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PERCEPTION AND ADOPTION OF INNOVATION IN THE USE OF CALIFORNIA PORRIDGE IN BANJAR SIAM CITRUS FARMERS IN BARITO KUALA REGENCY, SOUTH KALIMANTAN PROVINCE

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ABSTRACT

This study aims to analyze socioeconomic characteristics, analyze farmers' perceptions of innovation characteristics, analyze the influence of farmers' socioeconomic characteristics and farmers' perceptions on the decision to adopt innovations using california porridge on siamese lime plants in Barito Kuala Regency, South Kalimantan Province. This study uses primary data. The primary data of this study was sourced from the results of interviews and questionnaires. The results of the study showed that farmers' perception of each characteristic of california porridge innovation in siamese lime plants was average in the high category with details 79% of farmers had the perception that california porridge innovation was providing relative advantages to farmers, 74% of farmers had the perception that california porridge innovation was in accordance with farmer norms and culture, 56% of farmers had the perception that california porridge innovation was not complicated to apply, And 80% of farmers have the perception that California's porridge innovations are easy to try, and 77% of farmers have the perception that California's porridge innovations are easy to observe. The ten independent variables (farmer age, formal education level, total income, land area, farming experience, relative profitability, suitability, complexity level, ease of trying, and ease of observation level simultaneously affect the decision to adopt california porridge innovation in farmers in Barito Kuala Regency, South Kalimantan Province. Meanwhile, only 5 independent variables were significantly influenced by the decision to adopt California porridge in farmers, namely the level of formal education, relative advantages, the level of complexity, the level of trialability, and the level of observability.

Keywords: Adoption decision; Innovation; Perception; California Porridge; Siamese.

1. INTRODUCTION

The agricultural sector has a strategic role in meeting national food needs. However, agricultural activities in Indonesia face various obstacles, such as declining production and productivity, land degradation due to conversion of functions, uncertain climate change, and a dwindling agricultural workforce (Winanti, 2021). Horticultural crops, especially chayote oranges, are a commodity that is in great demand by the public because of its high taste and vitamin C content. Banjar siamese oranges are one of the leading varieties of South Kalimantan because of the good quality of the fruit. Chayote plants are not only a source of income for farmers, but also meet the nutritional needs of the community. However, the main problem faced by citrus farmers is the

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attack of plant pest organisms (OPT). Plant pest organisms in oranges are fruit flies and diplodia diseases.

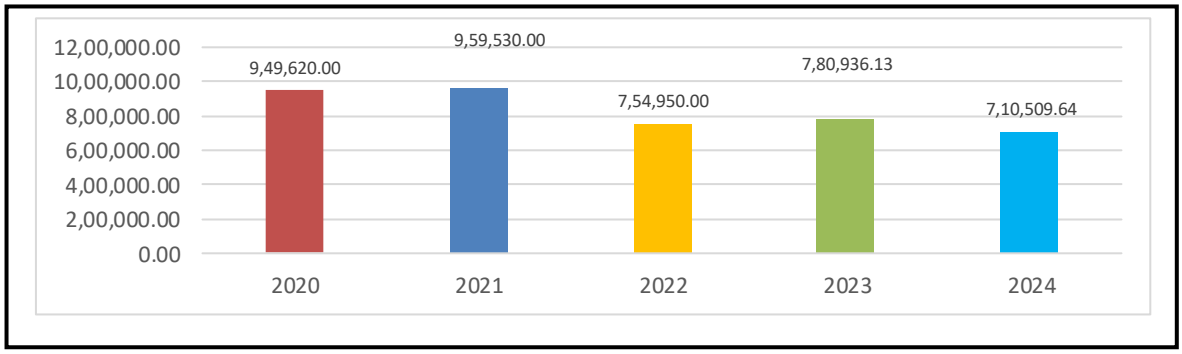

Figure 1. Production of siamese lime plants in Barito Kuala Regency, South Kalimantan Province in 2020-2024 (Central Statistics Agency: 2025, processed)

A graph of the development of chayote citrus plant production in Barito Kuala Regency can be seen in Figure 1. Siamese production was at a high level in 2020 and 2021, namely 949,620 tons and 959,530 tons, respectively. However, since 2022 production has experienced a sharp decline to 754,950 tons and remains at lower levels in 2023 and 2024.

The purpose of this study is to (1) analyze the socio-economic characteristics of siamese citrus farmers in Barito Kuala Regency; (2) analyze farmers' perceptions of the characteristics of california porridge innovation in siamese citrus plants in Barito Kuala Regency; (3) Analyze the influence of farmers' socioeconomic characteristics and farmers' perceptions on the decision to adopt the innovation of using california porridge on siamese citrus plants in Barito Kuala Regency. The results of this study are expected to (1) provide input and information to local governments, related agencies, and farmer extension workers in formulating formulation strategies in increasing the adoption of innovations for the development of citrus plants; (2) reference in conducting further studies for parties who are interested in continuing research by utilizing other analytical tools or reviews of other problems;

2. RESEARCH METHODS

2.1 Place and Time of Research

This research was conducted in Barito Kuala Regency from November 2023 to May 2026. This research activity goes through the following stages, namely making proposals, processing data, analyzing data to writing research report results.

2.2 Types and Data Sources

This study uses primary data. The primary data of this study was sourced from the results of interviews and questionnaires, including: (1) farmers' perception of the characteristics of California porridge innovation (relative profitability, suitability, complexity level, likelihood level to try, and observation level); (2) socioeconomic characteristics of siamese citrus farmers (farmer age, formal education level, total income, land area, and length of farming experience). The researcher took 3 sub-districts in Barito Kuala Regency because the three sub-districts are

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the sub-districts with the widest Siamese orange planting area among other sub-districts in Barito Kuala Regency. The three sub-districts that will be used as samples in this study are Belawang District, Barambai District, and Mandastana District. The number of samples to be taken in this study is 90 farmers.

2.3 Data Analysis Methods

The questionnaire instruments used in the study must go through the testing stage to ensure that the measuring instruments for the variables are feasible to use. There are 2 main aspects in testing the feasibility of questionnaire instruments, namely the validity test and the reliability test. The validity test aims to assess the extent to which each question in the questionnaire is able to represent the concept or variable to be measured. The validity test in this study used *Pearson's Product Moment* correlation technique, which measures the relationship between the score of each question item on each variable (x) and the total respondent score (Y). The Pearson correlation formula used is as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}} \quad (1)$$

with test criteria, namely:

- If R calculates ≥ R of the table at a significance level of 5%, then there is a correlation between the question instrument and the total score (valid).
- If R calculates < R of the table at a significance level of 5%, then there is no correlation between the question instrument and the total score (invalid).

The reliability test will produce a level of consistency of the questionnaire instrument that is used as a measuring tool so that the results of the measurement are reliable and *reliable*. In this study, the reliability test was calculated using *Cronbach's Alpha coefficient* through the IBM SPSS statistical program. *Cronbach's Alpha* measures consistency between questions in a single variable. According to Hair et al., (2010) the criteria for the reliability test with Cronbach's Alpha are as follows:

- If $\alpha > 0.60$ then the questionnaire instrument is *reliable*
- If $\alpha < 0.60$ then the questionnaire instrument is *not reliable*

The data analysis used to answer the first objective, which is to analyze the socioeconomic characteristics of siamese farmers in Barito Kuala Regency, is to use descriptive analysis. The presentation of data is in the form of graphs to facilitate the visualization of the socio-economic characteristics of siamese citrus farmers in Barito Kuala Regency.

The data analysis used to answer the second objective, which is to analyze farmers' perceptions of the characteristics of california porridge innovation in chayote lime plants in Belawang District, Barito Kuala Regency, is by using likert scale scoring. The Likert scoring method is a method to convert ordinal scales or qualitative data into the form of quantitative data. In measuring the level of perception of innovation characteristics where there are 5 characteristics of innovation, the measurement is by the Likert scale method. The measurement of the Likert scale to determine the level of farmers' perception based on the characteristics of California porridge innovation is at low, medium or high levels is carried out in several stages as follows:

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- Calculate the percentage value of the maximum score and the minimum score. The maximum score is 5 and the minimum score is 1. The maximum score percentage is 5/5 x 100% = 100% and the minimum score percentage is 1/5 x 100% = 20%
- Calculate the interval of the perception level class based on the characteristics of the California slurry innovation with the formula:

ibr = (R-r)/n (2)

with:
IBR : Perception Level Class Interval Based on California Porridge Innovation Characteristics
R : highest cumulative score
r : lowest cumulative score
n : number of class categories

Based on the above equation, the class interval of the perception level based on the characteristics of California porridge innovation is (100%-20%)/3 = 26.67%, which is more fully presented in Table 1.

Table 1. Percentage of perception score achievement based on the innovation characteristics of california porridge in Siamese citrus plants

Number	Percentage of perception score	Perception level category	Quantity	Presentase
1	20 – 46,67 %	Low	4	4.44%
2	46,68 – 73,35%	Medium	19	21.11%
3	73,36 – 100%	Height	67	74.44%
	Quantity		90	100%

Sources: Hadi Sutrisno (2001)

The data analysis used to answer the third objective is to analyze the influence of farmers' socio-economic characteristics and farmers' perceptions based on the characteristics of california porridge innovation on the decision to adopt the innovation of the use of california porridge on siamese citrus plants in Belawang District, Barito Kuala Regency using a logit model with data processing using SPSS. The logit model was chosen because the logit model is the most appropriate model in describing an equation where the bound variable is dichotomous yes (1) or no (0) and qualitative. In this study, the adoption decision is a dichotomous and qualitative bound variable where the response variable (Y) is given a symbol (x), with the farmer's decision to adopt california porridge innovation on Siamese orange plants = 1 and the farmer's decision not to adopt california porridge innovation on Siamese orange plants = 0. So that the equation of the logit model in this study is as follows:π

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$$(x) = ln\left(\frac{\pi(x)}{1-\pi(x)}\right) = (\beta_0 + \beta_1 UP + \beta_2 TPF + \beta_3 TP + \beta_4 Llhn + \beta_5 PB + \beta_6 Radv + \beta_7 Compb + \beta_8 Complex + \beta_9 Trial + \beta_{10} Observ) \quad (3)$$

with:

π(x) : California Pulp Adoption Decision in Siamese Citrus Grower (0 = No Adoption and 1 = adoption)

UP : Farmer's age (years)

TPF : Formal Education Level (Year)

HCMC : Total Revenue (Rupiah)

Llhn : Land area (ha)

PB : Farming Experience (Years)

Radv : Relative Advantage/*relative advantages* (Likert scale score of 1 = very unfavorable ; 2 = unprofitable; 3 = quite profitable; 4 = profitable, 5= very profitable)

Compb : Compatibility Level/*compability* (Likert scale score 1 = very inappropriate; 2 = inappropriate; 3 = quite suitable; 4 = suitable; 5 = very suitable)

Complex: level of complexity/*complexity* (Likert scale score 1= very complicated, 2 = complicated, 3 = enough complicated, 4 = uncomplicated, 5 = very uncomplicated)

Trial : Possibilities to try/*trialibility* (Likert scale score of 1 = very uneasy to try, 2= not easy to try, 3= quite easy to try, 4= easy to try, 5= very easy Tried

Observe: Observation Level/*observability* (Likert scale score 1 = very unobservable, 2 = not easy to observe, 3 = quite easy to observe, 4 = easy to observe, 5 = very easy to observe)

b_0 : konstanta

B_1-B_9 : Independent variable/independent variable regression coefficient

Model Feasibility Test (*Goodness of fit).* The model feasibility test is used to find out whether the logit model used in this study is feasible or not. The feasibility test was carried out with *the Hosmer test and the Lemeshow test.*

H0: There is no difference between the observed distribution and the estimated frequency distribution, so the model is declared fit to use (the model is considered fit)

H1: There is a difference between the observation distribution and the estimated frequency distribution (non-fit model)

The test criterion is that if the significance value > 0.05, then the model is considered able to predict the value of its observation (model fit) or cannot reject Ho.

Simultaneous Test (*Omnibus Test*). *The Omnibus Tests of Model Coefficients* are similar to the F test on linear regression.

H0: β1 = β2 = β3 = β4 = 0, where no independent variable has any effect on the bound variable.

H1: βx ≠ 0, there is at least one independent variable that affects the bound variable. The criterion for this test is that if the significance value < 0.05, it shows that there is a simultaneous influence of independent variables on dependent variables.

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Measure the coefficient of determination (*pseudo r-square*). In the logit regression test to measure the determination coefficient using *the value of Nagelkerke R Square*. This number shows how much of the variation of the dependent variable can be explained by the independent variable.

Classification Matrix Assessment. This stage shows the accuracy of the model in classifying the data into the right categories expressed in the percentage of accuracy. For example, what percentage of accuracy of the logit model in this study is able to predict which farmers will or will not adopt the technology.

Wald Test (Partial Test). This test is to test the signification of each independent variable. This is explained by Nachrowi and Usman (2002) as follows:

H0: βj = 0 for a given j; j = 1.2..p then there is no influence between the independent variable and the bound variable.

H1: βj ≠ 0 then there is an influence between the independent variable and the bound variable

The test criteria is that if the significance is > 0.05 then subtract $H_{1\ and}$ accept H_0 and if the significance < 0.05 then accept H_1 and subtract $H_{0.}$

Interpretation *of Odds Ratio (Exp B).* This is the most crucial stage in logistic regression. The value of Exp(B) indicates how likely it is that an event will occur if an independent variable goes up by one unit. The test criteria are:

If *the Odds Ratio* (Exp B) > 1: then increase the chances of adoption

If *the Odds Ratio* (Exp B) < 1: then lowers the chances of adoption

If *the Odds Ratio* (Exp B) = 1: then it has no effect on the chances of adoption.

3. RESULTS

3.1 Socio-Economic Characteristics of Farmer Respondents

The Age of the Farmer. Figure 2 shows the most age group of Siamese citrus crop respondent farmers in Barito Kuala Regency, South Kalimantan Province. The number of respondent farmers who are still classified as productive is 85 farmers. While the remaining 5 are classified as unproductive because they are over 64 years old. So it can be concluded that out of a total of 90 farmer respondents, around 94% of farmer respondents are at productive age and the remaining 6% are at unproductive age.

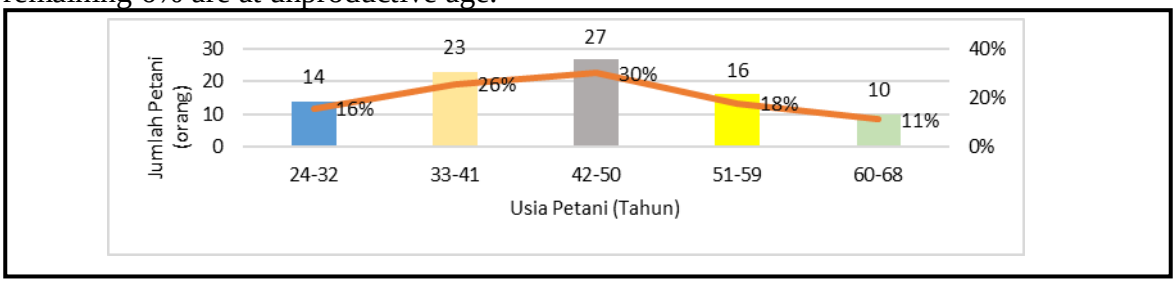

Figure 2. Age distribution of siamese lime crop respondents in Barito Kuala Regency, South Kalimantan Province (Data processed, 2026)

Farmer Education Level. Figure 3 explains that the highest level of education of the respondents in this study is the S1 education level with a total of 5 farmers or about 6% of the total 90 respondents. So it can be concluded that the most farmer respondents are high school

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graduates with a percentage of 37%, after that elementary school with a percentage of around 32%, junior high school with a percentage of 26%, and then only S1.

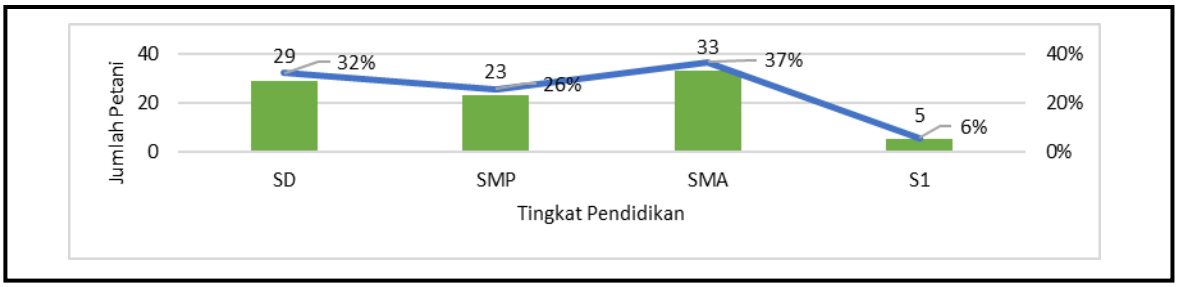

Figure 3. Distribution of education level of siamese lime plant respondents in Barito Kuala Regency, South Kalimantan Province (Data processed, 2026)

Farmers' Income Levels. The income level of Siamese orange farmers can be seen in Figure 4.

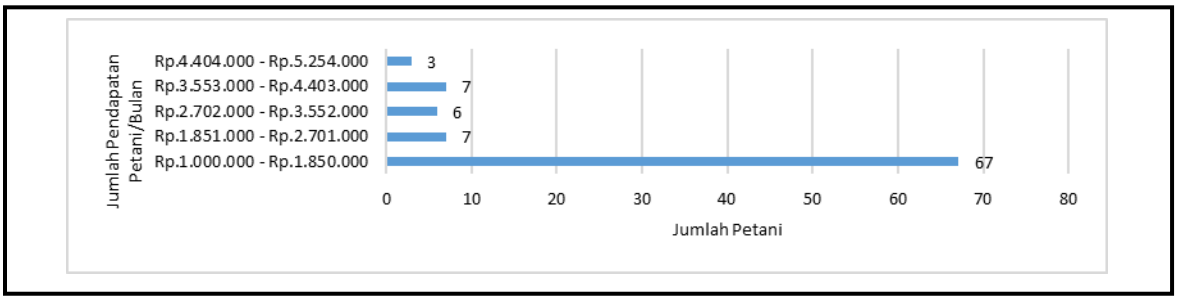

Figure 4. Distribution of income levels of Siamese citrus crop respondents in Barito Kuala Regency, South Kalimantan Province (Data processed, 2026)

The average income level of the most siamese orange farmers ranges from Rp. 1,000,000 to Rp. 1,850,000 every month with a total of 67 farmers. So it can be said that around 74% of siamese farmers have an income of less than Rp.2,000,000,-/month.

Land Area. The average area of farmland of the most respondents ranged from 0.5-1.3 ha with a total of 55 farmers or around 61% of the total respondents. The image of the area of the respondent farmers' chayote citrus farming land in Barito Kuala Regency, South Kalimantan Province can be seen more clearly in Figure 5.

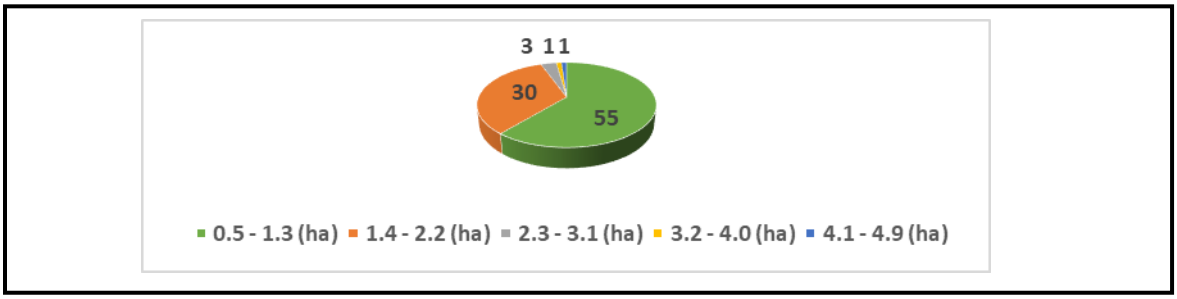

Figure 5. Distribution of agricultural land of Siamese lime plant respondents in Barito Kuala Regency, South Kalimantan Province (Data processed, 2026)

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Farming Experience. It can be seen in Figure 6 that the average experience of farming Siamese citrus plants in Barito Kuala Regency, South Kalimantan Province is 20 years. In addition, it can also be known that most of the respondent farmers have farming experience of around 13-22 years with 35 respondents being farmers.

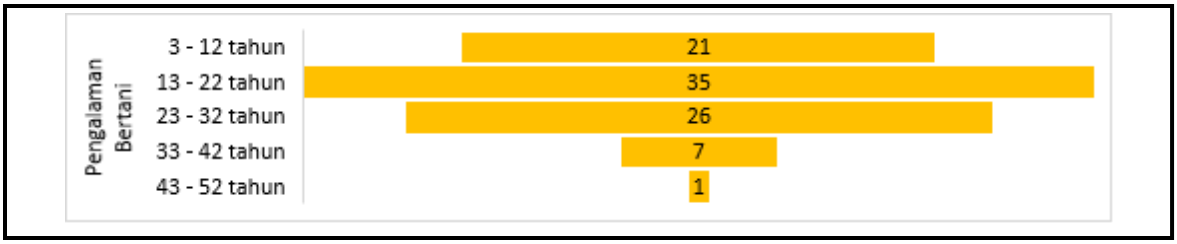

Figure 6. Distribution of Long Farming Experience of Siamese Citrus Plant Respondents in Barito Kuala Regency, South Kalimantan Province

Sources: Data processed (2026)

The results of the validity test showed that the r calculation of > r of the table with a sample number of 90 based on *the Pearson Product Moment* table was 0.207. *The value of Cronbach's Alpha* in this study was greater than 0.60 so it can be said that the research questionnaire is reliable.

3.2 Farmers' Perception of the Characteristics of California Porridge Innovation in Siamese Citrus Plants in Barito Kuala Regency

Table 2. Farmers' perception based on the characteristics of california porridge innovation in Barito Kuala Regency, South Kalimantan Province

Yes	Innovation Characteristics	Maximum Score	Score on the Field	Percentage of Maximum Score	Category
1	Relative Advantages	20	15.36	76.78%	Height
2	Compatibility Level	15	11.57	77.11%	Height
3	Complexity Level	15	10.74	71.63%	Medium
4	Ease of Trying	20	15.06	75.28%	Height
5	Compliance Rate	15	11.37	75.78%	Height
	Total	17	12.82	75.32%	Height

Sources: Data processed (2026)

3.3 The Influence of Farmers' Socio-Economic Characteristics and Farmers' Perceptions on the Decision to Adopt the Innovation of Using California Porridge on Siamese Citrus Plants in Barito Kuala Regency

The results of logite regression analysis to determine the influence of socioeconomic characteristics and farmers' perceptions on farmers' adoption decisions in this study are as follows:

Model Feasibility Test (*Goodness of fit*). The results of the model feasibility test are shown in Table 3.

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Table 3. Results *Hosmer dan Lemeshow test*

Chi-Square	Df	Say.
5,122	8	0,744

Sources: Data processed (2026)

Based on the results of the Hosmer and Lemeshow tests in Table 3, it shows that there is no significant difference between the observation results and the possible prediction results produced by the logit model in this study, so the model is feasible to use.

Simultaneous Test (*Omnibus Test*). The results of the Simultaneous Test showed that the variables of farmer age, formal education level, total income, land area, farming experience, relative advantages, compatibility, *complexity*, trialability, *and observability (*level of ease of observation) simultaneously affects the decision to adopt california porridge innovation in farmers in Barito Kuala Regency, South Kalimantan Province.

Table 4. Simultaneous test results (*Omnibus Test)*

		Chi-square	df	Say.
Step 1	*Step*	18.298	10	0.004
	Block	18.298	10	0.004
	Model	18.298	10	0.004

Sources: Data processed (2026)

Coefficient of Determination (*Pseudo R-Square*). The results of the determination coefficient test are presented in Table 5. The determination coefficient in Table 5 shows that *the value of Nagelkerke's R-Square* is 0.5289

Table 5. Determination coefficient test results

Step	*-2 Log likelihood*	*Cox & Snell R Square*	*Nagelkerke R Square*
1	93.299a	0.183979768	0.528904672

Sources: Data processed (2026)

This means that 52.89% of the variables of farmer age, formal education level, total income, land area, farming experience, *relative advantages*, *compatibility*, *complexity*, trialability, *and observability (*The level of ease of observability) is able to explain the variables of farmers' decisions in adopting California porridge innovations in siamese citrus plants.

Classification Matrix Assessment. The results from Table 6 show that this logit model can predict the likelihood that farmers will adopt California porridge innovations is as much as 74.4% of the total sample of 90 farmers and this logit model can predict the likelihood that farmers will not adopt California porridge innovations is as much as 28.6% of the total farmer sample.

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Table 6. Classification matrix test results

Observed			*Predicted* Adoption Decision		*Percentage Correct*
			No adoption	adopsi	
Step 1	Adoption Decision	No adoption	8	20	28.57%
		adopsi	3	59	95.16%
	Overall Percentage				74.44%

Source: Data processed (2026)

Wald Test (Partial Test). The results of the wald test in Table 9 show that there are 5 independent variables that have a partial significant effect on the decision to adopt california porridge in farmers because of the significance value of < 0.05, namely the level of formal education, *relative advantages, the* level of complexity, the level of *trialability*, and the level of observability.

Interpretation *of Odds Ratio.* The interpretation of the results of the Exp(B) coefficient or *odds ratio* in Table 9 for each significant variable has an effect on the adoption decision, which is as follows:

a. Formal Education Level
   The higher the level of formal education of a farmer, the chances of adoption rate will increase by 1,452 times.
b. Relative Advantage (*Relative Advantages)*
   The Exp(B) value is 1.277. So it can be concluded that the higher the relative profit rate (the advantage of california porridge innovation compared to the innovation before using california porridge) that farmers feel, the chances for farmers to adopt california porridge will increase by 1,277 times.
c. Level of Complexity
   The Exp(B) value of 3.474 shows that if the application of the California porridge innovation is less complicated, the chances of adoption will increase to 3.474 times.
d. Trialibility
   The Exp(B) value shows 9.777. So it can be interpreted that the easier it is for california porridge innovations to be tried by farmers on a small and large scale, it will increase farmers' adoption decisions by 9,777 times compared to if california porridge innovations are more difficult to try.
e. Level of Ease of Observation (*Observability)*
   The Exp value (B) is 1.876 which indicates that the easier it is for the California slurry innovation to be observed during and after the innovation is implemented, the adoption decision will increase by 1.876 times.

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Table 7. Wald test results (partial test)

Independent Variables	*95% C.I.for EXP(B)*					
	B	S.E.	Forest	df	Say.	Exp(B)
Farmer Age	-0.158	0.316	0.25	1	0.617	0.854
Formal Education Level	0.373	0.386	0.932	1	0.034*	1.452
Income Levels	-0.34	0.295	1.325	1	0.25	0.712
Land Area	0.073	0.392	0.035	1	0.852	1.076
Farming Experience	0.429	0.515	0.692	1	0.241	1.535
Relative Advantages	2.57	1.713	2.25	1	0.033*	1.277
Compatibility Level	0.391	2.064	0.036	1	0.85	0.478
Complexity Level	1.245	0.554	5.045	1	0.025*	3.474
Tingkat Kemudahan dicoba	2.985	1.281	5.425	1	0.02*	9.777
Ease of observation	0.132	1.996	0.004	1	0.042*	1.876
Constanta	-6.668	4.421	2.275	1	0.131	0.001

Sources: Data processed (2026)

4. DISCUSSION

From the results of the analysis of primary data in Table 7, it shows that the percentage of scores in the field obtained against the maximum score for relative profit is 76.78%. Some of the benefits felt include increased production of chayote plants and cost efficiency. The higher the relative profit, the more likely farmers are to adopt the innovation. Another study that supports the results of this study is (Margono, 2010) which found that agricultural innovations with clear economic benefits are adopted faster by farmers. Overall, the perception based on the characteristics of california porridge innovation in the control of diplodia disease in siamese lime plants is included in the high category so that innovation has great potential to be adopted by farmers.

The results of this study are also in line with the findings of Sari and Fahmi (2020) who stated that farming decisions are often based more on the accumulation of past experience than biological age factors alone. Progressive young farmers as well as experienced older farmers may have an equal chance of adopting the technology if they see the real benefits of the innovation. Age variables were not the main determinants in the adoption of California porridge, suggesting that this innovation could be accepted by various age groups without the physical or cognitive constraints that distinguish between generations of farmers. The results of this study are supported by Wongkar et al., (2016) who stated that the adoption rate of rice cultivation innovations is significantly influenced by formal education and has a positive correlation direction. The level of education affects the way a person thinks, communicates, and insights, making it easier for a person to understand the purpose and importance of innovation. Feder et al., (1985) also revealed that farmers tend to adopt technology after seeing the success of other farmers.

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5. CONCLUSION

The conclusions of this study are:

1. The majority of farmers are in the productive age of 42–50 years (27 people), have a high school education (33 people), have an income of IDR 1,000,000 – IDR 1,850,000 (67 people), have a land of 0.5–1.3 ha (55 people), and have farming experience of 13–22 years (35 people).
2. The assessment of farmers' perception based on the characteristics of California porridge innovation is relatively high, including aspects of relative profitability (79%), norm/cultural conformity (74%), ease of application (56%), ease of trial (80%), and ease of observation (77%).
3. Simultaneously, the ten socio-economic variables and innovation characteristics have a real influence on the adoption decision in Barito Kuala Regency. However, partially, only 5 variables are significant, namely formal education, relative advantage, level of complexity, ease of trying, and ease of observation.

6. SUGGESTIONS

Suggestions that can be given by researchers based on the results of this study are as follows:

- Counseling activities can focus on improving the technical and managerial capacity of high-school-educated productive age farmers and also simplify the technical guidance of the application of california porridge and provide intensive assistance to suppress the perception of complexity.
- The results of the logistic regression analysis showed that the variables of formal education, relative advantage, level of complexity, ease of trying, and ease of observation had a significant effect on the adoption decision. Therefore, innovation development policies should be focused on improving these factors, for example through the presentation of simpler and more applicable information, as well as clarifying the economic benefits that farmers can obtain.
- For researchers, they can then add new variables (access to information, role of extension workers, institutions, farmer groups) and use a time approach (longitudinal)

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