmer and Local Traders for Rubber Sheets and Cup Lumps**

At the farmer's level, the marketing costs were found to be 0.0240 \$/kg and 0.0179 \$/kg of the marketing channel 1 and 0.0323 \$/kg and 0.0250 \$/kg the marketing channel 2, for rubber sheet and cup lump respectively. The cost of marketing for rubber sheets was higher than the cost for the cup lumps at around 0.0061 \$ and 0.0073 \$ for the marketing channel 1 and 2 respectively. Also, it was found that the cost of transportation from the farm to the cooperative for rubber sheets was higher than the cup lumps (around 0.0058 \$/kg for the marketing channel 1 and 0.0050 \$/kg for the marketing channel 2) because the farmers needed to transport the product several times in the case

of larger amounts and needed to transport to several places in order to sell the product (Table 1). On the contrary, the local auction trader had a marketing cost of 0.0301 \$/kg and 0.0307 \$/kg of the marketing channel 1, 0.0384 and 0.0299 \$/kg of the marketing channel 2 for rubber sheets and cup lumps, respectively. The highest cost of rubber sheets and cup lumps is the transportation cost from farm to cooperative/group, which is the highest for both marketing channels (Table 2).

**Table 1.** Marketing cost of rubber farmer for rubber marketing channel 1 and 2 (unit: \$/kg)

Items	Mean	
	Marketing channel 1	Marketing channel 2
<b>Marketing cost for rubber sheet</b>	<b>0.0240</b>	<b>0.0323</b>
-Labor cost	0.0100	0.0138
-Transportation cost from farm to cooperative/group	0.0135	0.0171
-Telephone cost	0.0005	0.0014
<b>Marketing cost for cup lump</b>	<b>0.0179</b>	<b>0.0250</b>
- Sack	0.0053	0.0066
- Labor cost	0.0047	0.0061
- Transportation cost from farm to cooperative/group	0.0077	0.0121
-Telephone cost	0.0002	0.0002

Note: 1\$ = 36.2 Baht

**Table 2.** Marketing cost of local auction trader for rubber marketing channel 1 and 2 (unit : \$/kg)

Items	Mean	
	Marketing channel 1	Marketing channel 2
<b>Marketing cost for rubber sheet</b>	<b>0.0301</b>	<b>0.0384</b>
- Loading cost	0.0041	0.0022
-Cooperative/group service fee	0.0111	0.0193
-Transportation cost from farm to cooperative/group	0.0149	0.0169
<b>Marketing cost for cup lump</b>	<b>0.0307</b>	<b>0.0299</b>
- Loading cost	0.0050	0.0036
- Cooperative/group service fee	0.0111	0.0111
- Transportation cost from cooperative/group to factory	0.0146	0.0152

Additionally, the local auction trader purchased rubber sheets at an average price of 1.2486 \$/kg for the marketing channel 1 and 1.2431 \$/kg for the marketing channel 2 while at a selling price of about an average 1.3259 \$/kg for both the marketing channels. The gross marketing margin was 0.0773 \$/kg and 0.0828 \$/kg for the marketing channel 1 and 2, respectively, and the marketing costs were 0.0301 \$/kg and 0.0384 ha/kg for the marketing channel 1 and 2, respectively. Thus, the net marketing margin was 0.0472 \$/kg and 0.0444 \$/kg for the marketing channel 1 and 2, respectively.

For cup lumps, the purchasing and selling price was an average of 0.5829 \$/kg and 0.6354 \$/kg for the marketing channel 1 and 0.5801 and 0.6354 \$/kg for the marketing channel 2, so the gross margin was 0.0525 \$/kg and 0.0553 \$/kg for the marketing channel 1 and 2, respectively

resulting in the receipt of a net marketing margin of 0.0218 \$/kg and 0.0254 \$/kg for the marketing channel 1 and 2, respectively. On the other hands, farmers received a real price equal to 1.2246 \$/kg of the marketing channel 1 and 1.2108 \$/kg of the marketing channel 2 for rubber sheet and 0.5650 \$/kg for the marketing channel 1 and 0.5551 \$/kg for the marketing channel 2 of cup lumps (Table 3). Obviously, regarding local auction trading for cup lumps, a low purchasing price was offered at auction due to the fact that there was no quality standard to help in determining a price. Traders would evaluate cup lumps based on the percentage of moisture (an average of 45%) in the rubber, and if cup lumps were significantly dirty or contaminated, the traders would deduct 0.1381-0.2762 \$/kg depending on the amount present. Most farmers in the northeast produce cup lumps with contaminants which is cheaper. Meanwhile, the rubber sheet price from traders is not different from the market price because the quality standards of the rubber sheets have already determined the price. Moreover, both auction prices in rubber sheets and cup lumps have a lower price from traders due to collusion among the traders which led to lower incomes for the farmers.

**Table 3.** Marketing margin of local auction trader for marketing channel 1 and 2 (unit : \$/kg).

Items	Marketing channel 1		Marketing channel 2	
	Rubber sheet	Cup lump	Rubber sheet	Cup lump
<b>Local auction trader</b>				
Local rubber price (Selling price)	1.3259	0.6354	1.3259	0.6354
Auction rubber price (Purchasing price)	1.2486	0.5829	1.2431	0.5801
Gross marketing margin	0.0773	0.0525	0.0828	0.0553
Marketing cost for local trader	0.0301	0.0307	0.0384	0.0299
<b>Net marketing margin</b>	<b>0.0472</b>	<b>0.0218</b>	<b>0.0444</b>	<b>0.0254</b>
<b>Farmer</b>				
Auction rubber price	1.2486	0.5829	1.2431	0.5801
Marketing cost for farmer	0.0240	0.0179	0.0323	0.0250
<b>Real price for farmer</b>	<b>1.2246</b>	<b>0.5650</b>	<b>1.2108</b>	<b>0.5551</b>

#### Factors affecting participation in collective marketing in rubber

Around 56.3% of households are male. Most head households (50%) have the primary level of school education. The average length of education is 7.9 years. The mean farm size of rubber cultivation is 3.39 ha. The majority (64.7%) of households were members of rubber marketing group farmer. Farmers who had access to credit represented 63.4% in their marketing group farmer. The average of distance from the cultivated area to market is 7.4 km. (Table 4).

A chi-square of 140.22 percent at 5 percent level of significance that indicates a good fit to data and the log likelihood was 275.37 (Table 5). The Nagelkerke R-square was 0.49 indicating percentage of relationship between the predictors and the predation. The variables included in the estimation were farmers' gender, education level, farm size, membership in farmer groups, and access to credit and distance to the market. The intensity of participation in the market increases with the level of household education, farm size, membership in farmer groups, and access to credit. But, the distance to the market reduces the marketing participation. Gender of households ( $X_1$ ) had a positive but not significant effect: males are more likely to participate in rubber sale in marketing group.



**Table 4.** The characteristics of farm households participating in rubber marketing.

Variable	Mean	Standard Deviation	Percentage
Rubber marketing participation (Y)			
0 = otherwise			39.4
1 = farmers participate in rubber market			60.6
Farmer gender (X <sub>1</sub> )			
0 = otherwise			43.8
1 = male			56.3
Education in year (X <sub>2</sub> )	7.9	4.02	
Farm size (X <sub>3</sub> )	3.39	4.04	
Membership in marketing group farmer (X <sub>4</sub> )			
0 = Otherwise			35.3
1 = member			64.7
Access to credit (X <sub>5</sub> )			
0 = No			36.6
1 = yes			63.4
Distance to the market (X <sub>6</sub> )	7.4	7.5	

**Table 5.** Factors affecting a probability of marketing participation.

Variable	Coefficients	SE	Exp(B)
Constant	-1.473***	0.429	0.229
X <sub>1</sub>	0.228 <sup>NS</sup>	0.313	0.796
X <sub>2</sub>	0.033**	0.021	0.967
X <sub>3</sub>	0.029**	0.054	0.901
X <sub>4</sub>	0.556*	0.314	1.743
X <sub>6</sub>	-0.044*	0.025	1.045
Overall Percentage	82.2		
Chi-square	140.22**		
-2log likelihood	275.37		
Nagelkerke R square	0.49		

<sup>NS</sup> non-significance, \*\*\* significant at 1 %, \*\* significant at 5 %, \* significant at 10 %

Education of household was found to have a positive and significant effect ( $p < 0.05$ ). More educated farmers are more likely to increase the probability of participating in the market by 22.8%. The finding is in line with a study by Martey *et al.* (2012), Enete and Igbokwe (2009) but contrary to the finding of Makhura *et al.* (2001), Musah *et al.* (2014). An illiterate farmer may find it difficult to communicate with a trader and to sell in a distant market (Mawazo *et al.*, 2014). Accordingly, farm size is positively related to a probability of participating in farmers marketing group. A larger farm size has a greater amount of rubber yield to sell in this group. Membership in farmers marketing group positively and significantly ( $p < 0.10$ ) impacted the amount of rubber yield sold in the market similar to Sebatta *et al.* (2014). Access to credit is positively associated with the intensity of participating in rubber marketing group. It is consistent with Lerman (2004) and Musah *et al.* (2014). The distance to the market was significant at 10 percent level with negative effect. A non-further distance from the field to the marketing group would increase a probability of market participation (Table 5). The findings are consistent with Gicheha *et al.* (2015), Gani, 2011 but contrary to the finding of Sebatta *et al.* (2014) and Bartha and Bauer (2007).

## **DISCUSSION**

Farmers, who are members of a farmer group/cooperative, had greater confidence in terms of the rubber market and its prices because the ORRAF and the rubber central market had helped them to get fair prices and to improve their bargaining power. As a result of this, the rubber farmers have received better selling prices. Similarly, in Indonesia, the auction market can give a basic price through the provision of the local government related to the price of rubber (Zakky, 2009). In contrast, in the case of selling as an individual farmer, the farmer may be treated unfairly in terms of prices and the weighing of the rubber products. Thus, it can be said that within this kind of auction market mechanism, the farmers have the most advantages. However, despite using the rubber local auction markets, the small groups and those that are located far away would get a lesser auction price than the cooperative because the traders often refer to the transportation cost as one of many factors influenced marketing margin (Hadi, 1994). Sometimes there are only traders who are bidding, and as a result, that fact forces farmers to have to decide whether or not to sell their produce to traders at a lower auction price. Under cooperatives, the marketing of rubber is on an economic scale, influenced by the collection of rubber products and group marketing, and can lead to having more bargaining power in order to obtain a fair price for the rubber farmers (Suni, 2012). Yet, in fact, through ORRAF and rubber central market staff, the auction price process must be maintained for trading among these groups. However, sometimes no staff members have been available to help the groups because there are insufficient numbers of staff members to supervise the rubber auction process in several places at the one time. Thus, the government employs more officers, who help and manage in auction marketing process, in accordance with Zakky (2009).

The integration of farmers into groups of farmers is important to encourage the development of the local auction market. Nonetheless, the integration of farmers to create a local auction market will require working capital, which will be needed to finance the current system. Therefore, the government should encourage the groups of farmers in the Northeast into cooperatives in order that the farmers can gain more benefit from the auction market associated with Giroh *et al.* (2010). There should be support from the government to provide the groups with working capital at low-interest rates in order to strengthen and stabilize the groups or cooperatives. In order to create strength between small groups and larger groups (or cooperatives), a network of local rubber auction markets should be created in the area of each province to bolster small groups with more negotiation power and to encourage active operations of potential entrepreneurs and processors to improve market efficiency and increase the farmers' incomes. Moreover, most rubber factories in the Northeastern region produce rubber cup lumps for export, which has led the farmers to change their behaviors and to produce more rubber cup lumps, in order to increase productivity due to the simpler process and lower cost. As a result, the government should encourage areas, such as fostering the marketing of rubber cup lumps, by supporting the establishment cup lump factories.

Therefore, it can be concluded that with respect to the groups of farmers/cooperatives, it is important to encourage the development of local auction markets to provide better income so that the 'livelihoods' of the farmers can be improved through establishing fair prices in the rubber auction markets.

## **CONCLUSION**

All factors except gender significantly influence the participation in the rubber market. The access to credit is a key factor in deciding to enter the market to sell. Thus, the government should promote auction market among smallholders that can access cheaper inputs and credits. Through the farmers' groups or cooperatives, the marketing costs at farmer level were found to be 0.0240 and 0.0179 \$/kg of the marketing channel 1 and 0.0323 and 0.0250 \$/kg of the marketing

channel 2 for rubber sheet and cup lumps, respectively. In comparison, the local auction traders have a marketing cost of 0.0301 and 0.0307 \$/kg of the marketing channel 1, 0.0384 and 0.0299 \$/kg of the marketing channel 2 for rubber sheet and cup lumps, respectively. Thus, the net marketing margin for traders was 0.0472 and 0.0218 \$/kg of the marketing channel 1 for rubber sheet and cup lump, respectively and 0.0444 \$/kg and 0.0254 \$/kg of the marketing channel 2 for rubber sheet and cup lumps, respectively. Thus, the trader can get a good benefit from the rubber auction market at around 0.0276-0.0552 \$/kg. It can be seen that rubber marketing cooperatives or groups of farmers can give a rubber farmer more bargaining power. Thus, the integration of farmers as groups of farmers or cooperatives is important to encourage the development of local auction markets. However, in order for the auction market to operate in small groups, it needs financial support to manage the auction process. Thus, the government should support the formation of groups of farmers into cooperatives. Moreover, there should be support from the government to provide the groups with working capital in the form of low-interest loans to strengthen and stabilize the groups or cooperatives.

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