

Relationship between Behavior and Production and Income of Rubber Farmers during the Covid-19 Pandemic in Banyuasin III District, Banyuasin Regency, South Sumatra, Indonesia

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Abstract:Based on data from BPS (2017)for the area and production of rubber plantations according to their ownership in 2017, it turns out that Banyuasin Regency is 91,004 hectares for harvested area. As for the production itself, it reached a value of 93,777 tons. As for the sub-district, Banyuasin III sub-district has the largest harvested area of 16,191 hectares, while for its own production it is 16,666 tons. Based on this description, this study aims to analyze the behavior of rubber farmers, analyze the production and income of rubber farmers, analyze the relationship between behavior and farmers' incomes in Banyuasin III District, Banyuasin Regency.

This research will be conducted in Banyuasin III District, Banyuasin Regency. The selection of this location was carried out puIDRosively (deliberately) with the consideration that Banyuasin III District has the largest land in Banyuasin Regency. Data collection time will be in September 2019-August 2020.

The behavior of farmers is classified as high with a score of 41.91, the average rubber production of farmers is (5,008 tons/year/arable) and the average income of rubber farmers is (IDR. 33,600,059,122,-year/arable), and there is no the relationship between behaviorand production and income of rubber farmers with Spearman Rank correlation coefficient (Rs) = -0.032 and -0.070.

Key Word:Behavior; Farmers; Income; Pandemic;Production; Rubber.

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I. Introduction

COVID-19 or the latest corona virus is the cause of a new case of pneumonia, a case of pneumonia was found in Wuhan, China at the end of December 2019, as a result of which the World Health Organization (WHO) declared it an outbreak that must be handled immediately. This virus caused a lot of panic around the world, because of its fairly rapid spread (Azamfirei, 2020).

Rubber is one of the plantation commodities with high economic value. Therefore, it is not wrong if many think that rubber plants are one of Indonesia's wealth. Rubber obtained from the clumping process of rubber plant sap (latex) can be further processed to produce rubber sheets (sheets), lumps (boxes), or crumb rubber (crumbrubber) which are raw materials for the rubber industry (Tampubolon, et al 2013).

Based on data from BPS (2017) for the area and production of rubber plantations according to their ownership in 2017, it turns out that Banyuasin Regency is 91,004 hectares for harvested area. As for the production itself, it reached a value of 93,777 tons. As for the sub-district, Banyuasin III sub-district has the largest harvested area of 16,191 hectares, while for its own production it is 16,666 tons. Based on this description, this study aims to analyze the behavior of rubber farmers, analyze the production and income of rubber farmers, analyze the relationship between behavior and the production and income of rubber farmers in Banyuasin III District, Banyuasin Regency.

II. Material and Methods

Time and Place

This research will be conducted in Banyuasin III District, Banyuasin Regency. The selection of this location was carried out puIDRosively (deliberately) with the consideration that Banyuasin III District has the largest land in Banyuasin Regency. Data collection time have done in September 2019-August 2020.

Research Method

The method used in this study is a survey method. The survey method is a method of collecting primary data by obtaining it directly from sources in the research field. Collecting data or information and field

facts directly through questionnaires (questionnaires) and interviews (interviews) both orally and in writing which requires face-to-face contact between researchers and respondents (subjects) (Ruslan, 2006). This survey method is expected to be able to directly represent what is happening in the field, so that the processed data can be studied thoroughly and correctly as it is.

Sampling Method

The sampling method uses a multistage sampling technique (Sriati, 2012). Respondents consisted of 84 members of the Association of Farmers in Banyuasin III District.

Data Collection Method

Collecting data or information and field facts directly through questionnaires and interviews (interviews) both orally and in writing.

Data Processing Method

The data obtained from the results of research and interviews with respondents were made in the form of qualitative descriptions presented in tabulation and continued with mathematical calculations explained descriptively.

To answer the first objective, to find out the behavior of rubber farmers in Banyuasin III District, Banyuasin Regency with a Likert Scale (Ridwan and Akdon, 2007). To find out the behavior of farmers in rubber farming in Banyuasin III District, Banyuasin Regency with a Likert Scale. Likert scale (Ridwan and Akdon, 2007) then the class interval can be determined for each indicator, with the following conditions:

RV = HS – LS

Information :

RV = Range Value

HS = Highest Score

LS = Lowest Score

IL = RV : NCI

Information :

IL = Interval Length

RV = Range Value

NCI = Number of Class Intervals

The variables of this study include the measured behavior of farmers, namely (1) knowledge, (2) attitudes and (3) skills. Behavioral variables consist of 3 indicators and 45 questions consisting of 15 questions for one indicator. The description of the indicators is as listed in Table 1.

Table 1. Farmers Behavior Indicators in Rubber Farming

No.	Variable	Indicator	Question
1.	Knowledge	Fertilization	1 – 3
		Disease Pest Control	3 – 6
		slashing	7 – 9
		Harvest	10 – 12
		Post-harvest	13 – 15
2.	Attitude	Fertilization	16 – 18
		Disease Pest Control	19 – 21
		slashing	22 – 24
		Harvest	25 – 27
		Post-harvest	28 – 30
3.	Skills	Fertilization	31 – 32
		Disease Pest Control	33 – 35
		slashing	36 – 38
		Harvest	39 – 41
		Post-harvest	42 - 45

Furthermore, the question items are measured by giving a score of 1, 2 and 3 which represent low, medium, and high achievement. Total answers to indicators/variables are categorized into 3 levels/criteria based on the class interval formula, and the value of the criteria for each indicator is shown in Table 2.

Table 2. Class Interval Values for Measuring Farmer Behavior Variables

Variable /Indicator	Item Question	Min	Max	NR	PI	Criteria		
						Low	Medium	High
Behavior	45	45	135	90	30	45-74	75-104	105-135
Knowledge	15	15	45	30	10	15-25	26-35	36-45
Attitude	15	15	45	30	10	15-25	26-35	36-45

To answer the second objective, analyze the production and income of rubber farmers. For production, using qualitative analysis and described descriptively, while calculating income using microeconomic theory of income analysis (Soekartawi, 2002), are as follows:

a. Total biaya (TC)

$$TC = FC + VC$$

Information :

TC = Total cost

FC = Fixed cost

VC = Variable cost

b. Total Revenue (TR)

$$TR = Y \cdot Py$$

Where:

TR = Total revenue

Y = Production obtained in a farm

Py = Price y

c. Income/Profit

$$FI = TR - TC$$

Where :

FI = Farming Income

TR = Total revenue

TC = Total cost

To answer the third objective of analyzing the relationship between behavior and production and income of rubber farmers in Banyuasin III District, Banyuasin Regency, it was measured by the Rank Spearman test. Rank Spearman's test is a correlation method proposed by Carl Spearman in 1904. This method is needed to measure the closeness of the relationship between two variables. The two variables do not have to follow a normal distribution and the condition of the unknown variable is the same. Rank correlation is used when exact quantitative measurements are not possible. The data for the two variables are paired, for example measuring the level of morale, level of pleasure, level of motivation and so on (Sugiyono, 2009).

The calculation of the rank correlation coefficient is denoted by, the calculation steps are as follows:

1. The observed value of the two variables whose relationship will be measured is given a level. If there are the same observation values, the average level is calculated.
2. Each pair of levels is calculated the difference.
3. The difference in each pair of levels is squared and the amount is calculated.
4. The value of (Spearman correlation coefficient) is calculated by the formula:

$$\rho = 1 - \frac{6 \sum bi^2}{n(n^2-1)}$$

Information :

ρ : Spearman correlation coefficient.

bi :shows the difference between each pair of rank.

n :indicates the number of rank pairs.

The Ho hypothesis to be tested states that the two variables studied with the level value are independent, meaning that there is no relationship between one variable and another.

The decision-making criteria are :

Ho is accepted if $\rho \text{ count} \leq \rho \text{ table}$

Ho is rejected if $\rho \text{ count} > \rho \text{ table}$

III. Result

Rubber Farmer Behavior

The behavior of farmers in Banyuasin District is classified as high with a score of 41.91

Production, Production Cost, Revenue and Income of Rubber Farmers

The average rubber production of farmers is 5,008 kg (5,0008 tons/year/arable). The average total production cost of rubber farmers is IDR. 1,674,998,018,-/year/arable so that the total income obtained by farmers is IDR. 35,275,057.14,-/year/arable. This amount of income is obtained from the reduction between the income of respondent rubber farmers in Banyuasin III District, which is IDR. 35,275,057.14,-/year/arable.

IV. Discussion

Rubber Farmer Behavior

Farmer behavior is all actions or actions taken by farmers for the sustainability of farming. Farmer behavior in the form of knowledge, attitudes and skills. These indicators are measured using a questionnaire that has been prepared by the researcher, namely giving a score for each indicator. The average score of the measurement of each indicator of farmer behavior can be seen from each indicator it appears that all indicators of farmer behavior are high criteria. The questionnaire on farmer behavior variables consists of 45 statement items. The following is a detailed description of the respondents' answers to each of the questions shown in Table 3.

Table3. Farmer Behavior Score

Indikator	Knowledge		Attitude		Skills		Behavior	
	Score	Criteria	Score	Criteria	Score	Criteria	Score	Criteria
Fertilization	8,32	High	7,97	High	8,35	High	8,21	High
Disease Pest Control	8,19	High	7,91	High	7,91	High	8,00	High
slashing	9,00	High	8,88	High	8,89	High	8,92	High
Harvest	8,46	High	8,35	High	8,48	High	8,43	High
Post-harvest	8,36	High	8,15	High	8,55	High	8,35	High
Total Score	42,33	High	41,26	High	42,18	High	41,91	High

Based on Table 3 above, it can be seen that for the first indicator, namely knowledge, which obtained an average score of 42.33, it was classified as high criteria. This means that the behavior of farmers is good, this can be seen in every indicator because in the knowledge of farming the behavior of farmers shows good.

The second indicator is the attitude that gets an average score of 41.26 which belongs to the high criteria. This means that the behavior of farmers is also good, it can be seen from all the question items given to farmers showing high criteria. The third indicator is skills that get an average score of 42.18 which belongs to the high criteria. This means that the behavior of farmers is also good, it can be seen from all the question items given to farmers showing high criteria.

From the results obtained in the table that the behavior of farmers is high due to the implementation of social distancing during the COVID-19 virus pandemic, it has reduced community activities outside the home, causing farmers to have a lot of free time to do farming activities.

The results of this study are not in line with the research of Rani & Elly (2013). The results of the analysis show that most farmers have not applied the techniques of fertilization, use of growth regulators and pest management as recommended Price stability is a factor related to the behavior of farmers in various farming activities. Efforts are needed to ensure price stability received by farmers so that farmers are more motivated to increase productivity and yield quality.

This research is also not in line (Pratiwi & Sudrajat, 2012) the results of the analysis show that most farmers in Sumberejo Village are still low in managing agricultural land, namely the behavior of farmers who are not environmentally sound. The factors that significantly affect the tendency of farmers' behavior in managing agricultural land are the age of the farmer, length of farming and extension

Production, Production Cost, Revenue and Income of Rubber Farmers

The average amount of rubber production in Banyuasin III District is 420.720 kg or 420.72 tons/year/arable. The production results are taken on average per year per arable. The description of the production results is for farmers who have a land area of 1.5 ha as many as 4 farmers with a total rubber production of 15,600 kg or 15.6 tons/year/arable. Farmers who have a land area of 2 ha are 72 farmers with total rubber production of 51,360 kg or 51.36 tons/year/arable. For farmers who have a land area of 3 ha, the amount of rubber production is 353,760 kg or 353,76 tons/year/arable.

The average total production cost of rubber farmers in Banyuasin III District, Banyuasin Regency is IDR. 1,674,998,018,-/year/arable. The production costs consist of depreciation of tools (hoe, machete/scythe, hand sprayer, bowl, latex gutter, tapping knife, ring, ring rope and bucket) with an average fixed cost of IDR. 330.117,066,-/year/arable. The average variable cost is IDR. 1,344,880,952,-/year/arable which consists of an average fertilizer cost of IDR. 857500,-/year/arable, the average cost of herbicides is IDR. 120,714,29,-/year/farmed and the average cost of labor is IDR. 366,666.67,-/year/arable.

Farming revenue is the amount of rubber produced per year multiplied by the selling price. Revenue from rubber farming in Banyuasin III District, Banyuasin Regency can be seen in Table 4.

Table 4. Average Acceptance of Rubber Farmers Respondents

Component	Rubber
Rubber Production (Kg/Year/Arble)	5.008,5
Average Rubber Price (IDR/Kg)	7.040
Reception (IDR/Year/Arable)	35.275.057,14

Based on Table 4. above, the rubber price is taken from the average selling price of the entire respondent rubber farmers in Banyuasin III District, Banyuasin Regency, which is IDR. 7.040,-/kg. The determination of this rubber price is based on Rubber Dry Content (K3). The average rubber production of farmers is 5,008 kg (5,0008 tons/year/arable), so that the total income obtained by farmers is IDR. 35,275,057.14,-/year/arable.

Farming income is the difference between farm income and total production costs incurred by farmers per year (IDR/year/arable). Production costs include fixed costs and variable costs. The following are the results of the analysis of the average income of respondent rubber farmers in Banyuasin III District, Banyuasin Regency, which can be seen in Table 5.

Table5. Average Income of Rubber Farmers

Component	Rubber Farming
Reception (IDR/Year/Arable)	35.275.057,14
Total Cost	1.674.998,018
a. BiayaTetap (IDR/Year/Arable)	330.117,066
b. BiayaVariabel (IDR/Year/Arable)	1.344.880,952
Income (IDR/Year/Arable)	33.600.059,122

Based on Table 5. above shows that the results of the analysis obtained are the average income of rubber farmers in Banyuasin III District of IDR. 33,600,059,122,-/year/arable. This amount of income is obtained from the reduction between the income of respondent rubber farmers in Banyuasin III District, which is IDR. 35,275,057.14,-/year/arable with a total cost of farming production, which is IDR. 1,674,998,018,-/year/arable. According to the Banyuasin Regency Plantation Service, from the results of the interview, there was the participation of Gapoktan, Poktan and agricultural extension workers. In Banyuasin Regency, each village is required to form a UPPB (Rubber Marketing Processing Unit) institution. This UPPB functions as a rubber shelter, so that the selling price of rubber can be stable.

This research was supported by Lopes & Fallo (2019). The results showed that lowland rice farming activities went through several stages: 1) nursery; 2) preparation and processing of paddy fields; 3) planting; 4) maintenance; 5) harvest; 6) post harvest; and 7) marketing. Lowland rice farming revenues in Manleten Village ranged from IDR. 18,000,000 to IDR. 137,500,000 with an average of IDR. 57,889,063 lowland rice farming production costs ranging from IDR. 495,470 to IDR. 24,757,700 with an average of IDR. 12,696. 538 lowland rice farming incomes also ranged from IDR. 1,820,667 to IDR. 113,774,000 with an average of IDR. 45,192,524.

Relationship between Farmer Behavior and Production and Income

Income is the ultimate goal to be achieved by every farmer in doing farming. The amount of farmers' income depends on production, selling price and production costs. Farmer behavior is a supporting factor for the sustainability of farming. Because the behavior of farmers will lead to farmers who are creative, innovative and independent.

The results of the analysis of the relationship between behavior and production and income in Banyuasin III District, Banyuasin Regency with the Spearman Rank correlation analysis method are shown in Table 6.

Table6. Relationship of Behavior with Production and Income

			Knowle dge	Attitude	Skills	Behavior	Production	Reception
Spearman's rho	Knowledge	Correlation Coefficient	1.000	-.029	.153	.506**	.117	.101
		Sig. (2-tailed)	.	.792	.165	.000	.290	.359
		N	84	84	84	84	84	84
	Attitude	Correlation Coefficient	-.029	1.000	.082	.540**	.005	-.014
		Sig. (2-tailed)	.792	.	.460	.000	.965	.900

Relationship between Behavior and Production and Income of Rubber Farmers during the..

	N	84	84	84	84	84	84
Skills	Correlation Coefficient	.153	.082	1.000	.643**	-.097	-.128
	Sig. (2-tailed)	.165	.460	.	.000	.381	.244
	N	84	84	84	84	84	84
Behavior	Correlation Coefficient	.506**	.540**	.643**	1.000	-.032	-.070
	Sig. (2-tailed)	.000	.000	.000	.	.775	.528
	N	84	84	84	84	84	84
Production	Correlation Coefficient	.117	.005	-.097	-.032	1.000	.967**
	Sig. (2-tailed)	.290	.965	.381	.775	.	.000
	N	84	84	84	84	84	84
Reception	Correlation Coefficient	.101	-.014	-.128	-.070	.967**	1.000
	Sig. (2-tailed)	.359	.900	.244	.528	.000	.
	N	84	84	84	84	84	84

** . Correlation is significant at the 0.01 level (2 tailed).

Based on Table 6 above, it shows that the results of the Spearman Rank correlation analysis obtained the value of the correlation coefficient between behavioral variables (X) and production (Y1) of -0.032 and the coefficient value of behavioral variables (X) and income (Y2) of -0.070. Based on the inteIDRretation of the Spearman Rank correlation coefficient, it shows the strength of the relationship between behavioral variables (X) and production (Y1) and behavioral variables (X) and income (Y2) are at the level of no relationship. While the negative value between the two variables indicates the pattern of the relationship is not handover. This means that if the behavior variable increases, the production variable decreases.

The two-sided significant values (sig. 2-tailed) of the relationship between behavior and production and income are -0.032 and -0.070. Based on the test criteria Ho is accepted if the significance is < 0.05 and Ho is rejected if the significance is > 0.05. The sig (2-tailed) value of the relationship between behavior and production and income of rubber farmers is 0.775 > 0.05 and 0.528 > 0.05, so Ho is rejected, meaning that there is no significant relationship between behavior and production and income of rubber farmers in Banyuasin III District.

Based on the results of the Spearman Rank correlation analysis above, it can be concluded that there is no relationship between behavior and production and income of rubber farmers in Banyuasin III District. The absence of this relationship can be seen from the behavior of farmers ranging from knowledge, attitudes and skills. This data was taken in August 2020 at which time the COVID-19 pandemic was a frightening specter for the community. Less production is due to farmers not fertilizing. For rubber plants at least do fertilization twice in 1 year. Yields will increase if the plants are maintained and cared for properly. Their income is considered increased because they do not incur costs for plant maintenance.

This research is similar to the research of Tarigan & Sinaga (2020) that the results of the study show that commodity prices have decreased during this pandemic, however, it does not affect the performance of farmers because the performance of farmers during the pandemic is increasing.

This study is in line with Dalimunthe & Murdianto (2013), the results of the study show that the implementation of MFIs does not have a positive and real relationship to the income level of micro business actors because the overall income level of micro entrepreneurs is low.

Relationship between Production and Income

Based on Table 6, it can be seen that the results of the Spearman Rank correlation analysis obtained the value of the correlation coefficient between the variables Production (X) and Income (Y) of 0.967**. Based on the inteIDRretation of the Spearman Rank correlation coefficient (Sugiyono, 2009) it shows the level of strength of the relationship between production variables (X) and income (Y) is at a very strong relationship level. While the positive value between the two variables identifies the pattern of the relationship that affects the income of rubber farmers in Banyuasin III District, Banyuasin Regency.

Looking at the direction of the relationship between production variables and the income of rubber farmers, the correlation coefficient value is 0.967, so the relationship between the two variables is unidirectional (type of unidirectional relationship). Thus it can be inteIDRreted that the higher the production, the income of farmers will increase.

The two-sided significant value (sig. 2-tailed) of the relationship between production and income of rubber farmers is 0.000. Based on the test criteria Ho is accepted if the significance is < 0.05 and Ho is rejected if the significance is > 0.05. The value of sig (2-tailed) of the relationship between production and income of

rubber farmers is $0.000 < 0.05$, then H_0 is accepted, meaning that there is a significant relationship between production and income of rubber farmers in Banyuasin III District, Banyuasin Regency.

This study is in line with Damanik (2013), the results of the study show that together the land area, number of workers, and production costs have a positive and significant effect on the income of rice farmers in Masaran District as evidenced by the F test results of 860.3790 and the prob value. F-count (0.000000) < alpha 10%. The value of $R^2 = 0.974699$, it means that 97.4699 percent of the influence of the variables of land area, number of workers, and production costs on the income of rice farmers and the remaining 2.5301 percent is influenced by other factors. Partially, the variable area of land (X1) and the variable cost of production (X3) have a positive and significant effect, while the variable number of workers (X2) has an effect but is not significant.

This study is also in line with Mamondol & Sabe (2016) research results show that the average income of farmers with land area <0.5 ha is IDR 4,053,160/MT, the average production cost is IDR 3,302,599.33/ MT, and the average income is IDR 750,560.67/MT. Farmers with a land area of 0.5 – 1 ha have an average income of IDR. 11,892,624/MT, an average production cost of IDR. 7,579,606.60/MT, and an average income of IDR. 4,313,017, 40/MT. The average income of farmers with land area > 1 ha is IDR. 25,803,240/MT, the average production cost is IDR. 14,831,693.67/MT and the average income is IDR. 10,971,546.33/MT. There is a positive and significant relationship between land area and income, production costs, and farm income. The increase in land area causes an increase in revenue, production costs, and income. However, the increase in land area causes an increase in production costs that is greater than the increase in income, indicating inefficiency in farming activities.

This research is supported by Tomy (2013). The results show that the income received by respondent farmers in corn farming during one planting season is IDR. 2,216,596/0.78ha, that the average income of respondent farmers is IDR. 2,216,596/0, 78 ha or IDR 2,829,697/ha. Thus the corn production in Tongoa Village must continue to be increased so that the income received by respondent farmers also increases.

V. Conclusion

The behavior of farmers is classified as high with a score of 41.91, the average rubber production of farmers is (5,008 tons/year/arable) and the average income of rubber farmers is (IDR. 33,600,059,122,- year/arable), and there is no the relationship between behavior and production and income of rubber farmers with Spearman Rank correlation coefficient (R_s) = -0.032 and -0.070.

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