

## Analysis of Corn Farming For Gapoktan Farmers Nagori Sampuran (Case Study: Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency)

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### Abstract

The title of the research is "Analysis of Corn Farming by Farmers of Gapoktan Bah Sampuran" Case Study: Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency. The aims of this study were: To determine the effect (land area, seeds, fertilizers, pesticides, and labor) on maize farming by Gapoktan Bah Sampuran farmers, Tunas Jaya Poktan farmers, and Sejahtera, Nagori Bah Sampuran farmers. To find out the implementation of Farmers' Corn Farming in increasing the income of farmers of Gapoktan Bah Sampuran, Poktan Tunas Jaya, and Poktan Sejahtera, Nagori Bah Sampuran. This study aims to determine the role of the government in increasing corn farming income for farmers from Gapoktan Bah Sampuran, Poktan Tunas Jaya, and Poktan Sejahtera. The research area was determined that Nagori Bah Sampuran was the center of maize farming data production. The sample is the sampling method, the primary and secondary data methods, the primary from the questionnaire and direct interviews with the head of the respondent, secondary obtained by verified agencies. The analysis method R/C (Return Cost Ratio) to know the comparison of income and costs, the results obtained the conclusion: The process of subsidized fertilizer assistance through RDKK in Nagori Bah Sampuran. Affects Educational Income, Experience, And Affects Production Land area, seeds, fertilizers, pesticides, labor, and capital. The results of the analysis are 1.97 starting from Production, Production Costs, Revenues, Net Income.

### Keywords

Corn farming; gapoktan farmers; return cost ratio



## I. Introduction

Indonesia is one of the developing countries with the agricultural sector as a source of livelihood for the majority of the population based on the agricultural sector. That the majority of land use in the territory of Indonesia is designated for agricultural land and almost 50% of the total workforce still depends on their fate to work in the agricultural sector.

Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020)

Based on Central Statistics Data (BPS) that Indonesia's urban and rural poor in 2020 was recorded at 26.42 million, an increase of 5.09% compared to the previous year, which was 25.14 million. In the context of alleviating poverty and providing employment

opportunities, Nagori Bah Sampuran can have a positive impact on the welfare of farmers because government assistance basically provides capital strengthening assistance for farmers. Farming capital assistance what is distributed by Gapoktan is expected to increase agricultural income which supports agricultural household income to improve family welfare (BPS, 2020).

Fundamental problems farmers face access to capital sources, markets and technology and weak agricultural organization. Corn farmers are included in the food crop sub-sector in the agricultural sector for human and animal life. In Indonesia, corn is the third element of the world's staple food after wheat and rice. This plant contains carbohydrates, calories, and protein. Corn can thrive on a variety of soil types, apart from corn plants are suitable plants for dry season planting because they do not require a lot of water. Considering that Indonesia is a country with two seasons, corn is considered very suitable for the climate in Indonesia.

Based on the Prognosis Calculation Report of the Data Center and Information System (Pusdatin). The National Corn Crop Area for October 2019-2020 September reached 5.5 million (ha) the National corn harvested area for January-December 2020 reached 5.16 million (ha). The prognosis for corn production with a moisture content of 15% in January to December 2020 is quite satisfactory, reaching 24.95 million tons of shelled corn. The first to third rankings in 2020 did not shift compared to the rankings in 2019. First, East Java Province, with a harvested area of 1.19 million ha, produced 5.37 million tons of corn. Second, Central Java Province with a harvested area of 614.3 thousand ha produces 3.18 million tons of corn. Third, Lampung province with a harvested area of 474.9 000 ha produces 2.83 tons of corn. Fourth, North Sumatra province with an area of 350.6 thousand ha produces 1.83 million tons of corn. Fifth, South Sulawesi Province with a harvested area of 377, 7,000 ha produces 1.82 million tons of corn. Sixth, the province of West Nusa Tenggara with a harvested area of 283,000 ha produces 1.66 million tons of corn. Seven provinces of West Java with a planted area of 206.7 thousand ha produce 1.34 million tons of corn. Eighth, North Sulawesi province with a harvest area of 235.5 thousand ha produces 0.92 million tons of corn. Ninth, Gorontalo province with a harvested area of 212.5 thousand ha produces 0.91 million tons of corn. Tenth, the province of South Sumatra with a harvested area of 137,000 ha produces 0.80 million tons of corn (Pusdatin, 2020).

The use of agricultural resources, especially maize farming, is one of the most important agricultural products and is interdependent with large industries. Apart from being consumed for vegetables, maize fruit can also be transformed into various foods. Dry curled corn is used by animal feed. This condition makes corn cultivation have very promising opportunities, demand, and selling prices (Purwanto, 2015).

In an effort to make corn farming more competitive, efficient farming efforts are needed, both in terms of economy, quality and productivity through the application of technology, starting from determining the location, using varieties, quality seeds, planting, maintaining, handling harvest and post-harvest correctly because corn is a food crop. Which is very important. In addition to being a food product, corn can also be used as animal feeding materials and industrial raw materials, so it is estimated that corn crop production will increase, and more influence in corn farming according to the costs of farmers, Farmers, Agricultural Workers, Household Orders, This is can be seen in the following table:

**Table 1.** Harvested Area, Production and Average Production of Corn by Per Simalungun District 2020.

<b>districts</b>	<b>Harvest Area (Ha)</b>	<b>Production (Tons)</b>	<b>Average productivity (Kw/Ha)</b>
<b>Silimakuta</b>	1,801,000	10,197,000	56.62
<b>Silimahuta</b>	1,202,500	6,831,000	56.81
<b>Ancient</b>	1,163,000	6,641,000	57.10
<b>Haranggaol Horizon</b>	0.500	3,000	56.85
<b>Dolok Pardamean</b>	2,082,000	12,284,000	59.00
<b>Sidamanik</b>	2,923,000	16,819,000	57.54
<b>Pamatang Sidamanik</b>	3,934,000	22,286,000	56.65
<b>Girsang Sipangan Bolon</b>	5.18.000	2.76.000	55.53
<b>Javanese land</b>	3,398,000	19,318,000	56.85
<b>Hatondownload</b>	2,564,600	14,552,000	56.74
<b>Dolok Panribuan</b>	2,107,000	11,241,000	53.34
<b>Jorlang Hataran</b>	<b>1,287,000</b>	<b>9,749,000</b>	<b>53.36</b>
<b>Panei</b>	1,226,000	6,956,000	56.74
<b>Panombeian Panei</b>	2,006,300	11,348,000	56.65
<b>Raya</b>	3,239,500	18,255,000	56.35
<b>Dolog Masagal</b>	1.581.000	8,942,000	56.56
<b>Dolok Silou</b>	1.348.000	7,636,000	56.65
<b>Silou Kahean</b>	446,000	2,429,000	54.46
<b>Raya Kahean</b>	776.000	4,224,000	54.43
<b>Butan Dolok</b>	571,900	2,989,000	52.57
<b>Dolok Batu Nagar</b>	517,500	2,905,000	56.13
<b>Siantar</b>	641,000	3,616,000	56.13
<b>Mount Malela</b>	147,000	837,000	56.92
<b>Mount Maligas</b>	576,500	3,285,000	56.98
<b>Hutabayu Raja</b>	2,156,500	12,212,000	56.63
<b>Java Maraja Bah Jambi</b>	312,500	1,776,000	56.82
<b>Pamatang Bandar</b>	882,000	4,966,000	56.30
<b>Huluan City</b>	198.000	1,116,000	56.37
<b>city</b>	501,000	2,882,000	57.54
<b>Maslam City</b>	612,000	3,451,000	56.39
<b>Bosar Maligas</b>	404,000	2,288,000	56.63
<b>End of the Field</b>	13,000	67,000	51.84
<b>Simalungun</b>	<b>41,676,800</b>	<b>23,497,700</b>	<b>56.38</b>

*Source: Simalungun Regency Agriculture Office, 2020.*

Table 1. Shows that Jorlang Hataran District is an area with a productivity that reaches 53.36. With a land area of 1,287,000. Ha can produce 9,749,000 tons of corn from the total area of corn planted in Simalungun Regency, Jorlang Hataran sub-district covering 13 Kelurahan 1 District, where Nagori Bah Sampuran has a corn production

center. Therefore, based on the background, the authors feel the need for research on corn farming (agribusiness) in Nagori Bah Sampuran, Jorlang Hataran district, Simalungun Regency.

Based on the background and problem formulation above, the objectives of this study are: to determine (land area, seeds, fertilizers, pesticides, and labor) on farmers' corn farming, to find out the implementation of farmers' corn farming in increasing farmers' income, to find out the role of the government in improving corn farming by farmers from

Gapoktan Bah Sampuran, Poktan Tunas Jaya, and Poktan Sejahtera. Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency.

## II. Research Methods

### 2.1 Method of Determining Research Area

This research was conducted in the district of Jorlang hataran, Simalungun Regency. The determination of the research area is determined proportionally or intentionally, namely the research area is determined based on certain considerations adapted to the research objectives.

Jorlang Hataran District was chosen based on considerations because Jorlang Hataran District, Simalungun Regency, has a fairly high production. This can be seen in the following table:

**Table 2.** Harvested area, production and average production of food crops by type of plant in Jorlang Hataran District year 2020.

No.	Plant Type	Harvest Area	Production	Production average (Kw/Ha)
1	Rice Paddy	300.4	1,520	50.60
2	Field rice	-	-	-
3	<b>Corn</b>	<b>517.5</b>	<b>2,905</b>	<b>56.13</b>
4	Cassava	275.0	9,422	342.6
5	Sweet potato	-	-	-
6	Peanuts	-	-	-
7	Mung beans	-	-	-
8	Soya bean	-	-	-

*Source: Central Bureau of Statistics, 2020.*

Furthermore, the selection of research locations was determined in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency.

### 2.2 Method of Determination of Population and Sample

The population in this study were corn farmers in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency. The sample is a part of the population to be studied and which is considered to be able to describe the population. The sample in this study were corn farmers in the Nagori Bah Sampuran Village who joined the Bah Sampuran Gapoktan. There were 10 Poktans, among 10 Poktans 2 major income groups of corn farmers, namely Tunas Jaya Poktan and Sejahtera Poktans. Poktan Tunas Jaya has 24 corn farmers, Poktan Sejahtera has 16 corn farmers. And has received government assistance in the form of tools or seeds for corn farming, which was confirmed by the Pangulu Nagori Bah Sampuran.

The following are the names of Poktans in the Nagori Bah Sampuran Farmer Group Association (Gapoktan) as follows:

**Table 3.** Name of the Joint Poktan Bah Sampuran Farmer Group 2021.

Poktan name	farming	
	Paddy (%)	Corn (%)
1. Prosperous 1	50	25
2. Prosperous 2	63	33
3. Prosperous 3	55	28
4. Prosperous 4	72	30
5. Dus Roha	53	26
6. Tunas Jaya	32	75
7. Farmer's Ray	65	26
8. Fortune	57	20
9. Prosperous	24	73
10. Rose	61	31

*Source: Pangulu Nagori Bah Sampuran Office 2021.*

### 2.3 Method of collecting data

The data to be used in this study consists of primary and secondary data. Primary data was obtained through questionnaires and direct interviews with the respondents, namely farmers (members of Gapoktan) as well as to the administrators of Gapoktan or Poktan. Meanwhile, secondary data was obtained from related agencies including the calculation of the data center and information system, BPS Simalungun Regency. In addition, secondary data was also obtained from the library, internet, and other literature related to the research.

### 2.4 Data analysis method

This method of analysis, the authors use the method of analysis of the ratio of R / C (Return Cost Ratio), namely the comparison between income and costs (Soekartawi 1990). Mathematically it can be written as follows:

$$a = R/C$$

$$R = P_y \cdot Y$$

$$C = FC + VC$$

$$A = (P_y \cdot Y) / (FC + VC)$$

Description:

a = Value of revenue to cost ratio

R = Receipt

C = Cost

P<sub>y</sub> = Output Price

Y = Output

FC = Fixed cost

VC = variable cost (variable cost)

If:

a > 1 Farming is said to be feasible

a = 1 Farming is said to break even (no profit no loss)

a < 1 Farming is not economically feasible

### III. Result and Discussion

#### 3.1. Characteristics of Respondent Farmers

The characteristics of respondent farmers are seen from several criteria, namely Age, Education, Experience, and Number of Family Members. For more details, it can be seen in Table 4, as follows:

**Table 4.** Characteristics of Respondent Farmers 2021.

No	Description	interval	Average (%)
1.	Age	27-57	40
2	Education	6-12	10
3	Experience	11-31	15
4	Number of Family Members	1-5	3

*Source: Appendix 1, processed in 2021.*

In Table 4, it can be seen that farmer respondents aged from 27 years to 57 years, an average of 40%, Education from 6 years to 12 years, an average of 10%, Experience ranging from 11 years to 31 years, an average of 15%, And the number of family members ranging from 1 person to 5 people, an average of 3%.

#### 3.2. Corn Farming Condition

##### a. Corn Farmer Land Area

The land area of corn farmers owned by all respondent corn farmers is privately owned land. From the results of interviews through questionnaires, none of the respondents' corn farmers have the status of rented land. To find out about the status of the land and the area of land owned by the respondents can be seen in Table 5.

**Table 5.** Number of Corn Farmers Respondents Land Area Criteria 2021.

Land Area (Ha)	Number of Respondents (Persons)	Percentage (%)
0.7	11	20
0.8 – 0.9	5	15
1	24	65
<b>Total</b>	<b>40</b>	<b>100</b>

*Source: processed in 2021.*

In table 5, it can be seen that respondent farmers have an area of corn between 0.7 to 1 hectare, then respondent farmers who have a land area of more than 1 hectare are 65% or as many as 24 people. And the respondents who own corn farmers with land area under 0.7 hectares are as many as 20% or as many as 11 people, while those who have 0.8 to 0.9 hectares are 15% or as many as 5 people. This shows that corn farmer respondent farmers have a land area that can be said to be moderate, the land area owned by corn farmer respondent farmers is more than one hectare, the more corn farmers produce and of course farmers are expected to increase and quality.

### b. Labor Allocation

The outpouring of labor in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency generally starts from Land Preparation, Planting, Fertilizing, Pest Control, Weeding, and Harvesting. For more details can be seen in Table 6 as follows:

**Table 6.** Workforce allocation for Respondents in 2021.

No	Description of activities	HOK/Business	HOK/ha
1	Land Preparation	23	20.9
2	planting	12	10.9
3	Fertilization	12	10.9
4	Pest Control	6	5.5
5	Weeding	17	15.5
6	Harvest	14	12.7
	Amount	84	76.4

*Source: processed in 2021.*

In Table 6, it can be seen that the number of HOK/Businesses is 84 and HOK/ha is 76.4 starting from Land Preparation HOK/Business 23 or HOK/ha 20.9. Planting HOK/Business 12 or HOK/ha 10.9. Fertilizing HOK/Business 12 or HOK/ha 10.9. Pest Control HOK/Business 6 or HOK/ha 5.5.

Weeding HOK/Business 17 or HOK/ha 15.5. And Harvesting HOK/Business 14 or 12.4.

### c. Use of Production Facilities

The use of production facilities in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency generally starts from seeds, NPK Urea Organic Fertilizer, and Pesticides. For more details, it can be seen in Table 7 as follows:

**Table 7.** Use of Respondent Farmers' Production Facilities 2021

No	Description of Production Facilities	Unit	Total/Business	Quantity/Ha
1	Seed Organic	Wrap	33	30.0
2	fertilizer	kg	686	623.6
3	Urea Fertilizer	kg	166	150.9
4	NPK Fertilizer	kg	93	84.5
5	Pesticide	Liter	6	5.5

*Source: processed in 2021.*

In Table 7, it can be seen that the Unit, Total/Business, and Total/Ha. Starting from the seed pack unit, the amount/business is 33, and the number/ha is 30.0. Organic Fertilizer Unit Kg, Total/Business 686, and Total/Ha 623.6. Unit of Urea Fertilizer Kg, Total/Business 166, Total/Ha 150.9. NPK Fertilizer Unit Kg, Total/Business 93, Total/Ha 84.5. While Pesticide Unit Liter, Total/Business 6, Total/Ha 5.5.

#### d. Corn Plant Farming Equipment

Maize farming equipment in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency generally starts from hoes, tripe machines, sprayers, sickles, buckets, machetes, and jute. For more details can be seen in Table 8, as follows:

**Table 8.** Farming Equipment for Corn Crops Respondents 2021.

No	Equipment Type	Unit	Amount
1	Hoe	Fruit	4
2	Tripe Machine	Unit	1
3	Sprayer	Unit	1
4	Sickle	Fruit	4
5	Bucket	Fruit	3
6	machete	Fruit	5
7	Jute	Fruit	85

*Source: processed in 2021.*

In Table 8, it can be seen that from Unit to Quantity, starting from Hoe Unit of Fruit or Number of 4, Tripe Machine Unit of Unit or Number of 1, Sprayer of Unit or Number of 1, Sickle of Fruit Unit or Number of 4, Bucket of Fruit Unit or Number of 3, Machete Unit Fruit or total 5, and fruit unit burlap or total 85.

#### e. Corn Farming Cost

##### 1. Labor costs

Labor costs in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency, start from land preparation, harvesting, fertilization, pest control, weeding, and harvesting. For more details, it can be seen in Table 9 as follows:

**Table 9.** Labor Costs of Respondent Farmers 2021.

No	Description of activities	Rp/Business	Rp/Ha
1	Land Preparation	1,498,900	13,626.36.4
2	planting	691,800	6,289.09.1
3	Fertilization	691,800	6,289.09.1
4	Pest Control	345900	3.144.54.5
5	Weeding	1,037,700	9,433.63.6
6	Harvest	936,813	8,516.48.2
	<b>Amount</b>	<b>5,202,913</b>	<b>47,299.20.9</b>

*Source: processed in 2021.*

In Table 9, it can be seen that the amount of Rp./Business is 5,202,913 to Rp./Ha 47,299,20.9 starting from Land Preparation of Rp./Business of 1,498,900 or Rp/Ha of 13,626.36.4. Planting Rp/Business 691,800 or Rp/Ha 6,289.09.1. Fertilization Rp/business 691,800 or Rp/Ha 6,289.09.1. Pest Control Rp/Business 345,900 or Rp/Ha 3,144,54,5. Weeding Rp/Business 1,037,700 or Rp/Ha 9,433,63.6. And Harvesting Rp/Business 936,813 or Rp/Ha 8,516.48.2.

##### 2. Production Facility Cost

The cost of production facilities in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency, starts from seeds, organic fertilizers, urea fertilizers, NPK fertilizers, for more details can be seen in Table 10 as follows:



**Table 10.** Cost of Production Facilities for Respondents in 2021.

No	Description of Production Facilities	Total/Business	Quantity/Ha
1	Seed	683,681	6.21528.2
2	Organic fertilizer	1,028,625	9.35113.6
3	Urea Fertilizer	665,450	6,04954.5
4	NPK Fertilizer	1,116,900	10.15363.6
5	Pesticide	434.350	3,948.63.6
<b>Amount</b>		<b>3,929,006</b>	<b>35,718.23.6</b>

*Source: processed in 2021.*

In Table 10, it can be seen that the number of farms is 3,929,006 and the number/ha is 35,718,23.6, starting from the number of seeds/businesses of 683,681 or the number/ha of 6,21528.2. Organic Fertilizer Total/Business 1,028,625 or Total/Ha9,35113.6. Urea Fertilizer Total/Business 665,450 or Total/Ha 6,04954.5. NPK Fertilizer Total/Business 1,116,900 or Total/Ha 10,15363.6. And Pesticides Total/Business 434,350 or Total/Ha 3,948,63.6.

### 3. Equipment Depreciation Cost

Equipment depreciation costs in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency, ranging from hoes, tripe machines, sprayers, sickles, buckets, machetes, and jute. For more details can be seen in Table 11 as follows:

**Table 11.** Depreciation Costs for Respondent Farmers' Equipment 2021.

No	Equipment Depreciation Cost	Unit	Amount
1	Hoe	Rp.	48375
2	Tripe Machine	Rp.	192187.5
3	Sprayer	Rp.	70468.75
4	Sickle	Rp.	13300
5	Bucket	Rp.	32500
6	machete	Rp.	93500
7	Jute	Rp.	422837.5
<b>Amount</b>			<b>8,731,688</b>

*Source: processed in 2021.*

In Table 11, the Total Depreciation Cost of Equipment is 8,731,68.8 starting from the Hoe Unit Rp or the amount of 48375. The Tripe Machine Unit is Rp. or the Amount is 192187.5. Sprayer Unit Rp or Total 70468.75. Sickle Unit Rp or Total 13300. Bucket Unit Rp or Total 32500. Parang Unit Rp or Total 93500. Burlap Unit Rp or Total 422837.5.

## f. Data Analysis Results

### 1. Farming Analysis

Analysis of farming in Nagori Bah Sampuran, Jorlang Hataran District, Simalungun Regency, starting from Production, Revenue, Labor Costs, Production Facilities Costs, Equipment Depreciation Costs, Income to R/C. For more details, it can be seen in Table 12, as follows:

**Table 12.** Farmers' Analysis of Respondents 2021.

No	Description	Unit	Total/Business	Amount/ Ha
1	Production	kg	6,765	6,150
2	Reception	Rp	23,678,900	21,526,272
3	Labor costs	Rp	5,202,912	4,729,920
4	Cost of Production Facilities	Rp	6,663,731	6,057,937
5	Tool Depreciation Cost	Rp	5.07956	4.61778
6	Income	Rp	11,304,300	10,276,636
	<b>R/C</b>		<b>1.97</b>	<b>1.97</b>

*Source: processed in 2021.*

In Table 12, it can be seen that the R/C is 1.97 starting from the Production Unit of Kg Amount/Business 6,765 or Total/Ha 6,150. Revenue Unit Rp. Total/Business 23,678,900 or Total/Ha 21,526,272. Unit Labor Cost Rp Total/Business 5,202,912 or Total/Ha 4,729,920. Cost of Unit Production Facilities Rp. Total/Enterprise 6,633,731 or Total/Ha 6,057,937. Unit Equipment Depreciation Cost Rp Total/Business 5.07956 or Total/Ha 4,61778. Unit Income Rp Total/Business 11,304,300 or Total/Ha 10,276,636

## V. Conclusion

1. Land area, seeds, fertilizers, pesticides, and labor are obstacles for farmers of the Nagori Bah Sampuran Gapoktan, namely Tunas Jaya Poktan, and Prosperous Poktan.
2. The implementation of Farmers' Farming of Gapoktan Bah Sampuran namely Poktan Tunas Jaya and Poktan Sejahtera in Nagori Bah Sampuran increased farmers' income so that Poktan Tunas Jaya and Poktan Sejahtera farmers succeeded in achieving success in corn farming.
3. The government's role in increasing corn farming income is RDKK for the needs of the Bah Sampuran Gapoktan, namely Tunas Jaya Poktan and Sejahtera Poktan.

The results showed that the R/C data analysis was 1.97 starting from production, production costs, revenues, and net income.

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