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Marketing Channel Analysis in an Effort to Develop the Potential of Bananas in Pinrang Regency

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Abstract

Banana is one of the agriculture that has bright prospects in both the domestic and export markets, but banana farmers do not understand the potential of this banana. Therefore, a system is needed so that farmers know about the banana prospects. In marketing, until now there are still some discussions about the marketing patterns used are still quite long from farmers to consumers, increasing marketing costs incurred, marketing large margins, the benefits of each marketing institution and marketing of banana assistance. It dramatically affects the marketing of bananas in Pinrang Regency. The purpose of this study was to analyze the marketing patterns of Kepok bananas in Pinrang Regency. Determination of the sample in a study involving banana farmers, collector traders, wholesalers and retailers using the snow-balling method, samples related to all that was questioned, with the sample calculation were 30 banana farmers and 7 traders. The analytical method uses descriptive qualitative (quantitative) and quantitative (margin calculation) analysis. The results of this study indicate that farmers market their banana through two marketing channels in Pinrang Regency. There are two marketing channels, 1st channel is Farmer to Consumer, 2nd channel is Farmer to Collector Trader then to Retailer Trader and ends in Consumer. The involved marketing institutions require costs to operate marketing functions such as loading costs, transportation costs, fees, consumption and so forth.

Keywords: Marketing channels, Marketing margins, Bananas

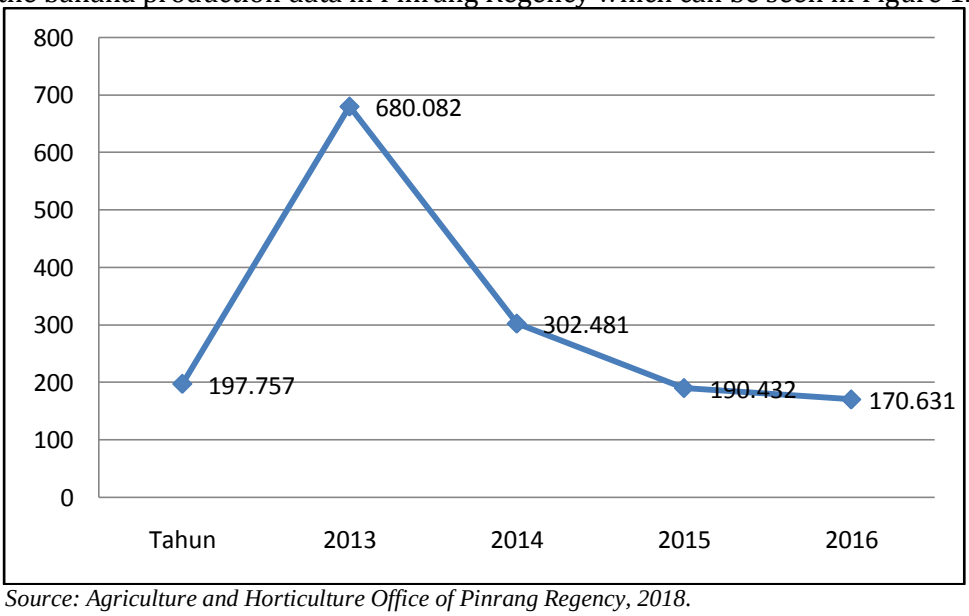
A. Background

Horticultural farming, especially fruits in Indonesia, has only been seen as a side business planted in yards with narrow areas and the application of post-harvest handling cultivation techniques is still simple. On the other hand, the market demand for fruit from both local and export markets requires a certain quality, uniform size and a sustainable supply of fruit. Therefore, to develop fruits in Indonesia and to increase competitiveness in both local and export markets, the government is promoting agricultural development in the field of horticulture.

Banana (Musa parasidiaca) is a horticultural commodity that has an international reputation. This herbaceous fruit plant originates from regions in Southeast Asia, including Indonesia. This plant then spread to Africa (Madagascar), the United States, and Central America. Bananas are included in the top four raw materials for global crops and one of the biggest profit makers in the market. It makes bananas a critical commodity for the global economy and food security. So far, bananas are included as the fourth essential food ingredient in developing countries. Bananas are like most cheap foodstuffs that we often forget where they come from and how they are obtained.

Banana is one of Indonesia's leading fruit commodities. It refers to the large harvested area and banana production, which always ranks first compared to other horticultural commodities. Indonesia's banana production is quite large, reaching 6.28 million tons per year. Apart from that, Indonesia is also one of the primary centres for banana diversity. More than 200 types of bananas exist in Indonesia, which provides opportunities for the utilization and business of banana commodities according to consumer needs. Almost all regions of Indonesia are the largest banana producing areas due to suitability of land and climate, availability of seeds, and the interest of farmers to cultivate bananas (Kementrian Pertanian, 2017).

Banana production in Pinrang Regency has decreased every year for the last five years according to the banana production data in Pinrang Regency which can be seen in Figure 1.1.



Source: Agriculture and Horticulture Office of Pinrang Regency, 2018.

Figure 1.1 Production (Tons) of Banana Fruit in Pinrang Regency in the Last 5 Years

Banana production in Pinrang District has decreased every year, wherein the previous years the banana production in 1 hectare usually produced 500-700 hands/month, but in recent years farmers have only been able to produce 100-200 hands/month. One of the factors that caused the decline in banana production was the reduction it lands due to the conversion of land from banana plants to paddy fields for paddy fields and improper cultivation techniques that resulted in disruption of banana pests and diseases.

Pinrang Regency is one of the banana production centres, which has the potential to be continuously improved and developed. One of the most significant banana producing areas in Pinrang Regency is Mattiro Bulu District. The demand for bananas continues to increase every year, but it is not in line with the availability of bananas which tends to fluctuate. Meanwhile, in terms of the ability to produce bananas, Pinrang Regency has a relatively wide and fertile land, with a large number of farmers who cultivate bananas and already have experience both in banana cultivation and in marketing. That is because the management of banana farming is only

a side crop and the community only makes it a side income (not a business priority). There is no application of specific cultivation technology to increase the amount of banana fruit production, considering the opportunity to develop banana agribusiness is still wide open. For the success of banana farming, apart from the application of technology, the use of superior varieties and improvement of varieties that are tolerant or resistant to essential pests and diseases of bananas, high productively, and have good fruit quality and are liked by the wider community.

The banana variety cultivated in Pinrang Regency is the Kepok banana. Banana production does not provide added value to the commodity to farmers because they sell their products directly to the market or collectors. The banana production is usually marketed in the market in Pinrang Regency first, and then if there is remaining production, it will be marketed outside of Pinrang Regency. However, during the harvest season, bananas in Pinrang District are also sold outside the island of South Sulawesi. Banana marketing in Pinrang District is focused on first meeting local market demands to minimize marketing costs.

In marketing, until now there are still some obstacles, including the pattern of marketing channels used which are still quite long from farmers to consumers, the number of marketing costs incurred, the size of the marketing margin, the benefits obtained by each marketing agency and the efficiency of marketing bananas. This greatly affects the marketing of bananas in Pinrang Regency. In addition, farmers also cannot determine the selling price of bananas.

In the beginning, farmers would only sell their banana products to collectors whom their customer. However, farmers are currently free to choose collector traders who come directly to the banana planting locations to sell their banana products due to the reduced number of traders in the Pinrang Regency area and the prices offered by these collectors are relatively cheap.

Sudiyono (2002) states that in studying agricultural marketing in the economy, there are five approaches that are commonly used, namely: (1) The Commodity Approach, which is conducted by determining the commodity that studied and followed by the flow of commodities from producers to end consumers. This approach emphasizes the description of what is done to agricultural commodities and how an agricultural commodity is marketed efficiently. (2) Institutional Approach, This is to examine marketing institutions involved in the marketing process of agricultural commodities. Marketing agencies carry out the decision-making process in the agricultural commodity marketing process. These marketing institutions can be in the form of middlemen, intermediate traders, wholesalers, and others.

The main objective of this research is to analyze the pattern of marketing channels in the development of banana potential in Pinrang Regency. The results of this analysis are expected to become a reference for policymakers, in this case, both central and regional government, regarding of this research can be used as input/suggestions in making regulations to maintain the existence and development of the banana fruit business.

B. Methodology

The research location was taken purposively, namely the method of purposive sampling for reasons known from the characteristics and criteria of the sample (Singarimbun and Effendi, 1997). The research location chosen was Pinrang Regency. Pinrang Regency is one of the centres for banana production in South Sulawesi. This research was conducted from April to May 2019.

A sampling of farmers is conducted using the proportional random sampling method, which is taking samples from the entire population. Following the proportion of each sub-population so that the sample taken can represent each sub-population, and each farmer has the same opportunity to be selected as a sample (Parel et al. all, 1973). In this study, a sample of 30 respondents from selected sub-districts was taken by considering the number of farmers who met the requirements as sample farmers with the formula:

$$Ni = \frac{Nk}{N} x\ n$$

Where :

Ni = The number of samples of banana farmers in each district
Nk = The number of subdistrict banana farmers from the selected districts
N = Total population of banana farmers from selected districts
N = Number of samples of desired banana farmers (30 respondents)

The object of this research is that business actors, namely banana farmers, collectors, wholesalers and retailers use the snow-balling sample method because the population of all these actors is unknown, with the sample size being 30 banana farmers and seven collecting traders in the Regency Areca. Data collection techniques were carried out by direct interviews with expert respondents, namely farmers, collectors and partner companies involved in the supply chain mechanism through questionnaires related to the object of research.

To analyze the pattern of marketing channels and marketing agency intermediaries in Pinrang Regency at the marketing agency level is used qualitative analysis (identification of channels and marketing agencies involved) and quantitative (margin calculation) of marketing margin can be calculated by the following equation:

$$Mm = Pr - Pf$$

Where :

Mm = Marketing margin at farm level
Pr = Price at retail level
Pf = Price at farm level

C. Findings and Discussion

1. Kepok Banana Marketing Channels and Institutions

In the framework of Kepok banana farming, the harvest process, harvest handling, distribution and marketing are a series of activities that support the success of farming. In order to maintain the quality of fresh and processed products, harvesting activities, handling the harvest and distribution of them must be taken into account the right steps to maintain the quality of Kepok banana and avoid physical damage. Based on the results of interviews with respondents in the study area, the marketing pattern applied by farmers is selling Kepok bananas to collectors. Most of the Kepok banana farmers sell their produced Kepok bananas to collectors, namely as much as 86.67% of the Kepok banana farmers, while the Kepok banana farmers who directly sell their crops to the market are 13.33%.

The marketing system used by Kepok banana farmers is the bunch buying system. In the bunch buying system, the collecting traders come to the farmers when the banana trees are ready to be harvested, and the harvesting when the bananas are ripe then the middlemen or collectors who harvest the bananas, with the prevailing price ranging from Rp. 3,000 to Rp. 3,500 per hands and farmers sell their crops in fresh form. This is consistent with research conducted by Teguh Purwadi (2009) which states that the marketing system used before Primatani was the bonded bond system and the bunch buying system. In the bonded system the middlemen come to the farmer when the banana tree has just issued a heart (banana flower) and buys the heart, but harvesting when the banana heart has become ripe fruit, the prevailing price ranges from Rp. 5,000 to Rp. 7,000 per bunch, this system was chosen by farmers for various reasons, including because of economic urgency and also that farmers do not have to bear the risk of crop failure. Meanwhile, in the research location in Pinrang District, there is no bonded marketing system implemented. It is because some farmers and collecting traders already understand the disadvantages when using the Ijon marketing system, namely the bonded bond system, which can harm farmers because the purchase price is low and can harm collectors because bananas that have been paid are not necessarily harvested successfully, so is the buying system a sign that contains many elements of speculation and uncertainty.

In addition, the system of bunches is also implemented, before weighing the bananas, it is conducted classify them first, then sorting and grading them. So that the bananas produced by farmers get a price according to their quality. This system is fully implemented, farmers only weigh their bananas and classify them first, then do the ivory based on the average quality of one bunch. So in one bunch, the price of bananas for all hands is the same.

Collecting traders have several marketing channels. These marketing channels are differentiated based on the quality of bananas, according to one trader who collects them. Bananas are classified into several qualities, namely quality one and quality two. The first quality is bananas which are sold to regional markets such as Maros Regency, Pare-pare City and Makassar City. The second quality is bananas that are sold to traditional markets such as the main market of Pinrang Regency, the Mattirobulu District Market and the markets around Pinrang Regency. The price of Kepok banana that is received by farmers varies depending on the quality and also the condition of the market price, which is quite fluctuating. The average amount received by farmers is between Rp. 3000 - Rp. 3,500 / hands.

Kepok bananas purchased by collectors will be sent regularly to areas outside Pinrang Regency, including Maros Regency, Pare-pare City, Pangkep Regency and Makassar City.

Delivery to regions usually occurs to certain farmers, in this case farmers who are also traders and already have special subscriptions. Kepok banana marketing channels in Pinrang Regency can be seen in Figure 4.3.

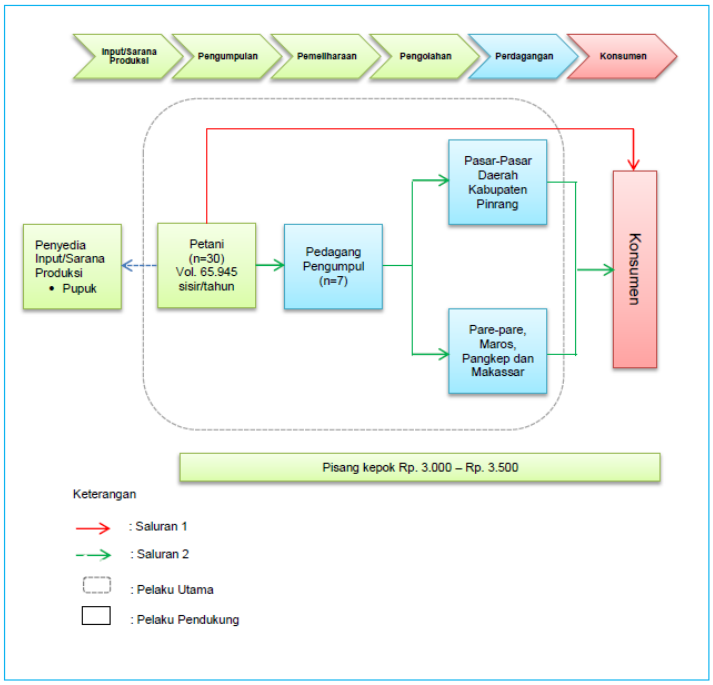


Figure 1. Kepok Banana Marketing Channels in Pinrang District

Figure 1 shows channel I, the farmer selling their kepok banana directly to consumers, usually consumers who come directly to farmers or farmers who are also sellers in the people's market in the vicinity of their residence. Besides, consumers on the channel I are people who do not have banana plants living around Kepok banana farmers' residence. In channel II, farmers sell kepok bananas to collectors, then collectors sell them to local markets around Pinrang Regency. Farmers sell all their produce to collector traders because farmers do not need transportation costs to the market, collector traders come to the land or farmer's house to collect Kepok bananas. Usually, farmers already have regular collectors. On average, collector traders who buy directly from farmers are collectors around the Kepok banana production center area. For the type of banana sold to the market area of Pinrang Regency, the quality of two Kepok bananas is two.

Meanwhile, farmers and traders sell Kepok bananas directly to markets outside the Pinrang Regency, including Pare-pare City, Pangkep Regency, Maros Regency and Makassar City. The type of banana quality that collectors sell to markets outside Pinrang Regency is the number one quality. Farmers who sell their products outside the Pinrang Regency area are farmers who act as traders, and the amount of Kepok banana production collected is greater. Marketing to supermarket suppliers and large companies is a new marketing channel that has not been implemented by both farmers and traders. That is because farmers/traders have not been able to supply supermarkets or companies constantly.

2. Kepok Banana Marketing Margin

According to Asmarantaka (2012), the marketing margin is the company's costs and benefits due to its business activities. These business activities are marketing functions, so it can be concluded that the marketing margin is the costs and profits of marketing institutions due to the marketing functions carried out by these marketing agencies. Marketing margin is one of the indicators used to measure the efficiency of marketing. The marketing margin for each banana marketing channel in Pinrang District can be seen in table 4.12.

Table 4.12. Details of Marketing Margin (IDR/Hand) for Respondents of Kepok Banana Farmers and Traders in Pinrang Regency in 2019.

Description	Channel 1	Channel IIa	Channel IIb
	IDR/Hand	IDR/Hand	IDR/Hand
Farmers			
Selling price	3.500	3.500	3.500
Collector Traders			
Purchase price		3.500	3.500
Cost		300,05	450,06
Selling price		4.500	6.000
profit		699,95	2.049,94
Margin		1.000	1.500
Retailers			
Purchase price		4.500	6.000
Cost		100	200
Selling price		6.000	10.000
Profit		1.400	3.800
Margin		1.500	4.000
Consumers			
Purchase price	3.500	6.000	10.000
Total Cost	0,000	400,05	650,06
Total Profit	-	2.099,95	5.849,94
Total Margin	0,000	2.500	5.500

Table 4.12 shows three patterns of distribution channels for the marketing of Kepok bananas in Pinrang Regency, where the marketing pattern involves several marketing agencies. Each marketing agency involved requires a fee to conduct marketing functions such as loading costs, transportation costs, user fees, consumption, etc. Costs incurred differ depending on the distance between the farmer and the consumer and the number of institutions involved. Collecting traders, both for Pinrang Regency and Makassar City, carry Kepok bananas using pickups and trucks. In distribution channel IIa, the costs incurred are lower because of the distance between the farmer's location and the market is closer so that transportation costs are cheaper.

The cost of distribution channel IIb is greater, but the total marketing profit on this channel is also greater than that of channel IIa. This occurs because the selling price at each institution's level between several destination regions is also different. The selling price at the merchant collector level in Pinrang Regency and Pare-pare City is 4,500, - / comb, while the destination for Maros Regency and Makassar City is 6,000, - / comb. Likewise, the price at the consumer level, in Pinrang Regency and Pare-pare City the selling price is 6,000, - / comb, while in Maros Regency and Makassar City the selling price is 10,000, - / comb. This higher selling price will cover greater marketing costs so that the profits obtained by both individual agencies and in total will be large. This is following the research conducted by Rokhman Permadi (2016), which states that the costs incurred differ depending on the distance between farmers and consumers and the number of institutions involved in the marketing system. That is in line with the research results conducted in Pinrang Regency that the distance determines the number of costs incurred by farmers and marketing institutions, namely Kepok banana collectors in Pinrang Regency.

The development of kapok banana in Pinrang Regency can be developed because banana products can be sold fresh, processed bananas and used as banana product diversification. Technological developments can make it easier to sell the products produced. Following research conducted by Yuni Sugiarti (2014), the demand for the world's banana fruit commodity is indeed very large, especially the cavendish banana, which covers 80% of the world's total demand. The relatively large national production volume and harvested area are compared to other fruit commodities, making banana a leading crop in Indonesia. There are several things in the marketing system that still need to be addressed. In this case, improvements in the IT sector are indispensable. This system is useful for introducing online sales of bananas at Mahkota Pisang stores and can improve performance to minimize the risk of errors in managing sales transactions. The establishment of an e-commerce system that can help Mahkota Banana Shop introduce and sell bananas online and manage product data,

customer data, and sales data. In addition, the land potential of Pinrang Regency to become a center for banana production in South Sulawesi is very available and used as banana plantation land by paying special attention to the cultivation process of Kepok banana from upstream to downstream of banana agribusiness so that it becomes a competitive banana product.

From the upstream banana agribusiness in general, the use of agricultural tools/machinery in banana farming starts from land preparation to processing. However, the operational use of these tools and machines for small-scale banana farming is still costly and can only be done by large plantation companies. Tillage involves a tractor machine to dig and level the ground. Most people's gardens still use tillers or part of the weevil that the farmers cultivate themselves. Tissue culture seeds are generally held to fulfill requests for expansion programs from the government or the opening of gardens by private parties and the use of tissue culture seeds has never been used by banana farmers in Pinrang Regency.

The banana plantation business in Pinrang Regency is mostly in yards and moor. Infrastructure facilities, especially irrigation, do not yet exist. Packaging facilities, transportation means, houses/warehouses for fresh handling also do not meet good standards. Likewise, capital facilities are still minimal. Several pre-harvest and post-harvest technological innovations from research results are available, including seed technology, nutrient management, pest and disease management, and fresh and post-harvest handling. However, banana farmers in Pinrang Regency have not been able to implement it because of the inability of pets.

D. Conclusion

In the marketing process of Kepok bananas in Pinrang District, farmer respondents are marketing Kepok bananas' products through two marketing channels. The two marketing channels, namely channel one, are Farmers to Consumers, channel two Farmers to Collecting Traders, and then to Retailers ending in 0Consumers. From these marketing channels, it can also be seen that the marketing agencies involved are collectors and retailers. Each marketing agency involved requires a fee to carry out marketing functions such as loading costs, transportation costs, user fees, consumption, and others.

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Analysis of Factors That Influence Civil Servants Performance in Balai Perikanan Budidaya Air Payau Situbondo

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Abstract

Balai Perikanan Budidaya Air Payau Situbondo (BPBAP) is one of the largest centres in East Java, to be precise in Situbondo Regency. BPBAP is a government- fish centre that is well developed as an engineering centre. The institution's performance resulted from the performance of employees that develop every year. To analyze the performance of BPBAP employees, this research was compiled regarding the factors that influence it. The research design used was survey research, with a total of 88 respondents. The analysis method used is multiple linear regression analysis including, t-test, F test, and coefficient. The results showed that the variables of transformational leadership style, transactional leadership style, organizational culture and motivation which had a correlation of 0.708 to performance of BPBAP employees which was a strong relationship. Furthermore, partially the transformational leadership style variable has a significant effect on performance, the transactional leadership style variable has no significant effect on performance, the organizational culture variable has a significant effect on performance and the work motivation variable has a significant effect on performance. The independent simultaneous variable has a significant effect on the dependent variable.

Keywords : BPBAP, Leadership Style, Organizational Culture, Motivation, Institutional Performance

A. Background

Data (Ministry of Marine Affairs and Fisheries, 2014) that the Gross Domestic Product (GDP) of each agricultural sub-sector has contributed, among others, the food crops sector 47.43%, fisheries 22.26%, plantation crops 13.37%, livestock 12, 60% and forestry 4.35%. This data explains that the fisheries sector is the second largest sub-sector that contributes to GDP in the agricultural sectors. The 22.26% of the fisheries sector's contribution came from aquaculture and fisheries. The volume and production value in 2014 of the fisheries sector consists of fisheries about 6.2 million tons and aquaculture 14.52 million tons..

The volume and value of aquaculture production reach 14.52 million tons or 68.50% of the total volume of fishery production that illustrates the aquaculture has a high contribution. To increase aquaculture production requires the institutions and technical facilities that managed.. The institution that supports aquaculture production, especially in East Java Province, is the Balai Perikanan Budidaya Air Payau Situbondo (BPBAP) Situbondo. BPBAP has five units including Pecaron Unit, Bletok Unit, Gelung Unit, Pasuruan Unit and Tuban Unit. Furthermore, the fishery products developed by BPBAP include vaname shrimp, milkfish, tiger grouper, mouse grouper, kertang grouper, cantang hybrid grouper and seaweed. The main office of BPBAP is in the coastal area of Situbondo district and its five units are spread across various regions in East Java. BPBAP reviews the employee performance every year to determine their performance and as a reference for improving performance. Improving the performance of the BPBAP employees will have a direct impact on improving the overall performance of the BPBAP.

According to (Hasbiadi, Rizal, & Utami, 2015) the results of the BPBAP employee performance appraisal 2010 to 2013 tend to be constant in the good category, this is because the assessment has not been applied objectively in that year and the results of the assessment are based on subjective by the head of BPBAP without considering the employee log-book for one year. Whereas in 2014, the BPBAP employee performance appraisal system had been changed with a quarterly period system. The percentage of results of employee performance appraisals for 2014 of 1st to 3rd quarter resulted in a varied assessment caused by an objective appraisal system had been implemented. The results of the performance appraisal criteria were obtained by each employee based on the realization of the logbook that employees arrange every quarter. The employee performance appraisal of the BPBAB in 2014 is described in Table 1 below.

Table 1. Results of Employee Performance Appraisal at BPBAB Situbondo in 2014

No	Performance Appraisal Criteria	Year		
		1st Quarter	2nd Quarter	3th Quarter
1	Very good	15.5%	15.5%	18.4%
2	Good	63.1%	78.7%	77.7%
3	Enough	1%	5.8%	1%
4	Bad	20.4%	0	2.9%
5	Very bad	0	0	0

Based on the table above, with the new appraisal format, the results of employee performance appraisals tend to differ from the five assessment criteria. The overall percentage of employee performance appraisals illustrates good performance results and there is an increasing trend. Improved employee performance will have a direct impact on improving the performance of the hall. Continuous employee performance appraisal will help improve employee performance, this means that employees can find out about each other's performance every quarter. This employee performance appraisal was implemented starting in 2014 for employees, especially those with the status of Civil Servants.

Based on the results of the BPBAP employee performance appraisal above and the explanation of the research related to the factors that affect the performance of various institutions or companies, the factors that influence the performance of BPBAP Civil Servants will be analyzed. These performance factors include variables of transformational leadership style, transactional leadership style, organizational culture and work motivation. The formulations of the research problems include :

1) Does the variable transformational leadership style, transactional leadership style, organizational culture and work motivation have a correlation with the employee performance of BPBAP Situbondo?.

2) Does the variable transformational leadership style, transactional leadership style, organizational culture and work motivation have a partial influence on the performance of BPBAP Situbondo employees.
3) Do the variables of transformational leadership style, transactional leadership style, organizational culture and work motivation have a simultaneous influence on the performance of BPBAP Situbondo employees.

The research objective is the factors that influence the performance of BPBAP employees, as follows :

1) To determine the correlation between the variables of transformational leadership style, transactional leadership style, organizational culture and work motivation on employee performance at BPBAP Situbondo.
2) To know the partial effect of transformational leadership style, transactional leadership style, organizational culture and work motivation on employee performance at BPBAP Situbondo.
3) To determine the simultaneous influence of transformational leadership style, transactional leadership style, organizational culture and work motivation on the performance of BPBAP Situbondo employees.

B. Methodology

1. Research Design

The study design was survey research. Survey research is research that takes a sample from a population and uses a questionnaire as a primary data collection tool (Singarimbun and Effendi, 1995).

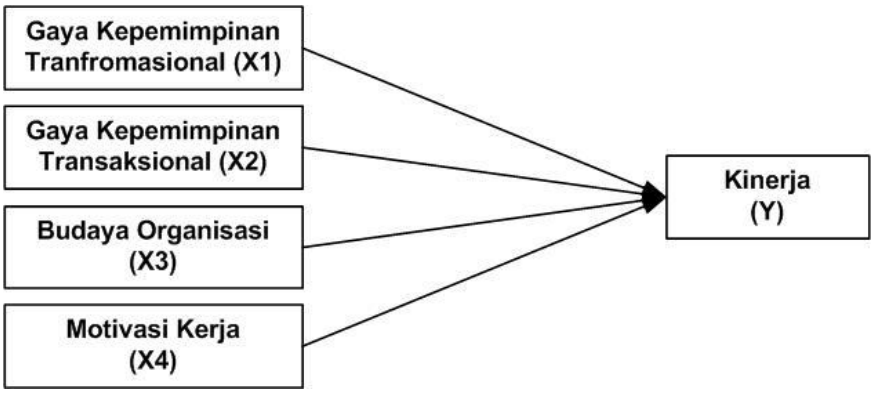
2. Participants/Respondents/Population and Sample

The sample in this study is all BPBAP Situbondo employees who are civil servants. Consideration of using all employees who are civil servants at BPBAP Situbondo or the study area to get a more representative picture and reduce the error rate of the data obtained closer to the real value. So that the population and sample in this study were 88 civil servants at BPBAP Situbondo. The data collection methods used in this study include:

a. Questionnaires, which is data collection techniques that conducted by distributing questions to respondents,
b. Interviews which is data collection techniques that are that conducted by directly asking each source, which is carried out systematically and based on research objectives. The method of collecting data through interviews was conducted by researchers with the aim of obtaining a complete and clear picture of the research.

3. Research Variables

The variables measured in this study are the independent variables and the dependent variable. The independent variables include transformational leadership style (X1), transactional leadership style (X2), organizational culture (X3), work motivation (X4), while the dependent variable is performance (Y). This following is a research concept framework :



The operational definition of the variables in this study includes :

a. The transformational leadership style (X1) illustrates that the BPBAP Situbondo leaders pay attention to the development needs and issues of each employee. Indicators of

transformational leadership styles include charisma, inspiration and individual consideration.

b. The transactional leadership style (X2) describes that the BPBAP Situbondo leadership guides or motivates employees towards the set goals by clarifying the requirements for the roles and duties of employees. Indicators of transactional leadership styles include reward, supervision, and responsibility.
c. Organizational culture (X3) is a culture and habits that are often carried out and found in BPBAP Situbondo. Indicators of organizational culture include innovation, attention to detail, result orientation, and team orientation.
d. Work motivation (X4) is the spirit to encourage or move employees to do and complete all work and tasks that are the responsibility of employees. Work motivation indicators include achievement, recognition, job satisfaction, career development, and compensation.
e. Performance (Y) is the result of work achievement and a measure of employee achievement while completing a given job. Performance indicators include quantity, quality, individual ability, and cooperation.

4. Technique of Data Analysis

The data analysis carried out was oriented towards the formulation of the problem and research objectives, to use validity and reliability tests as well as multiple linear regression analysis including correlation coefficient analysis, t test, and F test.

a. Validity Test and Reliability Test

The validity test is used to measure whether the instrument is valid or not, the instrument is said to be valid if it is able to measure what is desired and can reveal the variable data under study accurately. Reliability test is an index that shows the extent to which the measurement tool can be trusted or reliable, the instrument is said to be reliable is an instrument that if used several times in different times to measure the same object will produce the same data.

b. Multiple Linear Regression Analysis

The multiple linear regression analysis method is used to determine the significant or insignificant effect of the independent variable on the dependent variable. The general form of the multiple linear regression equation, are as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + u$$

Furthermore, the correlation coefficient analysis is an analysis used to measure the strength or weakness of the relationship between the independent variable and the dependent variable. While the t test is basically used to show how far the influence of the independent variables partially (one by one) on the dependent variable. Then the F test is used to determine the effect of the independent variables simultaneously (together) on the dependent variable. The tests above were carried out with the help of the Statistic Program for Social Science (SPSS) computer program version 22.

D. Findings and Discussion

1.1. Overview and Development of the Balai Perikanan Budidaya Air Payau Situbondo (BPBAP)

BPBAP is a government-owned fish cultivation centre that is developing and growing well as an engineering centre. Balai was established in 1986, which was originally called the East Java Tiger Shrimp Sub-flashlight Project, which at that time was still a tiger prawn fry maintenance facility under the auspices of the Directorate General of Fisheries, Ministry of Agriculture. This Tiger Shrimp Sub-flashlight is located in Blitok Village, Mlandingan District, Situbondo Regency and is a branch of BBAP Jepara, Central Java. The Tiger Shrimp Sub-flashlight then broke away from the Jepara Brackish Water Cultivation Center and changed its name to the Situbondo Brackish Water Cultivation Workshop, which was established on April 18, 1994, through the Decree of the Minister of Agriculture Number: 264 / Kpts / OT.210 / 4/94. The Situbondo Brackish Water Cultivation Workshop consists of three divisions including the fish division, the shrimp division and the aquaculture division. The Situbondo Brackish Water Cultivation Workshop is the Technical Implementation Unit (UPT) of the Directorate General of Fisheries in the field of brackishwater aquaculture production development which is under and responsible to the Directorate General of Aquaculture.

The increasing of duties and responsibilities, on May 1, 2001, the status of the Brackish Water Cultivation Workshop was upgraded to the Situbondo Brackish Water Cultivation Center based on the Decree of the Minister of Fisheries and Marine Affairs No. KEP. 260 / MEN / 2001.

4.1.3 Duties and Functions Based on the Decree of the Minister of Fisheries and Marine Affairs No. KEP. 260 / MEN / 2001, BBAP Situbondo has the task of implementing brackish water fish feeding and breeding techniques as well as preserving broodstock or fish seed resources and the environment.

1.2. Validity Test Results and Reliability Test

The results of the validity test are presented in the following table.

Table 2. The Result of Validity Test

Variables	Indicators	$r_{statistic}$	r_{test}	Explanation
Transformational Leadership Style (X_1)	X_{11}	0.668	0,207	Valid
	X_{12}	0.628		Valid
	X_{13}	0.687		Valid
Transactional Leadership Style (X2)	X_{21}	0.667		Valid
	X_{22}	0.661		Valid
	X_{23}	0.616		Valid
Organizational Culture (X3)	X_{31}	0.690		Valid
	X_{32}	0.744		Valid
	X_{33}	0.672		Valid
	X_{34}	0.651		Valid
Work Motivation (X4)	X_{41}	0.675		Valid
	X_{42}	0.793		Valid
	X_{43}	0.712		Valid
	X_{44}	0.784		Valid
	X_{45}	0.693		Valid
Performance (Y)	Y_1	0.733		Valid
	Y_2	0.745		Valid
	Y_3	0.779		Valid
	Y_4	0.775		Valid

Source: Data processed in 2020

Based on the table above, each variable indicator has a value of r count> r test so that the indicator variable used meets the validity criteria (valid data). Meanwhile, based on the results of the reliability test, the correlation coefficient value is 0.501, when compared with the r test value (0.207), the correlation coefficient > r test value, all indicators of the research variables are reliable.

1.3. Results of Multiple Linear Regression Coefficient Analysis

The factors identified in this study include independent variables and dependent variables. The independent variables include Transformational Leadership Style (X1), Transactional Leadership Style (X2), Organizational Culture (X3), and Work Motivation (X4) while the dependent variable is Performance (Y). Based on the results of the analysis using the SPSS application, the regression equation was obtained as follows.

$$Y = 4{,}447 + 0{,}344\ X1 + 0{,}198\ X2 + 0{,}382\ X3 + 0{,}313\ X4 + e$$

The constant value (a) = 4.447 is positive, meaning that if there are transformational leadership style factors, transactional leadership styles, organizational culture, and work motivation, the performance will increase by 4.447. Meanwhile, if the four factors are equal to zero, the performances is 4.447. Furthermore, the value of each independent variable, including transformational leadership style (0.344), transactional leadership style (0.198), organizational culture (0.382), and work motivation (0.313) illustrates that the value of each of these independent variables will increase performance according to the value. each independent variable provided that the other variables are considered constant.

1.4. Correlation of Independent Variables to Bound Variables

The correlation coefficient is used to determine the strength or weakness of the relationship between the independent variables, namely transformational leadership style (X1), transactional leadership style (X2), organizational culture (X3), and work motivation (X4), with the dependent variable namely performance (Y). From the analysis, the correlation coefficient

value is 0.708. This means that the correlation coefficient (r) of 0.708 is close to 1, so the independent variable has a strong or close relationship with the dependent variable.

1.5. Partial Influence of Independent Variables on Bound Variables

Partial regression coefficient test is used to test whether the regression coefficient of each independent variable, namely transformational leadership style (X1), transactional leadership style (X2), organizational culture (X3), and work motivation (X4), has a partial effect on performance (Y). If tcount> t table (α = 0.05), then the factors being compared have a significant effect on income. Conversely, if t count <t table (α = 0.05), then the factors being compared have an insignificant effect on performance (Y). The following is a table of regression analysis results.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.447	5.300		-.839	.404
	x1	.344	.169	.188	2.034	.045
	x2	.198	.128	.141	1.541	.127
	x3	.382	.102	.329	3.740	.000
	x4	.313	.084	.324	3.737	.000

Source: Data processed in 2020

The results of the above test analysis can be explained as follows :

a. Transformational Leadership Style (X1) to Performance (Y)
   Partially the transformational leadership style (X1) has a significant effect on the performance variable (Y). This can be seen from the results of the t-test analysis which has a value of t count (2.034)> t table (1.980 with (α = 0.05). partially consistent with previous research such as research conducted by Italiani (2013).
b. Transactional Leadership Style (X2) to Performance (Y)
   Partially the transactional leadership style (X2) has no significant effect on the performance variable (Y). This can be seen from the results of the t-test analysis which has a value of t count (1.541) <t table (1.980) with (α = 0.05). So the results of this study are partially inconsistent with previous studies, it can be explained that leadership style variables, especially indicators of rewards, are not a major factor in improving an employee's performance. It was further explained that the rewards at the hall were clearly and transparently structured so that the employees had a clear understanding.
c. Organizational Culture (X3) to Performance (Y)
   Partially organizational culture (X3) has a significant effect on the performance variable (Y), we can see the results of the t test analysis which has a value of t count (3,740)> t table (1,980) with (α = 0.05). So the results of this study are partially consistent with previous studies such as research conducted by Wahyuni (2015); Yuswani (2016).
d. Work Motivation (X4) toPerformance (Y)
   Partially work motivation (X4) has a significant effect on the performance variable (Y). This can be seen from the results of the t test analysis which has a value of t count (3,737)> t table (1,980) with (α = 0.05). So the results of this study are partially consistent with previous studies such as research conducted by Kapahang, Rorong, and Tampi (2015).

1.6. The Simultaneous Influence of Independent Variables on Bound Variables

Simultaneous testing (F test) of the influence of the independent variables of transformational leadership style (X1), transactional leadership style (X2), organizational culture (X3), and work motivation (X4), together or simultaneously on the dependent variable, namely performance (Y). The F test is used to see whether the coefficient of the independent variable simultaneously has a significant effect on the dependent variable. If F count> F table (α = 0.05), then the independent variables simultaneously have a significant influence on the dependent variable. Conversely, if F count <F table (α = 0.05), then the independent variables simultaneously have no significant effect on the dependent variable. Based on the results of the F test, it is obtained that the F test value is 6.628, which indicates that F count (6.628)> F table (0.444) (α = 0.05), meaning that the independent variable has a significant effect on the dependent variable (performance).

E. Conclusion

Based on the results and discussion, conclusions can be made, including:

1. The variables of transformational leadership style, transactional leadership style, organizational culture and work motivation have a correlation with the performance of BPBAP Situbondo employees with a correlation coefficient (r) of 0.708 close to 1, which means that they have a strong or close relationship.
2. Partially the transformational leadership style variable has a significant effect on performance, the transactional leadership style variable has no significant effect on performance, the organizational culture variable has a significant effect on performance and the work motivation variable has a significant effect on the employee performance of BPBAP Situbondo.
3. Simultaneously the transformational leadership style variable, transactional leadership style, organizational culture and work motivation have a significant effect on the employee performance of BPBAP Situbondo.

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Factors Affecting the Production of Rice Farming in Polenga Village, Watubangga District Kolaka Regency

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Abstract

The productivity of rice farming is largely determined by the use of production factors such as land, seeds, fertilizers, pesticides and labor. High productivity will only be achieved when the allocation of production factors is done effectively and efficiently. This study aims to determine the effect of production factors on the production quantity of rice farming in the Polenga village, Watubangga district, Kolaka regency. The sample determination in this study was performed using the Slovin method, while the data analysis method used in this study was multiple linear regression analysis. The results showed that the production factor of land area had a significant effect on the quantity of rice farming production. Meanwhile, the production factors of the quantity of seeds, the amount of urea fertilizer, the amount of NPK fertilizer, the amount of pesticides and the quantity of workers did not have a significant effect on rice farming production in Polenga village.

Keywords: Production, factors of production, rice farming, regression

A. Background

Rice farming commodity in Southeast Sulawesi are currently showing an increase where in 2012 the area was 118,961 hectares with a production of 491,567 tons of unhulled dry milled rice, in 2013 the area sown was 124,511 hectares with a production of 516,560 tonnes of unhulled dry milled rice, and in 2014 increased where the sown area was 132,415 Ha with a production of 594,255 tonnes of unhulled dry milled rice, so that lowland rice plants are one of the food crops still a priority in development. Indeed, not only because rice is the staple food, most of the population also makes lowland rice cultivation a source of income. However, the destruction of lowland rice plants is inseparable from various problems, one of which is the problem of pests and diseases. (BPS Sulawesi Tenggara, 2014).

The increase in agricultural production, especially food crops, will become heavier in the future (Yasa dan Hadayani, 2017). This condition is caused by the increasing demand for production, especially for rice due to population growth, better advice and increasingly limited land for rice cultivation in the lowlands. To deal with the food problem, the government has always tried to promote agricultural development with various programs. Among the objectives of the program is the ability of farmers to use limited resources. In order to increase agricultural production followed by increased income, farmers are based on efforts to make optimal use of all available resources and funds through identification, extensification, rehabilitation and diversification programs. agricultural. These programs are currently the focus of government attention, including the government of Southeast Sulawesi.

The Kolaka regency is one of the areas that depend on the agricultural sector as a source of regional income. The agricultural sector currently promoted by the regional government is the subsector of food crops, especially rice. This strategy is part of the central government program which has set itself an objective of food self-sufficiency. One of the Kolaka Regency lowland rice production centers is located in Watubangga district. According to data from the Central Bureau of Statistics (BPS) in 2017, the area of lowland rice cultivation in Watubangga district was 1318 ha with an average land productivity of 4.5 tons per hectare.

Besides the role of government with its various sets of policies, the productivity of lowland rice is largely determined by the use of factors of production such as land, seeds, fertilizers, pesticides and labor. High productivity will only be achieved when the allocation of factors of production is done effectively and efficiently. The use of factors of production in lowland rice cultivation in Polenga village as one of the centers of rice production in Kolaka regency is not the same among farmers, even though the cultivated area is the same, so that the amount of output produced is also different. This study aims to determine the effect of the use of factors of production on the production of lowland rice cultivation in the village of Polenga.

B. Methodology

1. Population and sample

The population of this study was all rice farmers in the lowlands of Polenga village, or 372 people. Determination of the sample in this study using the Slovin method, in order to obtain a total sample of 78 people. The determination of the selected sample was carried out using a simple random sampling method.

2. Analisis Data

The data analysis method of this study uses the Cobb-Douglas production function model (Soekartawi, 2003) with the following equation:

$$LogY = ß_0 + ß_1 logX_1 + ß_2 logX_2 + ß_3 logX_3 + ß_4 logX_4 + ß_5 logX_5 + ß_6 logX_6 + Ɛ \ldots\ldots\ldots\ldots (1)$$

Keterangan:

$LogY$ = Logaritized of the rice farming production (kg)
$LogX_1$ = Logaritized of the land area (ha)1
$LogX_2$ = Logaritized of the quantity of seed (kg)
$LogX_3$ = Logaritized of the quantity of urea fertilizer (kg)
$LogX_4$ = Logaritized of the quantity of NPK fertilizer (kg)
$LogX_5$ = Logaritized of the quantity of pesticide (liter)
$LogX_6$ = Logaritized of the quantity of labor (HOK)
$ß_0$ = Intercept coefficient
$ß_1$- $ß_5$ = Regression coefficient
Ɛ = *Error*, the other influencing factors that are not included in the model.

Criteria:

$H_0 = 0$: The independent variable has no effect on the dependent variable.
$H_1 \neq 0$: The independent variable affects the dependent variable.

The individually (partial) regression coefficient test is used to determine the effect of the partially independent variable on the dependent variable. The test method uses a two-tailed test, where α = 5%: 2 = 2.5% = 0.025. If $t_{calculate} < t_{table}$ (α = 0.05), then H0 is accepted and H1 is rejected, it means that the variable area of the land, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have in part no significant effect on the total production variable. rice cultivation. If $t_{calculate} > t_{table}$ (α = 0.05), then H0 is rejected and H1 is accepted, the variable land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have in part a significant effect on rice farming production.

C. Findings and Discussion

Quantity of production produced by farmers is strongly influenced by the use of the production inputs used. The more efficient and effective the use of production inputs, the more cereal production will be maximized. In this study, the production factors believed to have an effect on the level of rice farming production at the research site were land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor. In detail, the results of the analysis of the influence of these production factors on the level of rice farming production at the study site are presented in the following table.

Table 1. Results of The Analysis of Factors Affecting Rice Farming Production in Polenga Village, Watubangga District, Kolaka Regency, 2019

Variable	Coefficient	Sig.	$t_{calculate}$	Prob.
Constant	688,466	*	2,074	0,042
Land area	3236,156	*	3,962	0,000
Quantity of seed	0,489	ns	0,026	0,979
Quantity of urea fertilizer	0,704	ns	0,672	0,504
Quantity of NPK fertilizer	2,077	ns	0,623	0,535
Quantity of pesticide	-40,225	ns	-1,039	0,302
Quantity of labor	3,988	ns	0,538	0,592
R-Squarred	0,895			
$F_{calculate}$	100,747	*		0,000
F_{table}	2,229			
t_{table}	1,667			
α = 0,05				
n = 78				

Source: Output of SPSS, 2019
Keterangan:
* = Significant 5%
ns = Non significant

The R-squared (R2) value is 0.895 or 89.5%. This shows that the percentage of the contribution of the influence of independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) can explain 89.5% of the variation of the dependent variable (rice farming production), while the remainder 10.5% is explained by variables not included in this study.

1. Simultaneous Significance Test (F-test)

A simultaneous significance test (F-test) was used to determine whether the independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) together had a significant effect on the independent variable (rice farming production). Based on the results of the analysis, the $F_{calculate}$ value was obtained as 100.747, because the $F_{calculate}$ value was greater than

F_{table} (100.747 > 2.229) and the probability of significance (0.000 < 0.05), simultaneously, the independent variable consisting of land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have a significant effect on the dependent variable of rice farming production.

2. Partial Significance Test (t-test)

The partial significance test (t-test) is used to determine whether in the regression model the independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) partially have a significant effect or not on the dependent variable (rice farming production).

a. Land Area

Based on the results of the data analysis, the $t_{calculate}$ of the land area was 3,962, while the value of the $t\text{-}_{table}$ was 1.667. Since the value of $t_{calculate}$ is greater than the value in t_{table} (3962 > 1667) and the probability of significance (0.002 < 0.05), partially the independent variable of land area (X1) has a significant effect on the dependent variable of rice farming production (Y). This condition indicates that the greater the area of land used, the greater the production of rice farming that will be produced. The value of the regression coefficient of the independent variable for land area was 3236.156, indicating that the additional area of 1% in rice farming in Polenga village would increase rice farming production of 3.236.156 kilograms, assuming the other variables had a fixed value.

However, it is very difficult to expand the land area because the land area are overwhelmed by residential areas. Therefore, the increase in production can be continued through intensification, by making optimal use of existing land. It is strongly recommended to apply agricultural intensification in order to obtain more agricultural products or better quality products (Ihsan et al., 2016). Agricultural intensification can increase the Crop Index (PI), which divides the area harvested by the area of rice fields. According to Supriatna (2012), one of the efforts that can be made to increase the production of food crops, especially in rice farming, is technological innovation to increase intellectual property in irrigated and rainfed paddies.

b. Quantity of Seed

Based on the results of data analysis, the value of $t_{calculate}$ of the quantity of seeds was 0.026, while the value of t_{table} was 1.667. Since the $t\text{-}_{calculate}$ value is less than the $t\text{-}_{table}$ value (0.026 < 1.667) and the significance probability (0.979 > 0.05), partially the independent variable the quantity of seeds (X2) does not have significant effect on the dependent variable of rice farming production (Y). These conditions indicate that the higher the quantity of seeds used in rice farming, the higher the production will be. The value of the regression coefficient of the quantity of seeds variable is 0.489, indicating that a further 1% increase in the quantity of seeds in Polenga village will increase the quantity of production by 0.489 kilograms, assuming that the other variables have a fixed value (ceteris paribus).

c. Quantity of Urea Fertilizer

Based on the results of data analysis, the value of $t_{calculate}$ of quantity of urea fertilizer was 0.672, while the value of t_{table} was 1.667. Since the $t_{calculate}$ value is less than the t_{table} value (0.672 < 1.667) and the significance probability (0.504 > 0.05), partially, the independent variable the quantity of urea fertilizer (X3) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of urea fertilizer used in rice farming in the study area will increase the quantity of rice farming production. The value of the regression coefficient for the quantity of urea fertilizer is 0.704, which means that adding one unit of urea fertilizer will increase the rice farming production by 0.704 kilograms, assuming other variables have a fixed value (ceteris parius).

d. Quantity of NPK Fertilizer

Based on the results of the data analysis, the $t_{calculate}$ value of the NPK fertilizer was 0.623, while the t_{table} value was 1.667. Since the $t_{calculate}$ value is less than the t_{table} value (0.623 <1.667) and the significance probability (0.535 > 0.05), in part, the independent variable the quantity of NPK fertilizer (X4) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of NPK fertilizer used in rice farming cultivation in the study area will increase the quantity of production. The regression coefficient value for the quantity of NPK fertilizer is 2.077, which means that adding one unit of NPK fertilizer will increase rice farming production by 2.077 kilograms, assuming that a other variable should have a fixed value (ceteris paribus).

e. Quantity of Pesticide

Based on the results of the data analysis, the $t_{calculate}$ of pesticides was -1.039, while the t_{table} value was 1.667. Since the value of $t_{calculate}$ is less than the t_{table} value (-1.039 < 2.093) and the probability of significance (0.302 > 0.05), in part, the independent variable the quantity of pesticides (X5) has no significant effect on the dependent variable of the quantity of rice farming production (Y). This condition indicates that the quantity of pesticides used in rice farming cultivation in the study area is not optimal. The regression coefficient value for the quantity of pesticide is -40.225, which means that adding one unit of pesticide use without being followed by adding other variables will reduce the production of rice farming by 40.225 kilograms, assuming that other variable should have a fixed value (ceteris paribus).

f. Quantity of Labor

From the results of data analysis, the $t_{calculate}$ value of the quantity of labor was 0.538, while the t_{table} value was 1.667. Since the value of the $t_{calculate}$ is less than the value of t_{table} (0.538 < 1.667) and the probability of significance (0.592 > 0.05), in part, the independent variable the quantity of labor (X6) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of labor used in rice farming cultivation in the research area will increase the quantity of rice farming production. The value of the regression coefficient for the quantity of labor is 3,988, which means that adding the quantity of labor by one unit will increase the quantity of rice farming production by 3,988 kilograms, assuming the other variables have a fixed value (ceteris paribus).

D. Conclusion

The land area production factor has a significant effect on the quantity of rice farming production. Meanwhile, the production factors of the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor did not have siggnificant effect on rice farming production in Polenga Village, Watubangga District, Kolaka Regency.

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Dynamics of Price Growth of Curly Red Chili and Red Chili In Kolaka District

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Abstract

This study aims to: 1) Identify the price data pattern of Curly Red Chili and red chilies in Kolaka Regency; 2) Obtain the best time series forecasting method for forecasting the price of Curly Red Chili and ordinary red chilies in Kolaka Regency; 3) Get a forecast for the price of Curly Red Chili and regular red chilies for the coming year. This type of research is descriptive quantitative, the source of the data in this study is secondary data obtained from the office of industry and trade, Kolaka district. The data analysis method used is the time series forecasting method.The results showed that: 1) The results of the identification of data patterns on the plot of price data for Curly Red Chili and common red chilies in Kolaka Regency in 2015-2019 obtained a seasonal pattern. 2) The results of the application of the time series forecasting method for the price of curly red chilies, obtained the best time series forecasting method, namely the box-jenkins method of the SARIMA (1,0,0) (2,0,0) 12 model with the smallest MSE value, namely MSE = 41,534 590 While for the price of ordinary red chilies, the best time series forecasting method is the box-jenkins method of the SARIMA (1,0,0) (1,0,0) 12 model with the smallest MSE value, namely MSE = 44,764,512. 3) The results of forecasting the price of Curly Red Chili using the box-jenkins method SARIMA (1,0,0) (2,0,0) 12 with the help of the MINITAB 19 program is the highest price of IDR 47,355.4 / Kg which occurred in August 2020 and the lowest price is IDR 23,169 / Kg which occurred in January 2020, while the average price of Curly Red Chili in 2020 is IDR 32,487.3 / Kg. While the results of forecasting the price of ordinary red chilies using the box-jenkins method with the SARIMA (1,0,0) (1,0,0) 12 model with the help of the MINITAB 19 program is the highest price of Rp. 32,967.8 / Kg which occurred in August. 2020 and the lowest price is IDR 16,756.4 / Kg which occurred in December 2020, while the average price of ordinary red chili in 2020 is IDR 23,346.27 / Kg.

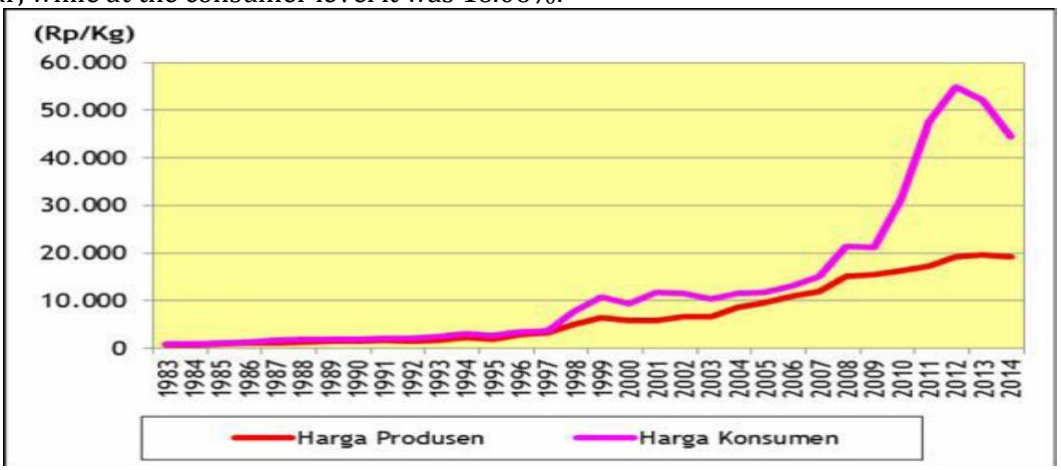
Keywords: time series forecasting, price of red chilies, curly red chili, red chilies, box- jenkins ARIMA-SARIMA

A. Background

Agriculture is a sector that plays an important role in human life. Activities in agriculture determine the availability of food sources for living things. Most Indonesian people depend on agriculture as a source of livelihood to earn income and meet their daily needs. Agricultural development is also very necessary to make society towards better agriculture. So that agricultural activities are not only carried out to meet family needs.

There are several agricultural sub-sectors in Indonesia, namely food crops, plantations, forestry, horticulture, fisheries and livestock. One of the agricultural subsectors that plays an important role in everyday life is horticultural crops. One of the horticultural plant commodities that the people of Indonesia always need is red chili. The spicy taste in red chilies is the reason why red chili is one of the most indispensable spices in the household. Apart from being used for household purposes, chili can also be used for industrial purposes, including the cooking spices industry, the food industry and the medicine or herbal medicine industry (Rukmana, 1994).

In order for the need for red chilies to be fully met, the use of various red chilies must be followed by an increase in production and price stabilization. In the last few years, the chili pepper commodity has often been monitored by the government because the price of this horticultural commodity has often fluctuated. Based on data from the Central Bureau of Statistics (in the 2016 Chili Outlook), the development of red chili prices at the producer and consumer levels in Indonesia during 1983–2014 shows an increasing trend (Figure 1.1). In that period, the price of red chili at the producer level experienced an average growth of 12.80% per year, while at the consumer level it was 16.06%.

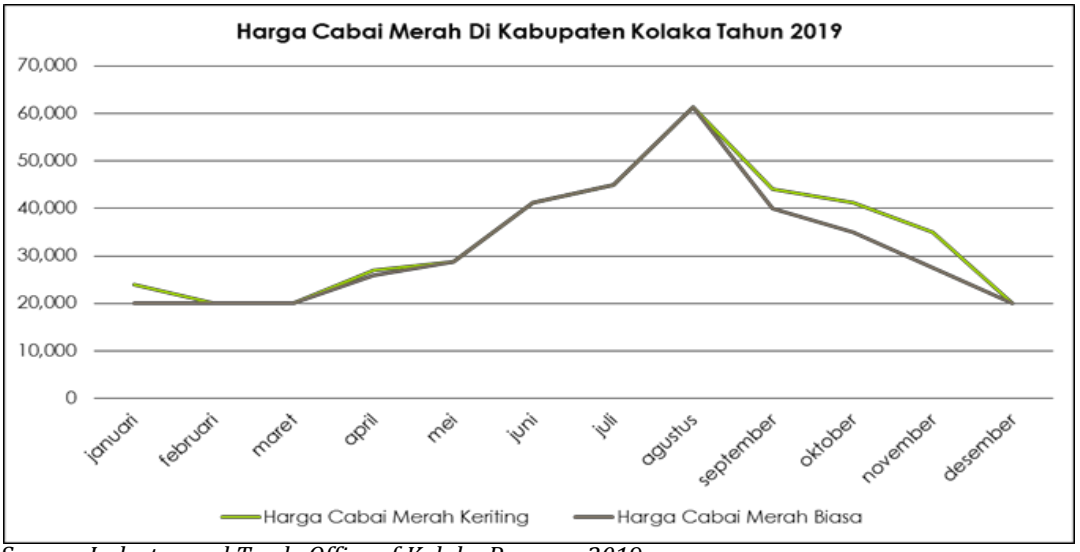


Source: Chili Outlok 2016

Figure 1.1. Indonesian Producer and Consumer Prices, 1983–2014.

In the last 5 years (2010-2014), the price of red chili at the producer level as well as at the consumer level has increased quite sharply. In 2010 the producer price of red chili was IDR 16,343 per kg and in 2014 it was IDR 19,237 per kg, while the price of red chili in 2010 at the consumer level was IDR 31,260 per kg, while in 2014 it was IDR 44,519 per kg. kg.

The largest margin occurred in 2012 amounting to Rp. 35,712.11 / kg, where the price of red chili at the producer level is Rp. 19,206.89 / kg, while at the consumer level it reached Rp. 54,919.00 / kg. According to the Ministry of Agriculture 2015 (in Outlook for Chili 2016), this increase in chili prices was caused by reduced supply, while demand was constant and continuous every day, even increasing in certain seasons. Chili price fluctuations occur due to seasonal chili production, rain factors, production costs and the length of distribution channels (Farid and Subekti, 2012). Meanwhile, the disparity in the price of chili between regions occurs because the center of chili production is concentrated in Java and the quality of road infrastructure is inadequate (Irawan, 2007). Kolaka Regency is one of the regions that produces red chilies. The price of red chili in Kolaka Regency in the last one year is still experiencing uncertain changes every month.



Source: Industry and Trade Office of Kolaka Regency 2019

The price changes that occurred in the commodity of red chili in Kolaka district were quite large, so the price of red chili had no price certainty. The lowest selling price of Curly Red Chili in Kolaka Regency is around IDR 20,000.00 / Kg, while the highest price can reach IDR 61,250.00 / Kg. and for regular red chilies, the lowest price is the same as Curly Red Chili, which is IDR 20,000.00 / Kg and the highest selling price is IDR 61,250.00 / Kg. According to the Department of Industry and Trade of Kolaka Regency, the decline in the price of red chili was caused by the increase in local farmers' production so that the stock of goods increased while consumer demand decreased or stabilized. Meanwhile, the increase in the price of red chili was caused by decreasing production of local farmers so that the stock of goods decreased while consumer demand increased. In addition, the increase in the price of red chilies was also caused by high consumer demand before the holiday, and decreased production of local farmers due to uncertain weather.

The fluctuating price of red chilies is a recurring phenomenon throughout the year. This is an unfavorable situation for both producers and consumers. Sometimes producers benefit greatly, and vice versa. The chili commodity traders will always expect profit. The amount of profit that will be obtained by these traders is relatively fluctuating due to changes in the price of chili. Based on the above background, the author takes the title "The Dynamics of Red Chili Price Growth in Kolaka Regency".

B. Methodology

1. The research object

The research object is the problem under study. According to Sugiyono (2012) the object of research is an attribute of people, objects or activities that have certain variations that are determined by the researcher to be studied and then draw conclusions. The object of this research is the Department of Industry and Trade of Kolaka Regency, where the price data for curly red chilies and red chilies are used as data from the Department of Industry and Trade of Kolaka Regency.

2. Data Analysis Techniques

.Secondary data that obtained is quantitative data, its processed using Microsoft Excel 2010 and Minitab 19 programs. The selection of the program was based on the reason that the program was widely known and easy to use.

3. Technique of Data Collection

The solution to the first problem is by identifying data patterns on the data plot of curly red chili and regular red chilies. The results that will be obtained from the identification of data patterns are the form of data patterns that will be adjusted to the forecasting method that will be carried out. Patterns that can be formed include the following patterns: 1) Stationary Patterns, 2) Seasonal Patterns, 3) Cyclic Patterns, and 4) Trend Patterns. Minitab program 19.

The best forecasting methods result from the processing of the average monthly price of red chili, the most appropriate method is chosen to predict the price of red chili. The criteria for

selecting the most frequently used method or the main criterion is the mean square error (MSE). The method chosen is the method that has the lowest MSE value. In addition, the second criterion is having the simplest form and requiring the least amount of time in the processing (Alex Muharlis, 2007).

The forecasting method that has the smallest MSE value implies that the smaller the MSE value of a forecast, the forecasting results will be closer to the actual value (stronger forecasting power) (AkhmadZacky, 2007). MSE values are formulated :

$$MSE = [\sum_{i=1}^{n} e_t^2] / n \quad \text{.....(2.1)}$$

The solution to the third problem is forecasting the price of red chili for the next year using the best time series forecasting method that meets the criteria.

C. Findings and Discussion

1. Identification of Data Patterns on the Plot of Curly Red Chili Price Data in Kolaka Regency 2015-2019

Kolaka Regency is one of the areas that always experiences fluctuations in the price of red chilies, both Curly Red Chili and regular red chilies. Curly Red Chili is a commodity that is widely marketed in the Kolaka district. The following is a plot of the Curly Red Chili (HCMK) price data in Kolaka Regency obtained with the help of the MINITAB 19 computer program.

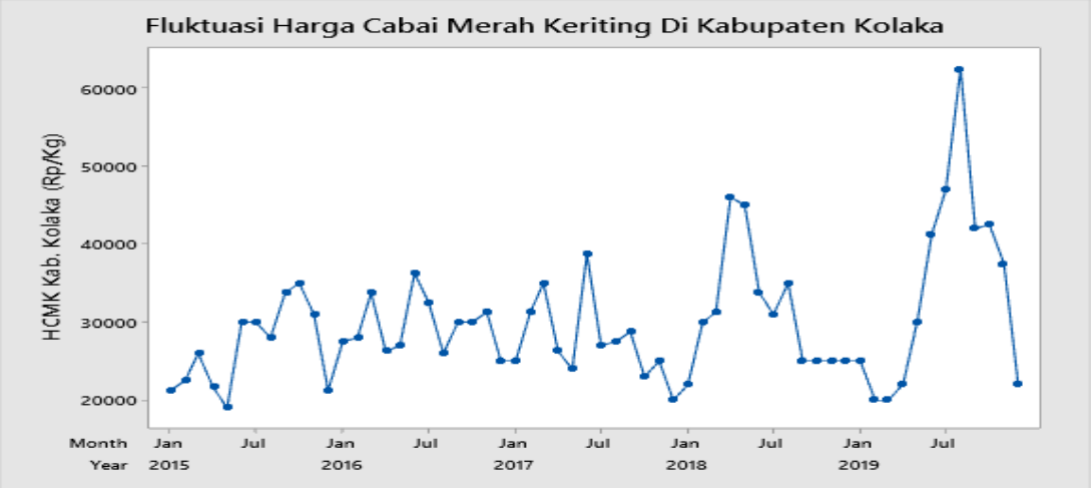


Figure 4.1. Plot of Curly Red Chili Price Data in Kolaka Regency

During 2015-2019, the price of Curly Red Chili fluctuated with the difference between the highest price and the lowest price of IDR 43,500.00. The highest price was reached at the price level of Rp.62,500 / Kg which occurred in August 2019, the high price was due to the decreasing production of local farmers so that the stock of goods decreased while consumer demand increased. Meanwhile, the lowest price was IDR 19,000 / Kg which occurred in May 2015.The low price was caused by the increase in local farmers' production yields so that the stock of goods increased while consumer demand decreased or stabilized. The average price was reached at the price level of Rp. 29,837.5 / Kg. Based on the data plot in Figure 4.1, the seasonal pattern of Curly Red Chili prices in Kolaka district is obtained. The pattern that occurs is low prices in four consecutive months, namely in November-February, while for the other eight months the prices tend to be higher which are repeated in the following year.

2. Identification of Data Patterns on the Plot of Common Red Chili Prices in Kolaka Regency 2015- 2019

The price of regular red chili always fluctuates. Ordinary red chili is also a commodity that is widely marketed in Kolaka district. Based on the results of the data plots obtained with the help of the Minitab 19 computer program, they are as follows.

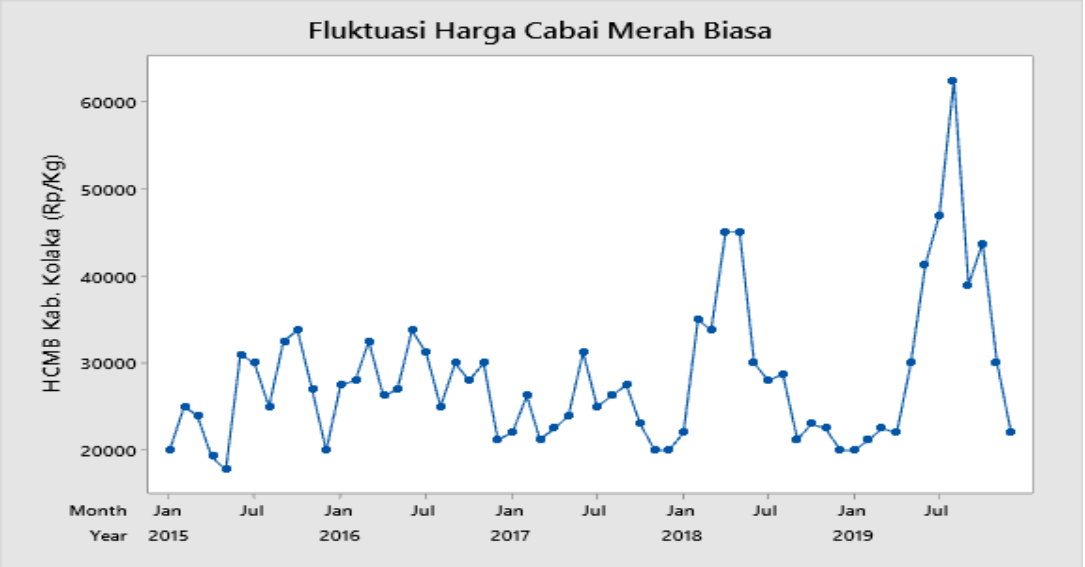


Figure 4.2. Plot of Common Red Chili Prices in Kolaka Regency

In 2015-2019, the price of regular red chilies fluctuated with the difference between the highest price and the lowest price of IDR 44,000.00. The highest price was reached at the price level of Rp.62,500 / Kg which occurred in August 2019, the same as curly red chilies, the high price was also caused by decreased local farmers' production so that the stock of goods decreased while consumer demand increased. Meanwhile, the lowest price was IDR 17,750 / Kg which occurred in May 2015.The low price was caused by the increase in local farmers' production yields so that the stock of goods increased while consumer demand decreased or stabilized. The average price was reached at the price level of IDR 28,220.83 / Kg. Based on the data plot in Figure 4.2, the seasonal pattern of red chili prices is obtained in Kolaka district. The pattern that occurs is low prices in four consecutive months, namely in November-February, while the other eight months the price tends to be higher repeatedly in the following year.

The fall in the price of red chili in Kolaka Regency, both the price of curly red chili and the price of regular red chili, is influenced by, among others, the increase in the production of local farmers so that the stock of goods increases, and the production of farmers' production increases while consumer demand decreases or is stable. Meanwhile, the increase in the price of red chili in Kolaka Regency is influenced by the decreasing production of local farmers so that the stock of goods decreases while consumer demand increases, high consumer demand ahead of holidays and decreasing production of local farmers due to unpredictable weather.

3. Selection of the Best Time Series Forecasting Method

The criteria for selecting the most frequently used method or the main criterion is the mean square error (MSE). The method chosen is the method that has the lowest MSE value. The MSE value of each time series forecasting method can be seen in table 4.13.

Tabel 4.13MSE Value Application of Time Series Forecasting Method

Methods	MSE		Least MSE	
	HCMK	HCMB	HCMK	HCMB
Trend linear	57.456.446	61.208.227	7	7
Trend kuadratik	56.877.051	59.562.399	6	6
Trend pertumbuhan eksponensial	58.439.170	62.332.877	8	8
Pemulusaneksponensialtunggal	47.472.433	45.459.353	4	2
Pemulusaneksponensialganda	50.483.357	50.707.183	5	5
Winters multiplikatif	66.859.964	73.318.738	10	10
Winters aditif	65.363.379	70.074.761	9	9
Dekomposisi multiplikatif	46.397.609	49.875.904	2	3
Dekomposisi aditif	46.830.210	50.326.663	3	4
ARIMA-SARIMA terbaik	41.534.590	44.764.512	1	1

Based on the results of the application of the time series forecasting method with the help of the MINITAB 19 program in table 4.13, the smallest MSE value for Curly Red Chili and regular red chilies is found in the best ARIMA-SARIMA box-jenkins method which has met the criteria For the price of curly red chilies, the ARIMA-SARIMA model that has met the criteria is the

SARIMA model (1,0,0) (2,0,0) 12 with an MSE value of 41,534,590. The application of the box-jenkins method with the SARIMA (1,0,0) (2,0,0) 12 model for the Curly Red Chili price will produce a more accurate forecast value when compared to other methods.

Meanwhile, for the price of ordinary red chilies, the ARIMA-SARIMA model that has met the criteria is the SARIMA model (1,0,0) (1,0,0) 12 with an MSE value of 44,764,512. The application of the box-jenkins method with the SARIMA (1,0,0) (1,0,0) 12 model for the price of ordinary red chilies will produce a more accurate forecast value when compared to other methods.

The advantage of the box-Jenkins ARIMA-SARIMA method is that it is good for short-term forecasting and does not require a certain data pattern so that the model can work properly. While the advantages of the ARIMA-SARIMA box-jenkins method are that the model building takes longer than other methods and there is no way to update the model if there is additional data.

4. Forecasting of price of curly red chili (HCMK) and prices of red chili (HCMB) in Kolaka Regency

Based on the best chosen time series forecast method, the price forecast for curly red chili and red chili peppers can be seen in table 4.14.

Table 4.14 Forecast price of curly red chili (HCMK) and prices of red chili (HCMB) in Kolaka Regency in 2020.

Periode	HCMK (Rp/Kg)	HCMB (Rp/Kg)
January	23.169	21.377,7
February	25.319,7	21.230,8
March	26.033,2	21.108,9
April	35.002	20.382,1
May	38.088,8	22.732,8
June	37.051,6	26.273,4
July	38.158,5	27.858,7
August	47.355,4	32.967,8
September	32.630,1	24.081,6
October	32.857,7	25.365,6
November	30.596,6	20.019,4
December	23.585	16.756,4
Min	**23.169**	**16.756,4**
Max	**47.355,4**	**32.967,8**
Rata-rata	**32.487,3**	**23.346,27**

Based on the results of forecasting Curly Red Chili prices and regular red chili prices using the best time series forecasting method, i.e. for Curly Red Chili price forecasting using the box-jenkins method with the SARIMA model (1,0,0) (2,0,0) 12 with the assistance of the MINITAB program 19, it can be explained that for the price of curly red chili peppers, the highest price is 47,355.4 IDR / Kg that It is produced in August 2020 and the lowest price is 23,169 IDR / Kg which is produced in January 2020, while the average price is for Rizado Red Chili in 2020 is IDR 32,487.3 / Kg. The price that will go on the market will not It will be exactly the same as this forecast, but the price will not be far from the forecast using the best time series forecasting method.

Meanwhile, the price of regular red chili peppers uses the box-jenkins method with the SARIMA model (1,0,0) (1,0,0) 12 with application of the MINITAB 19 program, the highest price is IDR 32,967.8 / Kg that occurs in August. 2020 and the lowest price is IDR 16,756.4 / Kg which occurred in December 2020, while the average price of ordinary red chili in 2020 is IDR 23,346.27 / Kg. The price that will come out in the market will not be exactly the same same as this forecast, but the price will not be far from the forecast using the best time series forecasting method.

D. Conclusion

1. The results of identifying data patterns in the Curly Red Chili price data plot at Kolaka Regency in 2015-2019 obtained a seasonal pattern. The pattern that occurs is the low prices in four consecutive months, that is, in November-February, while the other eight months the

price tends to rise repeatedly in the following year. Meanwhile, the results of the identification of data patterns in the data plot of the price of ordinary red chili peppers in Kolaka district in 2015-2019 also showed a seasonal pattern. The pattern that occurs is the low prices in four consecutive months, that is in November-February, while the other eight months the price tends to be repeatedly higher in the following year.

2. The results of the application of the time series prediction method for the price of curly red chili peppers, obtained the best time series prediction method, namely, the box-jenkins method of the SARIMA model (1.0, 0) (2,0,0) 12 with the smallest MSE value, that is, MSE = 41,534,590. Applying the box-jenkins method with the SARIMA (1,0,0) (2,0,0) 12 model for the price of Curly Red Chili will produce a more accurate forecast value compared to other methods. Meanwhile, for the price of ordinary red chili peppers, the best time series forecasting method is the box-jenkins method of the SARIMA (1,0,0) (1,0,0) 12 model with the value of MSE smaller, that is, MSE = 44,764,512. Applying the box-jenkins method with the SARIMA (1,0,0) (1,0,0) 12 model for the price of ordinary red chili peppers will produce a more accurate forecast value compared to other methods.
3. The results of forecasting the price of Curly Red Chili using the box-jenkins method, the SARIMA (1,0,0) (2,0,0) 12 model with the help of the MINITAB 19 program is the highest price of IDR 47,355.4 / Kg that occurred in August 2020 and The lowest price is IDR 23,169 / Kg that occurred in January 2020, while the average price of Curly Red Chili in 2020 is IDR 32,487.3 / Kg. The price that will go on the market It will not be exactly the same as this forecast, but the price will not be far from the forecast using the best time series forecasting method. Meanwhile, the results of forecasting the red chili prices usually use the box-jenkins method with the SARIMA model (1,0,0) (1,0,0) 12 with the help of the MINITAB program 19, the highest price was Rp. 32,967.8 / Kg that occurred in August 2020 and the lowest price was Rp. 16,756.4 / Kg that occurred in December 2020, while the The price of regular red chili peppers in 2020 is 23,346.27 IDR / Kg. The price that will hit the market will not be exactly the same as this forecast, but the Price will not be far from the forecast using the best time series forecasting method.

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Analysis of The Efficiency Allocativeof The Tabela Rice Farming System in Tondowolio Village, Tanggetada Sub-District, Kolaka

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Abstract

This research aims to determine the efficiency of the use of factors (seeds, fertilizers, pesticides, the number of workers) allocatively in the wetland rice farming system in the Tondowolio Village, Tanggetada District, Kolaka Regency; This is to determine the risk of lowland rice farming with a table system in Tondowolio Village, Tanggetada District, Kolaka Regency. This research was conducted in Tondowolio Village, TanggetadaSubdistrict, Kolaka Regency, using an analysis of allocative efficiency and farm risk. Results: The seeds with an NPMx / Px value of 499.9> 1 so that the use of seeds in the research area was not efficient, the allocative efficiency of fertilizers with an NPMx / Px value was 6.18> 1 so that the use of fertilizers in the research area was not efficient, the allocative efficiency of pesticides with a value NPMx / Px of 1357.56> 1 so that the use of seeds in the research area is not efficient, the allocative efficiency of HOK (labor) with an NPMx / Px value of -237.75 <1 so that the use of seeds in the research area is inefficient. Farm risk analysis obtained a production risk value of 0.41, a price risk of 0.008 and a risk of profit of 0.41. The value of production risk, price risk, and profit risk is directly proportional to the risk faced by farmers, the greater the coefficient of variation obtained, the greater the risk that must be borne by farmers, and vice versa.

Keywords: Allocative Efficiency, Farming Risk, Rice Farming.

A. Background

The agricultural sector is one of the components of national development towards food self-sufficiency in order to alleviate poverty. The important role of the agricultural sector in national development includes as an absorber of labor, contributing to Gross Domestic Product (GDP), sources of foreign exchange, industrial raw materials, sources of food and nutrition, as well as driving the movement of other economic sectors. In a narrower environment, agricultural development is expected to increase farmer people's access to production factors including sources of capital, technology, superior seeds, fertilizers, and distribution systems, so that they have a direct impact on improving farmer welfare (Apriantono, 2007). Farming activities aim to increase productivity so that profits are higher. Production and productivity cannot be separated from the production factors owned by farmers to increase the production of their crops. The low income received is due to the low level of labor productivity. One of the causes of low labor productivity is the slow increase in real wages of agricultural workers (Manning and J. Surya, 1996). One of the efforts made to increase rice productivity is by improving the quality of farming, namely planting methods, planting systems that are currently widely used by Indonesian farmers, namely the direct seed planting system (Tabela) and the transplanting system (tapin). Although the transplanting system is a cropping system that has been used for a long time, many farmers still use this cropping system. Many farmers who initially used the transplanting system (tapin) have left the planting system and switched to the direct seed planting system (Prasetyo, 2010).

B. Methodology

1. Data analysis technique

The data analysis technique used in this study was allocative efficiency. The efficiency test is used to see whether the input or production factors used in the wetland rice farming system in the Tondowolio Village, Tanggetada District, Kolaka Regency are efficient or not. The efficiency used in this research is allocative efficiency (seeds, fertilizers, pesticides, and labor).

2. Calculating Allocative Efficiency

Efficiency is an effort to use the smallest possible input to get the maximum production. Price efficiency is achieved when the ratio between the marginal productivity value (NPMx) is the same as the input cost (Px). (Soekartawi, 2002). Mathematically it can be written as follows.

$$\text{NPMx} = \text{Px} \text{ or} \frac{NPM_x}{P_x} = 1$$

$$\text{NPMx} = \text{PMx} \,.\, \text{Py}$$

$$PM = \frac{b.Y.P_x}{X}$$

Where :

b = Regression Coefficeient
Y = Production
Py = Price of Production
X = The Number of Input Utilization
Px = Price of Input

C. Finding and Discussion

1. Analysis of Average Farming Costs

The variable costs used in farming activities in Tondowolio Village consist of costs for seeds, fertilizers, pesticides, and labor. The amount of costs incurred by farmers can be seen in Table 1 as follows :

Table 1. The Average Cost of Rice Farming Per Hectare Per Planting Season in Tondowolio Village, Tanggetada District, 2020.

No.	List of Input	Cost (Rp)	Percentage (%)
1	Seed	145.833	7,98
2	Fertilizer	812.500	44,47
3	Pesticide	300.000	16,42
4	Men Hours	568.750	31,13
Amount		**1.827.083**	**100**

Source : Proceseed Data 2020

Based on the results in Table 1, it can be seen that the average use of variable costs for rice farming activities in Tondowolio Village is Rp. 1,827,083.3 / ha with the largest percentage found in the fertilizer component with a percentage of 44.47%, then the labor component (HOK) with a percentage of 31.13%, then the pesticide component with a percentage of 16.42%, and the lowest percentage was on the seed component with a percentage of 7.98%. For general explanation based on the average of each variable cost, it will be explained as follows :

a. Seed

The average use of seeds in the study area was 41.67 kg / ha with an average cost of one hectare of Rp. 145,833.3 / ha depending on the spacing used and the planting done by farmers and according to the habits of each growing season.

b. Fertilizer

Rice farmers in Tondowolio Village use various kinds of fertilizers in their farming activities, including urea and NPK fertilizers. The average use of fertilizers in the study area is 541.67 kg / ha with an average cost of one hectare of Rp. 812,500 / ha depending on the habits of each growing season.

c. Pesticide

The determining factor for success in rice farming activities is that farmers are able to produce good quality rice and are resistant to pests and diseases. One way that rice farmers in Tondowolio Village are controlling pests and diseases using pesticides. The average use of fertilizer in the study area is 6.67 liters / ha with an average cost of one hectare of IDR 300,000 / ha.

d. Men Hours

The use of labor for most of the rice farmers in Tondowolio Village comes from workers outside the family or commonly referred to as piece labor. The payment system is carried out by farmers by providing daily wages. The labor wage at the research location is set at Rp. 7,000, - per hour. The average use of labor is 9-10 people / ha with an average cost of one hectare of Rp. 568,750 / ha.

2. Analysis of the Efficiency Allocative on Production Factors

The efficiency of production factors in rice farming in Tondowolio Village, Kolaka Regency can be determined by calculating the NPM ratio of a production factor with the price of each factor NPMx / Px. The calculation used for the analysis of the allocative efficiency of production factors includes the coefficient value. The results of efficiency calculations can be seen in Table 4.11.

Tabel 2. Allocative Efficiency Analysis of the Use of Rice Production Factors in Tondowolio Village, Tanggetada District, 2020.

Variabel	bxi	Y	Py	x	Px	PMx	NPMx	NPMx/Px
Seed	206.47	3452.22	3811.11	41.671	45833.3	17105.3	65533370.5	499.37
Fertilizer	206.47	3452.22	3811.11	541.67	812500	1318.18	5023728.98	6.18
Pesticide	206.47	3452.22	3811.11	6.67	300000	106863.5	407268553	1357.56
Men Hours	-832.49	3452.22	3811.11	81.25	568750	-35480.72	-135220926	-237.75

Sumber: Data primer yang telahdiolah, 2020

a. Allocative Efficiency of Seed
From the results of the analysis, it is known that NPMx / Px of seed use is 499.9 where the number is greater than 1, so the use of seeds in the research area is not efficient. This shows that the use of seeds of 41.67 kg / ha in the study area is not efficient. The high cost of rice seeds makes farmers use rice seeds to a minimum so that the cost of production facilities incurred is small. Farmers' knowledge of rice cultivation, especially in the use of seeds, resulted in inefficient use of seeds, considering that the average education of the respondent farmers was elementary school graduates.

b. Allocative Efficiency of Fertilizer
From the analysis, it is known that NPMx / Px of fertilizer use is 6.18 where the number is greater than 1, so that the use of fertilizer in the study area is not efficient. This shows that the use of pesticides of 541.67 kg in 1 hectare in the study area is not efficient. The use of pesticides in the research area is very intensive and has not been in accordance with the dose or dose. In 1 growing season, fertilization is carried out 2 - 3 times. Farmers believe that if pesticide fertilization is not carried out, the results of rice production are not good. Judging from the intensive use of fertilizers and not in accordance with the dosage, the use of fertilizers in the research area is not efficient. So that the use of pesticides can be optimal, it is necessary to increase the use of fertilizers, so as to increase production and income of rice farmers.

c. Allocative Efficiency of Pesticide
From the analysis, it is known that NPMx / Px of pesticide use is 1357.56, where the number is greater than 1, so the use of pesticides in the study area is not efficient. This shows that the use of pesticides of 6.67 kg in 1 hectare in the study area is not efficient. In 1 growing season, spraying is carried out 3-4 times. So that the use of pesticides can be optimal, it is necessary to increase the use of pesticides, so as to increase production and farmers' income.

d. Allocative Efficiency of Men Hours
From the analysis, it is known that NPMx / Px of labor use is -237.75 where the number is less than 1, so the use of labor in the research area is not efficient. This shows that the use of labor as much as 9-10 HOK in the farm production process from land processing to harvesting with a land area of 1 hectare in the study area is inefficient. In order for optimal use of labor, it is necessary to reduce the use of labor, so as to reduce rice production costs. In research areas that require the most labor, namely in the process of planting, competition and harvesting.

D. Conclusion

Based on the research results, it can be concluded that the allocative efficiency of rice farming in Tondowolio Village was obtained :

a. Seeds with an NPMx / Px value of 499.9> 1 so that the use of seeds in the research area is not efficient so it needs to be added.
b. Fertilizer allocative efficiency with an NPMx / Px value of 6.18> 1 so that the use of fertilizer in the research area is not efficient so it needs to be added.
c. Pesticide allocative efficiency with a value of NPMx / Px of 1357.56> 1 so that the use of seeds in the research area is not efficient so it needs to be added.
d. HOK allocative efficiency (labor) with an NPMx / Px value of –237.75 <1 so that the use of seeds in the research area is inefficient so it needs to be reduced.

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Income Analysis of Local Corn Farming (*Zea mays* L) in Tapenpah Village North Central Timor Regency

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Abstract

This study aims to : 1) To determine the level of income of corn farming in the village of Tapenpah. 2) To determine the relative profitability of corn farming in Tapenpah Village . This study uses income analysis tools and R/C Ratio. From the results of research it can be known that the total income of the farmers of corn in the village Tapenpah amounting to Rp 72,932,416 , 00 with an average of Rp 1,072,535.00. Based on these results, the relative advantage of corn farming in the village of Tapenpah can be profitable with an R/C ratio of 1.82.

Keywords: *local corn*, *income analysis, production*

A. Background

One of the sub-districts in North Central Timor Regency that produces corn is Insana District. Thelevel of corn production in Insana Distric in the last three years has fluctuated. Tear 2018 production of corn in the subdistrictInsana back to experience an increase in line with the increased area of land that use by community subdistrict Insana to produce crops of corn in the region are. Where in the year 2016 with a broad area of 2,320 hectares can produce corn as much as 4.696 and productivity as much as 2.60 Kw / Ha. Year 2017 with a broad area of 2,418 hectares can produce corn as much as 4.473 tons and productivity as much as 2.13 Kw / ha and in the year 2018 with a broad area of 2,734 can produce corn as much as 4.844 and productivity as much as 2.01 Kw/Ha. Corn Productivity most much happened in the year 2016 with productivity as much as 2,60 Kw/ha (BPP district of Insana, 2019). Based on development of harvested area data, production and productivity of corn plants in North Central Timor Regency in the last three years, Tapenpah Village is one of the major corn producing areas among other villages in InsanaDistrict .Tapenpah Village is one of the local producer of corn which is quite large among the villages of the other in the District Insana . In the year 2016 widely harvested crop of corn in the village of Tapenpah of 58 hectares with the results of the production of as much as 116 tons at the level of productivity of 2 tons / ha, in the year 2017 area harvest 91 hectares with the results of the production of as many as 168, 35 tons on the level of productivity of 1.85 tonnes / ha and in the year 2018 area harvested crop of corn amounted to 83 ha with the results of the production of as much as 174.3 tons in the level of productivity of 2.1 tons / ha (Programa Penyuluhan Pertanian TTU , 2015).

Tapenpah village has the potential for corncommodity, so the development of this crop farming needs to be improved, among others, by utilizing its resources to make farming more efficient. Most of the people in Tapenpah Village work as farmers. One of agricultural commodities in the village Tapenpah is local Corn .based in Neonbeni et al., (2019), local Corn in the Tapenpahvillage consists of two kinds of local white corn (*penamutim'asa*) and local corn yellow (*penamolom'asa*). Between the two local corn farmers usually cultivate it in the same way as corn farmers in general. The production processes carried out by corn farmers in Tapenpah Village include input and output processes, where the input process includes land, labor in the family, depreciation of tools, self-produced seeds, natural fertilizers. While the output process includes the capital, personnel working outside the family, seeds, fertilizer, the process of processing the land until after harvest. Local corn plants in this area are harvested in the form of dry corn to meet the household needs of farmers as a substitute for rice, local corn is also harvested in fresh form (cobs) to be consumed as fruit and vegetables, and some are harvested as stems and leaves for feed needs. Livestock. Local corn that is harvested is not only for direct consumption but there are also those who sell the corn products. However, more farmers sell local White corn compared to Yellow local corn because there is more demand for local white corn than yellow local corn so the selling price of local White corn is higher than local yellow corn.

B. Methodology

1. *Research Design*

   This research was conducted in Tapenpah Village, Insana District, North Central Timor Regency, because Tapenpah Village is one of the local white corn producing villages in Insana District . This research was carried out by puppies for 3 months from March to June 2019 .

2. *Participants/Respondents/Population and Sample*

   The population of this research is farmers in Tapenpah Village who cultivate local white corn as many as 82 farmers. The sampling technique used simple random sampling with a sample size of 68 respondents.

3. *Technique of Data Collection*

   The data collection was performed by observation and interview questionnaire .

4. *Technique of Data Analysis*

   Data analysis using income analysis and R/C ratio.Data obtained from the study were analyzed using descriptive analysis and quantitative analysis to determine net income with the following formula:

$\pi = TR - TC$(*oekartawi*, 1995)

Where:

π = income Profit

TR = Total Revenue

TC = Total Cost

The R/C ratioformula R/C $= \frac{TR}{TC} = \frac{PxQ}{TFC+TVC}$

C. Findings and Discussion

1. Analysis of Corn farm income

Income farming is the difference between revenues and all expenses incurred . The results of the analysis of production, cost and acceptance of local corn farming in the village of Tapenpah are as follows.

a. Corn Production

The variation of local corn production by respondent farmers can be seen in the following Table 1.

Table 1. Local corn production in Tapenpah Village, 2019

Variation of production(Kg)	Amount(Person)	Percentage(%)
300–400	23	33.82
450 –550	36	52.9 5
600 - 700	6	8.82
750 - 800	3	4.41
Total	**68**	**100**

Source: Processed Primary Data, 2019.

The table above shows that the respondent farmers' corn production ranges from 300 kg - 800 kg of local corn. Of the 68 respondents farmers, who obtain corn range between 300 kg- 4 00 kg is 23 (33.82%) persons, corn production range between 450 kg - 550 kg is 36 (52.95 %) persons , corn production range between 600 kg - 7 00 kg is 6 (8.82%) people and the range between 750 kg - 800 kg is 3 (4.41%). While the total production of corn by the respondent farmers was 33,050 kg with an average of 486,029 kg.

b. Revenue

Revenue is the multiplication of corn production and the selling price of corn per kg. Based on the results of the calculation of the production analysis of corn cultivated by farmers in the Village of Tapenpah in one planting season, it shows the variation in income as follows.

Table 2.Corn farming Revenue in Tapenpah Village, 2019

Revenues Variation(Rp.)	Amount(person)	Percentage(%)
1,260,000- 1,715,000	13	19.11
1,750,000 - 2,245,000	17	25
2,250,000 - 2,700,000	2 5	36.7 8
2,870,000 - 3 .900.000	1 3	19.11
Total	**68**	**100**

Source: Primary data sources processed (2019).

Table 2. shows that the total income of the corn farmers in Tapenpah Village ranges from Rp. 1,260,000.00 - Rp. 3,900,000.00. Of the 68 farmer respondents, revenues in local corn farming between Rp. 1,260,000.00 - Rp. 1 .715. 000 , 00 is 13 (19.11%) people, the range of income from corn farming is between RP. 1,750,000.00 - Rp. 2,245. 000 , 00 is 17 (25%) of people, the range of the corn farm receipts between Rp. 2.250.000,00- Rp. 2 .700.000,00 was 25 (36.78 %) votes, and corn farm receipts range between Rp. 2.870.000, 00 - Rp. 3.900.000,00 is 13 (19.11 %) people.

Based on the results of the calculation of corn production cultivated by farmers in Tapenpah Village, the total production in one planting season is 33,050 kg with selling prices ranging from Rp. 3,500 to Rp. 7000, - / kg at the farm level. Based on the calculation results, the total revenue of corn farming was Rp. . 161 737 500 , - and the average is Rp.2.378,647.

c. Production Costs

Total costs are the total costs incurred to carry out the production process. Total costs are the sum of fixed costs and variable costs.

Tabel 3. Cornproduction costs in Tapenpah Village

Cost Variation(Rp.)	Aamount(Person)	Percentage(%)
860,750 - 1,112,000	17	25
1,181,167 - 1,296,859	17	25
1,303,452 - 1,459,357	16	23.5 3
1,494,048 - 2,057,357	18	26.47
Total	**68**	**100**

Source: Processed Primary Data 2019

The data above shows that the total production costs of the respondent farmers ranged from Rp. 860,750 to Rp. 2,057,357. Of the 68 respondent farmers, the production costs incurred in local corn farming ranged from Rp. 860,750, 00 - Rp.1.112.000,00 are 17(25%) people, the production costs incurred in local corn farming are around Rp. 1,118,067 – Rp. 1,296,857 are 17 (25%) people, the production costs incurred in local corn farming are around Rp.1,303,452 – RP.1,459. 357 were 16 (23.53 %) people, and the production costs incurred in local corn farming ranged from Rp. 1,494,048 - Rp. 2,057,357 is 18 (26.47%) people. Meanwhile, the total cost of production of corn for the respondent farmers was Rp. 88,805,083, with an average of Rp. 1,305,957 .

The production costs incurred for corn cultivation by the respondent farmers consist of:

a. Fixed costs of corn farming.

Fixed costs are costs that arerelatively constant in number and continues issued even though its productiona lot or a little. Sothe amount of fixed costs is independentthe size of the production obtained. Fixed cost is whose total is fixedin the volume change rangecertain activities (Santoso, 2010). Based on the results of research conducted on corn farmers in the village of Tapenpah, the total fixed costs of the respondent farmers ranged from Rp. 321,167.00 to Rp. 821,631.00 and the average yield incurred by farmers for corn farming in Tapenpah village was Rp. 501,545.00 of the total. costs incurred Rp. 34,105,083.00. These costs consist of machete depreciation with an average of Rp. 71,90,31, depreciation of *tofa* with an average of Rp. 53,068.63.00, hoe depreciation with an average of Rp. 76,742.82, crowbar depreciation with an average of Rp.76,373.00 on average, tarpaulin depreciation with an average of Rp. 211,660.00 and land tax with an average of Rp.11.790.44.

b. Variable costs of corn farming

Variable cost is the cost of the consumables used in the one -time process of production which consists of the cost of personnel working for the processing of land , planting , weeding , harvesting and post- harvest. Based on the results of the study were conducted in farmers' corn in the village Tapenpah, the total cost of variable farmer respondents ranged between Rp 415,000.00 up to Rp 1.195.000, 00. The average cost of a variable that is issued in one time production amounting to Rp 804.411,76. With a total cost of variable amounted to Rp 54.700.000,00. Cost of production that consists of the cost of personnel working with average Rp 755.808,82 and the cost of sacks with an average of Rp 48.602,94.

d. Corn Farming Income

According to Soekartawi (1995), income is the difference between total receipts with total costs. The size of the reception apart influenced by the high and low yield production and costs are also affected by the applied production process in a farm run by the farmer. The greater the difference in total value revenue compared to total costs incurred during the process production then the greater the level income received. To see the results of the analysis.Corn farm incomes obtained from the difference between revenue and costs incurred corn comprising d ari fixed costs and costs variable.

Table 4. Corn Farm Income in Tapenpah Village

Income variations (Rp.)	Amount(person)	Percentage(%)
203,333 - 644,286	17	25
688,500 - 1,079,762	17	25
1,092,643 - 1,447,667	17	25
1,452,917 - 2 . 1 12,476	17	25
Total	**68**	**100**

Source: Processed Primary Data, 2019

Table 4.shows that the total income of the respondent farmers ranges from Rp.203,333.00 - Rp.2 . 1 12,476.00 out of 68 respondent farmers, income in local corn farming ranges from Rp.203,333 to Rp. 644,286.00 is 17 (25%) people, income in local corn farming ranges from Rp.688,500.00 to Rp.1,079,762.00 is 17 (25%) people, income in local corn farming ranges from Rp. 1,092,643.00 - Rp.1,447,667.00 is 17 (25%) people, and income in local corn farming ranges from Rp.1,452,917.00 - Rp.2 . 1 12,476.00 is 17 (25%) people.

Based on the calculation results obtained from the total receipt of Rp. 161,737,500.00 with an average of Rp. 2,378,492.00 while the total cost was Rp. 88,805,083.00 with an average of Rp. 1,205,196,078 , - 1,305,957.00 . From the results of these calculations it can be seen that the total income of corn farmers in Tapenpah village is Rp. 72,932,416.00 with an average of Rp.1,072,535.00.This result is supported by Abdul and Sudin(2017) research; Purwanto and Muis (2015).

2. R/C ratio

R/C ratio is business efficiency, which is a measure of the ratio between revenue and total costs. Based on farming activities, there are several criteria that show that the business is profitable, loses or breaks even. If the research results say that the value of the R/C Ratio is less than 1, the business is losing and it is recommended not to continue. If the R/C ratio is equal to 1, the business is neither profitable nor loss (break even). Conversely, if the R/C value is more than 1, the business is profitable. The higher the R/C ratio, the more profitable the business is. More details can be seen in table 5.

Table. 5. R/C Ratio of corn farming in the Tapenpah Village

No.	Total revenue (Rp.)	Total cost (Rp.)	R/C Ratio
Total	161,737,500	88,805,053	
Average	2,378,492	1,305,957	1, 82

Source: Primary data source (2019)

Based on this table, to calculate the R/C ratio, a formula is used

$$\text{R/C} = \frac{TR}{TC} = \frac{PxQ}{TFC+TVC}$$

$$= \frac{\text{Rp .5.043/kg } x 3.207 \text{ kg}}{Rp\ 34.105 + Rp\ 54.700}$$

$$= \frac{161.737.500}{88.805}$$

$$\frac{TR}{TC} = 1{,}82$$

$$\text{Profit} = 1\text{ , }82 - 1$$

$$= 0.82$$

So each expenditure is Rp. 1 will produce 1.82 with a difference of 0.82, this means that the income of local corn farming in the village of Tapenpah is profitable and feasible to continue.

3. Conclusion

From the results of this study it can be seen that the total income of corn farmers in the village of Tapenpah is Rp. 72,932,416.00 with an average of Rp. 1,072,535.00. Based on these results, the relative advantage of corn farming in the village of Tapenpah can be profitable with an R/C ratio of 1.82.in line with the Karbajua and Hutapea(2017) research.

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