Research Article

Comparative Analysis of Rubber Farmers' Income from the Auction Marketing System and the Conventional System in Pangean District, Kuantan Singingi Regency, Riau Province

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Abstract.

This study aimed to: 1) Analyze the efficiency of rubber farming using the auction marketing system and the conventional marketing system. 2) Analyze the comparison of the income of rubber farmers using the auction marketing system and the conventional marketing system. This research was carried out in Pangean District, Kuantan Singingi Regency as one of the rubber production centers that have applied for an auction marketing system. The sampling technique used was simple random sampling based on auction and conventional marketing systems. The respondents in this study were 60 people, 30 from the auction marketing system and 30 from the conventional marketing system. The data analysis used was an independent sample t-test. The results showed that: 1) Rubber farming using the auction system and the conventional system in Pangean District was efficient with R/C values of 2.10 and 1.59. Rubber farming in the auction marketing system is more efficient than the conventional marketing system which is indicated by the higher R/C value of the auction marketing system. 2) There is a significant difference between the income of rubber farmers from the auction system and the conventional system.

Keywords: bokar, rubber, marketing, conventional, auction

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1. Introduction

Community economic development will not be separated from the agricultural sector. Rubber (Hevea brasiliensis) is a valuable commodity crop, being cultivated globally to produce natural rubber [1].

In Riau Province, Indonesia, Kuantan Singingi Regency is one of rubber production centres. The area of rubber plantations in Kuantan Singingi Regency in 2020 was 135,899.26 ha and production was 85,052.78 tons [2].

Rubber plants are a source of income for the people in Kuantan Singingi Regency which is sold in the form of processed rubber or often referred to as bokar. The low price of rubber has raised concerns for rubber farmers. However, previous research showed that rubber farmers managed to cope with the decrease of rubber price by applying strategies such as managing fertilizer, managing labor, changing the form of rubber sold and developing other crops [3].

Recent study in Riau Province concluded that one factor affecting the rubber marketing channel is intermediary consideration [4]. Farmer group is important to increase member access to inputs, equipments and better price for their crops through collective marketing [5].

One of the government's efforts to increase the selling price of rubber is by forming APKARKUSI (Kuantan Singingi Rubber Farmers Association) which implements an auction system of one district, one quality, one time, one place and one price through the Department of Agriculture with an average rubber price range of IDR 9,100 to IDR 9,980 per kg. One of the sub-districts that implements an auction system in Kuantan Singingi Regency is Pangean sub-district.

The bokar marketing system in Pangean District consists of an auction marketing system and a conventional marketing system. There is a difference in the price of rubber in the auction and conventional marketing systems, but there are still many farmers who are not interested in joining farmer groups that use the auction marketing system because farmers feel they will benefit from selling to collecting traders considering that it is easy to get loans and requirements for selling bokar in the conventional marketing system is easier.

Bokar prices for each marketing system are different. Prices in the auction marketing system are higher, which affects the income of rubber farmers in Pangean District. However, there are still many farmers who do not sell bokar to the auction marketing system, because in the auction marketing system farmers have to join a farmer group and must follow the conditions, rules within the group such as the quality of the bokar must be clean from scratch, does not contain frozen fertilizer, is tapped at least 3 day, left for 1 night, weighed once a week and must pay administration. This is different from the conventional system which does not have special rules and the prices received by farmers from collecting traders are lower.

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The comparison of farmers' income from the auction marketing system and the conventional marketing system has been previously studied in Kuantan Singingi Regency. Rubber marketing channels in the auction market are through farmers-farmer groups or GAPOKTAN-APKARKUSI-wholesalers-factories, Kurniati et al. [6], Yuswandi et al. [7], Hermansyah and Arby [8] and Purba et al. [9] have carried out a comparative analysis of farmers' income, marketing and processing costs for the last year alone, while farming costs which include initial investment are not taken into account. The existence of these two marketing systems means that it is suspected that there is a difference in the price income received by rubber farmers in the auction and conventional marketing systems. So far, auction marketing activities have been carried out via the Short Message System (SMS), but there is still no transparency in determining bokar prices. This research aims to: 1). analyze farmer income from auction marketing systems and conventional marketing systems, and 2). analyze the efficiency of rubber business auction marketing systems and conventional marketing systems.

2. Research Methods

The research was carried out from December 2020 to February 2021 in Pasar Baru Village and Sako Village, Pangean District, Kuantan Singingi Regency, using a survey method with cluster random sampling techniques. Samples were 60 people (30 farmers

who were involved in auction marketing channels and 30 people who used conventional marketing channels). Data analysis uses mathematical methods and independent sample t-test statistical methods.

Farming revenue and income [10].

$$Pd = TR - TC \tag{1}$$

Pd = Income (IDR/ha/year)

TR = Total revenue (IDR/ha/year)

TC = Total cost (IDR/ha/year)

Farming efficiency

$$RCR = TR/TC \tag{2}$$

TR = Revenue (IDR/ha/year)

TC = Total cost (IDR/ha/year)

Decision:

RCR>1 (efficient)

RCR<1 (not efficient)

RCR=1 (BEP)

Statistical test [7].

$$t = \frac{x1 - x2}{\sqrt{\frac{(n1-1)s1^2 + (n2-1)s2^2}{n1 + n2 - 2}}\left[\frac{1}{n1} + \frac{1}{n2}\right]} \tag{3}$$

Information

x1 = Average income of rubber farmers selling at the auction system (IDR/ha/year)

x2 = Average income of rubber farmers selling using the conventional system (IDRha/year)

n1 = Number of samples of rubber farmers who sell in the auction system

n2 = Number of sample of rubber farmers who sell using the conventional system

s1 = Income variance of rubber farmers who sell to the auction system

s2 = Income Variance of rubber farmers who sell to the conventional system

Hypothesis:

Ho: Both variants are the same (auction system variant and conventional system)

Ha: The two variants are different (auction system variant and conventional system).

Decision-making:

Sign < 0.05 Ho is rejected, sign > 0.05 Ha is accepted

3. Results and Discussion

The rubber marketing system in Pangean District consists of two marketing systems, namely the auction marketing system and the conventional marketing system. The auction marketing system is a bokar marketing system that is carried out regularly and directly under the auspices of the Kuantan Singingi Rubber Farmers Association (APKARKUSI). The rubber auction market is an alternative marketing distribution for farmers to get a more reasonable price with good raw material quality. Farmers who follow the auction market get of 40 to 60 percent farmer share. Price changes at the export level are transmitted very little to farmers, and farmers' effect is shallow [11].

Bokar price determination in the auction marketing system in Pangean District is carried out directly and openly, bokar is purchased at the same price at each weighing, the same quality (clean from chips and other objects, not mixed with clumping fertilizer and left overnight with a minimum of 3 days tapping), place the same (pricing and weighing) and the same time (once a week on Monday). The auction marketing channel can be seen in Figure 1.
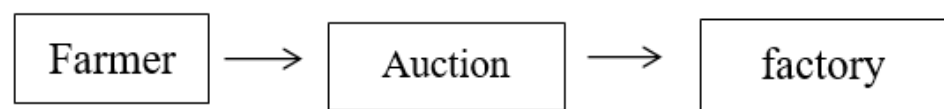

Figure 1: The auction marketing channel.

Figure 1 shows that the marketing channel for bokar in the auction marketing system in Pangean District is that farmers sell bokar through an auction system under the auspices of APKARKUSI and the Department of Agriculture, then distribute it to the factory with the highest price from the auction. The average price for the auction marketing system is IDR 9,082 with a weight loss discount of 4%-5%/kg. Bokar marketing activities in Pangean District are interconnected between marketing institutions (APKARKUSI and tauke) and companies, marketing institutions (APKARKUSI and tauke) with farmer groups, then farmer groups and farmers. According to Stevan and Alamsyah [12], the auction system is a form of orderly market system and aims to obtain price transparency, increase market efficiency, improve the bargaining position at the farmer level, improve the quality and

production of farmers' bokar. According to Syahza [13], the low quality of the products produced by farmers is because the handling carried out has not been intensive. This quality problem arises because the handling of activities from pre-harvest to harvest has not been carried out properly. Problems with the quality of the products produced are also determined in post-harvest activities such as through standardization and grading.

The auction marketing system in Pangean District is a regular bokar marketing system, which can increase the bargaining position and improve the quality of bokar. The results of Kurniati et al. S [6], explain that farmers who take part in the auction market must meet the bokar quality standards set by the Kuantan Singingi Rubber Farmers Association (APKARKUSI) and be part of a farmer group or GAPOKTAN.

The next marketing system is the conventional marketing system. The conventional marketing system in Pangean District is that farmers sell bokar outside the auction marketing system. Farmers sell bokar to collecting traders or tauke. Bokar sales are not bound by rules and conditions. The quality of bokar is bokar that is not clean from tar, mixed with clumping fertilizer and hard objects. Conventional marketing channels can be seen in Figure 2 and Figure 3.
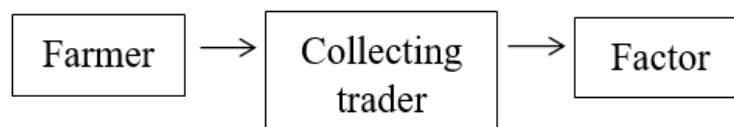

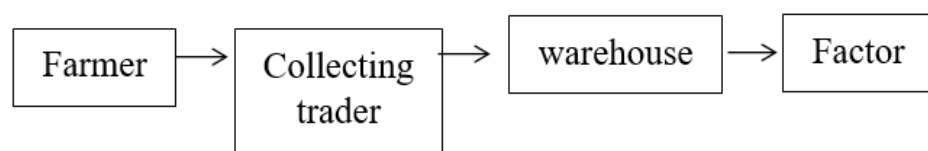**Figure** 2: Conventional marketing channel I.

Figure 3: Conventional marketing channel II.

Figure 2 and Figure 3 show that the bokar marketing channel in the conventional marketing system consists of two channels. In channel one, farmers sell to collecting traders and from collecting traders to factories. In the two marketing channels, farmers sell bokar to collectors and from warehouses to factories. The average price for the auction marketing system during 2021 is IDR 6,650 with a weight loss discount of 5%-20%/kg. Bokar prices in the conventional marketing system are set by collecting traders. Pricing is not based on the quality of the bokar sold. Kurniati et al. [6] shows the delivery of price and quality information on bokar using Whatsapp groups. Khaswarina et al. [14], the results higher marketing mix strategies mediated by customer value

improve marketing performance: namely, if the rubber farmer groups carried out a good marketing mix strategy, it created customer value, which in turn improved the marketing performance of smallholder rubber plantations.

Rubber farming in Pangean District includes cultivation activities involving land clearing, land processing, caring and maintenance, harvesting and marketing. The input factors used include the use of fixed costs and variable costs.

This research showed that when rubber prices were low, all groups of farmers will suffer losses [15]. As a result, farmers adjusted their fertilizer use to reduce production costs. They are trying to reduce the costs of chemical fertilizers by switching to cheaper chemical fertilizers, switching to organic fertilizers, or combining organic and chemical fertilizers. Rubber farming income is influenced by farming costs during the production process. Farming costs are all production input costs incurred during farming activities. Farming costs in this research include variable costs and fixed costs. Farming costs can be seen in Table 1.

Table 1 shows that the total production costs of the auction marketing system are higher than the production costs of conventional marketing systems. The high production costs of an auction marketing system are due to several fixed costs that are not incurred in a conventional marketing system, such as administration costs and monthly cash. The variable costs of the auction marketing system are also higher than conventional marketing systems, especially fertilizer and transportation costs so that the total production costs of the auction marketing system and conventional marketing system are IDR 10,006,453/ha/year and IDR 9,512,086/ha/year, respectively. According to Kurniati et al. [6], marketing costs incurred by farmers are in the form of loading and unloading costs of IDR 50.00/kg and a discount percentage on bokar volume of 5% consisting of 3% depreciation of bokar, 1% for transportation costs and 1% for operational costs.

The highest production costs in the auction marketing system are TKDK (Family Labor) costs. TKDK costs are farming costs that are calculated but not paid. The second highest production cost is investment costs and the third is fertilizer costs. Fertilizer is one of the most important production input factors in rubber farming. Fertilization aims to increase land productivity, maintain fertility, nutrients and soil sustainability as well as increase growth and resistance to disease [16]. Farming efficiency calculated in this research is the total income of rubber farmers per hectare per year divided by

TABLE 1: Rubber farming costs.

No	Component	Auction marketing system (IDR/Ha/ year)	Conventional marketing system (IDR/Ha/year)
1	Variabel cost		
	Fertilizer	698.083	540.233
	Pesticide	33.167	52.783
	Vinegar	108.721	141.433
	Rubber booster	98.500	81.167
	Transportation	154.800	144.000
	Labor outside the family (TKLK)	52.750	49.833
	Total Variabel Cost	1.146.021	1.009.450
2	Fixed cost		
	Investment	1.690.200	1.690.200
	Tool depreciation	245.899	206.728
	Initial Administration fees	4.000	-
	Land tax	13.000	13.000
	Cash	180.000	-
	Labor inside the family (TKDK)	6.727.333	6.592.708
	Total fixed cost	8.860.432	8.502.636
	Total Cost	10.006.453	9.512.086

the farmer's total production costs per hectare per year. Farming revenues from auction marketing systems and conventional marketing systems can be seen in Table 2.

TABLE 2: Production, prices and farming revenues in auction and conventional marketing systems.

No	Component	Auction marketing system	Conventional marketing system
1	Production (Kg/Ha/year)	2.226	2.209
2	Price (IDR)	9.082	6.650
3	Total Revenue (IDR)	20.219.257	14.686.525

Table 2 shows that the total rubber production for the rainy season and dry season in the auction marketing system is higher than in the conventional marketing system. The low production of the conventional marketing system is caused by the production discount (weight loss) in the auction marketing system being less than in the conventional marketing system. The production discount in the auction marketing system in Pasar

Baru Village is 5%/kg and in Sako Village it is 4%/kg. Meanwhile, in the conventional marketing system, production cuts (weight loss) are 5%/kg-20%/kg. The higher the price and production, the greater the income received. Ali et al. [17] the results shows as the rubber price has become more volatile, rubber farmers have reduced their tapping activities, shifted to other more lucrative crops or abandoned rubber farming altogether.

The total revenue from rubber farming from the auction system in Pangean District is greater than the conventional system, namely IDR 20,219,257 and IDR 14,686,525. The amount of revenue is influenced by production and the price of bokar per kilogram. The price and production of bokar greatly affect farmers' income. In accordance with research by Purba et al. [9], generally the production of rubber farmers who sell bokar to the auction market is higher than farmers who do not sell to the auction or non-auction markets. The greater the production, the greater the income earned. The efficiency of rubber farming with auction marketing systems and conventional marketing systems in Pangean District is determined based on the R/C value. The R/C value can be seen in Table 3.

TABLE 3: Efficiency of rubber farming in auction and conventional marketing systems.

No	Component	Auction marketing system (IDR/Ha/ year)	Conventional marketing system (IDR/Ha/year)
1	Total Revenue (TR)	20.219.257	14.686.525
2	Total Cost (TC)	10.006.453	9.512.086
	Farming efficiency (R/C)	2,10	1,59

Table 3 shows that the R/C values of farming auction marketing systems and conventional marketing systems in Pangean District are efficient or categorized as feasible. The R/C values for each system are 2.10 and 1.59. This is in accordance with the research results of Pangestu et al. which states that rubber farming is efficient and worth pursuing [18]. The rubber farming auction marketing system is more efficient than the conventional marketing system.

Khaswarina et al. [4], the results show that most smallholder rubber plantations operate in relatively inefficient conditions. The average technical efficiency (TE) and allocative efficiency (AE) of smallholder rubber plantations This implies an opportunity to increase the TE and AE of smallholder rubber plantations.

Soekartawi stated that a farming business is said to be efficient if the output produced is greater than the input used [19]. Table 3 shows that the output of the auction system in Pangean District is higher than the output of the conventional system.

The high value of farming efficiency means that rubber farming income can be increased. Increasing income can be done by increasing production quantities and selling prices. The amount of production can be increased by using fertilizer or using latex stimulants which are commonly used by farmers. Meanwhile, it is not possible to increase the selling price for farmers, but farmers can choose the auction marketing system which is a more efficient marketing system than the conventional marketing system because the price of bokar in the auction marketing system is much higher than the selling price of bokar in the conventional marketing system.

Farming income is the difference between the farmer's total income from farming minus the total costs of the farmer's cash expenditure in managing the farm while the plants are still producing [19]. Farming income includes net income and gross income.

TABLE 4: Rubber farming income in auction and conventional marketing systems.

No	Component	Auction marketing system (IDR/Ha/year)	Conventional marketing system (IDR/Ha/year)
1	Price (IDR/Kg)	9.082	6.650
2	Total Cost (TC)	10.006.453	9.512.086
3	Total Revenue (TR)	20.269.208	15.091.288
4	Net Income (TR-TC)	10.262.754	5.579.202

Table 4 shows that the net income of farmers from the auction marketing system in Pangean District is higher than the conventional marketing system. Farmers' income is greatly influenced by production costs, production quantities and prices. Production costs or farming costs in the auction marketing system are IDR 10,006,453/ha/year and IDR 9,512,086/ha/year. Even though the production costs of the auction marketing system are higher than the production costs of the conventional marketing system, the income of farmers from the auction marketing system is higher than the income of the conventional marketing system, namely IDR 10,262,754/ha/year and IDR 5,579,202 /ha/year, respectively. The output results of the independent sample t-test can be seen in Table 5.

Table 5 shows that the sig. (2-tailed) of 0.000 < 0.05 which indicates that Ho is rejected and Ha is accepted, meaning that there is a significant difference between the income of rubber farmers from the auction marketing system and the conventional marketing system in Pangean District. The difference in rubber farmers' income from the auction marketing system and the conventional marketing system in Pangean District is caused by price, the higher the price, the greater the income earned. Apart from

TABLE 5: The output results comparing the income of rubber farmers from the auction marketing system and the conventional marketing system.

			Rubber farmer income	
			Equal variances assumed	Equal variances assumed
Levene's Test for Equality of Variances		F	1.468	
		Sig.	.231	
t-test for Equality of Means		t	7.095	7.095
		df	58	52.801
		Sig. (2-tailed)	.000	.000
		Mean Difference	5.03836E6	5.03836E6
		Std. Error Difference	7.10178E5	7.10178E5
	95 % Confidence Interval of the Difference	Lower	3.61679E6	3.61380E6
		Upper	6.45994E6	6.46293E6

price, the amount of production also influences the income level of rubber farmers. The results of this research are in line with research by Yuswandi et al. [7], Purba et al. [9], Antoni and Tokuda [20], Mardhiyah [21] that there is a real difference between the income of farmers who sell bokar through the auction marketing system and the conventional marketing system. Other rubber marketing results show that the choice of PMU marketing system by rubber smallholders requires critical evaluation. This is because this type of marketing system tends to be chosen by older farmers and those with higher education. Moreover, with large land ownership and adequate income from rubber farming, farmers will not be dependent on middlemen. Farmers have the option to sell their rubber products through more profitable rubber marketing channels, such as the PMU marketing channel. On the other hand, if farmers have high rubber production and do not have debts to middlemen, then they have a better bargaining position with middlemen [20].

The price and quantity of production affect the income of rubber farmers, because the price and quantity produced by the auction marketing system are higher than the conventional marketing system. However, the number of farmers who join the auction marketing system is still relatively low, this is because there are certain requirements that must be met by farmers, such as the quality of the bokar which is required to be clean from scratches, a minimum of three tappings, it must be left for one night and not

used clumping fertilizer. If the farmer does not meet the bokar requirements, the bokar is not accepted.

The habit of farmers in processing bokar that is of poor quality causes farmers to be reluctant to sell through the auction marketing system. Bokar that is not of good quality is bokar that has chips, dirt or a mixture of chemical fertilizers. This habit is difficult for farmers to break, especially since farmers already have an attachment to collecting traders. Apart from that, the weighing can be done at any time and the payment system is cash, the weighing distance is not far because in general the collecting traders pick them up directly from the farmer's land. This is different from the auction marketing system in Pangean District, especially Sako Village, where the people are very enthusiastic about selling their rubber production through the auction marketing system. According to farmers, sales through the auction marketing system have much higher profits, fewer depreciation deductions and the prices received are higher and more transparent. Farmers feel that their economy is greatly helped by the auction marketing system. Factors affecting the rubber marketing chanels are market considerations, producer considerations and intermediary considerations [4].

4. Conclusion

Rubber farming with auction marketing systems and conventional marketing systems in Pangean District, Kuantan Singingi Regency is efficient/feasible/profitable. Based on the R/C value, the auction marketing system and conventional marketing system have an RC value greater than 1, namely 2.10 and 1.59. Rubber farming using an auction marketing system is more efficient than a conventional marketing system as indicated by the higher R/C value of the auction marketing system.

There is a significant difference between the income of rubber farmers who sell through the auction marketing system and the conventional marketing system with a significance value of $0.000 < 0.05$, which means Ho is rejected and Ha is accepted.

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