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# Development Strategies For The Sustainable Of Cocoa Through Certification Programs And Their Impact On Farmers' Incomes In Palolo District, Sigi Regency

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**Abstract**

*This research objectives was: (1) to explore and analyze sustainability strategies in the cocoa certification program; and (2) to determine the effect of the sustainable cocoa certification program on farmers' income. The data analysis methods used in this study were: (1) SWOT Analysis, and (2) Multiple Linear Regression Analysis. The results showed that, based on the evaluation of the IFAS and EFAS factors, the highest score among the four factors was the internal strength factor, with a score of 2.01, while the lowest score was the threat factor, with a score of 1.00. This can be explained as follows: (1) The representing the standard value when variable X equals zero, or the value of Y before being influenced by the independent variables studied. (2) The negative relationship and a negative effect of 28.0% on cocoa farmers' income. (3) The indicating a positive relationship and a contribution of 69.6% to cocoa farmers' income. (4) The positive relationship and a positive effect of 63.3% on cocoa farmers' income. (5) The negative relationship and a negative effect of 6.3% on cocoa farmers' income. Conclusion: (1) The sustainability strategy in the cocoa certification program supports an aggressive strategy, namely the Strength–Opportunities (S–O) strategy, with a score of 3.81, placing it in Quadrant I. (2) The sustainable cocoa certification program significantly affects cocoa farmers' income. This means that all independent variables (X) jointly explain 98.8% of the variation in the dependent variable (Y).*

**Keywords: Cocoa, Certification Program, Farmers' Income.**



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## INTRODUCTION

Cocoa is an agricultural commodity that plays a vital role in the economies of many countries, including Indonesia. Indonesia is one of the world's largest cocoa producers, making a significant contribution to farmers' incomes and local economies. However, cocoa production often faces various challenges, including environmental, social, and economic issues. In this context, cocoa certification programs have emerged as a solution to enhance sustainability throughout the cocoa supply chain. Certifications such as Fair Trade and Rainforest Alliance aim to ensure that cocoa is produced in an environmentally and socially responsible manner, while providing fair benefits to farmers. Although many certification programs have been implemented, challenges in their implementation persist. Data from the International Cocoa Organization (ICCO) shows that approximately 90% of cocoa farmers in Indonesia are not yet certified, indicating a gap in the adoption of sustainable practices. Additionally, there are challenges regarding farmers' understanding of the benefits of certification and how to obtain it. Therefore, it is important to explore sustainability strategies within cocoa certification programs to increase farmer participation and the success of these programs. Cocoa certification is one solution expected to enhance the competitiveness of Central Sulawesi's cocoa products in the global market. Certification programs such as UTZ and Rainforest Alliance guarantee that cocoa products are produced sustainably and meet specific standards. This not only leads to increased farmer income but also to better environmental management.

Research conducted by the International Cocoa Organization (ICCO) shows that farmers participating in certification programs are able to increase their income by up to 30% compared to non-certified farmers (ICCO, 2021). Global cocoa production data based on the seven largest cocoa-producing countries is shown in Table 1 below:

**Table 1. Global Cocoa Production Data Based on the Seven Largest Producing Countries, 2020–2021**

| No. | Countries | Production (Ton) | Year |
|---|---|---|---|
| 1 | Pantai Gading | 2.000.000 | 2021 |
| 2 | Gana | 800.000 | 2020 |
| 3 | Ekuador | 342.000 | 2020 |
| 4 | Kamerun | 280.000 | 2020 |
| 5 | Nigeria | 250.000 | 2020 |



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| | | | |
|---|---|---|---|
| 6 | Brazil | 201.000 | 2020 |
| 7 | Indonesia | 200.000 | 2020 |

Source: ICCO Data, 2024

Based on the data in Table 1, Indonesia ranks as the 7th largest cocoa producer in the world, with production reaching 200,000 metric tons in 2021. From an economic perspective, based on price, cocoa offers significant opportunities to increase farmers' incomes, which will automatically boost the country's revenue from the plantation sector, particularly cocoa. Therefore, if the cocoa certification program is successful, farmers' incomes will increase further.

Central Sulawesi Province is a major cocoa-producing region in Indonesia with relatively high production levels and a fairly varied distribution across its districts. This is influenced by various factors, including technical factors, natural resources, climate, temperature, rainfall, soil fertility, and human resource management among the key actors in the cocoa farming sector.

According to data from the Central Statistics Agency (BPS) on cocoa production in Central Sulawesi by regency, as shown in Table 2 below:

**Table 2. Cocoa Production by Regency in Central Sulawesi, 2020–2024**

| No | Regencies | Land Areas (Ha) | Production (Ton) | Produktivities (Ton/Ha) |
|---|---|---|---|---|
| 1 | Parigi Moutong | 17.723,30 | 25.319 | 0,70 |
| 2 | Poso | 18.279,80 | 23.740 | 0,93 |
| 3 | Sigi | 15.492,80 | 19.366 | 0,80 |
| 4 | Donggala | 13.410,00 | 17.880 | 0,75 |
| 5 | Toli-Toli | 7.109,60 | 8.887 | 0,80 |
| 6 | Morowali Utara | 3.997,00 | 5.710 | 0,70 |
| 7 | Morowali | 1.693,30 | 2.419 | 0,70 |
| 8 | Tojo Una-Una | 3.639,30 | 5.199 | 0,70 |
| 9 | Buol | 2.576,70 | 3.681 | 0,70 |
| 10 | Banggai produksi | 10.861,90 | 15.517 | 0,70 |
| 11 | Banggai Kepulauan | 194,60 | 278 | 0,70 |
| 12 | Banggai Laut | 62,30 | 89 | 0,70 |
| 13 | Kota Palu | - | - | - |
| | **Total** | **95.040,60** | **128 085** | **0,74** |

Source: Data BPS Sulteng, 2024



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Based on the data in Table 2, it can be seen that cocoa production varies across regions, with the lowest production at 89 metric tons in Banggai Laut Regency and the highest at 25,319 metric tons.

According to data on cocoa production in Central Sulawesi, Sigi Regency ranks second in terms of production area and productivity. Based on this data, Palolo Subdistrict is one of several cocoa-producing areas in Sigi Regency, Central Sulawesi Province. Some cocoa farmers in this area have participated in the certification program, while others still sell their produce without certification. This situation warrants further research into the extent to which the cocoa certification program can have a tangible impact on increasing farmers' incomes.

**Table 3. Cocoa Production in Sigi Regency by Subdistrict, 2024**

| No | Districts | Land Areas (Ha) | Production (Ton) | Produktivities (Ton/Ha) |
|---|---|---|---|---|
| 1 | Sigi Biromaru | 40,06 | 57,23 | 0,70 |
| 2 | Palolo | 8.253,21 | 8.874,42 | 0,93 |
| 3 | Nokilalaki | 12,44 | 15,55 | 0,80 |
| 4 | Dolo | 115,38 | 153,84 | 0,75 |
| 5 | Dolo Barat | 323,27 | 404,09 | 0,80 |
| 6 | Dolo Selatan | 943,75 | 1.348,21 | 0,70 |
| 7 | Marawola | 52,69 | 75,27 | 0,70 |
| 8 | Marawola Barat | 49,94 | 71,34 | 0,70 |
| 9 | Kinovaro | 1.387,07 | 1.981,53 | 0,70 |
| 10 | Tanambulava | 489,44 | 699,20 | 0,70 |
| 11 | Gumbasa | 586,39 | 837,70 | 0,70 |
| 12 | Lindu | 441,57 | 630,81 | 0,70 |
| 13 | Kulawi | 1.857,09 | 2.321,36 | 0,80 |
| 14 | Kulawi Selatan | 598,09 | 854,41 | 0,70 |
| 15 | Pipikoro | 821,89 | 1.174,13 | 0,70 |
| | Jumlah | 15.972,27 | 19.499,09 | 0,74 |

Source: BPS Sigi Kabupaten Sigi Dalam Angka (BPS Sigi), 2024

Based on the data in Table 3, it can be seen that Palolo Subdistrict has the highest production trend compared to the 15 other subdistricts in Sigi Regency, reaching 8,874.42 metric tons. Despite its great potential, the cocoa sector faces several challenges,



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including price fluctuations, limited market access, suboptimal cultivation practices, and pest and disease outbreaks. Cocoa advocates play a role in helping to address these issues. Among them are NGOs and nonprofit organizations such as the Rainforest Alliance and UTZ, which help facilitate collaboration between farmers, the government, and the private sector to find solutions to the challenges facing the cocoa industry. Various efforts have been made to improve quality, increase farmers' incomes, and facilitate access to global markets.

Based on field observations, particularly in Palolo Subdistrict, the Cocoa Certification Program has been implemented by farmers. Cocoa with Rainforest Alliance (RA) certification indicates that the product is produced sustainably, taking into account environmental, social, and economic aspects. RA certification aims to ensure that cocoa cultivation supports environmental conservation, farmer well-being, and the protection of workers' rights.

Data from PT. JB Cocoa, which serves as the buyer collaborating in this cocoa certification program, details the number of farmers, land area, production, and productivity of cocoa crops in Palolo and Nokilalaki subdistricts for the years 2022–2024, as shown in Table 4 below:

**Table 4. Data on the Number of Farmers, Land Area, Production, and Productivity of Cocoa Crops Participating in the Certification Program in Palolo Subdistrict for 2022–2024**

| No | Year | Number of Farmers | Land Areas (Ha) | Production (Ton) | Produktivities (Ton/Ha) |
|---|---|---|---|---|---|
| 1 | 2022 | 1.265 | 1.727 | 999 | 0,578 |
| 2 | 2023 | 752 | 785 | 454 | 0,578 |
| 3 | 2024 | 686 | 805,4 | 467 | 0,580 |

Source: Data PT. JB Cocoa, 2024

The research questions in this study are: 1) What are the sustainability strategies in cocoa certification programs? 2) Do sustainable cocoa certification programs affect farmers' income? The objectives of this study are: 1) To explore and analyze sustainability strategies in cocoa certification programs, 2) To determine the impact of sustainable cocoa certification programs on farmers' income.


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## RESEARCH METHODS

This study was conducted in Palolo Subdistrict, Sigi Regency. The research method was selected through a *purposive* approach (Sugiyono, 2018; Mukhlis et al., 2019; Mukhlis et al., 2024; Asgaf et al., 2025), based on the fact that Palolo Subdistrict has a relatively large land area and serves as a center for the production of high-quality cocoa; furthermore, Palolo Subdistrict is a participant in the Cocoa Bean Certification Program in Sigi Regency.This study was conducted from October through December 2025

### Data Analysis Techniques

#### 1. SWOT Analysis

The data analysis used to address the first research question involved a SWOT analysis of the strategy for cocoa commodity development through the certification program in Palolo Subdistrict, Sigi Regency

SWOT analysis was used to evaluate the strengths, weaknesses, opportunities, and threats associated with the cocoa certification program. In terms of strengths, the certification program can enhance the reputation of Indonesian cocoa products in international markets and provide farmers with better access to broader markets. However, existing weaknesses, such as high certification costs and a lack of understanding among farmers, may hinder their participation in this program. On the other hand, the opportunities for developing the cocoa certification program are significant, particularly given the growing consumer awareness of the importance of sustainable products.

#### 2 Multiple Linear Regression Analysis

Multiple linear regression analysis was used to address the second research question regarding the factors influencing the development of sustainable cocoa through the certification program in Palolo Subdistrict, Sigi Regency.

The regression equation is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \ldots b_nX_n + e$$

Where:

$Y$ = Cocoa Farmers' Income
$X_1$ = Training and Extension Services
$X_2$ = Implementation of Good Agricultural Practices (GAP) for Cocoa Cultivation
$X_3$ = Selling Price of Certified Cocoa


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$X_4$ = Cocoa Market Aspects
a = Constant (intercept)
$b_1$–$b_3$ = Regression Coefficients.

## RESULTS AND DISCUSSION

### 1. SWOT Analysis

SWOT analysis is a classic strategic planning tool that uses a framework of strengths, weaknesses, opportunities, and threats; this tool provides a simple way to determine the best strategy for carrying out an activity. It can help planners achieve their goals and identify key considerations. For a more detailed understanding of the SWOT analysis results for each factor—both internal and external—see the following:

### 2 Strengths and Weaknesses Analysis

To ensure that activities are dynamic and aligned with actual needs and conditions, it is crucial to conduct a strategic environmental analysis. In this strategic environmental analysis, the sustainability strategy for the cocoa certification program seeks to gain a deeper understanding of the internal and external factors that are expected to influence the sustainability of the cocoa certification program in Palolo Subdistrict.

Internal factors—specifically *strengths* and *weaknesses*—are important to understand in order to assess the extent to which strengths can be leveraged and the extent to which weaknesses must be addressed. Meanwhile, external factors—which originate from outside but are expected to have a strong influence on the sustainability of the cocoa certification program in Palolo Subdistrict—consist of potential *opportunities* and *threats*. The strategic internal factors in question, as shown in Table 5, are as follows.

**Table 5. Internal Factors Analysis Summary (IFAS)**

| Internal Strategic Factors | Weight | Rating | Weight x Rating |
|---|---|---|---|
| Strengths (Strengths) | | | |
| 1. Climate and rainfall | 0,15 | 4 | 0,60 |
| 2. Soil fertility | 0,14 | 4 | 0,56 |
| 3. Farmers' knowledge, skills, and attitudes | 0,10 | 4 | 0,40 |
| | 0,09 | 3 | 0,27 |


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| | | | |
|---|---|---|---|
| 4. Availability of human resources (skilled labor)<br>5. High production quality and quantity | 0,06 | 3 | 0,18 |
| Subtotal of Strengths | 0,54 | | 2,01 |
| Weaknesses (Weaknesses)<br>1. Limited capital<br>2. Difficulty obtaining subsidized fertilizer<br>3. Limited application of cultivation technologies<br>4. Small landholdings<br>5. Aged crops | <br>0,12<br>0,11<br>0,10<br>0,08<br>0,05 | <br>3<br>2<br>2<br>3<br>3 | <br>0,36<br>0,22<br>0,20<br>0,24<br>0,15 |
| Subtotal of Weaknesses | 0,46 | | 1,17 |
| Tota | 1,00 | | 3,18 |

Strategies that can be implemented in the Strategy for Sustainable Cocoa Development Through a Certification Program and Its Impact on Farmers' Incomes in Palolo Subdistrict, Sigi Regency, include the Internal Factors Analysis Summary (IFAS) and the External Factors Analysis Summary (EFAS). Further details regarding the IFAS and EFAS strategies, as outlined in Table 6, are as follows:

1. Priority Strategy I is to combine strengths with the utilization of available opportunities as follows

**Table 6. Priority I Strategy: Strengths - Opportunities (S - O)**

| Strengths | Opportunities |
|---|---|
| 1. Climate and rainfall<br>2. Soil fertility<br>3. Farmers' knowledge, skills, and attitudes<br>4. Availability of human resources (skilled labor)<br>5. High production quality and quantity | 1. High demand for cocoa in national and international markets<br>2. Government program support for cocoa development<br>3. Increasingly advanced cocoa cultivation technologies<br>4. Training and extension programs for cocoa farmers<br>5. Vast potential for the cocoa export market |


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**S-O Strategy *(Strength – Opportunity)***

1. Increasing cocoa production and quality to meet domestic and international market demand
   Favorable climatic conditions, adequate rainfall, and high soil fertility in Palolo Subdistrict are key strengths for cocoa cultivation. By leveraging these conditions, farmers can increase cocoa production and quality, thereby meeting the continuously rising market demand at both the domestic and international levels.
2. Leveraging government program support for cocoa farming development
   Farmers' knowledge, skills, and access to a skilled workforce can be optimized through various government programs, such as the provision of high-quality seedlings, improvements to production facilities, and cocoa development programs designed to boost productivity and farmers' well-being.
3. Implementation of more modern and efficient cocoa cultivation technologies
   With sufficient human resources and farmers' solid knowledge, evolving cocoa cultivation technologies can be optimally applied—such as pruning techniques, balanced fertilization, grafting, and integrated pest management—to increase production yields.
4. Optimizing training and extension programs for cocoa farmers
   Existing training and extension programs can be utilized to improve farmers' skills in managing cocoa farms, thereby ensuring that production remains high and of high quality.
5. Development of a cocoa export orientation
   With good production quality and quantity, as well as the support of available resources, farmers can take advantage of the vast cocoa export market opportunities to increase the market value and income from cocoa farming.

2. Priority II Strategy, the *Weakness–Opportunity* (W-O) Strategy**,** is as follows:

**Table 7. Priority II Strategy: Weakness–Opportunity (W-O) Strategy**

| Weakness | Opportunity |
|---|---|
| 1. Fluctuations in cocoa prices on the market<br>2. Pests and diseases affecting cocoa plants | 1. High demand for cocoa in national and international markets<br>2. Government program support for cocoa development |


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| | |
|---|---|
| 3. Climate change affecting cocoa production<br>4. Competition with other agricultural commodities<br>5. Conversion of agricultural land | 3. Increasingly advanced cocoa cultivation technologies<br>4. Training and extension programs for cocoa farmers<br>5. Extensive potential for the cocoa export market |

**W-O Strategy *(Weakness – Opportunity)***

1. Enhancing farmers' capabilities in pest and disease control through training and extension programsPest and disease outbreaks in cocoa plants can be minimized by utilizing training and extension programs from the government and relevant institutions, enabling farmers to apply more effective control techniques;
2. Promote the adoption of cocoa cultivation technologies to address the impacts of climate changeThe growing availability of cocoa cultivation technologies can be leveraged to address climate change, for example through the use of high-yielding varieties that are more resilient to environmental conditions and the adoption of adaptive cultivation techniques;
3. Leveraging government program support to enhance production stability and farmer incomeGovernment cocoa development programs can be utilized to improve cultivation systems, enhance crop quality, and help farmers cope with fluctuations in cocoa prices in the market;
4. Enhancing cocoa competitiveness through improved production qualityGiven the high demand for cocoa in national and international markets, as well as extensive export opportunities, farmers can improve the quality of their cocoa crops to achieve a higher market value compared to other agricultural commodities;
5. Optimizing the economic value of cocoa to prevent the conversion of agricultural landBy capitalizing on extensive market opportunities and support for cocoa development, cocoa farming can be made more profitable, thereby encouraging farmers to retain their cocoa land and avoid converting it to other uses.


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3. Priority Strategy III: The Strength–Threat (ST) Strategy is as follows:

**Table 8. Priority III Strategy: Strength–Threat (S-T) Strategy**

| Strength | Threat |
|---|---|
| 1. Climate and rainfall<br>2. Soil fertility<br>3. Farmers' knowledge, skills, and attitudes<br>4. Availability of human resources (skilled labor)<br>5. High production quality and quantity | 1. Fluctuations in cocoa prices in the market<br>2. Pest and disease infestations in cocoa plants<br>3. Climate change affecting cocoa production<br>4. Competition with other plantation commodities<br>5. Conversion of agricultural land |

**S-T Strategy *(Strength – Threat)***

1. Leveraging climate conditions, rainfall, and soil fertility to maintain stable cocoa production.

   Favorable agroclimatic conditions can be leveraged to sustain cocoa productivity, ensuring farmers continue to achieve good yields despite market price fluctuations.
2. Enhancing farmers' capabilities in controlling pests and diseases of cocoa plants. Farmers' knowledge, skills, and positive attitudes can be leveraged to implement appropriate cultivation techniques—such as farm sanitation, pruning, and integrated pest management—to reduce crop damage caused by pests and diseases.
3. Optimizing skilled labor in the application of cultivation techniques adapted to climate change

   The availability of a skilled workforce enables farmers to adapt cocoa cultivation techniques to changing environmental conditions, thereby minimizing the impact of climate change on production.
4. Improving the quality and quantity of cocoa production to compete with other commodities

   With high-yield, high-quality cocoa production, the cocoa commodity can maintain a competitive economic value compared to other plantation crops.
5. Optimizing cocoa production potential to preserve agricultural land

   High cocoa productivity can increase farmers' incomes, thereby encouraging them to maintain their cocoa farms and reduce the tendency to convert agricultural land to other uses.



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4. Priority IV Strategy: Weakness–Threat (WT) Strategy, as follows:

**Table 9. Priority IV Strategy: Weakness–Threat (W-T) Strategy**

| Weakness | Threat |
|---|---|
| 1. Fluctuations in cocoa prices in the market<br>2. Pest and disease infestations affecting cocoa plants<br>3. Climate change affecting cocoa production<br>4. Competition with other plantation commodities<br>5. Conversion of agricultural land | 1. Fluctuations in cocoa prices in the market<br>2. Pest and disease infestations in cocoa plants<br>3. Climate change affecting cocoa production<br>4. Competition with other agricultural commodities<br>6. Conversion of agricultural land |

**S-T Strategy (Weakness – Threat)**

1. Improving farm management efficiency to mitigate the impact of cocoa price fluctuations

   Farmers need to improve efficiency in managing their cocoa plantations—such as by controlling production costs and improving crop quality—so they can remain profitable despite market price fluctuations.
2. Strengthen efforts to control pests and diseases in cocoa plants

   More intensive plantation management through sanitation, routine pruning, and the use of appropriate control techniques is necessary to reduce losses caused by pest and disease outbreaks.
3. Implementing cultivation techniques adapted to climate change

   Farmers need to adjust cocoa cultivation practices to changing environmental conditions, such as shade management, soil conservation, and water management to maintain production stability.
4. Enhancing the competitiveness of cocoa compared to other plantation commodities
   Efforts to improve cocoa quality and productivity are necessary to ensure that cocoa remains an economically attractive commodity for farmers.
5. Preserving cocoa farmland to prevent land conversion

   More productive and profitable cocoa farm management can encourage farmers to retain their cocoa land rather than converting it to other uses.


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With good production quality and quantity, as well as the support of available resources, farmers can take advantage of the vast export market for cocoa to increase the market value and income from their cocoa farming operations.

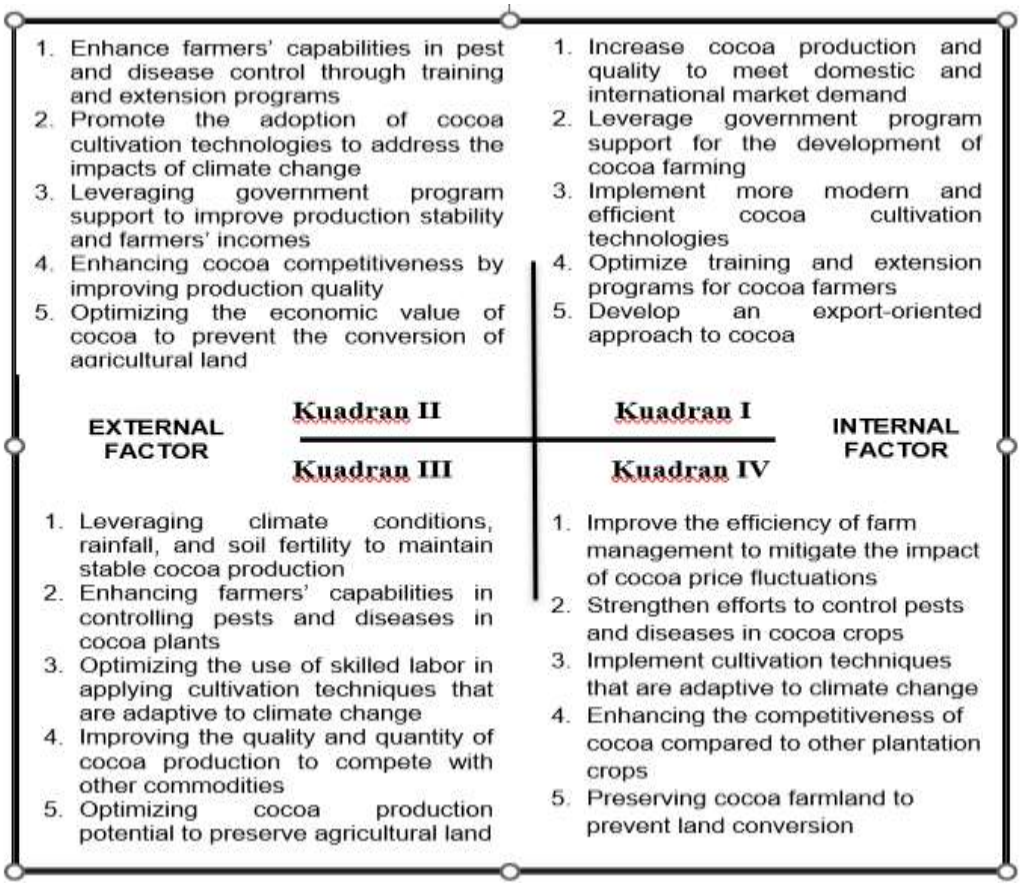



**Figure 1**. Grand Strategy Matrix

Figure 1 above illustrates the integration of internal and external factors by leveraging strengths and opportunities to address weaknesses and threats.

Based on the results of the IFAS and EFAS factor evaluations, it was found that the highest score among the four factors was for the internal factor of strengths (Strengths: 2.01), while the lowest was for threats (Threats: 1.0). For a clearer understanding of each score, the details are as follows:

1) Strengths : 2.01
2) Weaknesses : 1.17,
3) Opportunities : 1.80, and
4) Threats : 1.00.



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Based on these IFAS and EFAS factor scores, a SWOT matrix was developed to serve as a reference for formulating subsequent strategic assumptions. The IFAS and EFAS matrices are shown in Table 10.

**Table 10. IFAS and EFAS Matrices for the Strategy of Sustainable Cocoa Development Through a Certification Program and Its Impact on Farmers' Incomes in Palolo Subdistrict, Sigi Regency**

| IFAS / EFAS | Strength (S) | Weakness (W) |
|---|---|---|
| *Opportunity* (O) | Strategy (SO)<br>2,01 + 1,80 = 3,81 | Strategy (WO)<br>1,17+ 1,80 = 2,97 |
| Threat (T) | Strategy (ST)<br>2, 01 + 1,00 = 3,01 | Strategy (WT)<br>1,17 + 1,00 = 2,17 |

Source: Processed primary data, 2014

Based on Table 10, the scores for each strategy are as follows: the Strengths-Opportunities (S-O) strategy scored 3.81, the Weaknesses-Opportunities (W-O) strategy at 2.97, the Strengths-Threats (S-T) strategy at 3.01, and the Weaknesses-Threats (W-T) strategy at 2.17. The results of the IFAS and EFAS strategy analyses are illustrated in the following SWOT diagram.

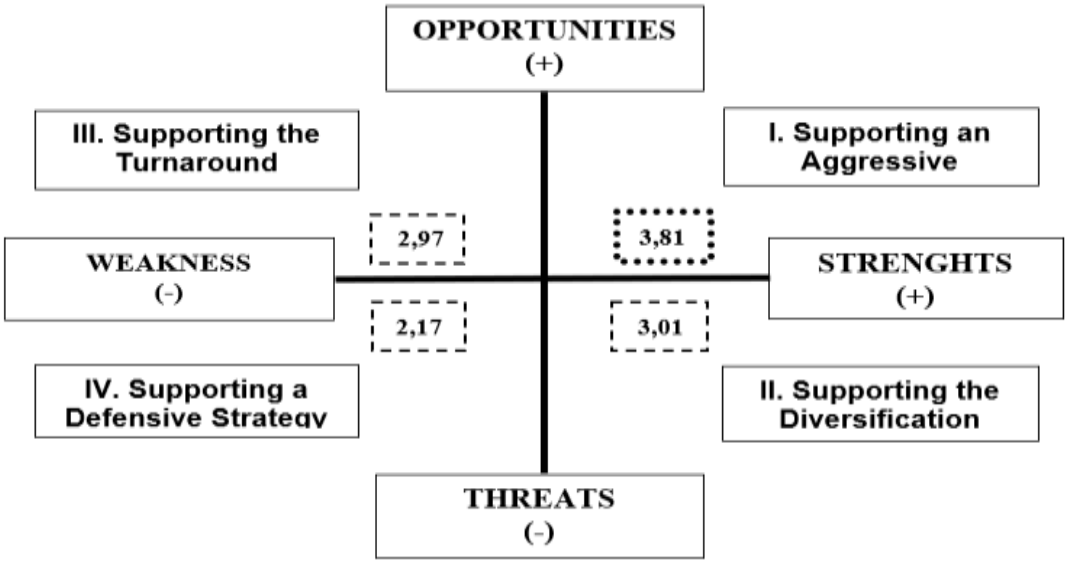



**Figure 2**. Results of the IFAS and EFAS strategy analyses


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**Multiple Linear Regression Analysis**

Multiple linear regression analysis aims to determine the effect of independent variables (X), namely: 1) Training and Extension Services ($X_1$), Implementation of Good Agricultural Practices (GAP) in Cocoa Cultivation ($X_2$), the Selling Price of Certified Cocoa ($X_3$), and Cocoa Market Aspects ($X_4$), on the dependent variable (Y), namely Cocoa Farmers' Income in Palolo Subdistrict, Sigi Regency. The results of the regression analysis are presented in Table 11 as follows:

**Table 11. Results of Multiple Linear Regression Calculations**

| Dependent Variables (Y) | Independent Variables (X) | Regression Coefficient | t-value | Sig | Note |
|---|---|---|---|---|---|
| Farmers' Income | Training and Extension Services (X1) | -,280 | -4,493 | ,000 | Sig |
| | Implementation of Good Agricultural Practices (GAP) in Cocoa Cultivation (X2) | ,696 | 10,206 | ,000 | Sig |
| | Selling Price of Certified Cocoa (X3) | ,633 | 7,178 | ,000 | Sig |
| | Market Aspects (X4) | -,063 | -,961 | ,343 | No Sig |
| R Square | | ,976 | | F hitung = 353,220 | |
| Adjusted R Square | | ,973 | | Sig = 0,000 | |
| R | | ,988a | | Constant = -1,019 | |

Source: Processed primary data, 2025 (Appendix 4)

Based on Table 11, which presents the results of the multiple linear regression analysis, the regression equation can be formulated as follows:

$$Y = -1.019 + -4.493\ X_1 + 10.206\ X_2 + 7.178X_3 + -,961X_4 + ,126e$$

Based on the data analysis, the intercept value is -1.019, which can be explained as follows:

1. The intercept represents the income of farmers in the cocoa certification program (Y) at -1.019, which is the standard value when variable X is 0 or the value of variable Y before being influenced by the value of the studied variable X;



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2. The regression coefficient of −0.280 indicates that the relationship between Training and Extension Services ($X_1$) has a negative effect on farmers' income, specifically a negative correlation of −2.80% with cocoa farmers' income in Palolo Subdistrict, Sigi Regency;
3. The regression coefficient of 0.696 indicates that the relationship between the Implementation of Good Agricultural Practices (GAP) for Cocoa Cultivation ($X_2$) is negatively correlated and can account for 69.6% of the variation in cocoa farmers' income in Palolo Subdistrict, Sigi Regency;
4. A regression coefficient of 0.633 indicates that the relationship between the selling price of certified cocoa ($X_3$) is positively correlated and can positively influence cocoa farmers' income in Palolo Subdistrict, Sigi Regency, by 63.3%.
5. A regression coefficient of -0.063 indicates that the relationship between Market Aspects ($X_4$) is negatively correlated and has a negative influence of -6.3% on the income of cocoa farmers in Palolo Subdistrict, Sigi Regency.

## CONCLUSION

Based on the results and discussion regarding strategies for the sustainable development of the cocoa commodity through certification programs and their impact on farmers' income in Palolo Subdistrict, Sigi Regency, the following conclusions can be drawn:

1. The sustainability strategy within the cocoa certification program regarding farmers' income in Palolo Subdistrict, Sigi Regency, supports an aggressive strategy—specifically the Strengths–Opportunities (S–O) strategy—with a value of 3.81, placing it in Quadrant I. Key activities include: 1) Increasing cocoa production and quality to meet national and international market demand; 2) Utilizing government program support for cocoa farming development; 3) Implementing more modern and efficient cocoa cultivation technologies; 4) Optimizing training and extension programs for cocoa farmers; and 5) Developing a cocoa export orientation.
2. The sustainable cocoa certification program influences the income of cocoa farmers in Palolo Subdistrict, Sigi Regency, based on the percentage of simultaneous influence of the variables Training and Extension ($X_1$), Application of Good Agricultural Practices (GAP) in Cocoa Cultivation ($X_2$), the Selling Price of Certified Cocoa ($X_3$), and Cocoa Market Aspects ($X_4$), as indicated by a coefficient of determination ($R^2$) of 0.988. This means that the combined effect of all independent variables (X) on changes in the dependent variable (Y) is 98.8%,


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**REFERENCES**

Adha, W. M., Yamin, M. M., & Ghazali, R. (2023). *Pengaruh sertifikasi mutu biji kakao terhadap peningkatan pendapatan petani kakao di Kecamatan Luyo Kabupaten Polewali Mandar. MANDAR:* Management Development and Applied Research Journal, 6(1), 20–28.

Adrian Darmawan Lubis1dan Sri Nuryanti, (2011). *Analisis Dampak Acfta Dan Kebijakan Perdagangan Kakao Di Pasar Domestik Dan China.* Pusat Pengkajian Kebijakan Kerjasama PerdaganganInternasional, Kementerian Perdagangan. Jakarta

Anwar, A., Galib, M., & Amran, F. D. (2022). *Analisis status keberlanjutan kakao (Theobroma cacao L.) di Kabupaten Bantaeng*. *Jurnal Tanah dan Sumberdaya Lahan*, 9(1).

Arikunto, S. (2010). *Manajemen Penelitian*, Penerbit PT. Rineka Cipta, Jakarta.

Arsyad, L. (2015). *Ekonomi Pembangunan*. Yogyakarta: UPP STIM YKPN.

Asgaf, K., Hifizah, A., Astati, Ananda, S., Jamili, M. A., & Mukhlis. (2025). Application of Fermented Feed Technology to Improve Beef Cattle Business Efficiency and Student Agribusiness Learning. *Jurnal Penelitian Pendidikan IPA*, *11*(5), 604–610. https://doi.org/10.29303/jppipa.v11i5.11135

Atmoko, T. (2010). *Stratgi Pengembangan Ekowisata Pada Habitat Bekatan Di Kuala Samboja Kalimatan Timur.* Balai Penelitian Teknologi Perbenihan Samboja. Jurnal penelitian hutan dan konservasi alam. VII (4); 425-437.

Azzahra Soraya Bilhaq, (2018). *Pengaruh Sertifikasi Kakao terhadap Penurunan Praktik Perbudakan Anak oleh Petani Kakao di Pantai Gading,* Departemen Hubungan Internasional, Fakultas Ilmu Sosial dan Ilmu Politik Universitas Diponegoro Journal of International Relations, 4 (1) : 107-114

Badan Pusat Statistik Kabupaten Sigi, (2023). *Kecamatan Dalam Angka*.

*CoEx-2021 Guidelines (English version)*. *Cocoa of Excellence Programme*.

Direktorat Jenderal Perkebunan. (2022). Statistik Perkebunan Unggulan Indonesia 2020-2022 Kakao. Jakarta (ID): Kementrian Pertanian. Edufarmers Kementrian Foundation. 2023. https://www.edufarmers.org.

Dwi Ahrisa Putri1, Arman Amran, Nurmadina, Nurlaela, 2023. *Analisis Pendapatan Usahatani Kakao Integrasi Ternak (Studi Kasus Di Desa Tapango Barat Kecamatan Tapango Kabupaten Polewali Mandar).* Agribisnis, Universitas Sulawesi Barat, Indonesia, 6 (1) : 85-94

Gittinger, J. P. (1986). *Analisis Ekonomi Proyek-Proyek Pertanian*. UI Press. Jakarta:



Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

*Guidelines for the Sensory Evaluation of Cocoa Beans as Chocolate. Cocoa of Excellence (2021) Edition*. Alliance of Bioversity International & CIAT,

Idfal1, dkk. (2024). *Analisis Pendapatan Petani Kakao di Desa Makmur Kecamatan Palolo* Jurnal 2 (1) : 1-8

ICCO, (2021). *Program Sertifikasi Kakao, International Cocoa Organization (ICCO). Quarterly Bulletin of Cocoa Statistics*.

ICCO (2022). *Cocoa Market Report.*

Indah, N., Lamusa, A., & Alamsyar. (2022). *Kontribusi usahatani kakao terhadap pendapatan rumah tangga petani di Desa Sintuwu Kecamatan Palolo Kabupaten Sigi.* Agrotekbis: Jurnal Ilmu Pertanian.

Indra, A. (2023). *Efek program sertifikasi kakao terhadap perbaikan praktek pertanaman dan produktivitas petani.* Skripsi. Universitas Hasanuddin

Karmawati, E., Mahmud, Z., Syakir, M., Munarso, S. J., Ardana, I. K., dan Rubiyo, (2010). *Budidaya dan pasca panen kakao,* pusat penelitian dan pengembangan perkebunan. Bogor.

Kementerian Pertanian RI (2023). *Pengembangan Kakao Nasional.*

Kotler, P., & Keller, K. L. (2016). *Marketing Management*. Pearson Education.

Makmun Syadullah, (2012). *Dampak Kebijakan Bea Keluar Terhadap Ekspor dan Industri Pengolahan Kakao* Buletin Ilmiah Litbang Perdagangan 6 (1), 53-68.

Mappatunru, A., Fariaty, C. N., & Zainuddin, S. I. (2024). *Hubungan kapitalis di tempat produksi yang tersembunyi: Studi kasus petani kakao sertifikasi di Desa Piriang Tapiko*. Jurnal Sosiologi Andalas.

Mosher, A. T. (1987). *Menggerakkan dan Membangun Pertanian*. Yasaguna, Jakarta

MuhammadIdfal1, Rita Yunus, Laendatu Paembonan, SantiYunus, dan Ika Rafika, (2024). *Analisis Pendapatan Petani Kakao di Desa Makmur Kecamatan Palolo,* Universitas Tadulako, 3 (3) : 1222-1232.

Mukhlis, M., Ismawati, I., Sillia, N., Fitrianti, S., Ukrita, I., Wisra, R. F., Raflis, H., Hendriani, R., Hanum, L., Ibrahim, H., Nofianti, S., Marta, A., & Sari, N. (2024). Characteristics of Production Factors and Production of Zero Tillage System Rice Farming. *Jurnal Penelitian Pendidikan IPA*, *10*(8), 6013–6019. https://doi.org/10.29303/jppipa.v10i8.8542

Mukhlis, Noer, M., Nofialdi, & Mahdi. (2019). Analysis of income and feasibility of rice-cattle integration system farming based on enterprises scale. *Journal of Advanced Research in Dynamical and Control Systems*, *11*(7), 544–553. https://www.jardcs.org/abstract.php?id=2678



Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Nazaruddin, M. (2023). *Pelatihan Budidaya Kakao Guna Peningkatan Kapasitas Petani Dan Peningkatan Produksi Kakao Di Aceh Utara*", Jurnal Malikussaleh Mengabdi, 2(1): 65.

Pearce, J. A., & Robinson, R. B. (2013). *Strategic Management: Formulation, Implementation and Control*. McGraw-Hill.

Prasmatiwi, F.E. (2023). *Sekolah Lapang Pemanfaatankomposlimbah Buah Kakaodi Perkebunan Kakao Di Kecamatan Air Naningan Kabupaten Tanggamus*", Jurnal Pengabdian Masyarakat,: 2–5

Radot Manalu, (2018). *Pengolahan biji kakao produksi perkebunan rakyat untuk meningkatkan pendapatan petani,* Pusat Penelitian Perkembangan Ilmu IPTEK (PAPPIPTEK)-LIPI 99-111

Rainforest Alliance (2021). *Sustainable Agriculture Standard*.

Ramadhana, I. H., Suardi, I. D. P. O., & Dewi, R. K. (2021). *Peran yayasan Kalimajari dalam pendampingan sertifikasi kakao lestari di Kecamatan Melaya Kabupaten Jembrana.* Jurnal Agribisnis dan Agrowisata.

Rangkuti, F. (2016). *Analisis SWOT Teknik Membedah Kasus Bisnis*. Gramedia, Jakarta:

Soekartawi. (2002). *Prinsip Dasar Ekonomi Pertanian*. Raja Grafindo Persada, Jakarta:

Rompolemba, A., Meringgi, A. B., Melumpi, M. H., & Kolompo, S. A. (2025). Determinan partisipasi petani dalam skema sertifikasi kakao Rainforest Alliance di Kabupaten Poso. *Syntax Literate: Jurnal Ilmiah Indonesia*.

Siregar, T.H.S, S. Riyadi dan L. Nuraeni, (2010). *Budidaya Cokelat.* Penebar Swadaya. Jakarta.

Sulfiana, Deoni, A.S.A.R. and Ibrahim, H. (2022). *Pemberdayaan Petani Kakao Melalui Kegiatan Program READSI (Rural Empowerment And Agricultural Development Scaling-Up Initiative) (Studi Kasus di Desa Kalotok Kecamatan Sabbang Selatan Kabupaten Luwu Utara)*", Tarjih Agriculture System Journal, 02(1), 67–79.

Sugiyono, 2008. *Metode Penelitian Bisnis.* (Pendekatan Kuantitatif, Kualitatif dan R dan B). Penerbit Alfabeta, Bandung.

Sugiyono. (2018). *Metode Penelitian Kuantitatif dan Kualitatif dan R&G* (p. h. 8). Alfabeta.

St Sabahannur, Netty Syam dan Ervina, (2023). *Mutu fisik dan kimia biji kakao (theobroma cacao l.) Pada beberapa jenis klon,* Jurnal Program Studi Agribisnis, Fakultas Pertanian Universitas Muslim Indonesia, dan Program Studi Agroteknologi, Fakultas Pertanian Universitas Muslim Indonesia 7 (2) : 99-107.



Copyright at authors some right reserved this work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Tjahjana, B., dan Sobari, I. (2014). *Rehabilitasi Kakao Rakyat Dengan Sambung Samping. Sirinov* 2 (1): 48-53

Uswatun Hasanah, Sulfiana, Suardi Bakri, A Majdah M Zain, Helda Ibrahim, dan Kisman Awaluddin Arsyad, (2025). *Peningkatan Kapasitas Petani Kakao Melalui Program Bertani Untuk Negeri(Studi Kasus Petani Binaanyayasan Edu Farmers Internationa di Desa Kamarora, Sulawesi Tengah),* Universitas Islam Makassar Politeknik Pembangunan Pertanian Gowa, Jurnal AGRIFO10 (1): 42-54.

UTZ Certified (2020). *Code of Conduct for Cocoa*.

Windi Arihta Ginting, I.G. A.A. Ambarawati, Ida Ayu Listia Dewi, (2019). *Peranan Program Sertifikat Utz Terhadap Peningkatan Produksi Dan Pendapatan Petani Kakao Di Kabupaten Jembrana Provinsi Bali,* Program Studi Agribisnis, Fakultas Pertanian, Universitas Udayana, Jurnal Agribisnis dan Sosial Ekonomi Pertanian, 8 (2): 67-76

Yanto Trisman Gea, Sri Ariani Safitri, dan Syahbudin, (2023). *Analisis Pendapatan Dan Kelayakan Usahatani Kakao (Theobroma Cacao L.) Rakyat (Studi Kasus Desa Hilihambawa Kecamatan Gunungsitoli Idanoi Kota Gunungsitoli*). Program Studi Agribisnis, Fakultas Pertanian, Universitas Medan, 24 (2) : 62-69.

Yuda, W. A., Guritno, A. D., & Suyantohadi, A. (2025). Menelisik masa depan kakao berkelanjutan: Menjembatani kesenjangan kesediaan membayar konsumen di Indonesia. *Analisis Kebijakan Pertanian*.



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