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FACTORS IN FARMERS' DECISION-MAKING IN THE IMPLEMENTATION OF THE GOOD AGRICULTURAL PRACTICES (GAP) SYSTEM IN TILONGKABILA DISTRICT

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Abstract

This study aims to analyze the effectiveness of corn farming management and to identify the factors influencing farmers' decisions to adopt Good Agricultural Practices (GAP) in Tilongkabila District, Bone Bolango Regency. The research employed a descriptive quantitative approach using a survey method involving 30 corn farmers selected through purposive and snowball sampling techniques. Data were collected through observation, interviews, questionnaires, and documentation. The effectiveness of corn farming management was analyzed using a Likert scale and an effectiveness index, while the influence of social, economic, technological, and policy factors on farmers' decisions to adopt GAP was examined using multiple linear regression analysis. The results indicate that corn farming management in Tilongkabila District falls into the effective category, with an average effectiveness score of 74.42%, covering aspects of planning, organizing, implementation, and supervision. Regression analysis shows that social, economic, technological, and policy factors simultaneously influence farmers' decisions to adopt GAP; however, partially, only certain factors have a significant effect.

Keywords: Farm Management, Farmers' Decision-Making, Good Agricultural Practices, Corn, Tilongkabila

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

INTRODUCTION

Corn is one of the strategic food commodities in Indonesia which has an important role in supporting national food security and the development of the agribusiness-based agricultural sector. (Fetra et al., 2021: 591)The ever-increasing demand for corn, both for food consumption and for the feed and processing industries, demands sustainable increases in productivity and production quality. One recommended approach to addressing this challenge is the implementation of Good Agricultural Practices (GAP), which emphasizes efficient, safe, and environmentally friendly cultivation principles.(Apriyani et al., 2023: 60).

However, the adoption rate of GAP among corn farmers remains relatively low, including in Gorontalo Province, known as one of the national corn production centers. The low adoption of GAP indicates that farmers' decisions to adopt sustainable cultivation systems are not solely determined by technical aspects but are also influenced by various complex factors. Farmer decisions are the result of rational and social considerations involving economic conditions, the social environment, the availability and mastery of technology, and existing policy support.

In Tilongkabila District, the low adoption of GAP in corn farming poses a serious challenge to increasing agricultural productivity and sustainability. Most farmers still employ conventional cultivation practices that pay little attention to food safety and environmental sustainability. This situation indicates that economic factors such as limited capital, social factors such as education and social interaction, technological factors related to access to information and innovation, and policy factors such as the role of extension services and government support all influence farmers' decision-making regarding GAP implementation.

Therefore, an in-depth study of the factors influencing corn farmers' decisions regarding the implementation of Good Agricultural Practices (GAP) is crucial. Understanding these factors is expected to provide the basis for formulating more targeted policy strategies, extension programs, and mentoring to increase GAP adoption and encourage sustainable corn farming development in Tilongkabila District.

LITERATURE REVIEW

Corn (Zea mays L.) is a cereal crop belonging to the Poaceae family and the Poales order. This plant is monoecious, with separate male and female flowers on

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

the same plant. Corn is also known as a protandus plant, meaning that the male flowers bloom and the release of pollen usually occurs one to two days before the female flowers bloom. Corn is a food commodity that has the potential to grow and thrive in various types of soil and is widely cultivated by the community.(Suleman et al., 2019 :72).

Corn is an annual plant belonging to the grass family (Gramineae). This plant typically has a single stem, although under certain genotypes and environmental conditions, it is possible for shoots to appear. Corn stalks are composed of sections called nodes and internodes. Corn leaves grow at each node, opposite each other. Male flowers are found on separate parts of the plant, so cross-pollination often occurs. Corn is a short-day plant; the number of leaves is determined at the time of initiation of male flower formation and is influenced by genotype, duration of light exposure, and temperature. According to(Wulandari & Jaelani, 2019: 55)Corn growth phase classes are divided into four categories, namely the germination or transplantation phase, the vegetative phase, the generative or reproductive phase, and the ripening phase.

Essentially, decision-making is a process in which a number of alternatives are considered before making a choice. This process is crucial for leaders in bureaucracies, as it plays a crucial role in motivating, communicating, coordinating, and driving change within the organization.(Pasolong, 2023 :4). According to(Muhyadi, 2015 :2)Decision-making is the process of selecting alternative actions to achieve a set goal or objective. In every decision made, it is crucial to ensure that its implementation does not involve physical violence.

Decision making is carried out with a systematic approach to problems through the process of collecting data into information and adding factors that need to be considered in decision making.(Muhyadi, 2015 :2).

GAP is a program aimed at ensuring food quality and safety on farms. This program includes the implementation of a certification system for agricultural production processes that utilize modern, environmentally friendly, and sustainable technology.(Yekti & Suryaningsih, 2021: 70). According to(Nahraeni et al., 2020: 50) Good agricultural practices (GAP) are guidelines for cultivating crops that are good, correct, environmentally friendly, and safe for consumption. By implementing GAP, farmers' productivity, income, and well-being increase.

Good Agricultural Practices (GAP) is a technical guideline aimed at implementing good and correct cultivation methods. The application of GAP reflects the sustainability aspect of agriculture. Agricultural practices that adhere to GAP principles are designed to ensure that the cultivation of a commodity is not only economically viable but also environmentally friendly, high-quality, safe

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

for consumption, and socially acceptable to the wider community.(Apriyani et al., 2023:62)

In this regard, the main point of Good Agricultural Practices (GAP), as explained above, is the application of environmentally friendly technology. Therefore, in implementing GAP, chemical use must be limited to the recommended dosage. Implementing GAP offers numerous benefits to farmers. In addition to preserving the environment, this practice also produces safe and halal food, ensures worker welfare, and increases the competitiveness of food products in the international market. Implementing GAP can provide solutions to address various agricultural problems and improve long-term agricultural production.

RESEARCH METHOD

The research location was conducted in Tilongkabila District, a purposive selection in Bone Bolango Regency, Gorontalo Province. This was due to the potential for adopting GAP in corn farming. The research was conducted from June 2025 to the present. The study used a survey method with a descriptive quantitative approach. Multiple linear regression analysis was used to examine the factors influencing farmers' decisions regarding GAP implementation.

Sampling was conducted using Purposive Sampling, which is deliberate sampling, and Snowball Sampling, which is sampling based on recommendations from initial respondents. Purposive Sampling was used because the sample was selected based on certain considerations that were adjusted to the research objectives. The criteria set were as follows: (1) Corn farmers who have implemented GAP. (2) Corn farmers who have implemented GAP partially or completely. (3) Corn farmers who have access to information on GAP.

Data collection techniques in this study were conducted through direct observation of corn farming conditions and the implementation of GAP, distribution of questionnaires to respondents to obtain quantitative data related to farmer decision-making factors, interviews to obtain more in-depth information, and documentation as supporting data relevant to the research objectives. Primary data was obtained through interviews and questionnaires with corn farmers who implement GAP. Secondary data came from reports, publications, and documents from relevant agencies.

The data analysis used in this study utilized multiple linear regression analysis to identify and measure the factors influencing farmers' decisions

MJIFM | MAJAPAHIT JOURNAL OF ISLAMIC FINANCE AND MANAGEMENT
Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

regarding GAP implementation. Before conducting the multiple linear regression analysis, validity and reliability testing were performed using the following formula:

$$\frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Information:

n = number of respondent observations
x = total score obtained from all items of variable x
y = total score obtained from all items of variable y

$$r_{11} = \left[\frac{k}{k-1}\right]\left[1 - \frac{(\sum \sigma_b^2)}{\sigma_t^2}\right]$$

$$\sigma^2 = \frac{\sum x^2 - \left[\left(\frac{\sum x}{n}\right)^2\right]}{n}$$

Information:

r_{11} = Instrument Reliability
k = Number of Question Items
$\sum \sigma_b^2$ = Total Question Items
σ_t^2 = Total Variance
n = Number of Respondents

Next, the classical assumption test is required as a requirement.which must be met in multiple linear regression analysis based on Ordinary Least Square (OLS). According to Fatra (2018:41) classical assumption tests are divided into four, namely: (1) Normality Test, (2) Multicollinearity Test, (3) Autocorrelation Test, (4) Heteroscedasticity Test.

After all classical assumption tests are met, hypothesis testing is carried out using multiple linear regression with the model:

$$Y+ + ...+ + \varepsilon = a + \beta_1 X_1 \beta_2 X_2 \beta_K X_{KI}$$

Information:

Y = Farmer's Decision
X_1 = Social Factors
X_2 = Economic Factors
X_3 = Technology Factors
X_4 = Policy Factors

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

a = constant
β_{12345} = regression coefficient
e =error

RESULTS AND DISCUSSION

Corn farmers' decisions to implement Good Agricultural Practices (GAP) are influenced by various factors, including knowledge, social support, economic conditions, experience, access to information, perceived benefits, and government policies. Although GAP has been shown to increase productivity, its adoption rate remains low in the field, primarily due to farmers' inadequate understanding. Consistent with the findings of Yekti & Suryaningsih (2021), this study focused on identifying factors influencing corn farmers' decisions to implement GAP in Tilngkabila sub-district.

1. Classical Assumption Test

a. Data Normality Test

A normality test is a test of existing research data to determine whether it is normally distributed. This normality test utilizes graphs and also the non-parametric Kolmogorov-Smirnov statistical test, which uses the cumulative distribution function.

Table 1.
Normality Test Results

Data	Number of Samples	Sig	Information
Unstandardized Residual	30	0.129	Normal

Source: Data Processed by SPSS, 2025

Based on the table above, it can be seen that the results of the Kolmogorov-Smirnov data normality test obtained a significant value of normality testing greater than the alpha value of 0.05. Thus, the results of the one-sample Kolmogorov-Smirnov normality test above which was conducted on 30 respondents showed that all research variables had a value of 0.129 > 0.05, so it can be concluded that the data in the study were normally distributed.

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

b. Multicollinearity Test

This test was conducted to determine whether the independent variables used in the study were similar. If each independent variable is similar, that's a good sign. The results of the multicollinearity test can be seen in the table below:

Table 2.
Normality Test Results

Model	Collinearity Statistics	
	Tolerance	VIF
X1	0.762	1,312
X2	0.633	1,580
X3	0.770	1,299
X4	0.664	1,506
Dependent Variable: Y		

Source: Data Processed by SPSS, 2025

In the table above, it can be concluded that the VIF value of the social variable (X1) is 1.312 with a tolerance value of 0.762, the economic variable (X2) is 1.580 with a tolerance value of 0.633, the technology variable (X3) is 1.299 with a tolerance value of 0.770, and for the policy variable (X4) is 1.506 with a tolerance value of 0.664. From all the variables used, it can be seen that the VIF value is less than 10 and the Tolerance value exceeds 0.10, therefore it can be said that the independent variable does not experience symptoms in the multicollinearity test.

c. Heteroscedasticity Test

The heteroscedasticity test is a test of the basic assumptions that must be met in regression analysis. This test is conducted to determine whether there is any bias in the regression model analysis. According to Wahyudi et al., 2023,The heteroscedasticity test aims to check whether there are differences in variance between residuals from one observation and those from other observations within a regression model. The results of the heteroscedasticity test can be seen in the figure below:

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

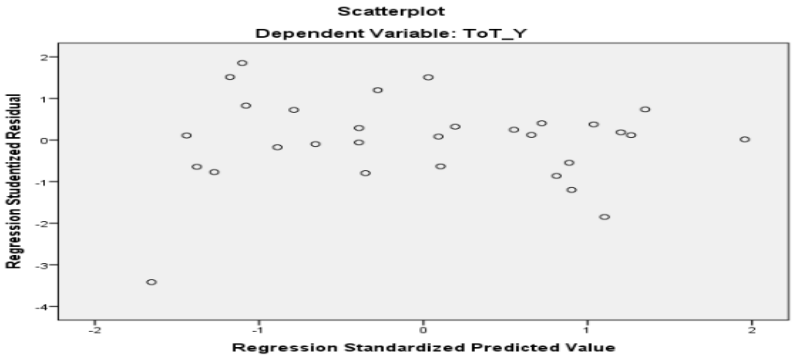

Figure 1.
Results of the Heteroscedasticity Test

As seen in Figure 3 above, the scatterplot graph shows that there is no clear pattern, and the points are spread above and below the number 0 on the Y axis, which indicates that heteroscedasticity does not occur in the regression model analysis in this study.

d. Autocorrelation Test

The autocorrelation test is used to ensure that the residuals in the regression model are uncorrelated across periods, thus meeting the assumption of residual independence. According to Hana et al. (2023), the presence of autocorrelation can lead to estimation bias and reduce model reliability.

Table 3.
Autocorrelation Test Results

Model Summary					
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Durbin-Watson
1	0.156	0.571	0.503	0.097	2.145
Predictors: X4,X3,X2,X1					
Dependent Variable: Y					

Source: Data Processed by SPSS, 2025

The Durbin Watson value from the correlation test results in this study is 2.145, where this value is greater than the dU value of 1.7386 and less than 4 – dU 2.2614, so it can be concluded that there is no positive or negative autocorrelation in the regression model used in this study.

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

2. Multiple Linear Regression Test

Multiple regression analysis is a method used to measure and analyze the relationship between one dependent variable and two or more independent variables.

a. Coefficient of Determination

The coefficient of determination is essentially an important measure in regression analysis used to assess the extent to which a model can explain variations or changes that occur in the dependent variable. In other words, the coefficient of determination (R2) test is used to measure the extent to which the independent variable contributes to changes in the value of the dependent variable being studied. The following is a table of the results of the determination test obtained in this study:

Table 4.
Determination Test

Model	R	R Square	Adjusted R Square
1	0.756[a]	0.571	0.503

Source: Data Processed by SPSS, 2025

Based on the table above, the coefficient of determination (R2) is 0.571, or 57.1%. This value indicates that farmers' decisions regarding corn farming can be influenced by social factors (X1), economic factors (X2), technological factors (X3), and policy factors (X4). The remaining 42.9% is influenced by other independent variables not studied, such as the environment, culture, and infrastructure.

b. F Test (Simultaneous)

The F test is an important part of multiple regression analysis, used to determine whether independent variables simultaneously have a significant effect on the dependent variable. The F test is a simultaneous test of the regression coefficients to measure the overall influence of independent variables on the dependent variable.(Hana et al., 2023). The following is a table of the results of the F test in this study:

Table 5.
F Test

Model	Sum of Squares	Df	Mean square	F	Sig
Regression	319,728	4	79,932	8,335	.000[b]
Residual	239,738	25	9.59		

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

Total	559,467	29

Source: Data Processed by SPSS, 2025

Based on the table above, the ANOVA analysis on the multiple regression model obtained a calculated F value of 8.335 with a significance of 0.000. Because the significance value in the simultaneous test shows a value smaller than the significance level of 0.05, it can be concluded that the independent variables consisting of social factors X1, economic factors (X2), technological factors (X3), policy factors (X4) simultaneously have a significant effect on farmer decisions in corn farming.

c. T-Test (Partial)

The T-test is a method for testing regression coefficients individually, with the aim of determining whether the independent variable has a significant influence on the dependent variable. The following table shows the results of the partial test:

Table 6.
T-Test (Partial)

Model		Unstandardized Coefficients				
		B	Std. Error	t	sig	Information
1	(Constant)	8,012	5.185	1,545	0.135	
	X1	0.321	0.126	2,553	0.017	Sig
	X2	0.121	0.145	0.837	0.410	No Signature
	X3	0.435	0.149	2,910	0.007	Sig
	X4	0.005	0.169	0.028	0.978	No Signature

Source: Data Processed by SPSS, 2025

Based on the research results, the social factor variable has a t count of 2.553 while the t table is 1.70133, so the t count is greater than the t table with a significant value of 0.017 or less than 0.05. And the coefficient value for the social factor variable is 0.321. So, it can be concluded that social factors (X1) significantly influence decisions (Y).

Based on the research results, the economic factor variable has a t count of 0.837 while the t table is 1.70133, so the t count is smaller than the t table with a significant value of 0.410 or greater than 0.05. And the coefficient value for the economic factor variable is 0.121. So, it can be concluded that the economic factor (X2) does not significantly influence the decision (Y).

Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

Based on the results of this study, the technology factor variable has a calculated t value of 2.910 while the t table value is 1.70133, so the calculated t value is greater than the t table value (2.910 > 1.70133) and the significance level value is 0.007 or less than 0.05 and the coefficient value for the technology factor variable is 0.435. This shows that the technology factor variable has a significant effect on the decision (Y).

Based on the results of this study, the policy factor variable has a t-value of 0.028 while the t-table value is 1.70133, so the calculated t-value is smaller than the t-table value (0.028 < 1.70133) and the significance level value of 0.978 is greater than the value of 0.05 and the coefficient value is 0.005. This shows that the policy factor variable does not affect the decision (Y).

CONCLUSION

The results of the study indicate that corn farmers' decisions in implementing Good Agricultural Practices (GAP) in Tilongkabila District are more influenced by social and technological factors. The results of the ANOVA test show that social, economic, technological, and policy factors simultaneously have a significant influence on farmers' decisions, with a calculated F value of 8.335 and a significance of 0.000 (<0.05). However, based on the t-test, only social and technological factors have a positive and significant effect partially, while economic and policy factors have a positive but insignificant effect, so their role is relatively weak in influencing farmers' decisions.

This research is expected to encourage farmers to apply GAP principles more comprehensively, increase the role of extension workers in mentoring and socializing GAP through extension and field schools, become a basis for the government in formulating policies and providing supporting facilities such as production facilities, fertilizer subsidies, and market access, and become a reference for further researchers to expand the scope of respondents, regions, and research periods.

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Vol. 6 No. 1, 2026, 1316–1327 e-ISSN 2798-0170

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