

## **Market Efficiency and Income Level of Red Chili Farmers who use the Auction Market in Siborong-Borong Subdistrict, North Tapanuli Regency, North Sumatra**

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**Abstract:** *This study aims to determine the level of income of red chilli farmers who sell to the auction market and outside the auction market and the efficiency of marketing chili in Siborong-Borong Subdistrict through the auction market and non auction markets. The data used are primary data with 70 respondents. The technique of data collection is done by means of interviews, observations, and questionnaires using the purposive sampling method. The results of this study indicate the income of red chilli farmers in Siborong-Borong Subdistrict for farmers who sell to the auction market in the amount of Rp76,660,587 per planting season, far greater than the income of farmers selling outside the auction market which is Rp10,379,260. Based on the results of the average difference test, there is a significant difference with a 95% confidence level, between farmers who sell directly to the auction market with farmers selling red chili outside the auction market. The level of marketing efficiency between the auction market and outside the auction market does not have distant difference. The marketing efficiency level between the auction market and outside the auction market does not have much difference. The level of marketing efficiency can be seen from the number of marketing efficiency and also in terms of the short length of the marketing chain in the research area. Channel I which is the most efficient with Farmer's share amounting to 73.33% and trading costs 5903.2 (Rp/Kg). This can be explained that the main purpose of the auction market is to prosper local farmers who cultivate red chili. Channel II pattern Farmer's amount shares 65% of trading costs 5903.2 (Rp/Kg). Channel III pattern is still in the efficient category because Farmer's share is at 65%, trading costs are 7043.2 (Rp/Kg), but in fact it involves the length of the marketing channel. Then it can be concluded from the three marketing channel patterns categorized as efficient and the most efficient marketing channel is channel III.*

**Keywords:** *chili farmers, auction markets, income, market efficienc, farmer's share*

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### **I. Introduction**

Red chili is an annual fruit vegetable plant that is needed by all levels of society as a spice or flavoring food. Starting from the people's markets, supermarkets, roadside stalls, small restaurants, catering businesses, star hotels, sauce factories, to daily noodle factories need chili in a number that is not small. This commodity has bright prospects, has the ability to raise the level of farmer income, high economic value, is an industrial raw material, is needed at any time as cooking spices, has the opportunity to export, can open employment opportunities. Red chili is also one of the agricultural products that are prone to fluctuations in prices. Prices can jump high but can also change very low.

Price games by middlemen (collectors) are very detrimental to red chili farmers in North Tapanuli Regency. One solution to suppress the drop in the price of red chili is the existence of an auction market institution. The marketing institution in the marketing of cabins performs several marketing functions both storing, processing, transporting, and others, which carry out these functions requiring costs. Costs and profits of marketing will affect prices at the producer and consumer level.

In increasing the production of chili plants, it is also necessary to pay attention to the marketing process, because the produced commodities are not efficient (high cost per unit), so the price per unit is high so it will be difficult to market. Inefficient marketing activities cause the farmer's share to be small, which in turn will not stimulate increased production.

The background of the emergence of the Commodity Auction Market is the length of the commodity trade chain. The selling price of farmers tends to be low and the consumer purchase price becomes high resulting in a high cost economy and far from prosperity on the producer and end-consumer side. Through the

Commodity Auction Market, the commodity trade chain can be more efficient because it can bring direct sellers and buyers together.

Starting from the decision of the North Sumatra Tapanuli RPJMD in 2014 to 2019 page VII-17 mandated the direction of the policy "Development of a collection and marketing system or buffer for agricultural products" with performance indicators for the Auction Market. Through the decision of the Regent of North Tapanuli number 257 of 2016 concerning the establishment of a working group (Pokja) for auctioning agricultural products in North Tapanuli Regency in 2016.

However, since the establishment of the auction market until now, the dynamics in its continuation continue to be experienced, conditions where there are not particularly farmers who cultivate red chili and a considerable distance to reach the auction market located in two sub-districts namely Tarutung and Siborong-Borong Subdistrict.

## II. Theoretical Review

In this study the sample collection technique used a purposive sampling method. According to Yunus Hadi (2016), the purposive sampling method is a carefully chosen sample method that takes the object of selective research and has specific characteristics, namely farmers who cultivate red chili. The sample taken has special characteristics from the population so that it can be considered quite representative.

For goal 1 analyzed using farm analysis as follows:

1. To calculate the amount of receipt of chili farmers selling in the auction market and chili farmers who sell outside the auction market in the research area, it is calculated using the formula:

$$TR = Y \times P_y$$

2. To calculate the amount of production costs from chili farmers selling in the auction market and chili farmers selling outside the auction market in the research area, it is calculated using the formula:

$$TC = TFC + TVC$$

3. To calculate the amount of income from chili farmers selling in the auction market and chili farmers selling outside the auction market in the research area, it is calculated using the formula:

$$\Pi = TR - TC$$

If  $TR > TC$ , farmers will benefit from their farming activities. If  $TR = TC$ , the farmer is not profitable and has no loss in his farming activities. If  $TR < TC$ , the farmer experiences a loss in his farming activities. After tabulation of income data, the difference in the level of farm income between farmers who sell chili to the auction market and farmers who sell outside the auction market, is used a different test average with the formula Independent Sample t-test:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{X_1 X_2} \cdot \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$th = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left[ \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \right] \left[ \frac{1}{n_1} + \frac{1}{n_2} \right]}}$$

Information :

$th$  = the value of the test results to see the difference in average

$X_1$  = Average chili farming income that sells to the auction market (Rp. Ha/Month)

$X_2$  = Average chili farming income that sells outside the auction market (Rp. Ha/Month)

$S_1$  = Standard deviation of variable 1

$S_2$  = Standard deviation of variable 2

$n_1$  = Number of samples of chili farmers who sell to the auction market

$n_2$  = Number of chili farmers who sell outside the auction market

Test criteria:

If ( $th < ttabel \alpha = 5\%$  db =  $H_0$  received,  $H_1$  is rejected;  $th > ttabel \alpha = 5\%$  db =  $H_0$  is rejected,  $H_1$  is accepted)

Hypothesis:

$H_0$ : There is no difference in income between farmers who sell to the auction market and farmers who sell outside the auction market in the research area

$H_1$ : There is a difference in income between farmers who sell to the auction market and farmers who sell outside the auction market in the research area

With formulations  $H_0$  and  $H_1$

$H_0: \mu_1 = \mu_2$

$$H_1: \mu_1 \neq \mu_2$$

Information :

$\mu_1$  = variable average 1

$\mu_2$  = variable mean 2

Marketing channels that are analyzed descriptively and for calculating efficiency or not using a trading efficiency analysis tool. Marketing efficiency can be analyzed by calculating the portion of prices received by farmers (Farmer's share). Mathematically Farmer's share can be seen as follows:

$$Fs = Pf / Pr \times 100\%$$

Where :

Fs = Part of price received by farmers (Rp/Kg)

Pf = Price of red chili at the level (Rp/Kg)

Pr = Price of red chili at the merchant level (Rp/Kg)

Decision rules according to Downey and Erickson (1992):

FS  $\geq$ 40% = Efficient

FS <40% = Not Efficient

### III. Research Results and Discussion

#### 3.1 Difference in Average Receipt of Red Chili Farming from Farmers Participants in Auction and Outside Market Auctions in 2018 in Siborong-Borong Subdistrict

The difference in receipt of red chili farming with farmers participating in the auction market and outside the auction market, Siborong-Borong Subdistrict can be seen in the table below:

**Table 1. Levene Test Results and Independent Sample T-test Test for Average Acceptance of Sample Farmers in Siborong-Borong Subdistrict**

Acceptance	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	19,772	,000	6,280	68	,000	78956571,4
Equal variances not assumed			6,280	35,873	,000	78956571,4

Source: Primary Data Analysis

The receipt of red chili farming with farmers participating in the auction market and outside the auction market, Siborong-Borong Subdistrict, there is a difference, for the acceptance of farmers participating in the auction market is Rp96,802,857 and the acceptance of farming with farmers outside the auction market is lower than the income from farming with farmers participating in the auction market, which is Rp17,846,286.

The mean different test of free samples is done by independent sample t-test.

If the significance is  $> 0.05$ , then  $H_0$  is accepted or  $H_1$  is rejected

If the significance is  $< 0.05$ , then  $H_0$  is rejected or  $H_1$  is accepted

The estimation results show a significance value of 0.01. Thus the significance is  $< 0.05$  ( $0.00 < 0.05$ ). So  $H_1$  is accepted which means there is a significant difference between the acceptance of the farmers participating in the auction market and outside the auction market, Siborong-Borong Subdistrict both in units per hectare.

#### 3.2 Differences in Average Production Costs of Red Chili Farming from farmers Auction Market Participants and Outside the Auction Market in 2018 in Siborong-Borong Subdistrict

The difference in production costs of red chili farming with farmers participating in the auction market and outside the auction market, Siborong-Borong Subdistrict can be seen in the table below:

**Table 2. Levene Test Results and Test of Independent Sample T-Test for Production Costs**

Production Costs	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	5,750	,019	7,689	68	,000	12675243
Equal variances not assumed			7,689	52,212	,000	12675243

Source: Primary Data Analysis

The difference in average production costs between Red Chilli farming using the auction market and Red Chili by using outside the auction market, namely the average production cost for red chilli farmers using the auction market is Rp20,142,270 per farmer per planting season and the amount the production costs for red chilli farmers using outside the auction market are at an average of Rp7,467,026 per farmer per planting season. This is due to the fact that the red market farmers participating in the auction market need more outpouring of labor and the land area is on average quite high. Whereas red chilli farmers using outside the auction market area of land that is managed more narrowly so that the production costs also become smaller than the costs incurred by red chili farmers using the auction market.

The estimation results show a significance value of 0.00. Thus the significance is  $< 0.05$  ( $0.00 < 0.05$ ). So  $H_1$  was accepted which meant there was a difference in the production costs of red chili farmers using the auction market and red chilli farmers by using outside the auction market in Siborong-borong Subdistrict. auction in Siborong-Borong Subdistrict. Because the land area managed by the two farmers' kelomok samples is different, the red chilli farmers who are participants in the auction market have an average land yield of 2.55 ha while the red chili farmers outside the auction market have an average land area of 0.35 ha. This is in accordance with the theory which says that planting land area is the sum of all land that can be planted or cultivated. So there is a difference between the land area used by farmers participating in the auction market and outside the auction market.

### 3.3 Comparative Analysis of Differences in Average Income of Red Chili Farming from Farmers in Auction Market and Non-Market Auction Participants in 2018 in Siborong-Borong Subdistrict

Farm income is farm income minus all farming costs incurred. The difference in the income of red chili farmers using the auction market and red chili farmers using outside the auction market in Siborong-Borong Subdistrict. can be seen in the table below:

**Table 3. Levene Test Results and Independent Test of Sample T-test Auction Market Revenues and Red Chili Farmers Using Outside the Auction Market Siborong-Borong Subdistrict**

Revenues	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	22,571	,000	5,712	68	,000	66281327,8
Equal variances not assumed			5,712	35,115	,001	66281327,8

Source: Primary Data Analysis

The income of red chilli farmers using the auction market and red chilli farmers by using outside the auction market in Siborong-Borong Subdistrict, there is a difference, for income using the auction market is Rp76,660,587/farmer while seen from income per Ha is Rp30,079,826.9 and farmers' income outside the auction market is lower than farmer's income by selling to the auction market, which is Rp29,630,838/Ha and income of Rp10,379,260/farmer. The estimation results show a significance value of 0.01. Thus the significance is  $< 0.05$  ( $0.01 < 0.05$ ). Then  $H_1$  is accepted which means that there is a significant difference between the income of red market farmers and red chilli farmers by using outside the auction market in Siborong-Borong Subdistrict both in units per hectare and every planting season.

It is said that there is a difference in income because the production of red chili farmers in the auction market is much higher than that of farmers who use outside the auction market in Siborong-Borong Subdistrict. This is due to the price of red chillies offered by the auction market is higher with an average of Rp42,742/kg. So that the acceptance of red chilli farmers participating in the auction market is higher so that the income of farmers participating in the auction market is higher compared to farmers who sell red chili outside the auction market in Siborong-Borong Subdistrict. Phenomenon that occurs in the study area is still many farmers who have not can accept technological advances and information development because they are used to the system has been passed down for many years applied in the research area, this is also reinforced by reasoning that selling to middlemen or red chilli containers in the area or close to farmers' fields is easier.

### 3.4 Marketing Efficiency

Marketing efficiency is intended to maximize the use of input-output ratios, namely reducing input costs without reducing consumer satisfaction with goods or services. The ability to deliver results from producer farmers to consumers at the cheapest cost - cheap and able to provide a fair share of the overall price paid by the last consumer to all involved is a requirement to measure marketing efficiency. There are several indicators to determine whether a channel can be said or defined efficiently or not. Starting from the short length of the marketing channel pattern that is formed, the trading costs incurred, the farmer value of the shares obtained by the farmers as well as in each of the trading institutions.

**Table. 4 Red Chili Marketing Efficiency Indicators in Siborong-Borong Subdistrict**

Channel Pattern	Number of Trading Institutions	Margin (%)	Trading Fees (Rp/Kg)	Farmer's Share (%)	Efficiency (%)
Saluran I	4	10000	5903,2	73,33	19,68
Saluran II	3	10500	5903,2	65	19,68
Saluran III	4	12000	7043,2	60	23,48

Source: Primary Data Analysis

Based on the table above, it can be seen from the three red chili trading channels that are formed, channel I and channel II which are the most efficient with the amount of 19.68%. This can be explained that the main purpose of the auction market is to prosper local farmers who cultivate red chili, that is why the channel I pattern and channel II pattern are not too far apart. And channel III patterns that are least efficient because they involve the length of the channel that occurs.

The trading margin in each institution is also different. It can be seen that the highest marketing margin occurs in channel III of Rp12,000 per kilogram, then followed by the channel II pattern of Rp10,000 per kilogram and finally the channel marketing pattern through the lowest auction market, Rp10,000 per share the kilogram. This is in accordance with Gultom's (1996) theory that trading margins are differences in prices or differences in prices paid by consumers with prices received by producer farmers. Marketing margins which consist of costs that are captured in carrying out the marketing functions and benefits of marketing institutions. Each marketing agency usually carries out different functions so that the share margin obtained at each marketing institution involved will be different. One of the uses of the calculation of marketing margin price spread and share margin is to know the level of marketing efficiency.

Based on farmer's presentation, the highest share of farmer's share was obtained by farmers in channel I, namely auction market institutions with 73.33% presentation. Then in the second place is channel II which is equal to 65% and the last sequence on channel III is 60%. Based on the theory above, the three trading channels are included in the efficient category. Based on the principles of Downey and Ericson (1992) a channel is said to be efficient if the farmer's share value is more than 40%. Based on the above theory of eating it can be concluded from the three patterns of marketing channels categorized as efficient. The most efficient is the salaruran I pattern, namely through auction market institutions. Soekartawi (2002) suggests that measuring marketing efficiency uses the number of farmers' selling prices as a basis (Pf) and compared with the purchase price of traders at the final consumer level (Pr) multiplied by one hundred percent.

## IV. Conclusion

Based on the results of the research and discussion and proof of the proposed hypothesis, the conclusions can be drawn as follows:

1. The income of red chilli farmers in Siborong-Borong Subdistrict for farmers who sell to the auction market is Rp76,660,587 per planting season, far greater than the income of farmers selling outside the auction

market which is Rp10,379,260. Based on the results of the average difference test, there is a significant difference with a 95% confidence level, between farmers who sell directly to the auction market with farmers who sell red chili outside the auction market.

2. The marketing efficiency level between the auction market and outside the auction market does not have much difference. The level of marketing efficiency can be seen from the number of marketing efficiency and also in terms of the short length of the marketing chain in the research area. Channel I which is the most efficient with Farmer's share amounting to 73.33% and trading costs 5903.2 (Rp/Kg). This can be explained that the main purpose of the auction market is to prosper local farmers who cultivate red chili. Channel II pattern Farmer's amount shares 65% of trading costs 5903.2 (Rp/Kg). Channel III pattern is still in the efficient category because Farmer's share is at 65%, trading costs are 7043.2 (Rp/Kg), but in fact it involves the length of the marketing channel. Then it can be concluded from the three marketing channel patterns categorized as efficient and the most efficient marketing channel is channel III.

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